



MINISTRY
OF
EDUCATION, YOUTH & INFORMATION
Every Child Can Learn, Every Child Must Learn

NATIONAL STANDARDS CURRICULUM

RESOURCE & TECHNOLOGY

GRADES 4 - 6



NATIONAL STANDARDS CURRICULUM GUIDE

GRADES 4-6

RESOURCE & TECHNOLOGY

© Ministry of Education, Youth and Information, Jamaica, 2018

A C K N O W L E D G E M E N T

Our connection with each other is unquestionable and so at the end of this arduous yet rewarding journey, the Ministry of Education, Youth and Information gratefully acknowledges the contributions of the following individuals and institutions who generously gave of their time and resources in the planning and development of the National Standards Curriculum (NSC):

- Mrs. Sharon Neil- former DCEO, Curriculum and Support Services, who provided leadership to the process during her tenure
- Mrs. Lena Buckle Scott- DCEO, Curriculum and Support Services, who provided leadership to the process
- Mrs. Patricia Britton – former Assistant Chief Education Officer, Technical & Vocational Unit, who started the process
- Mrs. Janice Latty-Morrison – former Assistant Chief Education Officer, Technical & Vocational Unit, who completed the process.
- Mr. Anthony Gray – Assistant Chief Education Officer, Technical & Vocational Unit
- Current and former Education Officers of the Technical & Vocational Unit and Resource persons who led the writing of the curriculum and gave oversight to the development process:

Industrial Education	Business Education	Home Economics Education	Agricultural Science Education
Mr. Roy Taylor, Senior Education Officer, Industrial Education	Mr. Conrad Valentine, Senior Education Officer Business Education	Mrs. Vivene Jones-Robinson, Former Senior Education Officer, Home Economics Education	Mr. Ruel Service Former Senior Education Officer, Agricultural Science Education
Mr. Everette Riley, Education Officer, Industrial Education	Mrs. Winsome Mills-Neil, Education Officer, Business Education	Mrs. Shereen Davy-Stubbs, Senior Education Officer (Actg), Home Economics Education	
Mr. Glenroy Hemmings (late) Education Officer, Industrial Education		Mrs. Maxine Hills, Education Officer, Home Economics Education	
Mr. Oneil Lalor Education Officer, Industrial Education		Ms. Judith Moore Education Officer, Home Economics Education	
Mr. Owen Wilson, Education Officer, Industrial Education			

- Principals/ school administrators, lecturers, teachers and other resources persons who participated in the writing process
- Principals and staff of the forty (40) pilot schools who facilitated the two years of curriculum piloting in their schools
- Regional Directors and Territorial Education Officers who contributed to the development and implementation of the curriculum
- The team of Mathematics and Literacy coaches and specialists led by Dr. Tamika Benjamin and Dr. Andre Hill respectively who participated in the writing and review of the Mathematics and Language Arts curriculum documents
- Consultants:
 - Ms. Lila Oliver, Ms. Mary Surridge, Mr. Brian Male and Ms. Wendy Pemberton for their guidance in the development and design of the curriculum
 - Dr. Sherril Gardner and Mrs. Herma Meade Thompson for guidance in the area of integration at Grades 1-3
 - Dr. Nancy George and Mrs. Diane Browne for work on the evaluation of the draft curriculum documents
 - The team of local reviewers
 - The team of international reviewers led by Professor Jari Lavonen, Dr. Kaisa Hahl and Dr. Mary Jean Gallagher
- Miss Jean Hastings, former Director of the Education System Transformation Programme, who during her tenure in the post facilitated the processes of the Curriculum Units
- Mrs. Winnie Berry and Mrs. Sophia Forbes Hall, former Senior Functional Education Officers of the Core Curriculum Unit who provided administrative and technical leadership to the development process
- Mrs. Michelle Kerr, Senior Functional Education Officer (Acting) and Mrs. Coleen Clarke Russell, Functional Education Officer who provided administrative leadership to the production process
- The members of the Curriculum Secretariat, the administrator and secretaries in the Core Curriculum Unit who provided administrative support during the development and implementation of the curriculum
- The team of curriculum editors led by Mrs. Taina Williams, Miss Keisha Hill and Dr. Donna Powell Wilson
- Curriculum formatter, Ms Janeille Flowers
- The various stakeholder groups, who provided valuable information on societal needs in relation to the curriculum
- All others whose names do not appear, but who contributed to the production of the NSC.

T A B L E O F C O N T E N T S

Title page	
Acknowledgement.....	iii
Table of Contents	v
Messages.....	vi
NSC Glossary of Terms	xii
Introduction to Resource & Technology.....	xiv
Philosophy of Resource & Technology.....	xvi
Rationale for Resource & Technology.....	xviii

GRADE 4

Agriculture & the Environment	1
Family & Consumer Management.....	8
Business Basics.....	17
Engineering and Mechanisms.....	29

GRADE 5

Agriculture & the Environment.....	40
The Family & Consumer Management.....	48
Business Basics.....	60
Engineering and Mechanisms.....	71

GRADE 6

Standards for Resource & Technology.....	81
Agriculture for Sustainable Development.....	83
Business Basics.....	88
Early Entrepreneur.....	90
The Family & Consumer Management.....	102
Engineering and Mechanisms.....	112

Appendices

Resource & Technology Glossary	123
Business Basics Glossary Grade 4.....	124
Business Basics Glossary Grade 5.....	125
Business Basics Glossary Grade 6.....	126
Business Basics Early Entrepreneur Glossary.....	128
STEM and the NSC.....	129
NSC: The 5Es.....	133

Lesson Plans: Grade 4.....	137
Lesson Plans: Grade 5.....	143
Lesson Plans: Grade 6.....	148

Strategies for the Delivery of Resource & Technology.....	157
Aims of the Design Process.....	161
Assessment & Record Keeping.....	162
Record of Assessment of Learning Outcomes.....	163



Education has always been pivotal to societal and economic development. It is for this reason that Jamaica remains unshaken and hopeful of a realized vision to be “the place of choice to live, work, raise families and do business.” The assurance of the possibility of all that such a vision entails comes from the recognition that Jamaica is endowed with tremendous God-given talent and creative potential and as a people of strong faith in spiritual principles and resilience; we are able to harness our capabilities, to make significant influence on the world. It is through this new National Standards Curriculum (NSC) that we hope to propel this vision of the education system whilst becoming more relevant, current and dynamic.

The team at the Ministry of Education Youth and Information is cognizant of the fact that the curriculum is the heart and mind of education and remains the most powerful means by which any country can develop and be sustainable. It is for this reason that the NSC has been designed with the understanding that people, learning and national development are at the core of our existence in a time of rapid change in the physical, social, economic and other dimensions of the global landscape. As a consequence, we celebrate the wisdom of the developers who through the engagement of numerous stakeholder groups, have responded favourably to the need for that kind of education that prepares our young people for life; while challenging our more mature to join in this lifelong journey of learning to learn.

Our commitment to the development of each learner and our support and appreciation of the various stakeholder groups that are partnering with us in providing quality education, remain at the forefront of our efforts in ensuring that this journey transforms education. This commitment is conveyed through our adoption of a

Pathway Approach to learning that demands of us to provide customized programmes, differentiated learning experiences and specialized support for our learners. Our actions have been fruitful as is evident by the systems and conditions we have put in place for successful implementation.

Like the rest of Jamaica, I look forward to the testimonials of students, parents, teachers and other stakeholders of the empowering effect of this learner-centred curriculum and remain confident that it will contribute to make Jamaica renown.

The Honourable, Senator Ruel Reid, CD

Minister of Education, Youth & Information



Building a modern society where young people can prosper and achieve their aspirations is paramount on the Ministry of Education, Youth and Information's (MoEYI) agenda. In its bid to advance this agenda the team at the MoEYI has developed the National Standards Curriculum (NSC) on a clear set of values that will permeate learning and become embedded in young people's approach to life. Young people need to be clear about their Jamaican identity. Justice, democracy, tolerance and respect need to be more than mere words; they need to become an essential part of people's lives. Young people's understanding of, and commitment to, sustainable development is critical to the future of Jamaica and of the world. These values that permeate the new curriculum and more importantly, will by its use, be ingrained in the fabric of the Jamaican society.

The development of a new curriculum is a major achievement in the life of any country. It is even more noteworthy because this curriculum embodies the set of knowledge, skills, values and attitudes that our country deems relevant at this particular time. It is intended that these attributes be conveyed to the next generation as a means of cultural continuity in preparation to cope with the future, both nationally and individually.

I am particularly excited about the prospects of the NSC honing key twenty-first century skills such as communication, collaboration, critical thinking and creativity in our youth as they prepare to take on their roles as global citizens. I encourage parents, students, teachers and indeed the community to partner with us as we prepare our young people not just for today, but for the rapidly changing times ahead.

The Honourable, Floyd Green, MP

State Minister in the Ministry of Education, Youth & Information



In responding to the challenges confronting education in Jamaica, The Ministry of Education Youth and Information has taken strategic measures to address the need for a national curriculum that is relevant for the 21st century, the dynamics of the Jamaican context and the profile of the learners at the pre-primary, primary and secondary levels. One major output of these strategic actions is the National Standards Curriculum. This curriculum is intended to be one of the means by which the Jamaican child is able to gain access to the kind of education that is based on developmentally-appropriate practice and the supporting systems and conditions that are associated with high quality education.

This curriculum has the potential to inspire and provide challenges in the form of problem situations that all our learners can handle in ways that are developmentally appropriate. It compels us to move beyond the traditional functional perspectives of being literate to a focus on the physical and physiological as well as the ethical, social and spiritual.

I invite all our stakeholders to fully embrace this new curriculum which promises to excite imaginations, raise aspirations and widen horizons. Learners will become critical and creative thinkers with the mindset required for them to be confident and productive Jamaicans who are able to thrive in global settings as they take their place in the world of uninhibited change.

Mr. Dean Roy Bernard

Permanent Secretary , Ministry of Education, Youth & Information



It was the mandate of the Curriculum Units of the Ministry of Education, Youth and Information to spearhead the crafting of a new curriculum for the nation, in keeping with international standards, global trends in the educational landscape and societal goals and aspirations. The mandate had several facets: to establish clear standards for each grade, thereby establishing a smooth line of progression between Grades from 1 to 9; to reduce the width, complexity and amount of content; to build in generic competencies such as critical thinking across the subjects; to ensure that the curriculum is rooted in Jamaica's heritage and culture; to make the primary curriculum more relevant and more focused on skills development, and to ensure articulation between primary and secondary curricula, especially between Grades 6 and 7. To achieve this, the MoEYI embarked on an extensive process of panel evaluations of the existing curricula, consultation with stakeholders, (re)writing where necessary and external reviews of the end products.

Today, we are indeed proud that, the curriculum development teams have succeeded in crafting a curriculum which has met these expectations. Under the National Standards Curriculum (NSC) focus will be given to project-based and problem-solving learning, with an integration of Science, Technology, Engineering and Mathematics/Science, Technology, Engineering, Arts and Mathematics (STEM/STEAM) methodologies across the system. Learners will benefit from more hands-on experiences which should enhance the overall learning experience and cater to the different kinds of learners in our classroom. In addition, they will be exposed to work-based learning opportunities that will help them become productive citizens of Jamaica and the world at large.

It is anticipated that as school administrators and teachers system-wide implement the National Standards Curriculum that improvements will be evident in the general academic performance, attitude and behaviour of our students.

We anticipate the participation of all our stakeholders in this process as we work together to improve the quality of life and prospects for all the children of Jamaica and to realize our mantra that *every child can, and must, learn*.

Dr. Grace McLean

Chief Education Officer, Ministry of Education, Youth & Information



The Ministry of Education Youth and Information (MoEYI) is committed to providing high quality education to all Jamaican children. We have heard the cries from the various sectors of the Jamaican society about the level of preparedness/readiness of our students for life in the 21st century; and we are taking the necessary steps to ensure that our students graduate with marketable skills. The MoEYI has reviewed and redesigned the Grades 1-9 curricula around the principles of Vision 2030 Goal number one; “Jamaicans are empowered to achieve their fullest potential”.

The National Standards Curriculum (NSC) will lay the foundation for students by preparing them for working lives that may span a range of occupations, many of which do not currently exist. This has been done by way of designers carefully integrating the theoretical principles of Science, Technology, Engineering and Mathematics/Science, Technology, Engineering, Arts and Mathematics (STEM/STEAM) methodologies into the curricula at all grade levels. The NSC illustrates that in order to make education effective for our 21st century children; we need to change how we teach, and what we teach.

We are satisfied that the curriculum designers and writers have produced a curriculum that is indeed fitting for the 21st century. The NSC was designed to develop students’ understandings of subject matter and their ability to apply what is learnt; it fosters their ability to communicate and solve problems collaboratively, think critically and create novel solutions.

The success of our children is dependent on the participation of all stakeholders in the learning process. We encourage you all to be our committed partners in education as the true impact of this curriculum will only be felt when we have all hands on board. I am indeed proud to be associated with the development and implementation of this curriculum; it will inspire hope in our nation and future generations; kudos to the various teams that contributed to its development.

Mrs Lena Buckle Scott

Deputy Chief Education Officer,

Curriculum and Support Services, Ministry of Education, Youth & Information



The 21st century has challenged countries to provide quality education for all. The key challenge to this paradigm is how to develop and sustain an education structure and system that will prepare citizens to compete in the knowledge based economy.

With the paradigm shift in our labour force demands, greater emphasis is being placed on how teaching and learning takes place in our schools. This is with a view to build 21st Century skills among our students who will in a few years join our workforce at different levels. In a bid to ensure that these objectives are met, adjustments and inclusions to our curriculum at the primary level is paramount for the transformation to be effective.

For the first time in our education system, Technical and Vocational Education and Training (TVET) is being integrated at the primary level through the Resource & Technology programme. The Resource & Technology Curriculum emphasizes a project based learning approach that has been adopted to introduce content, skills and attitudes and to ensure authentic learning activities that engage students' varying interests and motivation.

The aim of Resource and Technology at this level is to foster students' awareness of foundational technical skills and their relationship to future careers and occupations. The discrete introduction of this program at Grades 4-6 proposes that students be engaged in the development of projects which will provide them with the opportunity to build foundational Technical and Vocational skills in a real life context. This inclusion not only provides progression to the upper secondary Technical Vocational programmes, but reflects awareness of our national needs.

With these benefits in mind, an inclusion of a Resource & Technology programme at our primary education level and the revision of the secondary programme is fully endorsed and supported.

Mr. Anthony Gray

Assistant Chief Education Officer,

Technical and Vocational Unit, Ministry of Education, Youth & Information

TERMS	DEFINITIONS/MEANINGS
Range of Content	Provides an overview of the concepts, knowledge, skills and attitudes that will be developed in a unit of study.
About the Unit	Gives a brief overview of the content, skills and methodologies that are covered/ used in the unit as well as the attitudes to be developed.
Standards	Statements that explain what all students are expected to know and be able to do in different content areas by the end of a course of study e.g. by the end of period spanning grades 4 – 9.
Attainment Targets	An attainment target is a desired or expected level of performance at the end of a course of work, within a given/specified teaching- learning period. Attainment targets identify the knowledge, skills and understanding which students of different abilities and maturities are expected to have by the end of each Grade. It is the standard that we expect the majority of children to achieve by the end of the grade.
Benchmarks	Behaviours students are expected to exhibit at different stages of development and age/grade levels.
Theme/Strands	Unifying idea that recurs throughout a course of study and around which content, concepts and skills are developed.
Prior Learning	It is what students are expected to already know through learning and experience about a topic or a kind of text.
Specific Objectives	Specific objectives state what the student is expected to know or understand as a result of the learning experience. The specific objective is usually framed in the areas of the knowledge, skills and attitudes that the students are expected to achieve. Specific objectives tell us what the children will learn or will be taught.
Suggested Teaching/Learning Activities	A teaching/learning activity is an organised doing of things towards achieving the stated objectives. They are suggested activities that are crafted in a way to be an efficient vehicle which can move the student between what is to be learnt (objective) and what the student is to become (outcome).
Key Skills	Indicate the important skills that students should develop during the course of a unit. Key skills are aligned to the suggested teaching and learning activities in the unit which are intended to develop the skill to which it is aligned. Included in the key skills are the 21st century skills such as critical thinking and problem solving, collaboration, communication and ICT.

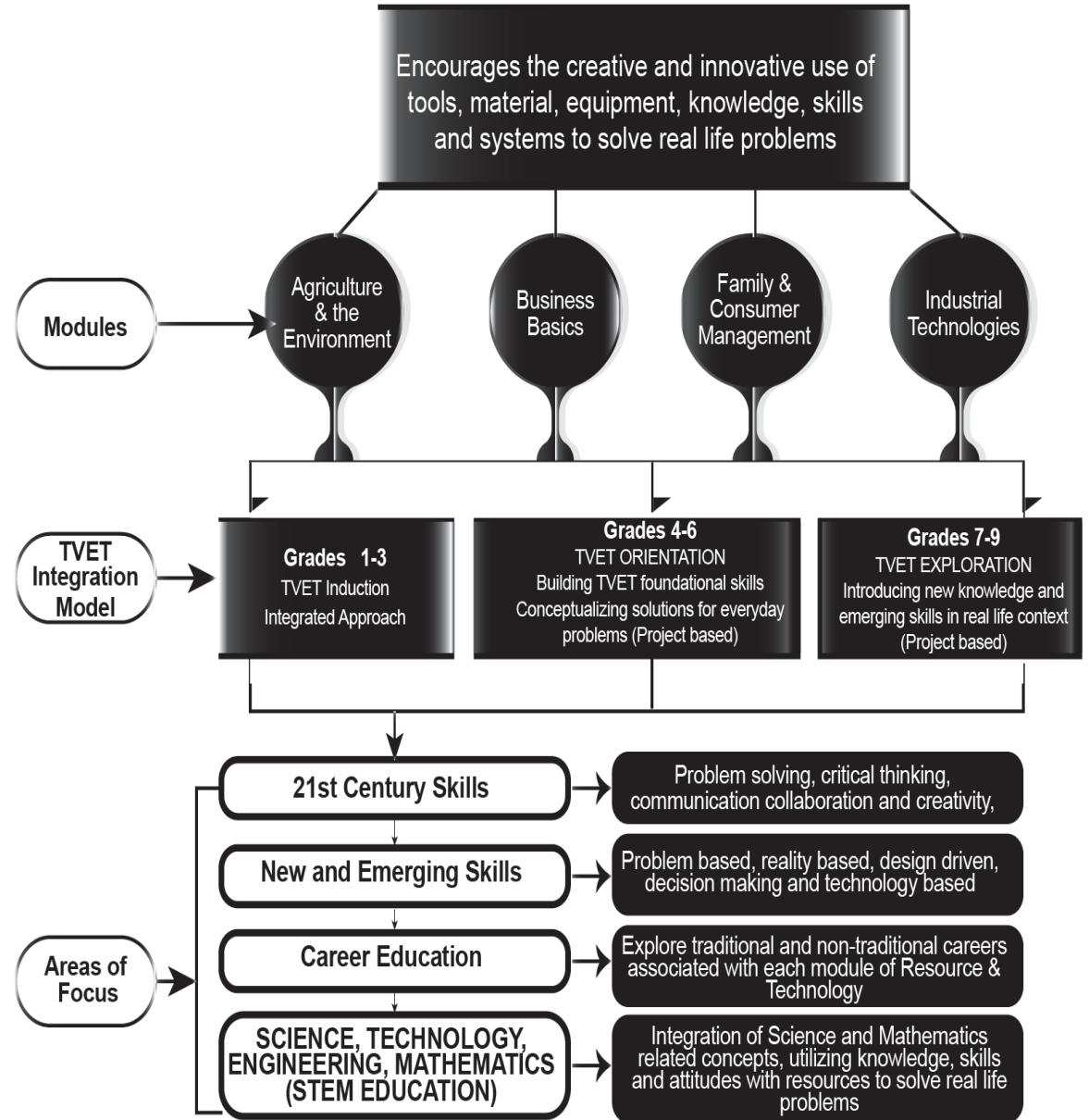
TERMS	DEFINITIONS/MEANINGS
Assessment	<p>An assessment is a determination of whether intended results have been achieved. This section of the curriculum speaks to both the product that will be judged as well as the criteria against which it will be judged. It must be noted that this section does not introduce new activities. Instead, it speaks to the judging of the suggested teaching and learning activities</p> <p>Formal assessment may be conducted with the aid of instruments (e.g. via written test, portfolio) or by requiring students to complete assigned tasks (e.g. performance), and is usually recorded against a pre-determined scale of grading. Informal assessment (e.g. via observation or spontaneous student expression) may also reveal important evidence of learning.</p>
Points to Note	<p>This section provides technical information that must be considered in delivering the unit. It may also include information that provides additional explanation of key concepts that may be unfamiliar to the teacher as well as suggestions for infusion within the unit.</p>
Extended Learning	<p>These are opportunities for students to utilise the knowledge and skills they would have acquired in the unit in authentic situations/experiences.</p>
Learning Outcomes	<p>A learning outcome is a demonstration/ behavioural evidence that an intended result has been achieved at the end of a course of study. The learning outcome tells us if pupils have understood and grasped what they have been learning.</p>
Links to other Subjects	<p>Suggests opportunities for integration and transfer of learning across and within different subject areas.</p>
Key Vocabulary	<p>This section consists of a number of words/phrases that addresses the skills, topics and content that must be covered in the unit.</p>

This first edition of the Resource & Technology Curriculum/Teachers' Guide has been developed as a working document for teachers at the Primary level of the education system. The subject is being introduced at the primary level for the first time and is a pre-cursor to the Grades 7-9 Resource and Technology programme.

The project-based learning approach has been adopted to introduce content, skills and attitudes and is the instructional approach built upon authentic learning activities that engage student's interest and motivation. At Grades 4-6 content is presented using real life contexts resulting in practical outcome based activities. Students will have the opportunity to learn new knowledge and develop new and emerging Technical and Vocational skills.

The practical application of Science, Technology, Engineering and Mathematics (STEM) education/ concepts is being emphasized to ensure that students at this early stage develop an understanding of the importance of integrating these knowledge and skills in the Technical and Vocational programmes. The 'E' **Engineering Design Process**, a problem solving approach which is used in Resource and Technology is

Resource & Technology

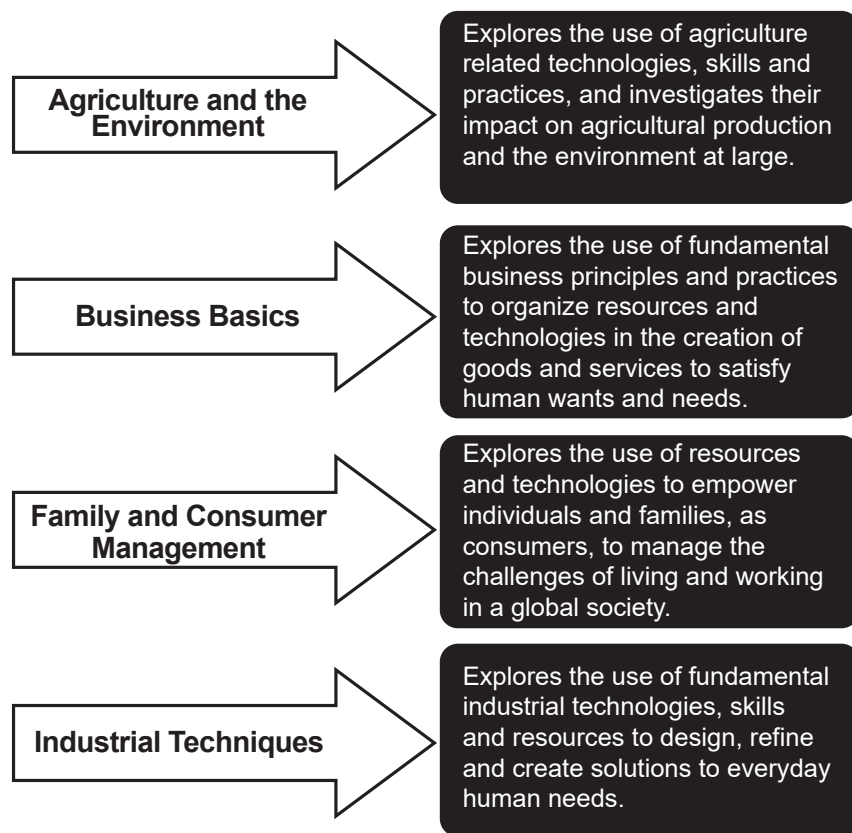


standard and prescriptive and is the methodology for teaching the subject. This should ensure that similar concepts are learned by all students in all schools irrespective of the nature of the projects selected.

The activities outlined are suggestions and are provided to stimulate further creative ideas for activities as each school context is different in terms of availability of resources and problems to be solved.

Resource and Technology is a single subject spanning the breadth of technical and vocational foundational competencies. Content is organized in four modules with each providing its own specialized knowledge and skills, which are integral to the understanding of how resources and technology are utilized in meeting needs and solving problems experienced on a daily basis.

Module Synopses



Justification for the Modules of Resource and Technology

The modules of Resource and Technology represent areas of study through which appropriate knowledge, skills and attitudes can be achieved by students at the Grade 4-6 level. Each module has content peculiar to a technical and vocational discipline, but they all embrace technology as the main concept of understanding and utilizing skills and resources.

The four modules provide a pool of knowledge which forms the basis for the progression from primary to secondary and more definitive technical and vocational pursuits.

Contribution to the competencies

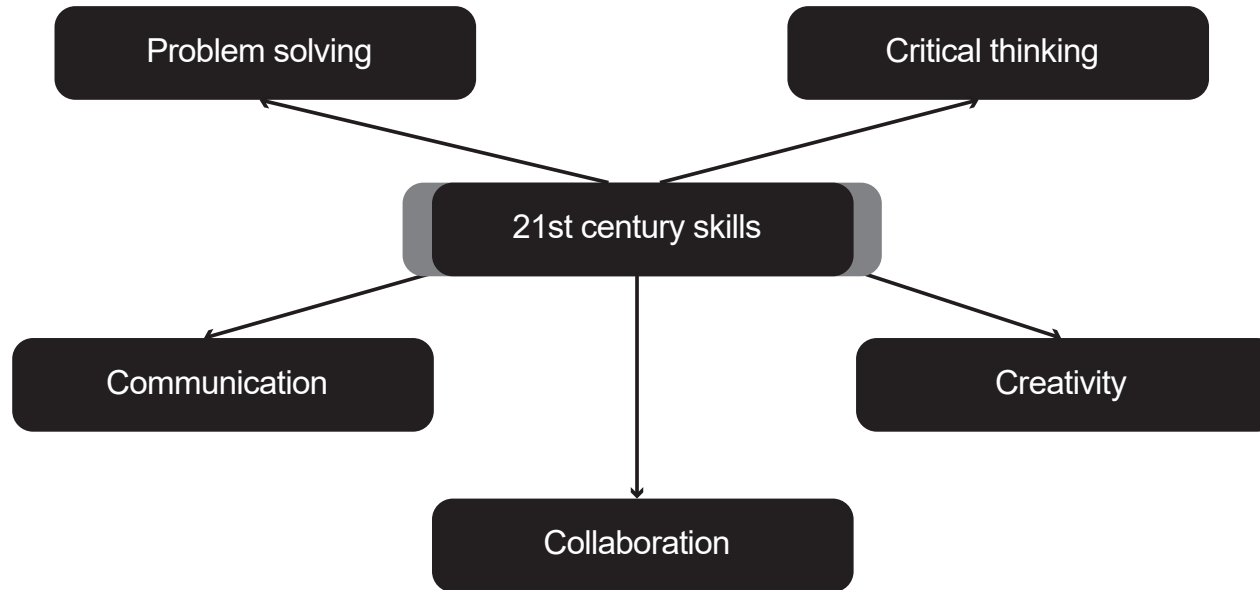
Resource and Technology contributes to all three of the framework competencies (learner centredness, STEM and project based learning). The subject contributes to the development of investigative, problem solving, critical thinking skills and evaluating solutions. It will also provide the opportunity for students to acquire crucial attributes of unity, cooperation, community, peer appreciation and tolerance.

*At the primary level Industrial Techniques is referred to as Engineering and Mechanisms

Technical and Vocational Education in Jamaica has embarked on a new era in the twenty-first century. New and emerging careers are being introduced at a rapid pace and most jobs require a technological background and an understanding of processes to create solutions to the many challenges experienced in the world. If Jamaica is to be a part of the high-tech global market place, the workforce must possess the requisite competencies. To achieve our goal of producing students with the desired technological competencies, attitudes and theoretical knowledge to participate in the international marketplace, technical and vocational education must be seen as the vehicle. We must begin by exposing our learners at the beginning grades to understand, appreciate and develop skills to create solutions to real life problems. It is for this reason that the Ministry of Education has integrated Technical and Vocational skills in the Grades one to three curriculum and the revised Resource and Technology programme is being introduced as a discrete discipline from as early as Grade 4 to provide students with knowledge to use a range of materials and gain appropriate skills to use tools and equipment efficiently.

The emphasis of the Resource and Technology programme is on 'problem solving' which should unearth the potential of learners so that they can become originators of solutions rather than adapters of solutions. We also believe that an understanding of processes involved in creating a solution or system is critical to the outcome. As part of a global community we must ensure our students develop skills to conceive, plan, design and create solutions which can compete with others goods and services and meet the needs of the consumer. The opportunity must also be provided for learners to utilize available resources at their disposal to create solutions. This will result in greater appreciation and utility of our local and indigenous resources. Students will develop confidence in using them to create solution to everyday problems and assist in using foreign exchange to acquire those items we cannot produce locally.

The Resource and Technology programme is not gender-biased and is designed for learners of all ability levels and socio-economic groups. However, one of the most important features is that it encourages students to work collaboratively in search of solutions to everyday problems. This is a desirable focus that we believe should help students develop critical skills which will be reflected in their lives as they contribute to the productive sector.



Skills of the 21st Century Learner

The inclusion of Resource and Technology as a core subject in the National Standards Curriculum for Grades 4-6 can be justified as it:

- aims to meet the needs of students
- provides for progression to upper secondary
- reflects awareness of national needs

The decision to introduce the Resource and Technology programme at Grades 4-6 as a discrete subject is based on MoE's Policy Priority 2012; Integration of TVET in the education system. The TVET Integration Model proposes that students at Grades 4-6 be engaged in the development of projects which will provide them with the opportunity to build foundational Technical and Vocational skills in a real life context. They will conceptualize and create solutions for everyday problems e.g. design and make functional items, fashion accessories, create simple agricultural projects and explore opportunities for businesses.

Aim of Resource & Technology

The aim of Resource and Technology at this level is to foster students' awareness of foundational technical skills and their relationship to future careers and occupations. In a project-based format students use the design process for problem solving in a range of technology based design contexts.

Range of activities

Students will be exposed to a range of activities through the various projects. Projects are designed to help students:

- Develop imaginative and innovative solutions to real life problems
- Use the elements and principles of design to create design solutions to problems
- Learn to control the elements/factors appropriate to the project
- Understand the relationships between materials, systems and processes
- Develop an understanding and the use of technological skills through processing and manipulation of tools and equipment
- Explore the use of physical materials found in the environment to solve practical problems
- Work individually to execute tasks and projects
- Understand the importance of hygiene and safety in the use of resources
- Conserve resources in the environment
- Develop skills to manage and operate a business enterprise
- Evaluate the success of their solutions and processes
- Learn through their senses
- Make informed choices within their environment and set personal goals
- Develop an awareness of career opportunities
- Participate in lifelong learning
- Understand the application of Science and Mathematics content to solving problems

NATIONAL STANDARDS CURRICULUM GUIDE

GRADE 4

RESOURCE & TECHNOLOGY



GRADE 4

RESOURCE & TECHNOLOGY

AGRICULTURE & THE ENVIRONMENT **CURRICULUM GUIDE**

AGRICULTURE FOR SUSTAINABLE DEVELOPMENT

AIM OF RESOURCE AND TECHNOLOGY

PROJECT: CREATE AN ORNAMENTAL GARDEN

The aim of Resource and Technology integration at this level is to foster students' awareness of foundational technical skills and their relationship to future careers and occupations. In a project-based format students use the design process for problem solving in a range of technology based design contexts. This exposure will continue to be articulated seamlessly into Resource and Technology at the grades 7-9 level.

AIM OF PROJECT

The aim of the project is to help students to develop an appreciation for aesthetics pleasure. Additionally students should develop skills to create simple gardening skills.

RANGE OF CONTENT

The range of content is project specific and covers key concepts, skills, knowledge and attitudes students will learn in this project will include:

- Key concepts and terms related to creating an ornamental garden.
- Parts of the plant relevant to their roles in a garden (e.g. flower or foliage)
- Plants in the local environment which may be suitable for creating an ornamental garden.
- Some common ornamental plants and their methods of propagation (e.g. seed, cuttings, bulbs, corms, rhizome)
- Selection of available resources which may be suitable to create a border for the ornamental garden.
- Environmental impact of creating the ornamental garden
- Growing media for ornamental gardens
- Tools and materials required to prepare/create an ornamental garden
- Planting material for a new ornamental garden (e.g. seeds, seedlings, suckers, bulbs, cuttings)
- The use of direct soil or containers in the ornamental garden
- Area for aquatic life (if used)
- Placing plant materials in rooting medium (soil, sand, coir, saw dust, wood shavings, water) in garden, according to design
- Aquatic life in their containers (if used)
- Optimal conditions for growing plants (moisture, temperature, light and aeration)
- Garden borders
- Work as a member of a group
- Careers/occupations associated with ornamental gardens
- Outcome of project against targets

Prior to the lesson, the teacher should:

- scope the lesson for time of delivery, so that, prior preparation can be made as necessary
- review literature on the project/topic
- collaborate with fellow Grade 4 teachers
- appraise Principal and relevant senior staff about requirements to articulate the projects
- seek the assistance of parents and other community stakeholders as needed
- consider forming student groups, and allow group dynamics which foster leadership and follower-ship skills
- where possible, solicit the assistance of the grounds staff to assist with logistics
- get some ideas of source suitable range of plant materials/seed prior to the start of the project
- identify available and suitable planting materials to create the ornamental garden
- determine costs of items which may have to be purchased
- recognize that some planting materials may have to be prepared prior to class time
- plan how to effectively ensure that each student participates meaningfully
- critique real-world applications using graphics such as videos, still picture, data set
- be prepared to highlight skills and related careers-direct and indirect (e.g. use 'Rich Picture' model)
- ensure a safe working environment (e.g. considerations for use of tools, insecticides, fungicides, chemicals, wet surfaces, prickly plants, harmful plant saps)

SCIENCE

- What is Ornamental Garden
- What are ornamental plants
- Name ornamental plants
- Parts of ornamental plants
- Parts of the plant that can be used to create an ornamental garden
- Parts of an Ornamental Garden
- Benefits of ornamental garden to the surrounding
- Suitable conditions needed for plant growth

MATHEMATICS

- Make a budget for establishing the garden
- Calculate the number of plants needed to create the garden
- Calculate the quantity of resources required to establish the garden
- Measure the space to be used for establishing the garden
- Make time table of all the activities
- Check the number of plants that grow and use the result for simple calculations

WHAT IS BEING ASSESSED?

Knowledge and skills required to create an Ornamental Garden using available resources.

TECHNOLOGY

- Skills – Measuring, cutting, designing, weeding, tilling, labeling, writing, calculating
- Equipment – garden forks, shovels, cutlasses
- Skills in using simple garden tools

'E' DESIGN PROCESS

- Identification of problem to be solved
- Problem statement created
- Ideas for solving problem generated
- Idea(s) of possible solution selected
- Plan activities/procedure to create the garden
- Implementation of planned procedure
- Look at the outcome of the project
- Presentation of results (tell how the garden looks)

AGRICULTURE FOR SUSTAINABLE DEVELOPMENT:

Focus Questions:

1. Why are ornamental gardens important?
2. What are the factors to be considered in establishing and maintaining ornamental gardens?

STRAND 1:**Creativity and Innovations**

Students will be able to apply design principles to create an ornamental garden from use of available resources

STRAND 2:**Explore Methods & Procedures**

Students will be able to utilize methods and procedures to develop a garden, and determine from a range of options the design and the plans to create an ornamental garden.

STRAND 3:**Apply Solution**

Students will be able to apply the appropriate gardening techniques and design principles to create an ornamental garden.

STRAND4:**Career Pathways**

Students will be able to demonstrate awareness of a range of careers related to ornamental gardening.

OBJECTIVES:

The student will

- define an ornamental garden
- discuss reasons for creating ornamental gardens
- develop possible designs solution for an ornamental garden for the selected site/location
- select from a range of possibilities, the most suitable plants for creating an ornamental garden
- discuss alternative ways to create an ornamental garden
- describe the processes involved in creating an ornamental garden
- outline the steps to be taken in creating an ornamental garden
- select appropriate materials and tools to create the designed ornamental garden
- follow instructions and carry out steps necessary to create the ornamental garden
- manipulate selected tools and materials efficiently to create the ornamental garden
- perform safe and hygienic use of tools and materials in creating an ornamental garden
- demonstrate ability to work as part of a team
- evaluate success in creating the ornamental garden
- discuss the importance of an ornamental garden to the environment
- discuss enjoyable activities experienced in creating the ornamental garden
- identify personal strengths, interests and abilities observed in the exercise to create the ornamental garden
- discuss some jobs/careers that may be related to ornamental gardening.
- Identify personal strengths, interests and abilities observed in the growing of selected vegetables

Suggested Teaching and Learning Activities

Key Skills

Assessment Criteria

Students will:

- Conduct a tour of the school environment and recommend strategies for improving ethos or beautifying the school environment
- Collect pictures of ornamental gardens and present to class for discussion on the designs, types of plants used and purposes
- Guided by teachers choose an appropriate location for the garden
- In groups, develop creative layout/designs and environmental compatibility for the proposed garden to enhance ethos of environment considering factors such as, available resources, aesthetics, elements of design, security, best use of resources, sustainability, cost, number of plants needed for different designs, soil conservation, health/recreational functions.
- Make a list of the resources to be used to create the ornamental garden considering a range of available plants, tools, and other resources required
- Identify sources of the resources to create the ornamental garden
- Use a spreadsheet/table software to prepare a list of resources to create the ornamental garden
- Work in group to layout the garden using the resources procured
- Use tools and other materials to establish plants and other facilities in the garden according to establish design
- Use available resource e.g. stones, picket fencing to establish garden border
- Use writing materials to create labels to name types of plants and install in garden.
- Use recording device to capture images/sounds of students' preparation of the garden
This can be played back after the completion of the project for discussion regarding processes for creating garden and health and safety practises.
- Use image capturing device to take photo of the garden
- Carry out the necessary cultural practices e.g. removing weeds, fertilizing, watering, removing insects until the garden is fully established
- Assisted by teacher, use rubric to evaluate outcome of project against stated goals

- Assess and evaluate school environment
- Research to define terms
- Research types of plants for ornamental gardens in Jamaica
- Brainstorm to make select
- Design and make plot
- Discuss and make selection
- Observe processes
- Measure accurately
- Cut precisely and safely
- Perform simple mathematical operations
- Demonstrate methods of planting, weeding, watering, insect control
- Write legibly
- Spell correctly
- Evaluate solution
- Operate electronic devices

Design for ornamental garden created and developed effectively against core criteria

Appropriate resources for garden selected

Ornamental Garden established successfully against key project criteria

Project evaluated against criteria to determine success

Learning Outcomes

Students will be able to:

- ✓ Perform safe and healthy practices related to gardening functions
- ✓ Select appropriate materials and tools to create an ornamental garden
- ✓ Perform mathematical functions to design and create an ornamental garden
- ✓ Know the procedures and processes for preparing an ornamental garden
- ✓ Establish and maintain an ornamental garden

Points to Note

- The teacher should research the project prior to implementation
- Teacher may need to prepare/procure some resources prior to project
- Plants to be used may include those that the students (and teacher) can find in the community
- Knives used in gardening are sharp, so materials should be cut for the students
- It is essential that solid media for rooting be loose to allow circulation of air, be able to hold moisture
- Try to use as many different plants as possible, to enrich the experience for the students, while creating an aesthetically pleasing ornamental garden.

Extended Learning

Students practice various processes/techniques in creating ornamental gardens at home/community

Resources

Resources may include:

- Natural Resources: suitable location for garden, planting medium (e.g. soil, sand, peat) various readily available garden plants/flower seeds/planting material such as: Easter lilly, marigold, Moses in the basket, dahlia, zinnia, balsam, Joseph coat, gladiola, water, stones
- Man-made Resources: gardening tools, plastic bags for collecting plant specimen, boxes, bottles, knife, secateurs, pruning sheer, flower pot, poly bags/polyethylene plastic cover, ruler, watering cans, water hose, hand spade, hand fork, labels and markers, white lime; computer with spreadsheet software, recording device, image capturing device and any other available technologies.

Key Vocabulary

- Ornamental
- Aesthetics
- Environment
- Sustainability
- Parent plant
- Cutting
- Rooting medium
- Node
- Internode
- Secateurs
- Stem
- Setting
- Flowering plant
- Stem cutting
- Plant propagation
- Collaboratively/collaboration



GRADE 4

RESOURCE & TECHNOLOGY

FAMILY AND CONSUMER MANAGEMENT CURRICULUM GUIDE

THE FAMILY AS A CONSUMER | The Environment and Me

SCIENCE

- Effects of pollution as a result of improper disposal of waste
- Recycling and its link to pollution in the environment
- Parts of a flower and their function
- Recycling waste material.

MATHEMATICS

- Basic calculation and computation of collected recyclable items
- Measurement of recyclable materials to create flowers, vase and floral arrangements.
- Using basic geometry shape to design a floral arrangement

Floral arrangements
made from recyclable
materials

TECHNOLOGY

- Manipulation and use of tools and equipment in creating floral arrangement.
- Use of computer for research and information processing
- Demonstrate skills in
 - cutting, binding and pasting material for creating stems and flowers
 - assembling of flowers and floral arrangement
- Observe safety procedures when using cutting tools

'E' DESIGN PROCESS

- Discuss potential problems to the environment as a result of improper disposal of waste.
- Generate creative ways of solving the problem of environmental waste
- Decide on the most appropriate materials to use to create floral arrangement.
- Make petals and stem from recyclable materials.
- Create floral arrangement and vase.
- Evaluate the finished product.
- Display floral arrangement in a public area.

AIM OF RESOURCE AND TECHNOLOGY

The aim of Technical Vocational Education Training (TVET) integration at this level is to infuse the Technical Vocational standards to foster students' awareness of foundational technical skills and their relationship to future careers and occupations. In a project-based format students use the design process for problem solving in a range of technology based design contexts. This exposure will continue to be articulated seamlessly into Resource and Technology at the grades 7-9 level.

RANGE OF CONTENT

RANGE OF CONTENT are project specific, and cover key concepts, skills, knowledge and attitudes students will learn in Resource & Technology at Grade 4.

- Environmental problems caused by improper waste disposal
- The importance of recyclable to the environment
- Classifying and sorting recyclable materials
- Types of recyclable materials that can be used to make flowers
- Tools and materials used in floral arrangements
- Steps in using recyclable materials to make the different parts of a flower
- Procedures for making artificial flower
- Basic floral arrangements
- Careers in floral arrangement

About the Project

In the articulation of this project, students will design and make artificial flowers from a range of recyclable materials e.g. card board, paper, fabric, straws, and wire and use these flowers to create floral arrangements. The floral arrangements should provide decoration and improve the aesthetics of homes and offices while reducing waste and damage to the environment.

Prior Learning

Students would have been exposed to both natural and artificial flowers in their environment. In addition, they would rely on their scientific knowledge gained about the parts of a flower.

Focus Question 1:

How can I convert waste material into treasure?

STRAND 1 : CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Through a project based approach students will be able apply creativity and innovation to designing solutions to the problem of environmental waste

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Through a project based approach, students will be able to explore methods and procedures in solving problems relating to environmental waste

STRAND 3 : APPLY SOLUTION

ATTAINMENT TARGET 3

Through a project based approach, students will be able to apply appropriate strategies to converting recyclable materials into floral arrangements

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Through a project based approach students will be able to identify skills related to a range of Career Pathways in floral arrangements

THEME: Planning and Organizing My Business

ICT ATTAINMENT TARGETS:



Use technology to communicate ideas, information and understandings for a variety of purposes.



Use technology to design and produce multimedia products to demonstrate their creative thinking.

MATHEMATICS STANDARDS:

Measurement: Use the correct units, tools and attributes to estimate, compare and carry out the processes of measurement to given degree of accuracy.

TECHNOLOGY STANDARDS:

Students will develop an understanding of the characteristics and scope of technology..

SCIENCE STANDARDS:

Exploring science and the environment : Understand the scientific process, and the impact of air and water on the environment, and on our everyday life

OBJECTIVES:

- Discuss the importance of recyclable to the environment
- Identify ways to solve problems associated with environmental waste
- Collect recyclable materials suitable for making flowers and floral arrangement
- Identify tools and materials used in floral arrangements
- Demonstrate ways in which recyclable materials can be used to create flowers
- Identify the parts of a flower
- Design and make artificial flowers from recyclable materials
- Create a floral arrangement for public areas
- Mount environmental campaigns
- Evaluate floral arrangements against design criteria

Teaching and Learning Activities 11 weeks

Key Skills

Assessment Criteria

Attainment Target 1: Creativity and Innovation

Students will:

Read articles or watch videos on the state of the environment, and discuss potential problems to the environment as a result of waste. Discuss innovative and creative ways of solving the problem of environmental waste.

Using the KWL chart, brainstorming what they know about recycling and its links to pollution, what they would like to know and what they would like to do to help. Watch a video or read an article and discuss the importance of recycling to the environment. At the end students will complete the 'what they have learnt' section of the chart.

Go on a recycling treasure hunt around the school and collect materials for recycling. (Treasure hunt can be extended to the home where students are asked as homework, to bring recyclable materials from home). Mount a display of the recycled materials in class. From this display students will identify and classify various types of recyclable materials and create an inventory of recycled materials.

Choose to write a song, poem, perform a skit, draw or make a poster about recycling and the environment (this is to cater to the multiple intelligences). Students can use the computer and internet in researching information and in preparing the creative piece e.g. makes posters.

- Observe
- Analyse
- Create
- Identify
- Creative thinking
- Innovation
- Collect
- Assembly
- Research
- Sketch
- Record
- Write
- Evaluate
- Design
- Create
- Illustrate
- Analyse
- Interpret

Evaluate the project outcome.

Assess list of tool and equipment for project

Assess assembling of the parts of the flower.

Assess floral arrangement.

Assess creative piece – songs, poems etc.

Student's oral presentation about recycling and the environment.

Evaluate creative pieces

Attainment Target 2: Explore Methods & Procedures in solving problems

Take a sample of a favorite flower to class. Examine a real flower, identify the parts and discuss colours, aesthetics value and other features. Make an observational drawing of a flower. Label the parts of the flower. Students may be allowed to use a drawing program on an electronic device to draw the flower. Student's drawings should be displayed in the class.

Place the real flowers together in a vase/container. Discuss the guidelines for creating a floral arrangement to include simple shapes, principles and elements of design such as balance, emphasis, colours and lines that can be used to create a pleasing arrangement. Using the created bouquet, demonstrate balance and emphasis and other elements of floral design.

Explore how to make artificial flowers from waste materials. Teacher will demonstrate how to make flowers from recyclable materials. Video clips can be used to show how various flowers are made. Students will make templates for the flower and explore ways to produce petals, leaves and stems.

Go on a virtual field trip to a flower shop where they will observe the various roles and functions of the florist as well as the tools, materials and technologies used in floral arrangements. (Video may be used in lieu of virtual field trip). Label and colour a list of tools used in floral arrangements using work sheet.

Attainment Target 3: Apply Solutions to an identified need

Working in groups students will reexamine the display of recyclable materials and select materials that they will use for an artificial arrangement (flowers and vase). Working as a team of florist, students will create petals leaves and stems from recyclable materials and create an artificial floral arrangement. Observe safety and hygiene practices by washing hands and using cutting tools with care and practice efficient utilization of resources to enable the designs to be effective.

Project: Mount a 'Protect the Environment Campaign' by displaying the floral arrangements along with posters and speeches, essays, poems, letters and perform the skits. Communicate the design ideas orally to the class; this should be shared with the general school population or at a community event.

Evaluate the floral arrangements and project using developed criteria

Attainment Target 4 : Career Pathways

Identify skills related to jobs in floral arrangement (done during the virtual field trip)

Discuss what they found enjoyable about the project and how this can contribute to the development of the community. (Can be done during the evaluation session).

Learning Outcomes

Students will be able to:

- ✓ Understand the benefits of recycling waste materials
- ✓ Classify recyclable materials
- ✓ Identify the parts of a flower
- ✓ Use recyclable materials to create artificial flowers
- ✓ Use artificial flowers to make a bouquet
- ✓ Use ICT to search for and present information
- ✓ Evaluate the recycling project against design criteria

Points to Note

This activity will help students to connect with concepts taught in Language Arts, Visual Arts, Mathematics and Science. For example in:

1. Mathematics students can relate to measurement and the shapes of leaves and petals to geometric shapes and discuss their symmetry

Extended Learning

Students can use a CAD programme to create flowers and floral designs. Video and post the "protect the environment campaign" on the internet.

Points to Note

1. Science students explore the parts of a flower. There is considerable opportunity for informal conversations about pollination, germination and seed production during the designing and making.
2. Language Arts, students will use appropriate words to describe the different parts of the flower
3. Visual Arts students will use their knowledge of print making, painting or collage work taking flowering plants as a stimulus; colour-mixing

Guide the teacher here into the different careers that are connected with this project

E.G Florist
Botanist etc

Extended Learning

Resources

- a selection of real flowers, pictures of real flowers
- large drawing of flower with parts labelled
- large sheets of plain paper
- hand lenses
- pencils
- card board
- glue
- straws
- pipe cleaners
- plain paper
- tissue paper – green, yellow and brown
- coloured paper
- masking tape
- Crepe paper
- Card board
- Scissors
- Thread
- Fabric
- Banana bark
- Palm leaves
- Plastic bottles
- Pencils
- Wire
- Glue
- Gloves
- Plastic aprons
- Other necessary resources

Key Vocabulary

- Stem
- Stamen
- Stigma
- Symmetrical
- Artificial
- Template
- Recycling
- Pollen
- bouquet
- recyclable

Articles and videos about the environment are readily available on line or on television Discovery channel etc.

KWL is an acronym for what the students Know, What they Want to know and what they Learn. Usually done in a table, the students complete the first two columns before the lesson and at the end of the lesson they complete the last column. (The completion of the Learn column can be used as evaluation/assessment. See sample KWL chart below. If students are not able to write, KWL chart could be drawn on the chalk/white board and teacher ask the questions and complete the chart based on student's response.

Sample KWL chart

K.W.L CHART		
Topic: _____		
K What I Already Know	W What I Want to Know	L What I Have Learned

Provide garbage bags and gloves where possible to collect items. Remind students to be careful and observe safety rules. Students should be encouraged to wear protective clothing while collecting recycled materials and when making flowers.

When using multiple intelligences students must be allowed to choose the activity they prefer. In so doing they draw on their own strengths and discover and develop their natural talents.

GRADE 4 RESOURCE & TECHNOLOGY

BUSINESS BASICS CURRICULUM GUIDE

CREATING ENTREPRENEURIAL IDEAS



Current financial situation

Strategizing the right timing that fits your customers' buying cycles
maintain sales. The marketing plan should be innovative in how
it is implemented. At the same time, it will also show how you're going
through networking, advertising etc.

Investment

Stocks

5% Return

30%

15%

50%

Learn & ensure Reading success

actual competition

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

It includes short term and long term activities of marketing that has to do with the analysis of a company's situation and contribute to its objectives. The objectives will be based on how you gain sales by acquiring and keeping customers. A marketing strategy helps convey effective messages with the right level of marketing approaches that will maximize your sales outcome and marketing activities.

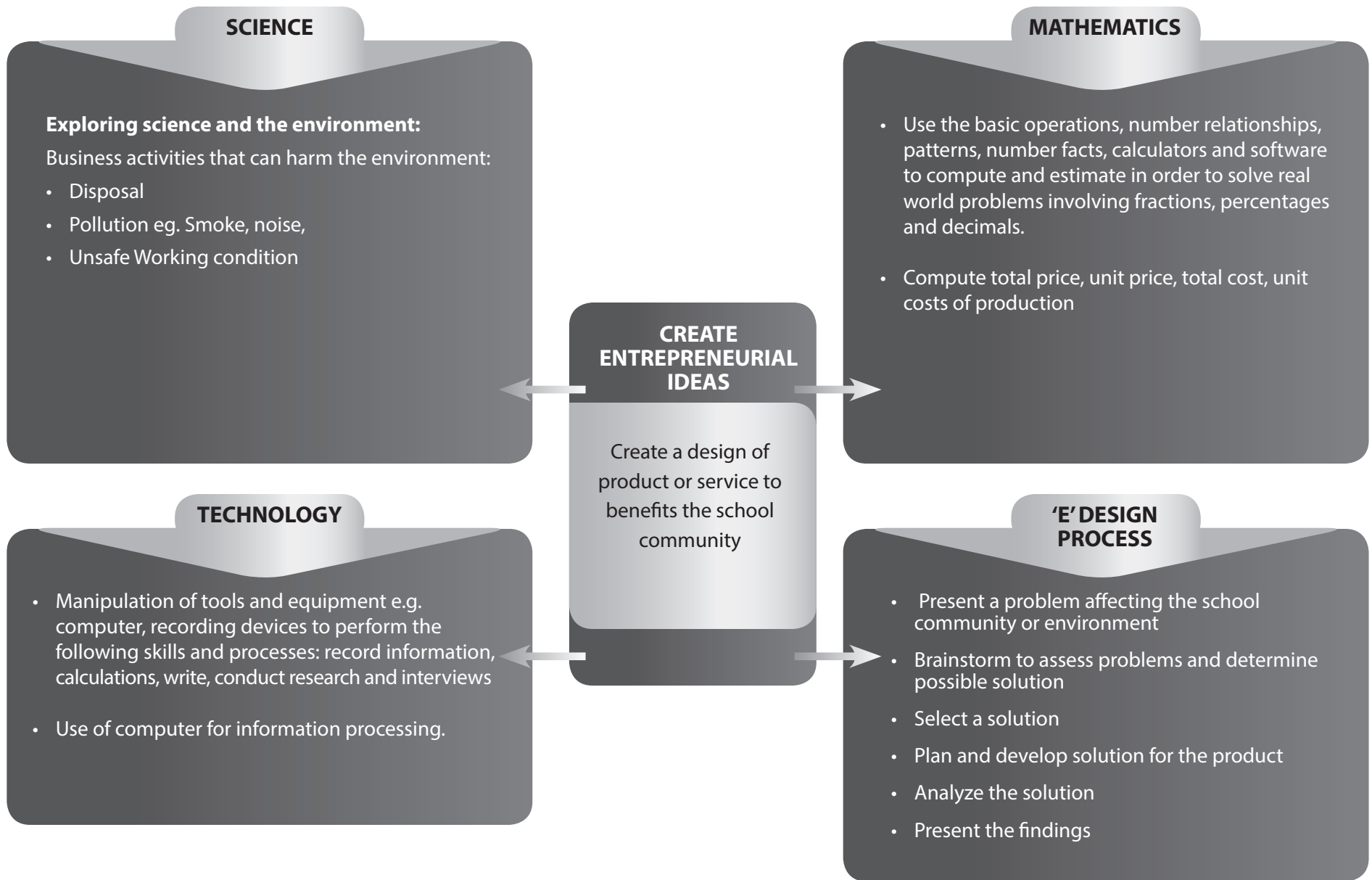
Information	24,766	45,556	12,357	20,775	24,766	45,556
Product A : North America	354	1,876	534	3,541	354	1,876
Product B : Australia	133	190	543	764	133	190
Product A : Europe	346	134	456	246	346	134
Product A : Asia	25,599	47,756	13,890	25,326	25,599	47,756

Information	24,766	45,556	12,357	20,775	24,766	45,556
Product A : North America	364	1,876	534	3,541	354	1,876
Product B : Australia	133	190	543	764	133	190
Product A : Europe	346	134	456	246	346	134
Product A : Asia	25,599	47,756	13,890	25,326	25,599	47,756

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

08:15

MODULES	MODULES	CONTENT	SKILLS
<p>Business Basics</p>	<p>Grade 4 Creating Entrepreneurial Ideas</p>	<ul style="list-style-type: none"> • Role or function of a business • Steps involved in identifying business opportunities • Develop business idea • Key terms and concepts e.g. needs, wants, • Harmful business practices e.g. pollution, smoke emission • Sources of start-up capital • Importance of a market research • Procedure for conducting a market research to determine consumer preferences (strategies e.g. surveys, sampling) • How to construct a simple questionnaire • How to analyse and present data • How to use information collected to the determine feasible of business idea 	<p>Researching business functions Observing & Exploring business ideas Brainstorming business ideas Analysing market research critical thinking Evaluating business ideas collaborating Discussing Identifying assessing Problem solving Creating/designing Differentiating Recommending</p>



About the Project

The project aims at developing students understanding of how business ideas are conceptualized. Students will participate in the actual process of identifying business opportunities or ideas that can be operated in their immediate environment. They will develop skills in data gathering, analysing and evaluating. Students will also be introduced to some basic economic concepts and how they are used in the real world.

RANGE OF CONTENT

The key concepts, skills, knowledge and attitudes students will learn in this project are:

- Key role or function of a business
- Steps involved in identifying business opportunities
- Key terms and concepts e.g. needs, wants, goods, services, opportunities, entrepreneur, capital, market survey, consumer/customer
- Harmful business practices e.g. pollution, smoke emission, noise and unsafe business practices
- Sources of start-up capital
- Importance of a market research
- Procedure for conducting a market research to determine consumer preferences (strategies e.g. surveys, sampling)
- How to construct a simple questionnaire
- How to analyse and present data
- How to use information collection to determine most feasible business idea

Prior Learning

Check that students are:

- aware of the role of businesses in the immediate community
- of the specific needs and wants that are met by the businesses

Focus Question 1: How do I determine the type of business activity I should set up?
What type of business should I choose?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Identify business ideas by observing needs or problems in the school community

Brainstorm to identify possible business solutions to satisfy wants or needs identified in the school community

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Discuss the use of technology in developing of a product

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Evaluate business ideas selected to determine if the needs or wants of persons in the school environment that will be met

Identify materials and resources required to conduct market survey

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Collaborate with each other to achieve various tasks

Discuss some jobs that may be created by an entrepreneur

THEME: Creating Entrepreneurial Ideas

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DESIGNING AND PRODUCING - use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.



RESEARCH, CRITICAL THINKING, PROBLEM-SOLVING AND DECISION MAKING-use appropriatedigitaltoolsandresourcestoplanandconduct research, aid critical thinking, manage projects, solve problems, and make informed decisions.

SCIENCE STANDARD

Attainment Target 1. Exploring Science and the Environment – Earth’s Resources – Grade 3
Recognise how some activities can harm the environment.

MATHEMATICS STANDARD

Attainment Target 5. Collect, organise, interpret and represent data and make inferences by applying knowledge of statistics and probability - Data Handling and Probability Grade 3
Interpret data presented in simple tables, pictographs and bar graph using horizontal and vertical representations.

TECHNOLOGY STANDARD

T&S Standard 5
Student will develop an understanding of the characteristics and scope of technology.

Objectives:

- Discuss the steps involved in identifying a business opportunity
- Explain the key role or function of a business
- Identify businesses in their community that provide goods and services to satisfy needs and wants
- Differentiate between goods and services
- Identify business practices that are harmful to the environment
- Identify business opportunities in the school community
- Develop business ideas
- Evaluate business ideas conceptualized to determine effectiveness in satisfying consumers wants and needs
- Discuss ways of improving existing goods or services to provide greater benefits
- Identify sources of capital to operate a business
- Demonstrate skills and attitudes necessary for working with others

Suggested Teaching and Learning Activities

Key Skills

Assessment Criteria

Focus Question 1:

How will I determine the type of business activity I should select?

Students will:

- Conduct a tour of businesses in their community to do the following:
 - (a) Determine whether they provide a good or service to satisfy needs
 - (b) Conduct an interview with the entrepreneur to find out how the business ideas were developed and the reasons for operating the business
 - (c) Use a checklist to detect harmful practices observed on the tour and suggests corrective measures to be undertaken.
- In groups, following the tour of school community, identify needs or problems relating to e.g. safety, nutrition, learning facilities and then create a mind map to generate ideas for entrepreneurial ventures in the school community.
- Explore business ideas that could be created to solve the problems identified during the tour
- Brainstorm to determine which business idea would be most profitable
or
- Play a game “who is more valuable’ to determine the most profitable business activity. From the business ideas presented, students should identify which would best meet the needs and wants of the school community;

research for
information
make judgement

Observe and interpret
pictures/videos

Discuss and classify

- Compile appropriate questions
- Research for information
- Deduce relevant information

Definition of terms goods and services

Classify products as good or service

A least 5 harmful practices

Documentation of the business ideas that can be introduced in the school

Classification of resources required by business involved in producing a product or service.

At least possible business ventures to be explored
Completed design or set of recommendations

Focus Question 1:

How will I determine the type of business activity I should select?

Students will:

students may vote to select the favoured business idea.

- Use the telephone directory (Yellow pages) to identify businesses and tell whether they provide goods or services
- Select an existing good or service provided or sold in the school community and suggest ways of improvements to satisfy wants and needs of school community
- Select the resources that would be required by the business that will provide the good or service. (Class can be divided into small groups, with one group representing business providing a service and one providing a good).
- View video presentation on sources of capital or conduct a field trip to a lending institution to collect information on sources of funding

Classify information

Analyse information
and present findings

Creativity in
presentation

Record information

Learning Outcomes

Students will be able to:

- ✓ Identify the main function of a business
- ✓ Differentiate between goods and services
- ✓ Explain the procedures for identifying a business idea
- ✓ Recommend improvements to a good or service to ensure user gain greater benefits
- ✓ Identify business ideas or opportunities to satisfy needs or wants of a particular population demonstrate skills necessary to work with others

Points to Note

An entrepreneur is an individual who identifies a business opportunity that will meet the needs and wants of customers and takes the risk of setting up that business.

Main functions of a business

- to provide a good or service to meet the needs and wants of customers/clients
- to make a profit

Business ideas should be selected to satisfy the most critical needs and wants identified in the immediate school community

Resources can be a list of items that are required to operate the business e.g. a business producing caps will require resources such as sewing machines, cash to start the business, premises or location and persons to sew the caps

Good is an item that can be touched and felt e.g. football, pair of shoe

Service is intangible item and cannot be felt or touched e.g. teaching, nursing,

Steps in identifying a business opportunity

- Identify need/problem'
- Assess your skill set
- Conduct market research/feasibility study

Understand what copyright is and the importance of identifying the creators of information sources.

Observe moral principles when using digital materials.

Extended Learning

Encourage students to talk with entrepreneurs (business persons) in their community and/or family members who operate businesses to find out:

- why they decided to set up their businesses
- how does the business meets the needs of the community in which it is established
- benefits of setting up a business
- what was required to establish the business
- Discuss the use of information technology to promote and enhance business.
- Explore and use the organisational features of various online and electronic media, e.g., newspapers websites, encyclopaedia games quizzes, database to promote and enhance business.
- Highlight forms Types of Business units

Resources

Video, recording device e.g. camera, computer, internet access, telephone directory, interview protocol/schedule

Key Vocabulary

Business, needs, wants, opportunity, good, service, resources, solution, capital, entrepreneur, business idea, noise pollution, smoke emissions, protective clothing, product

Links with Other Subjects

Mathematics – Grade 3 Attainment Target 5 – Data Handling and Probability

Science – Grade 3 Attainment Target 1 – Exploring Science and the Environment – Earth's Resources

Prior Learning

Check that students can:

- Identify the steps involved in identifying a business opportunity.

Focus Question 2: What product or service will I provide?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Evaluate various strategies used by businesses to determine consumer preferences

Brainstorm to identify the most effective market research to be used to determine which product/service to offer in school community

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Gather information and develop market research instruments to determine customers preferences

Identify materials and resources required to create a display for goods to be sampled

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Evaluate/analyse survey instruments to determine which good/service is preferred by members of school community

Participate in group activities

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Discuss some jobs that may be related to market survey

THEME: Making the Right Choice

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DESIGNING AND PRODUCING - use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.



DIGITAL CITIZENSHIP - Recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.

SCIENCE STANDARD

Attainment Target 1. Exploring Science and the Environment – Earth’s Resources – Grade 3

Recognise how some activities can harm the environment.

MATHEMATICS STANDARD

Attainment Target 5. Collect, organise, interpret and represent data and make inferences by applying knowledge of statistics and probability - Data Handling and Probability Grade 3

Interpret data presented in simple tables, pictographs and bar graph using horizontal and vertical representations.

TECHNOLOGY STANDARD

T&S Standard 5

Student will develop an understanding of the characteristics and scope of technology.

Focus Question:**What product or service will I provide?****Students will:**

- Discuss strategies businesses use to determine personal preference e.g. sampling, surveys
- Conduct survey in class/school community using questionnaires or sampling to determine preferences
- Use appropriate application software to design survey instruments e.g. questionnaire to collect information to determine personal preferences
- Create a display table with goods which will be offered by the business to determine customers' preferences and allow individuals to sample items to indicate preferences.
- In groups use a checklist to analyse the information from survey instruments to identify consumer preferences
- Present results to indicate the ranking of choices desired by school community
- Select most preferred good or service
- Create a design of a new good or service that will satisfy the consumers preference
- Conduct research to assess the impact of the creation of the new product on the environment.
- Evaluate the solution identified to determine its ability to solve need or problem identified in school community

- Researching
- Listening
- Observing
- Exploring
- Brainstorming
- analysing
- critical thinking
- Evaluating
- collaborating
- Discussing
- Identifying
- assessing
- Problem solving
- Creating/designing
- Differentiating
- Recommending

- Explanation of market research strategies
- 10 point Questionnaire with relevant questions
- Graphic presentation of data
- Product display
- Survey conducted determines preferred good or service required by school community
- Product design created
- Environment impact assessment conducted
- Evaluations give evidence against success criteria of identified solution to solve need or problem

Learning Outcomes

Students will be able to:

- ✓ Discuss the reasons prospective businesses conduct marketing research
- ✓ Explain benefits of conducting market research
- ✓ Identify types of market research instruments
- ✓ Design questionnaire using appropriate software
- ✓ Design a product display
- ✓ Utilize various methods to conduct market research
- ✓ Analyse data and draw conclusions
- ✓ Present findings of market research coherently

Points to Note

Market Research is conducted by businesses to determine the needs of consumers in order to satisfy those needs

Type of Market Research

- observations
- Survey

Questionnaire items should focus on the following:

- Number of students in class
- Number of students who are male and female
- Product or service preferred
- Observe moral principles when using digital materials.
- Begin to understand what copyright or patent is and the importance of identifying the creators of information sources.
- Practice safe, respectful, and responsible digital communication.

Extended Learning

Ask students to observe and report on activities used by businesses e.g. supermarkets, banks, communication companies and shops in their community to promote their goods and services

Students can be encouraged to find out from a relative or family friend who participates in market research how the process is conducted

Resources

Internet to source, recording device e.g. camera or cell phone, Computer, internet access, bond paper, products for display

Key Vocabulary

Product, service, survey, questionnaire, sampling, market research, observation, consumer preference

Links with Other Subjects

Mathematics – Grade 3 Attainment Target 5 – Data Handling and Probability

Science – Grade 3 Attainment Target 1 – Exploring Science and the Environment – Earth's Resources



GRADE 4

RESOURCE & TECHNOLOGY

ENGINEERING AND MECHANISMS
CURRICULUM GUIDE

PROJECT: KEEP THE WHEELS TURNING

About the Project



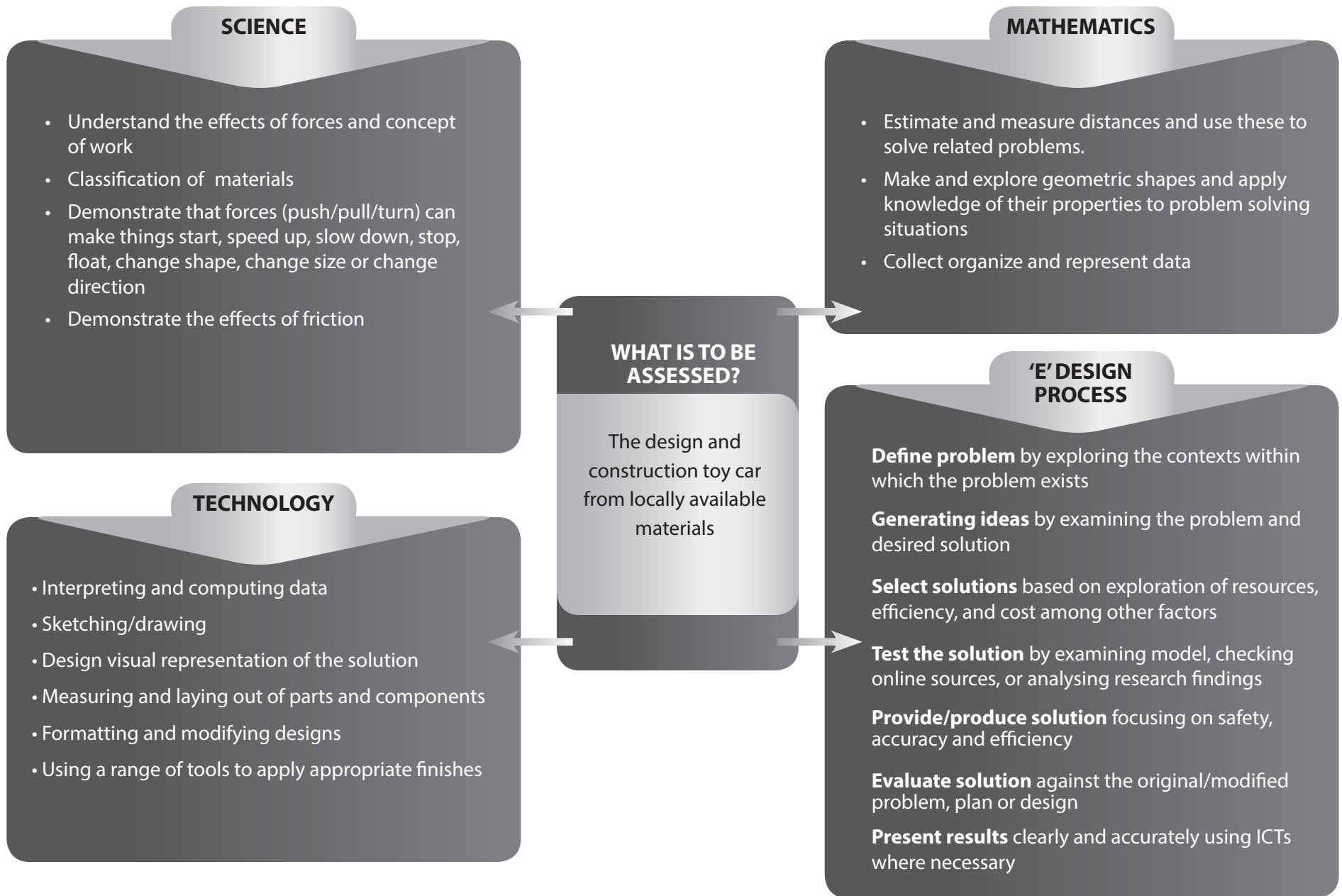
The community sports club of which you are a member of has decided to visit and provide home-made gifts to the Applepine Children's Home for Boys during this year's Christmas charity children's treat. The group that you have been assigned to is tasked with the responsibility to design and make toy cars for a special group in the Boy's home. Your group has decided to construct the toys from locally available materials; also the toy cars should be attractive and durable.

In this project students will create a model toy from simple available (indigenous) materials. Students will manipulate hand tools to construct the project and complete with an appropriate finish. It is anticipated that students will be introduced to the fundamentals behind the manipulation of mechanical energy in the production of regular household devices and more complex applications in respect to a range of transportation solutions. Students will also explore career offerings in the fields of automotive and mechanical engineering technology.

RANGE OF CONTENT

RANGE OF CONTENT are project specific, and cover key concepts, skills, knowledge and attitudes students will learn in Resource & Technology at Grade 4.

- Key terms and concepts related to mechanical energy (work, energy, acceleration, impact, velocity, mass)
- Mechanical energy: Kinetic and Potential energy
- Application of mechanical energy
- How solids, liquids and gases are used in the make and operation transportation mechanisms
- Shape and solid for movement
- Hand tools and materials used in the construction of a toy car
- Procedures for constructing a toy car
- Working safely with tools and materials
- Automotive and mechanical engineering career specializations
- Project assessment evaluation



Prior Learning

Check that students can:

- Read measuring devices such as a ruler and measuring tape
- Operate basic hand tools in carrying out simple tasks
- Identification of shapes and various geometric solids

Focus Questions:

What are the steps involved in creating a project from a given working drawing?

What is the most appropriate material(s) to be used for the making of the model car?

Who are some of the professionals that work in the automotive industry?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Students will:

select from a range of alternatives, the most appropriate design for the model car.

brainstorm possible solutions for designing the wheel and other components of the model car.

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Students will:

critique the drawings of the model car to determine if changes may be required

create their own simple designs of the model car to be made

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Students will:

create their individual model cars with the intervention and feedback of their teacher and classmates

select appropriate materials and tools to make the different components of the model car

follow series of instructions to make the different components of the project

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Students will:

discuss some jobs that maybe associated with the manufacturing of vehicles and other motorized means of transportation

evaluate the design of the model car against a prescribed checklist or rating scale

THEME: Creating Entrepreneurial Ideas

ICT ATTAINMENT TARGETS:



DESIGNING AND PRODUCING - use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.



RESEARCH, CRITICAL THINKING, PROBLEM-SOLVING AND DECISION MAKING - use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems, and make informed decisions.



DIGITAL CITIZENSHIP - Recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.

MATHEMATICS STANDARD

Attainment Target 2: Use the correct units, tools and attributes to estimate, compare and carry out the processes of measurement to given degree of accuracy.

Attainment Target 3: Explore paths, geometric shapes and space and make generalization about geometric relationships within the environment.

SCIENCE ATTAINMENT TARGETS

Attainment Target 3: Energy and Matter - Understand the effects of forces and the concept of work.

TECHNOLOGY STANDARDS

Students will develop an understanding of the characteristics and scope of technology.

Students will develop an understanding of the role of society in the development and use of technology.

Students will develop an understanding of and be able to select and use manufacturing technologies.

OBJECTIVES:

- Define terms related to mechanical energy
- Differentiate between kinetic and potential energy
- Identify basic devices that utilize mechanical energy
- Explain how a car uses solid solids, liquids and gases
- Interpret dimensions and annotations on a simple working drawing of a toy car
- Identify the different types of shapes and solids found on a car
- Explain how the use of different shapes found on a car influence its operation
- Create personal designs of a model car
- Classify hand tools according to use and purpose
- Prepare material and tool list of resources needed to construct personal designs of the model car
- Identify careers in the motor vehicle manufacturing industry
- Collect data on the skills required to work in the automotive industry
- Observe safety considerations in executing practical tasks.
- Measure all the necessary layout dimensions and indicators for: cutting, boring and other related processes using the most appropriate hand tools.
- Trace design on selected material as indicated on design drawings using appropriate layout tools
- Create holes to the appropriate diameter in material according to the design of the toy using boring device.
- Cut material to appropriate dimensions to accommodate other component parts of the toy
- Assemble the components of the model car in accordance with given specifications correctly
- Make minor adjustments to components with the use of simple hand tools, (e.g. Possible trimming of axle length) where necessary.
- Apply appropriate finishing material(s) to the body of the model toy safely
- Demonstrate the safe use of all hand tools and materials as each task is performed
- Evaluate product against given plan (working drawing).

Suggested Teaching and Learning Activities

Key Skills

Assessment Criteria

Students will:

- Explore a range of resources, including those online and offline, which utilize the capacity of mechanical energy in executing everyday tasks ranging from simple household tasks to more complex tasks; for example, energy associated with the operation of a roller coaster.

(Formats of interaction: guided discussion, the use of audio visual tools such as podcast and video inserts on car tutorials)

- Conduct a research of sample toy cars using books, magazines, brochures and online sites. At the end students will compare the sample drawings of a model

Read working drawings.

Conduct electronic searches

Checklist and rating scale will be used to assess the different stages in the construction of the project.

Students to complete Pictionary of simple machines which utilizes mechanical energy (showing at least 3 simple machines)

Students will:

<p>car and incorporate the highlighted features and elements to their personal designs</p>		
<p>iii. Produce shapes, solids and composite objects using 2D – Two Dimensional and 3D - Three Dimensional drawing orientations. Discuss how the different shapes, solids and other composite objects will be used when making and assembling the various components of the toy car</p>	<p>Measure accurately</p> <p>Create design</p>	
<p>iv. Make a list of all the parts to be used to complete the model car; for example, axles to attach wheels, wheels (bottle covers).</p>	<p>Question</p> <p>Discuss alternatives</p>	
<p>v. Carry out a virtual/simulated tour of a parking lot. Students will count and tally the number of wheels, doors, windows and other visible parts found on a car and a small bus or truck to produce a pie chart/bar graph using ruler and graph paper or Microsoft excel to represent and compare both vehicles.</p>	<p>Calculate correctly</p> <p>Measure correctly</p>	
<p>vi. Compare the information gathered from the pie chart/bar graph to the personal design of the toy car to illustrate how the parts will be used in their own designs</p>		<p>Students complete a tool and material list for project according to the design of the toy car</p>
<p>vii. Use traditional drawing instruments such as pencil, ruler, stencil and compass to create a design of the model car that they wish to construct</p>	<p>Drawing neatly</p>	<p>Students explore and present at least two careers in the automotive design and manufacturing industry</p>
<p>• Alternate Activity: create personal designs of the model car they wish to make with the option of using digital drawing tools such as Microsoft Paint or Google SketchUp</p>	<p>Produce graph</p>	<p>Student presentation of design concept. Teacher evaluate using rating scale</p>
<p>viii. Compile a list of materials and tools of the resources they will need to successfully complete the model car. Students will also collect the materials needed to complete the project by reusing and repurposing existing materials found in the home, community and school such as plastic caps and bottles; gift boxes and wrapping paper, drinking straws, juice and milk cartridges.</p>	<p>Conduct interview</p>	<p>Observation of Students in conducting layout, assembly and finishing work. Teacher evaluate using rating scale</p>

Students will:

The items collected should be properly sanitized or washed and inspected thoroughly by the teacher before each item is used.

- ix. Conduct a research or go on a virtual field trip to an automotive manufacturer or dealer where they take note of the various roles and discuss careers that are connected to the automotive design and engineering as well mechanical engineering e.g. motor vehicle, aircraft and boat designers and engineers, and inventors of safety devices and gadgets. Students will compile a list of 5 to 7 questions to be used in developing a questionnaire for the field trip.
- x. Present their concept drawings of the model car to peers or work group, the groups will critique the concept car and suggest appropriate modifications that can be made where necessary to the drawings.
- xi. Make a cardboard mock-up of the toy car's body; make sure the body design will be compatible with the chassis of the toy car. Student will design and make a prototype based on a set criteria to be developed. The students should use the drawings from the body template activity to create the basic shape of their mock-up. Ideas from magazines and newspapers may enhance the design's appearance or view a video on "a Model car" for class discussion and critique
- xii. Carry out practical operations with tools provided to perform the following series of steps:
 - a) Draw design on material as indicated on drawings using pencil, a light maker or other appropriate marking tool
 - b) Use stencil knife or other appropriate cutting tool to cut design in material
 - c) Indicate points where axle will be placed using marker and other layout devices
 - d) Bore holes or create mechanism for axle attachment, (axle may be a plastic straw, bamboo strip, cylindrical dowel strip, or other materials of choice).
 - e) Bore holes in wheels accurately considering the diameter of axle on centre to centre, using a range a hand tools such measuring and driving

Conduct research

Presenting sketches and drawings

Produce neat drawings

Cut and bore operations.

Research the origin of driver's license or license plates; identify three distinct features and explain why they are used.

Students will:

tools (measuring tape, gimlet and screwdriver)

- f) Assemble all the components of the model car based on design. Take a picture of model and store image in folder on computer or removable media.
- g) Apply paint, wrapping or other appropriate finish to the toy car to improve visual appeal (using colour and choice of wrapping material of choice)
- xiii. Test project for accuracy and workability.
- xiv. Research the main features of a driver's licence and motor vehicle registration plates locally and internationally and in groups discuss their similarities and differences. At the end groups will compile a list of distinct features of both the national driver's licence and the motor vehicle registration plate. Findings will be presented to the class in groups to be determined by the teacher.
- xv. Take photographs of themselves to class and create a prototype driver's licenses using student photographs and other available resources
- xvi. Design a personalized license plates using available resources, the characters used should be alphanumeric and not exceed seven characters for example SR DOC17
- xvii. Evaluate project against the following design criteria:
- Size and proportion of composite shapes
 - Balance and functionality
 - Aesthetics and quality of finishing
 - Originality and creativity

Assembly of components

Take pictures

Apply finishes

Evaluate progress during tasks

Take pictures
Use digital drawing tools

Critique final output
Plan

Student group discussion to evaluate finished product. Teacher evaluate using rating scale

Learning Outcomes

Students will be able to:

- ✓ State the importance of mechanical energy in the execution of everyday activities
- ✓ Read and interpret instructions given on a simple working drawing
- ✓ Design and create a model car using two and three dimensional drawing concepts and principles
- ✓ Use measuring tools accurately and confidently
- ✓ Perform basic layout procedures correctly
- ✓ Use basic hand tools to carry out simple practical operations
- ✓ Apply finishing material to a surface of the model car to improve the aesthetic appeal
- ✓ Perform safe and healthy practices related to the use of workspace, tools and materials
- ✓ Identify jobs associated with the design and motorized transportation industry
- ✓ Use computer and other digital drawing tools to communicate design ideas for a car

Points to Note

Make link with Mathematics - reproduce, create, and describe patterns and sequences using a variety of materials (for example, pattern blocks and paper folding).

Make link with Science - students know and understand interrelationships among science, technology, and human activity and how they can affect the world of travel.

Health and Safety issues need to be taken into consideration as students will be using sharp tools in the execution of the project.

Students should be encouraged to practise safe behaviour when using digital media or searching for information on the internet.

Extended Learning

Students can apply the principles of this project (assembly) to other situations such as designing and making models of different descriptions and dimensions

Explore how a car uses solids, liquids and gases in its operation

Visit the tyre sales store and measure and record the width, height and circumference of various size tyres. Also, record the names and profile of different brands of tyres, using a camera.

Resources

The project to be constructed will include but are not limited to the following resources:

- I. Blank paper
- II. Basic hand tools to include snips/nippers, boring device, measuring devices),
- III. Mallet
- IV. Drink boxes of various sizes,
- V. Metal or wood shaft for axle (bamboo, metal spokes, Coconut leaf mid rib.
- VI. Masking tape
- VII. Paper glue
- VIII. Soda Cans
- IX. Other materials in the case of personal design.
- X. Image capturing device
- XI. Computer and any other available technologies
- XII. Internet
- XIII. Speakers

Key Vocabulary

- Model
- Classify
- Dimension
- Working drawings
- Measurements
- Safety
- Assembly
- Axle
- Design
- Careers
- Engineer
- Dimension
- Mechanical energy
- Kinetic
- Potential
- Gravity
- Velocity

NATIONAL STANDARDS CURRICULUM GUIDE

GRADE 5

RESOURCE & TECHNOLOGY



AGRICULTURE FOR SUSTAINABLE DEVELOPMENT

PROJECT: HOW TO ESTABLISH AND MAINTAIN A BASIC
CONTAINER GARDEN

Resource & Technology:

The aim of Technical Vocational Education Training (TVET) integration at this level is to foster students' awareness of foundational technical skills and their relationship to everyday problem-solving, as well as, to future careers and occupations. In a project-based format students use the design process for problem solving in a range of technology-based design contexts. This exposure will continue to be articulated seamlessly into Resource and Technology at the Grades 7-9 level.

RANGE OF CONTENT

In the articulation of this project, students will learn about solving practical issues, using the Design Process methodology in **establishing and maintaining a container garden**.

Key concepts, skills, knowledge and attitudes students will learn in this project will include: Key concepts, skills, knowledge and attitudes students will learn in this project will include:

- terms related to creating a container garden.
- parts of the plant relevant to their roles in a garden
- plants not normally grown from seeds
- methods of plant propagation
- plants in the local environment which may be suitable for creating a container garden.
- selection of available resources which may be suitable to create a border for the container garden
- growing media for container gardens
- tools and materials required to establish and maintain a container garden.
- planting material for a container garden
- growing medium to be used in the container garden
- placement of plants and fixtures in container garden, according to design
- planting the container garden
- area preparation to locate containers
- nutrients supply to plants
- moisture conservation using mulch
- weed control without the use of harmful chemicals
- insect control without the use of harmful chemicals
- optimal conditions for growing the new plants (moisture, temperature, light and aeration)
- garden borders
- plant irrigation
- calculations relevant to creating and maintaining the garden
- language arts to communicate ideas and concepts
- relevant knowledge of plants gained from the science curriculum
- work as a member of a group
- occupations associated with creating ornamental gardens
- presentation of completed project
- evaluate outcome of project against tasks in successfully establishing and maintaining a container garden

Prior Learning

Check that students :

have some knowledge of plants in their environment
which would have been covered in Science Curriculum

ABOUT THE PROJECT/PROJECT DESCRIPTION – GRADE 5

While many families are living in homes with small yard space, there is still the need for them to grow a number of different plant species for food, medicine, and recreation.

Given that many unused containers are often available to householders, your class

is to **create and maintain a container garden** to demonstrate how some of the needs in the three (3) areas named above could be met. Using relevant competencies from other subject areas, particularly mathematics, language arts, science, social studies, visual arts, and ICT, your class will research, design, establish and maintain a container garden over a period of one term.

(Note: Project to be constrained to ‘container’ since ‘open field’ is more demanding of resources and may not even be available in many primary schools)

**STRAND 1: CREATIVITY
AND INNOVATION**
ATTAINMENT TARGET 1

Students will be able to apply Creativity & Innovations in establishing and maintaining a container garden

**STRAND 2: EXPLORING
METHODS AND PROCEDURES**
ATTAINMENT TARGET 2

Students will be able to Explore Methods & Procedures in establishing and maintaining a container garden

**STRAND 3: APPLY
SOLUTION**
ATTAINMENT TARGET 3

Students will be able to Apply Solutions in establishing and maintaining a container garden

**STRAND 4: CAREER
PATHWAYS**
ATTAINMENT TARGET 4

Students would have developed awareness of a range of Career Pathways related to establishing and maintaining container garden

OBJECTIVES:

Students will be able to:

- Brainstorm possible solutions to establish and maintain a container garden
- Discuss the benefits of container gardening
- Create possible designs for a container garden in a real or imagined space of given dimensions
- Select from a range of plants, the most appropriate plants for container gardening
- Select from a range of growing media, the most appropriate for container gardening
- Use terms associated with container gardening e.g. fertilizer, irrigation, drainage, containers, growing media, terrarium
- Consider and verbalise other resources which could be used for container gardening
- Identify resources required for establishing and maintaining a container garden
- Explain steps in establishing a container garden

OBJECTIVES CONT'D:

Students will be able to:

- Demonstrate awareness of the safe and hygienic use of tools and materials
- Select appropriate materials and tools for establishing and maintaining a container garden
- Explain the steps necessary for establishing and maintaining a container garden
- Manipulate selected tools and materials to establish and maintain a container garden
- Demonstrate ability to work as part of a team
- Follow instructions in carrying out steps necessary to establish and maintain a container garden
- Differentiate resources (natural and man-made)
- Evaluate success in establishing and maintaining a container garden based on the quality of the plants produced
- Discuss enjoyable activities experienced in establishing and maintaining a container garden
- Compile a list of personal attributes
- Identify personal strengths, interests and abilities observed in the exercise to establishing and maintaining container gardens
- Identify technological applications used in container gardening within the community
- List some occupations of persons associated with container gardening within the community
- Discuss some jobs that may be related to container gardening
- Identify some skills and behaviours necessary to work collaboratively.
- Observe rules and procedures of working within a group

Suggested Teaching and Learning Activities

Students will:

“How To Establish And Maintain A Basic Container Garden”

Note 1: This project requires the teacher to do much advance preparation, including the appropriate research

Note 2: Teacher can get tremendous help from Container Gardening sites on the Internet or offline media

Note 3: Use student groups as much as possible, and manage group dynamics/ team work

Note 4: It may be useful if the teacher became familiar with the ‘Rich Picture’ concept

- Brainstorm – (the use of containers for gardening; where do we see container gardening; where else could we use container gardening).
- Guide the students in viewing container garden ideas available on the Internet or offline.
- discuss reasons for container gardening

Key Skills

- reflect
- collect data
- advocate
- analyse data,
- apply information
- argue,
- assess,
- carry out instructions
- compute
- create
- define problems,
- describe,
- design
- list

Assessment Criteria

- Accuracy displayed in measurement
- Calculate resource requirement
- Evaluate design for main elements
- Checklist completed for GroupWork
- Checklist completed or developing design
- Checklist completed for laying out garden
- Accurate checklist for basic budget
- Letter/Essay supporting/promoting the project
- Brief oral/written report to support design
- Demonstration of procedures and techniques
- Produce a poster promoting the value of the project
- Prepare an illustrated manual showing the steps in carrying out the project
- Fulfilment of learning contract for the project
- Active participation in group work
- Write an answer to a ‘client’s’ question on the project
- Short answer questions: True/False/ Multiple Choice
- Questions (paper-based or computer-aided - assessment)

Students will:

- project evaluated against criteria to determine success
 - students take pictures of possible locations for container garden at the school and project and discuss the merits of each location
 - select location(s) for container garden(s)
 - design a container garden using graphic or other appropriate available software,
 - discuss/identify possible containers for use in gardening
 - research online or offline media and discuss some plants that can be effectively grown in containers
 - discuss some possible growing media that can be effectively used in container gardening
 - identify and select suitable containers for gardening
 - identify suitable growing media for container gardening
 - use graphic or other appropriate computer software to assist in designing the container gardening
 - select suitable growing medium for each container gardening project
 - select suitable plants for each container gardening project
 - discuss steps in establishing container gardening
 - use spreadsheet or other appropriate computer software to develop a basic budget for the container garden project
 - discuss safe use of tools and materials
 - document using notes or text editing software and photograph, the different stages of the establishment of the project
 - fill selected containers
 - plant seed, suckers, seedlings, cuttings, etc.
 - water containers
- design project,
 - develop arguments
 - evaluate
 - follow procedures
 - identify
 - Identify problems
 - Imagine
 - innovate
 - Interpret
 - interview
 - Investigate
 - judge
 - learn independently
 - manage tasks
 - managing time
 - manage use of materials
 - negotiate
 - non-verbal communication.
 - observe and interpret
 - organise
 - organise information
 - perform
 - plan
 - pose problems
 - present
 - produce

Students will:

- Protect/secure containers
 - Carry out maintenance of container garden, e.g. irrigation, weeding, plant nutrition, mulching, pest control, harvesting.
 - Discuss the classification of resources used in the project
 - Use recording device to capture images of students' preparation and completion of the garden. This can be played back after the completion of the project for discussion.
 - Present a case for Principal/PTA to support the project
 - Prepare an Article for the local newspaper promoting the use of the project in the wider community
 - Evaluate the outcome of the project against original project objectives
 - Discuss with students, their experiences in establishing (later, maintaining) the project (pleasant and unpleasant).
 - Brainstorm with students, some skills, personal strengths/interests needed for establishing and maintaining a container garden
 - Brainstorm with students, different application of science, technology, engineering, and mathematics in the project.
 - Discuss some occupations/jobs in the society associate with container gardening
- recall
 - recognise
 - recount
 - reflect
 - relate & interrelate
 - report,
 - research
 - review
 - review and paraphrase information
 - search and manage information sources
 - self-directed
 - take reading
 - use specific written forms
 - use tools
 - visualise
 - work co-operatively
 - work independently

Learning Outcomes

Students will be able to:

- ✓ Apply design considerations in laying out container garden
- ✓ Select location for container gardening
- ✓ Select suitable plants for container gardening
- ✓ Select suitable containers for container gardening
- ✓ Provide suitable irrigation and drainage in containers
- ✓ Select medium for growing plants in containers
- ✓ Prepare medium and fill containers
- ✓ Plant crops in containers (e.g. seeds, seedlings, suckers)
- ✓ Care of plants in containers
- ✓ Collaborate with group members in planning and executing a task
- ✓ List occupations associated with plant production

Points to Note

Teacher may need to research resources available in the community, prior to project

If possible, the teacher may 'quietly' accumulate some containers

Teacher should identify possible locations for the container garden

Security for the container garden is important

The teacher may choose to establish more than one garden per class if that is desirable to the circumstance.

Plants to be used may include vegetables: pak choi, cabbage, radish, lettuce, string bean, callaloo, cucumber, tomato, pepper; ornamentals: cacti, flowering plants, foliage plants; herbs/condiments: parsley, celery, thyme, mints, escallion, fennel, leek, aloe vera

Extended Learning

Students practice techniques in establishing and maintain container gardens at home, church.

Resources

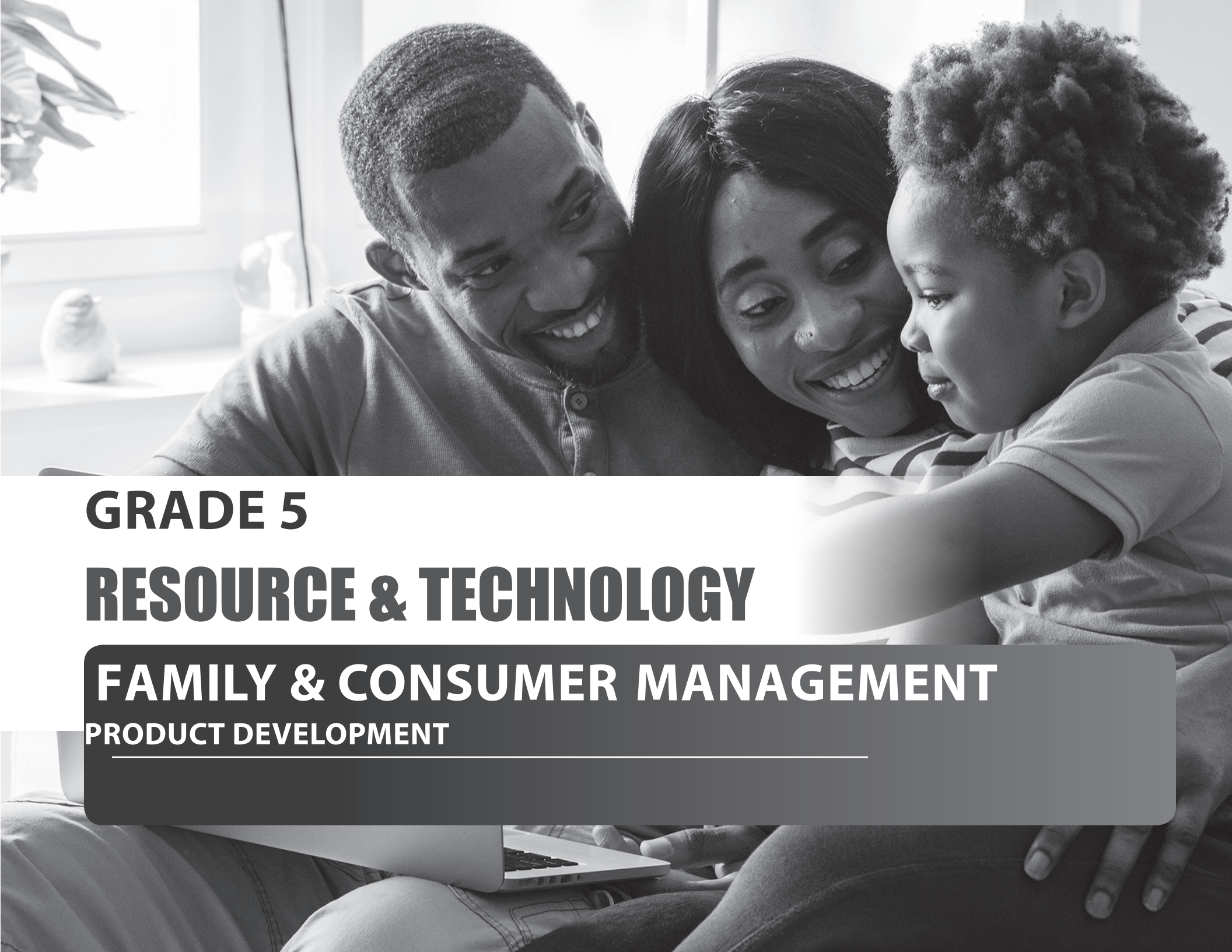
Natural Resources include: Seeds, seedlings, suckers, runners, rhizome, plant cuttings, soil, potting medium, water, manure/compost,

Man-made Resources include: design of garden, list of tasks, schedule for carrying out tasks, various appropriate containers, knife, poly bags, ruler, measuring tape, watering cans, water hose, hand spade, hand fork, fertilizer, detergent, string for lining out, improvised hand tools

Recording devices, computer and any other available technologies

Key Vocabulary

- Food
- Medicine
- Recreation
- Seed
- Container
- Seedling
- Suckers
- Cutting
- Rhizome
- Ornaments
- Vegetables
- Condiments
- Potting medium
- Manure
- Compost
- Node
- Internode
- Stem
- Setting
- Plant propagation
- Collaboratively/collaboration



GRADE 5

RESOURCE & TECHNOLOGY

FAMILY & CONSUMER MANAGEMENT

PRODUCT DEVELOPMENT

AIM OF RESOURCE AND TECHNOLOGY

The aim of Technical Vocational Education Training (TVET) integration at this level is to foster students' awareness of foundational technical skills and their relationship to future careers and occupations. In a project-based format students use the design process for problem solving in a range of technology based design contexts. This exposure will continue to be articulated seamlessly into Resource and Technology at the grades 7-9 level.

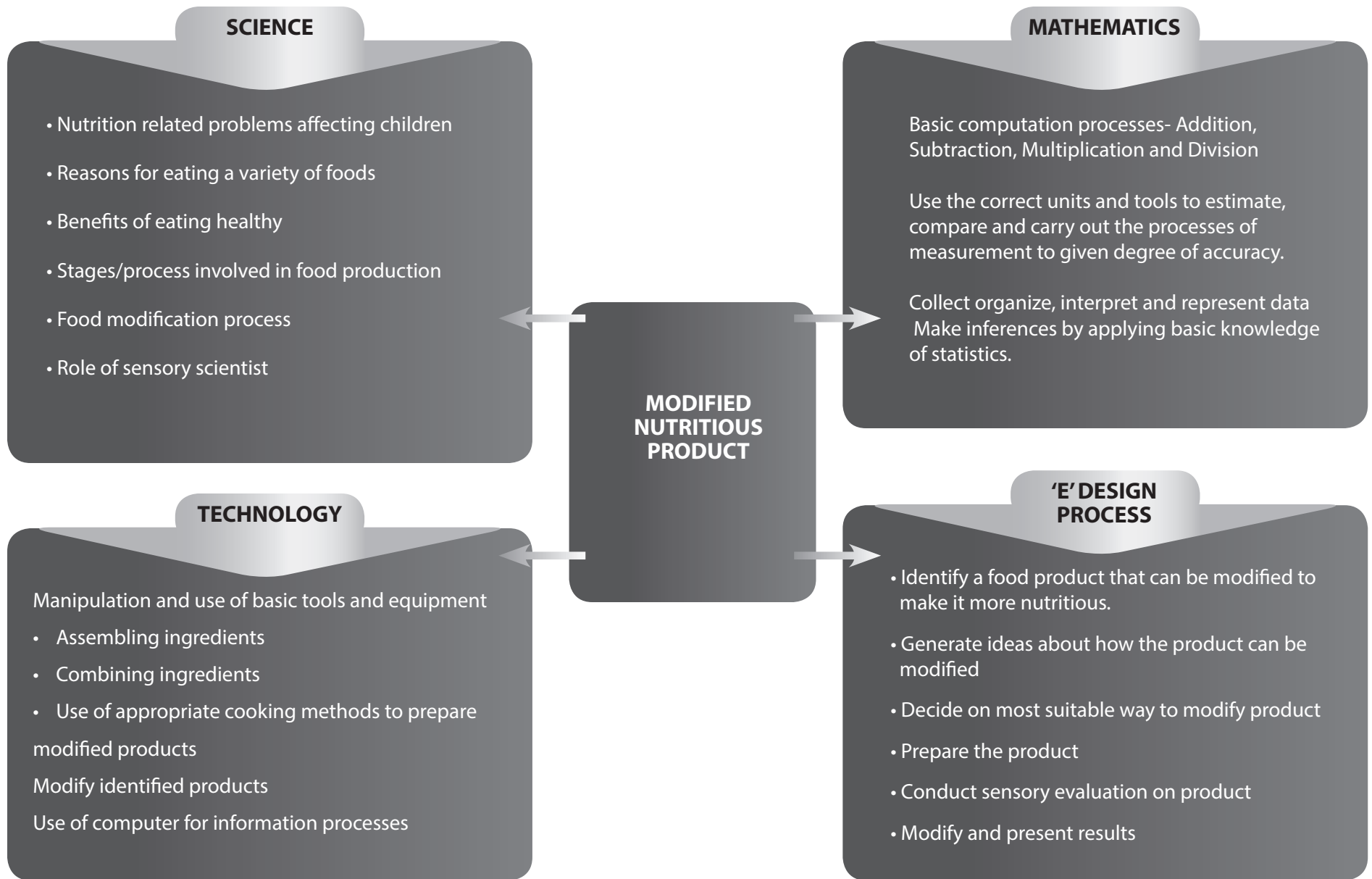
ABOUT THE PROJECT

In the articulation of this project, students will use their investigative skills and sense of taste to develop a new food product. They will explore career roles as sensory scientists and taste panellists, understand and apply some basic principles of nutrition, hygiene and safety in food preparation. Prepare and test a new food product. Select packaging materials and design labels for the product, and set up a display of the products.

RANGE OF CONTENT

RANGE OF CONTENT are project specific, and cover key concepts, skills, knowledge and attitudes students will learn in Resource & Technology at Grade 5.

- Key terms and concepts related to nutrition and diet
- Food groups
- Personal and kitchen hygiene
- Steps in Product Development
- Tools and equipment used in food preparation
- Recipe modification
- Terms and concepts related to product development
- Conducting sensory evaluation
- Food packaging and labelling
- Career opportunities in Food Production



Students should have been exposed to the sense of taste in science class
 Students should be familiar with variations in food products, for example, an original cookie modified by adding cheese or chocolate to produce cheese or chocolate cookie

Focus Question:

How do I use my senses to create a new product?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Through a project based approach students will be able to apply **Creativity & Innovations** in developing a new food product.

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Through a project based approach students will be able to **Explore Methods & Procedures** in modifying recipes and preparing a new food product.

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Through a project based approach students will be able to **Apply Solutions** in creating a new food product.

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Through a project based approach students will be able to developed awareness of a range of **Career Pathways** in Food Production

THEME: Scientists on the Go

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.

SCIENCE ATTAINMENT TARGET:

Be aware of food nutrients, their importance, food tests (fats and starch), and the process by which plants produce food.

MATHEMATICS ATTAINMENT TARGETS:

Use The correct units, tools and attributes to estimate, compare and carry out the processes of measurement to given degree of accuracy.
 Collect organize, interpret and represent data and make inferences by applying knowledge of statistics and probability.

TECHNOLOGY STANDARDS:

Students will develop the abilities to apply the design process. Develop, test and evaluate the solutions for the design problem.

Focus Question: How do I use my senses to create a new product?**Attainment 1: Creativity and Innovations****Students will:**

Working in groups, select a snack (e.g. cookie, milk etc.). Taste the snack and analyse the taste, texture, nutrition contents etc. Use a “SCAMPER” worksheet to explore ways to modify the snack to create a new nutritious product. Sketch the proposed packaging and present the new product idea.

Working in groups, conduct a mini research within the school community to find out what snacks children buy and why they like them. Collect and analyse the data and create a graph to show why children like or dislike various foods. Publish the findings.

Research, Critical thinking

Problem Solving,

Sample

Analyse, Design,

Creativity

Discuss, , Taste

Report (verbal, written)

Plan, Critique,

Investigate

Describe, Explore

Navigate digital content on websites and storages devices

Rate sheet to record and analyse taste-test

Sensory evaluation checklist

Peer assessment of product made

Food group interactive chart shows evidence of concepts learnt

SCAMPER worksheet completed correctly

Project grading rubric

Attainment 2: Explore Methods and Procedures

Discuss nutrition related problems affecting children, and brainstorm for solutions to the problems. Read about various nutrition related terms, for example: food, nutrition, nutrients, etc. Use a vocabulary activity (e.g. The 4-Fold vocabulary activity) to define and reinforce assigned words/terms.

Brainstorm to identify reasons why a variety of foods are eaten and the benefits of these foods to the body. Discuss the six Caribbean food groups. Create a food group chart by cutting out pictures of foods and pasting them under the appropriate food groups (chart may be done electronically). Use an interactive food group chart as culminating/evaluation activity.

Students will:

Invite a representative from a Food or Beverage company or self-employed person from the community to introduce the products they offer for sale. The resource person should brief students about the reasons for producing a variety of products and briefly outline the process/stages in the production of a product. Where possible students can go on a field trip to a food processing plant to observe food production process. Use a concept map e.g. T-chart to prepare a report.

Use the internet or offline media to conduct information search on the role of sensory scientist and other careers in food development and present the information in a creative way to the class (role play, drawing, podcast, movie etc.)

Attainment Target 3:

Modify a recipe to develop a nutritious new product. Prepare a plan of work for making the product. Use a computer or other electronic devices to prepare a flow chart to outline the production process for the new product. Identify the tools and equipment needed to prepare the product.

Collect the tools, equipment and ingredients required to make the new food product. Set up a work area. Read and follow a recipe and make the new product. Observe hygiene and safety practices while preparing the products.

Set up a sensory evaluation team to test and critique samples of the product. Panellists will provide feedback on the product, using a sensory evaluation form. Use the information from the sensory evaluation to make modification to the product until a desired product is achieved.

Identify suitable packaging material for the product developed. Give reason (s) for the choice of packaging material, giving consideration to sustainability and the environment. Use the computer to design a suitable label for the packaged product.

Students will:

Set up a display and sampling area for the finished products. Showcase the new, nutritious product and also display information on the benefits of eating healthy nutritious foods.

Evaluate the project against the design criteria. (Taste, nutrition, presentation etc.)

Attainment 4: Career Awareness

- Observe rules and procedures for working in a group.
- identify personal strengths, interests and abilities as observed in completing the project

Learning Outcomes

Students will be able to:

- ✓ Create a food group chart
- ✓ Conduct local research to ascertain food likes and dislikes
- ✓ Modify a recipe
- ✓ Develop a new food product
- ✓ Identify suitable packaging materials for products developed
- ✓ Conduct sensory evaluation
- ✓ Design a food label
- ✓ Display samples of new food products

Points to Note

There are opportunities in this section to link with Science, Mathematics, Technology and Language Arts.

For example:

1. Science nutrition related concepts are taught such as nutrients and using the tongue and its four basic tastes to identify food
2. Language Arts- descriptive writing
3. Technology – using the computer and the internet to conduct research and design label.

Maths – measurements and calculations

Extended Learning

- Encourage students to modify recipes/ dishes prepared at home to create a new product.
- Visit the Scientific Research Council and discuss what assistance they provide in product development.
- Research the latest technology/equipment been used in the manufacturing a chosen food product

Resources

Selected food products (snacks) for sampling e.g. banana chips, biscuits, peanuts, milk, juices, others.

Ingredients for product development: flour, sugar, milk, butter, others depending on the product to be made.

Measuring cups and spoons; plates; napkins; cups; forks

Mixing bowls, wooden spoon, display board, paper; pencil;

Other necessary items required depending on the type of product developed.

Key Vocabulary

Label
Representative
Tongue
Technologist
Production
Product development
Nutrition
Critique
Recipe
Hygiene
Analyse
Modification
Scientist
Sensory
Sensory evaluation
Recipe
Package
Product


INTERACTIVE CHART

For the interactive chart the teacher will make a blank Food Chart with just the title and the subheading for the different food groups (Caribbean Food Groups must be used, these include -Staples Food from Animals, Legumes, Fruits and Vegetables). The teacher will cut out pictures of foods from the different food groups, put a piece of tape (cello or masking) at the back of the pictures and tape them under the student’s desk or chair before class. Towards the end of the lesson the teacher will mount the blank food chart on the board and ask students to look under their desk to find the pictures of the foods and come to the board and tape them under the correct food group. Teacher and students will discuss the placements and make corrections where necessary. This serves as both a culminating and evaluation activity. N.B. words of the foods (e.g. Yam, Apple) can be used in cases where pictures are not available.

The 4-Fold Vocabulary

In this activity, students fold their papers into rows of 4 sections each. The number of row can relate to the number of words to be studied. In the first section, the student writes the word. In the 2nd section, the student writes a definition of the word in their own words. In the 3rd section, the student draws a picture or symbol to represent the word. In the 4th section, the student writes a sentence with the word based on their definition.

After completing the page, the students cut apart the sections and put them in an envelope. The words are review by having student reassemble the word rows. Students can trade rows/envelopes with others.

Word	Definition	Picture	Sentence
Oven	kitchen appliance used for baking or roasting		We baked cookies in the oven.

The T- chart is used to help students graphically organize thought. Students can use this concept to describe the stages involved in the production in one column and the outcome in the other. Example of a T- chart

Description	Outcome

Careers In Food Development

Examples of careers in food development include:

Food Service Manager, Test Kitchen Manager, Food Technologist, Flavour Chemist, Researcher, Food Scientist, Food Chemist, Quality Assurance Specialist, Food Plant Production, Health Inspector, Food Photo Journalist, Public Relations for a Food Business and Advertising Specialist.

SCAMPER

SCAMPER is an acronym which stands for substitute, combine, adapt, magnify, put to other use, eliminate and rearrange. It is based on the notion that everything new is a modification of something that already exists. Each letter in the acronym represents a different way to modify the characteristics of what is challenging you to trigger new ideas:

To use the SCAMPER technique, first identify the product you want to modify, and then ask the following questions:

- **S (Substitute):** What can I substitute in this recipe?
- **C (Combine):** How can I combine ingredients to make a different product?
- **A (Adapt):** Which ingredient can I adjust?
- **M (Magnify):** Which ingredient can I increase?
- **P (Put to Other Uses):** How else can I use the ingredients?
- **E (Eliminate):** Which ingredient can I eliminate?
- **R (Rearrange):** What can I change in this recipe?

These questions will help you to think differently about the product and eventually come up with innovative solutions to the problem

Recipe Modification

When modifying recipes, it is best to make one modification in a recipe at a time. Reduce or increase the amount of the ingredient to be modified by a small amount at first. Try additional modifications in the recipe later. Suggested recipes that can be modified to make a nutritious product include: beverages, cookies, sandwiches. Students should be encouraged to utilize local available ingredients such as fruits and vegetables. For example lemonade can be modified to a mango drink making use of mangoes.

Plan of Work should include the following:

A list of ingredients,

A list of the tools and equipment

Sequential outline of the steps involved in the making of the product.

Product Development Steps

1. Explain the idea
2. Conduct a market research (short questionnaire to find out what children like)
3. Finalize your idea
4. Finalize recipe
5. Make product
6. Conduct Sensory Evaluation
7. Selection and Modification (Based on the feedback given by sensory panelists this step can take place until the ideal product is achieved)
8. Make the final Product
9. Packaging and Labelling
10. Marketing

Sensory Evaluation

Sensory Scientists and Sensory Evaluation

Sensory scientists ensure that our food tastes as it should and is good to eat.

Sensory evaluation is a scientific discipline that analyses and measures human responses to the composition of food and drink, e.g. appearance, touch, odour, texture, temperature and taste. It provides an ideal opportunity for students to evaluate and give feedback on their dishes, test products and experimental designs. Sensory evaluation can be used to:

- compare similarities/differences in a range of dishes/products;
- evaluate a range of existing dishes/food products;
- analyse food samples for improvements;
- gauge responses to a dish/product, e.g. acceptable v unacceptable;
- explore specific characteristics of an ingredient or dish/food product;
- check whether a final dish/food product meets its original specification;
- provide objective and subjective feedback data to enable informed decisions to be made.

The five senses are used to give us information about food. There are three types of Sensory evaluation testing. These include preference testing, discriminatory testing and attribute testing. Preference testing is used to find which of the dishes people like best. Discriminatory testing is used to see if people can tell the difference between two samples. Attribute testing describes what you want your finished dish to look like.

Sample of a Sensory Evaluation Form

Recipe Name: _____

Directions: Circle one rating for each of the following: Appearance, Taste/Flavor, Texture/Consistency, Aroma/Smell, and Overall Acceptability

Appearance	Extremely Attractive	Moderately Attractive	Attractive	Not very attractive	Unattractive
Taste/Flavor	Excellent flavor	Very good Flavor	Acceptable flavor	Not very flavorful	Unappealing Flavor
Texture Rating	Excellent texture	Very good texture	Good texture	satisfactory	Unsatisfactory texture
Aroma/ Smell Rating	Excellent aroma	Very good aroma	Good aroma	satisfactory Aroma	Unsatisfactory aroma
Overall Acceptability	Extremely Acceptable	Moderately Acceptable	Acceptable	Moderately Unacceptable	Unacceptable

Types of packaging materials used in food production

Paper and Carton- Some food products are packed in paper bags or carton boxes. Sealed paper bags protect sugar and flour, because bags allow them to “breathe” as much as needed. Products packed in carton boxes (like cereal and crackers) are usually put in a plastic bag prior to the box, for additional protection.

Plastic- The food industry uses plastic widely for food protection in the form of bags, films, containers and boxes. Plastic bags allow for printing and perforation and hold food like bread, chips, cereal and many others. Cling films work for meat protection mostly.

Foam- Foam (usually Styrofoam or polyethylene foam) is a good insulator. It becomes cups, trays and boxes. The trays combined with the cling films serve as meat protection. Foam boxes, mostly in the fast food industry, keep food warm for an extended time.

Glass- Glass bottles and containers (jars) are mostly used to protect liquids and sauces. They break easily, but offer good protection and preservation and are recyclable. A paper label made of thin film lists the product information and attaches to the glass packaging.

Metal- Manufacturers also pack food and beverages in metal cans, usually made of aluminum and steel. Metal can have an airtight seal, so it is used to pack food that needs an extra long preservation time (vegetable, fruit, fish, soup). Bisphenol-A (BPA), sometimes used for inside coating, protects food from contamination by the metal can during the heating process to kill bacteria.

Adhesives- Some products (like fruit and vegetables) have a label attached directly on them. The label offers information about the producer and usually contains the internal code of the store, to be easily identified and charged. The adhesive used for these labels comes directly in contact with the food. It is safe and does not change the nature, substance or quality of the food

FOOD LABELS

Food labels should have the following information:

1. Name of the product
2. Manufacturer’s name and address, telephone number, email address
3. Ingredients in descending order of weight
4. The shelf life (use-by or best-before date)
5. Storage instructions
6. Country of origin
7. The weight
8. Instructions for use



GRADE 5

RESOURCE & TECHNOLOGY

BUSINESS BASICS
UNITS OF WORK

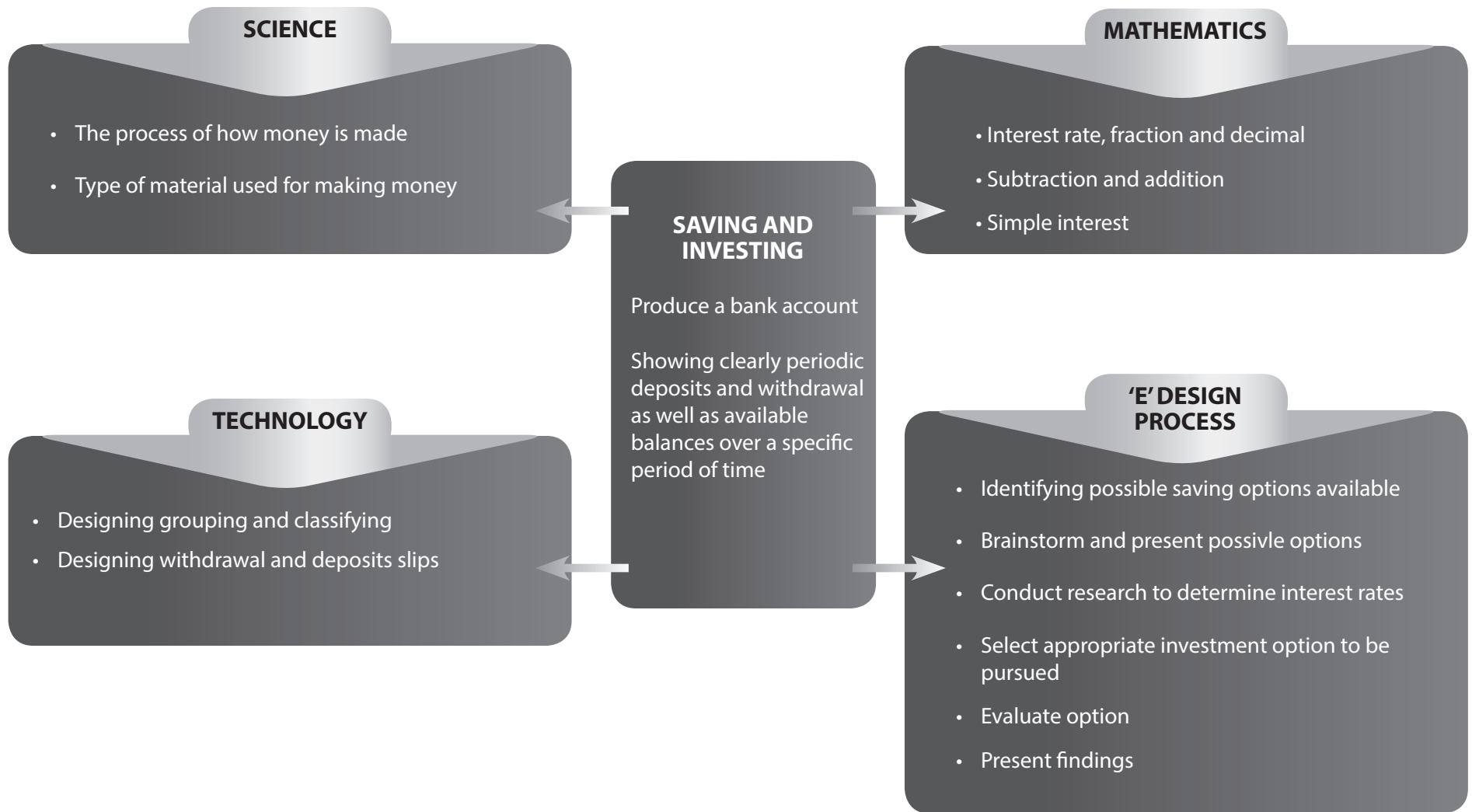
MODULES	UNIT	CONTENT	SKILLS
<p>Business Basics</p>	<p>Saving & Investing</p>	<ul style="list-style-type: none"> • Reasons for saving and investing money • Differences between short-term and long-term goals • Difference between saving and investing • Steps/strategies for setting goals saving and investing • Terms associated with saving and investing e.g. goals, short-term, long-term, saving, investing, bank • Various ways of savings • Sources of savings • Advantages and disadvantages of saving and investing in different institutions • Steps in developing a successful plan for saving and investing to achieve financial goals • How to complete banks forms used for savings and investing .g. application forms, deposit and withdrawal slips • Procedures for conducting electronic banking transactions. • Steps in operating a savings account • Work collaboratively to simulate banking transactions for depositing money for saving 	<p>Differentiating</p> <p>Examining</p> <p>Comparing</p> <p>Defining</p> <p>Simulating</p> <p>Discussing</p> <p>Role playing</p> <p>Classifying</p> <p>Illustrating</p> <p>Analysing</p> <p>Designing</p> <p>Evaluating</p> <p>Reading</p> <p>Writing</p> <p>Completing form</p> <p>Calculating</p> <p>Typing</p> <p>Use standard browser features</p>

GRADE 5

RESOURCE & TECHNOLOGY

BUSINESS BASICS
SAVING AND INVESTING PROJECT





PROJECT: SAVING AND INVESTING

ABOUT THE PROJECT

The aim of the project is to develop students' understanding and knowledge of the importance of achieving personal and financial goals. It also seeks to introduce strategies for setting personal and financial goals and how to establish a plan to achieve those goals. Additionally, students will be given the opportunity to practise the concept of identifying personal financial goals and develop a process to achieve these goals. They will also be engaged in performing banking transactions which involve completing application forms, deposit, withdrawal slips and electronic banking activities.

RANGE OF CONTENT

The key concepts, skills, knowledge and attitudes students will learn in this project are:

- Reasons for saving and investing money
- Differences between short-term and long-term goals
- Difference between saving and investing
- Steps/strategies for setting goals saving and investing
- Terms associated with saving and investing e.g. goals, short-term, long-term, saving, investing, bank
- Various ways of savings
- Sources of savings
- Advantages and disadvantages of saving and investing in different institutions
- Steps in developing a successful plan for saving and investing to achieve financial goals
- How to complete banks forms used for savings and investing .g. application forms, deposit and withdrawal slips
- Steps in operating a savings account
- Procedures in conducting electronic banking transactions
- Work collaboratively to simulate banking transactions for depositing money for saving

Focus Questions: What are the benefits of saving my money?
 How can I save my money to achieve my goals?
 What is the difference between saving and investing?

Check that students can:

- Identify some reasons why people save their money
- Identify ways of saving their money
- Identify institutions for saving in their immediate communities

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Students will:
 devise a successful savings plan to achieve their financial goal
 prepare financial records

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Students will:
 examine various ways of savings identifying similarities and differences

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Students will:
 select and complete appropriate banking documents used in the process of savings
 explain the steps necessary to devise a savings and investment plan

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Students will:
 discuss roles performed by persons in the banking sector (savings and investing) e.g. tellers, customers
 observe the rules and procedures of working within a group

THEME: Saving and Investing

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DESIGNING AND PRODUCING - use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.



RESEARCH, CRITICAL THINKING, PROBLEM-SOLVING AND DECISION MAKING - use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems, and make informed decisions.

SCIENCE STANDARDS

Attainment Target 1. Exploring science and the environment– Grade 3
 Measure quantities to make comparisons and contrasts, identify simple relationships, draw conclusions from results and begin to use scientific Knowledge to suggest explanations.

TECHNOLOGY

T&S Standard 5
 Student will develop an understanding of the characteristics and scope of technology.

MATHEMATICS

AT1 Number Operation and application – Grade 3
 Use the basic operations, number relationships, patterns, number Calculators and dynamic software to compute and estimate in order to Solve real world problems involving fractions, percentages and decimals.
 Identify the value of notes and coins in the Jamaican currency and apply these values to the use of money to everyday situations using various combinations to show \$1000.

OBJECTIVES:

Students will:

- Explain the reasons people save and invest money
- Explain the process of how money is made
- Identify the material used for making money
- Define the terms associated with saving and investing e.g. goals, plan, and budgeting
- Differentiate between savings and investing
- Identify various sources of savings
- Examine different strategies/ways for saving and investing
- Compare the benefits of different saving and investment strategies
- Design a successful plan to save and invest to achieve short-term and long-term goals
- Apply simple math concepts to determine the future value of money (percentage)
- Identify various places for long term and short-term saving options.
- Create a personal budget
- Complete appropriate banking forms e.g. application, deposit slips and withdrawal.
- Outline the correct procedures when using electronic banking systems (online banking & ABM)
- Identify careers associated with savings and investing
- Simulate roles of bank tellers, customers, floor assistant to deposit money (savings)
- Maintain a record of savings and calculate balances
- Assess savings plan to determine if financial goal would be achieved

Focus Questions:**What are the benefits of saving and investing my money?****How can I save/invest my money to achieve my goals?****What is the difference between saving and investing?****Students will:**

- Indicate if they save and identify reasons for doing so
- Watch a digital presentation on the concept of setting 'short-term' and 'long-term' goals, then play game to reinforce these concepts.
- Students make a list of items they would like to acquire or teacher provides a list of items to be acquired. Classify items which require less time to save as short-term and those items which require more time to save as long-term. Items should include video games, bicycle, money for the movies, cell phones, laptop, clothes and snacks.
- Read /listen /view the story of the 'Ant and the Grasshopper" or any other story that further illustrates the concept of short-term and long-term savings.
- View video presentation of the process of how money is made or conduct research on the internet/books on the process of making money.
- In groups make a presentation on the process of making money using suitable pictures, diagrams, video etc.
- In groups students will examine samples of notes and coins, students will then identify the features and characteristics of each.
- Discuss the concept of savings and investing illustrated in the story.
- Discuss scenarios/watch digital presentations to differentiate between saving and investing e.g. money saved in the bank for to buy a car (Investment) money saved in a piggy bank.
- Identify sources for saving and investing e.g. running errands, saving from lunch money, gifts, salary/wages
- Conduct research, call or visit a local bank and ask information regarding opening an account. Then Complete chart to compare the account: Institution, minimum balance, account type, interest rate, compound or add on, payment option etc.
- Make a list /view a digital presentation of places where money can be saved or invested and the benefits associated with each e.g. bank –money is safe and interest is earned,

- Differentiating
- Examining
- Comparing
- Defining
- Simulating
- Discussing
- Role playing
- Classifying
- Illustrating
- Analysing
- Designing
- Evaluating
- Reading
- Writing
- Completing form
- Calculating
- Typing
- Use standard browser features

Accurate ABC plan for achieving financial goal

Understanding of how to keep a Savings Account Record accurately

- Design a saving and investment plan to achieve an item they would like to purchase but cannot afford to purchase immediately using the ABC plan
- Evaluate saving and investing plan created to determine if the outcome will be achieved
- Draft a simple personal budget for their weekly allowance or lunch money that will enable them to save towards a specified short term goal.
- Invite resource personnel from banking institution to give talk on how to open bank account; various saving options; electronic banking facilities and provide opportunities for students to open personal saving accounts.
- Complete pre-designed application forms used for opening bank accounts.
- Conduct virtual tour or visit a commercial bank to observe the procedures for using electronic banking services (deposit and withdrawal).
- Create pictorial to illustrate the use of electronic banking systems (ABM, online banking) using visuals or computer aided tools.
- View a video presentation highlighting good customer service practised by a bank teller and discuss importance of good customer service
- Role play and record using a recording device of banking activities (simulate roles performed by tellers and customers when open savings accounts)
- Critique the video recording highlighting the good customer service skills identified in the role play
- Complete chart/worksheet to show the future value of a sum invested at varying rate of interest (5%, 10%, 15%) for specific time periods (1, 2, 5,10 years)
- Produce a bank savings account. Students will record entries of dates and amount of money deposited and withdrawn. Balances must be shown e.g. March 20 \$50 was deposited, March 30, \$5.00 was withdrawn. Students will use counterfeit notes and coins sourced from the internet

Learning Outcomes

Students will be able to:

- ✓ Explain the importance of savings and investing
- ✓ Differentiate between saving and investing
- ✓ Establish a successful plan to achieve a financial goal
- ✓ Explore options of digital banking .e.g. opening of online bank account or pay pal account.
- ✓ Communicate respectfully and safely online with peers.

Points to Note

Saving is generally to meet short-term goals and is used to acquire inexpensive items or pay for emergency

Investing is generally done by adults to meet long-term goals e.g. to buy house or motorcar

Goal - a plan outlining how something desired will be achieved

Budgeting- the process of planning how to spend ones income.

ABC Saving Plan to set financial goal

Students identify items from magazines or catalogues they would like to acquire

Aim – identify an item you want and attach the price of the item

Bank – identify where the money will be saved to acquire the item

Coins/currency (money) – identify sources from which money will be saved

Institutions for Saving and investing – commercial banks, credit union, insurance companies, building societies,

Remind students to:

- Follow guidelines to promote healthy use of ICT tools.
- Demonstrates safe, respectful, responsible and clear online communication
- Recognize and understand the importance of technology access for all.
- Budget (an estimate of income and expenses over a specific future period.)

Extended Learning

Have students interview an adult or a parent about the role money plays in his/her life e.g.

- How do you earn money?
- What do you need to spend money on?
- What percentage of your money is deposited in a savings a/c?
- What long-term purchases are you saving for?

Have students scrutinize records kept by parents of their savings and investments (**if parents are willing to share the information**)

Students ask their parents to collect sample application forms, deposit and withdrawal slips from commercial banks or teacher collects or designs sample forms used in the banking system

Have students create/design their own money to be saved in the simulated banking activity

Explore saving and investment websites that are students friendly to learn more about money management

- Internet access, recording devices e.g. camera, cell phone, speaker
- Magazines or catalogues with pictures of items
- Samples of bank forms used in the savings and investment process e.g. application forms, deposit and withdrawal slips
- Sample template of ABC Saving Plan (see sample)
- Story of the Ant and the Grasshopper (available on the internet)
- Sample of Bank Savings Account record containing five columns to record date, amounts deposited, withdrawn and balances
- Computer, speakers, DVD/CD player, Internet

- Goal, opportunity cost, short-term, long term, investing, bank, deposit, withdrawal, saving, investing, application form ,budget, budgeting, E-banking, Online banking

NAME _____

ABC Saving Plan

Aim/Goal Draw or paste a picture of an item you would like to have but you cannot afford to buy just now
Put the price of your goal inside the price tag.

Bank Write where you plan to save the money to buy the item a piggy bank or jar at home a savings account at a bank

other _____

Coins and Currency The money I save will come from

- my allowance
- pay for chores
- gifts
- other _____

Draw a picture of your opportunity cost. (anything that will be given up to achieve your goal)

The background of the entire page is a grayscale photograph of architectural blueprints. A large sheet of paper with various technical drawings, including floor plans and structural diagrams, is spread out. In the upper left corner, a white rolled-up document is visible. The lighting is dramatic, with strong highlights and deep shadows, creating a professional and technical atmosphere.

GRADE 5

RESOURCE & TECHNOLOGY

**ENGINEERING & MECHANISMS
PROJECT: THIS LITTLE LIGHT OF MINE**

PROJECT: THIS LITTLE LIGHT OF MINE

ABOUT THE PROJECT

A local light amplification company has approached several schools in Jamaica about the design and development of simple light solution for kids. The light solution will be marketed to young children in preparation for the upcoming hurricane season in an effort to build self and disaster awareness. Your design should be simple to make and easy to use, also it is recommended that participants work in design teams of three to five individuals.

This project involves the use of electrical energy from a battery source to provide a desired result (in this case light). This is intended to expose students to the possibilities that exist in the field of electrical engineering, while developing student's basic manipulative skills when connecting components of simple circuits and overall assembly of a portable lighting device/system. It is also expected that students will begin to realize or see the direct link between scientific principles and electrical mechanism in determining basic solutions to everyday tasks, problems or needs.

RANGE OF CONTENT

RANGE OF CONTENT are project specific, and cover key concepts, skills, knowledge and attitudes students will learn in Resource & Technology at Grade 5.

1. Key terms and concepts related to energy sources and circuit design
2. Types of energy sources
3. Uses of energy
4. Discovering current flow
5. Types of circuits (simple circuits)
6. Components of a circuit
7. Circuit design and construction
8. Safety in work
9. Careers offerings in the energy and electrical engineering sectors
10. Powering your home, school and community
11. Product design and functionality

SCIENCE

- Energy and forces: explain the different forms and types of energy sources
- Classification of materials
- Identifying reversible and irreversible changes in materials

MATHEMATICS

- Compute with whole numbers, decimals and fractional numbers quickly and accurately
- Know and use relationship between measurement to determine perimeter and area
- Make and explore geometric shapes and their application
- Manipulating equations and formulas

WHAT IS BEING ASSESSED?

Using chemical energy to power a flashlight

'E' DESIGN PROCESS

Define problem by exploring the context which the problem is to be solved
Generating ideas based on existing problem and design solution(s)
Select solutions based on exploration of material, efficiency, costs and ease of convenience
Test the solution by a set of predetermined features
Provide/produce a solution focusing on safety, accuracy and efficiency
Evaluate solution against the original/modified problem, plan or design
Present results clearly/accurately using a range of ICT tools

TECHNOLOGY

- Interpreting and computing data
- Sketching/drawing
- Design visual representation of the solution
- Measuring and laying out of parts and components
- Formatting and modifying designs
- Using a range of tools to apply appropriate finishes

- i. Students are familiar with the materials required for this project, e.g. batteries, bulbs and other locally available materials.
- ii. Students have constructed projects to satisfy personal needs.

Focus Question 1: How can we use electricity to achieve a desired outcome?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Students will:
explore different approaches used to arrive at the final design of the flashlight to be constructed

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Students will:
gather information and resources necessary to effectively design and construct a working flashlight
demonstrate an awareness of the safety precautions to be observed at each stage of the project

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Students will:
create visual images of their personal design ideas of the flashlight
follow a series of instructions in the execution of tasks to have a fully functioning portable flashlight

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Students will:
identify the technological applications related to the design and construction of the flashlight in the field design and engineering
observe the rules and procedures of working within the environs of the classroom/lab along side their peers

THEME: Saving and Investing

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DESIGNING AND PRODUCING - use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.



RESEARCH, CRITICAL THINKING, PROBLEM-SOLVING AND DECISION MAKING - use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems, and make informed decisions.



DIGITAL CITIZENSHIP - Recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.

OBJECTIVES

- Identify electrical energy sources for devices such as fans, flashlights, calculators, and radios
- Discuss the importance of electrical energy in our daily lives.
- Explain how a simple circuit used in a building or electrical device operates with the aid of a diagram
- Identify the basic components of a flashlight circuit.
- List possible resources needed to complete personalized designs of the flashlight housing.
- Identify basic materials which are used in the construction of simple electrical devices. In the case of the flashlight, cardboard, copper wire, tape etc.
- Create personal designs of a working portable flashlight.
- Use simple diagrams to illustrate the layout of a flashlight circuits.
- Explain the operation of simple electrical equipment as demonstrated by teacher (in this case the flashlight).
- Analyze the engineering process utilized in designing a flashlight or any simple electrical item

OBJECTIVES CONT'D

Practise safety precautions which must be observed when making simple circuits.

Use basic hand tools to construct and assemble a working portable flashlight.

Apply appropriate finishing application to completed project.

Critique the assembled project for neatness, accuracy and functionality using a prescribed checklist and rating scale.

Evaluate the final assembled project of the portable flashlight against original need.

Suggested Teaching and Learning Activities

Students will:

use online and offline sources to access pictures of various types of flashlights and ask students to critique the overall design by highlighting what they perceive to be the qualities of a good flashlight. At this point the teacher will share with students, information from the project notes, on the developments in technology that led to the invention of the first flashlight (web based/other digital or print format).

The teacher will discuss with students the qualities of a good flashlight based on a number of design features to include but not limited to: ease of handling and care, brightness: beam of light, size and shape, ease of use of the on and off switch, durability of housing for batteries and wires and design of electric circuit.

Students will then create their own unique design of the flashlight housing based on a preferred mood or theme. Students will express these ideas in class and make simple sketches of these for the teacher to view. Students will have the option to create designs using digital drawing tools.

Students will be shown both a schematic diagram and the cross sectional view of the flashlight to determine how the components are connected in order to make a simple circuit.

Teacher will demonstrate to students how to assemble the components of the

Key Skills

Make observation
Navigate digital content
Question and explore solution to needs or problems
Discuss
Identify
Design and draw solution to identified problems

Interpret drawing
Measure and layout accurately and efficiently

Calculate accurately with respect given instruction and information

Assessment Criteria

Checklist developed addressing all aspects of the project.

Project will also be subjected to peer assessment.

flashlight (from the completed sample project package).

Students will identify the components of a simple flashlight assembly and discuss the materials which could be used to make each component

Students will examine features of each component. For example, batteries, conductors, bulb.

Students will use table features of appropriate software to make a material list of all the resources needed to complete their personal designs of the flashlight's housing.

Teacher will review list of resources and make adjustments where necessary.

Construct the housing for the main components of the flashlight

Use appropriate adhesive strip to connect flashlight assembly, e.g. battery to battery (in the case of two batteries) and conductor to battery and bulb.

Fit batteries in cardboard (housing) assembly and cut copper wire to required length. (Strip 2.5 cm off end and connect wires to the base of the battery (negative) and pull through wire to be connected to bulb.

Connect wires by attaching them to the screw thread and electrical foot contacts of the bulb

Cut from refined compressed cardboard the conical shade for the light and attach to the main housing (alternative solution: affix paper cup to main housing.)

If conical shade is made from cardboard as indicated above, this will be completed with the use of masking tape or glue to secure ends.

Use cardboard strip to fit bulb firmly and use tape to anchor this assembly to conical shade.

Use cutting tools safely
Use digital drawing tools
Assemble components accurately
Analysis information
Connect components
Evaluate solution against original design
Plan

Insert tables

Suggested Teaching and Learning Activities

Key Skills

Assessment Criteria

Use available adhesive tape and other joining methods to put entire assembly together.

Cover shade with plastic as a protective lens after installing a reflective material at the base of the bulb and on the inside of the conical section of the flashlight

Complete with finishing material of your choice

Discuss careers that are connected to this type of project and other electrical orientated jobs e.g. electricians, electrical engineers, prop designers and inventors. Use internet to conduct research on careers associated with the project.

Capture image of project and save to computer or removable storage.

Evaluate project against design criteria

Post images captured to class blog or other online forum, respond to and comment on the designs of images posted by other class members.

Identify the technological applications related to the design and construction of the flashlight in the field of design and engineering

Observe the rules and procedures of working within the environs of the classroom/lab along side their peers

Test the functionality of the portable flashlight

Evaluate the project against design criteria

Conduct electronic search

Capture image
Save files
Communicate and collaborate online

Learning Outcomes

Students will be able to:

- ✓ Produce simple schematic drawings of lighting device
- ✓ Construct housing to accommodate electrical components
- ✓ Fit components of into portable housing
- ✓ Connect conductor to load and source
- ✓ Identify given careers in connection with the project
- ✓ Complete the design and construction of lighting device
- ✓ Evaluate project design against set criteria
- ✓ Use internet to conduct research on careers associated with project
- ✓ Use digital tools to communicate designs
- ✓ Communicate and collaborate online, respond to and comment on designs of peers.

Points to Note

There are opportunities in this section to link with Science, Mathematics, Social studies and Language Arts.

For example:

1. Science related concepts are taught such as force, energy and forms of energy construct ion of devices to keep things hot or cold
2. Language Arts- research and reporting
3. Social Studies – to examine how people lives have evolved over time
4. Technology – using the computer and the internet to conduct research, view pictures and videos and to complete worksheets
5. Maths – measurements, calculations and construction of basic shape and solids
6. Students should be encouraged to practise safe behaviour when using digital media or searching for information on the internet.
7. Students at this point should be exploring the use of 2D and 3D software tools to develop their sketches and drawings (for example microsoft paint and google sketch up tools)

*Health and Safety issues need to be taken into consideration as students will be using sharp tools in the execution of the project.

Extended Learning

Students will understand that the flashlight assembly can be applied to a number of other situations. E.g. moving mechanisms such as fans and sound mechanisms such as bells and buzzers.

Suggested resources needed for this project will include but are not limited to the following list:

- i. 2 D size cell batteries or (AA batteries)
- ii. 45 cm long number 22 insulated copper bell wire with approximately 1" of insulation stripped off all ends
- iii. Cardboard tube (toilet tissue or paper towel) cut to appropriate length.
- iv. 3-volt flashlight bulb
- v. 1" x 3" cardboard strip
- vi. Paper clip/switch based on design.
- vii. Tape (Electrical, masking etc.)
- viii. Paper cup.
- ix. Project notes and diagrams
- x. Drawing software for 2D and 3D sketches and designs
- xi. Computer
- xii. Internet

- Circuit
- Current
- Battery
- Conductor
- Source
- Safety
- Design
- Housing
- Electrons
- Electrical engineering
- Prop design
- Component
- Reflective
- Transparent
- Protective
- Voltage
- Load
- Insulator
- Electricity

NATIONAL STANDARDS CURRICULUM GUIDE

GRADE 6

RESOURCE & TECHNOLOGY

There are four (4) key Strands and the associated Attainment Targets within Grade level.

STRAND 1:

At the end of this project, students will be able to apply **Creativity & Innovations** in the solution of problems

Students will be able to:

- identify needs or problems by observing or thinking about a range of design contexts in the environment
- explain understanding of a design task
- brainstorm possible solutions for a problem
- select from a range of alternatives, the most appropriate solution to an identified problem
- understand that people create solutions to satisfy a particular need
- use expressive language to describe the process effecting a solution to a given problem
- explore different approaches in arriving at the most appropriate solution to a design problem

Application of Design Principles

- Evaluate product/s for functionality, proportion, appearance, strength, purpose and context.

Appraise goods/services

- Examine possible solutions to problems
- Financial records

STRAND 2:

At the end of this project, students will be able to **Explore Methods & Procedures** in solving problems

Students will be able to:

- critique product designs; identify differences/similarities
- understanding that the making of a product is a series of steps
- discuss the role of technology in the development of an identified product
- gather information, data, and images necessary to plan the solution to a given problem.
- create simple drawings/designs, and verbalize ideas
- identify materials and resources required to execute a project
- use simple tools and equipment to execute specified tasks
- demonstrate awareness of the safe and hygienic use of tools and equipment

There are four (4) key Strands and the associated Attainment Targets within Grade level.

STRAND 3:

At the end of this project, students will be able to **Apply Solutions** to an identified need

Students will be able to:

- interpret a design brief
- create a visual image of an idea
- select appropriate materials, tool, and equipment to answer a specified need
- explain the steps necessary to effect a solution
- manipulate simple equipment, tools and materials to execute a simple task
- understand the value of working as a team.
- follow instructions in the execution of a task
- differentiate materials, tools and equipment
- evaluate an outcome against a given design brief

Plan a project outline

- Apply scientific method/observation, procedures, deductions, and conclusions to project development and implementation
- Perform independent tasks as required

Present and describe project outcomes

- Create individual projects with intervention and support
- Present project outcomes in a variety of ways
- Evaluate the successes of processes and solutions

Design evaluation

- Use descriptive language to explain understanding of simple systems, technologies and processes
- Determine whether a particular design outcome solves the stipulated problem

STRAND 4:

At the end of this project, students would have developed awareness of a range of **Career Pathways**

Students will be able to:

- discuss enjoyable activities in a given project.
- compile a list personal attributes
- identify personal strengths, interests and abilities as observed in completing this project
- identify technological applications in a given project
- identify technological applications in 'real world' situations
- discuss some jobs that may be related to this project
- demonstrate an awareness of a range of occupations held by persons in the family and community
- identify skills and behaviours necessary to get along with others.
- observe the rules and procedures of working within a group

Set personal goals

- Explore the roles that they would like to pursue as adults
- Articulate possible career pathways/plans to enable achievement of likely careers
- Set simple goals and identify areas of improvement

Develop participation skills

- Develop appropriate work habits and routine
- Participate in group activities
- Identify skills and behaviours necessary to get along with others.
- Observe the rules and procedures of working within a group

Learn about life and work

- Describe work that people do
- Identify skills that are needed for different careers
- Identify volunteer situations in their communities.
- Demonstrate civic/community responsibility
- Describe roles that people undertake within their communities

GRADE 6 RESOURCE & TECHNOLOGY

AGRICULTURE FOR SUSTAINABLE DEVELOPMENT

PROJECT: GROWING SELECTED VEGETABLES



AIM OF RESOURCE & TECHNOLOGY:

The aim of Technical-Vocational Education Training (TVET) integration at this level is to foster students' awareness of foundational technical skills and their relationship to everyday problem-solving, as well as, to future careers and occupations. In a project-based format, students use the design process for problem solving in a range of technology-based design contexts. This exposure will continue to be articulated seamlessly into **Resource and Technology** at the Grades 7-9 level.

The study of Resource and Technology should enable students to become:

- Critical thinkers and problem solvers
- Confident, responsible and productive citizens
- Adaptable to changes in the world around them
- Aware of range of career options

RANGE OF CONTENT

Key concepts, skills, knowledge and attitudes students will learn in this project include:

- Parts of vegetables that can be eaten
- Some common vegetables
- Vegetables established from seedlings or direct seeding
- Preparation of seedbed/seedling trays for sowing seeds
- Plant/sow of seeds
- How to calculate germination percentage
- Care for seedlings: watering, weeding, pest control, fertilizing
- Line-out plot for planting vegetables
- Prepare holes (dig holes and in-corporate manure) for planting seedlings
- Transplant of seedlings
- Irrigate/water plants
- Importance of mulch
- Weeds control without the use of harmful chemicals
- Insects control without the use of harmful chemicals
- Reasons plants need nutrients
- Evaluating outcome of project against established tasks of successfully growing selected vegetables
- Resources used for growing vegetables
- Careers involving the growing of vegetables

Prior Learning

Check that students:

Some knowledge of plants in their environment

ABOUT THE PROJECT

This project aims to expose students to the importance of growing vegetables to the family and community, some common resources which can be used, and some activities involved in the growing of some popular vegetables, and, some focused careers associated with vegetable production.

TECH-VOC PROJECT GRADE 6 - Project: Growing Selected Vegetables**ATTAINMENT TARGET 1:**

Students will be able to apply **Creativity & Innovations** in growing selected vegetables

ATTAINMENT TARGET 2:

Students will be able to Explore **Methods & Procedures** in growing selected vegetables

ATTAINMENT TARGET 3:

Students will be able to **Apply Solutions** in growing selected vegetables

ATTAINMENT TARGET 4:

Students would have developed awareness of a range of **Career Pathways** related to growing selected vegetables

OBJECTIVES:

- Develop possible solutions to establish plot for growing selected vegetables
- Discuss the benefits of growing vegetables
- Create possible designs for a vegetable garden of given dimensions
- Select from a range of vegetables, the most appropriate vegetables for the garden
- Select from a range of growing media, the most appropriate for the selected vegetables
- Use terms associated with the growing of vegetables e.g. fertilizer, manure, irrigation, mulch, drainage, containers, growing media, leafy vegetables, fruit vegetables, root vegetables, weeds, pests
- Consider and verbalise other resources which could be used for growing vegetables
- Identify resources required for growing vegetables
- Explain steps in establishing and maintaining a vegetable garden
- Demonstrate awareness of the safe and hygienic use of tools and materials
- Select appropriate materials and tools for establishing and maintaining a vegetable garden
- Explain the steps necessary for establishing and maintaining a vegetable garden
- Manipulate selected tools and materials to establish and maintain a vegetable garden
- Demonstrate ability to work as part of a team
- Follow instructions in carrying out steps necessary for the growing of selected vegetables
- Differentiate resources (natural and man-made) used in the growing of vegetables
- Evaluate success in the growing of vegetables based on the established goals
- Discuss enjoyable activities experienced in the growing of selected vegetables
- Compile a list of personal attributes
- Identify personal strengths, interests and abilities observed in the growing of selected vegetables

OBJECTIVES CONT'D:

- Identify technological applications used in the growing of selected vegetables
- List some occupations of persons associated with the growing of selected vegetables
- Discuss some jobs that may be related to growing of selected vegetables
- Identify some skills and behaviours necessary to work collaboratively.
- Observe rules and procedures of working within a group

Suggested Teaching and Learning Activities

Note 1: This project requires the teacher to do much advance preparation, including the appropriate research

Note 2: Use student groups as much as possible, and manage group dynamics/team work

Note 3: It may be useful if the teacher became familiar with the 'Rich Picture' concept

- Brainstorm – (the use of vegetables, parts eaten, where are they grown)
- Discuss reasons for growing vegetables
- Discuss/identify possible methods of growing vegetables
- Discuss some plants that can be grow effectively at the school
- Discuss some possible growing media that can be effectively used in growing vegetables
- Select suitable vegetables for the project
- Prepare growing medium/soil for selected vegetables
- Discuss steps in growing selected vegetables
- Discuss safe use of tools and materials
- Plant seeds or seedlings
- Protect/secure growing vegetables
- Carry out maintenance of growing vegetables e.g. irrigation, weeding, plant nutrition, mulching, pest control, harvesting.
- Discuss the classification of resources used in the project (natural and man-made)
- Evaluate the outcome of the project against original project objectives
- Discuss with students, their experiences in growing the selected vegetables
- Brainstorm with students, some skills, personal strengths/interests needed for growing vegetables
- Brainstorm with students, the integration of different subject areas in the project.
- Discuss some occupations/jobs in the society associate with the growing of vegetables.

Key Skills

- Arrange
- Calculate
- Classify
- Combine
- Compare
- Create
- Critique
- Cut
- Demonstrate
- Describe
- Discuss
- Evaluate
- Explain
- Identify
- Investigate
- Label
- Listen
- Measure
- Plan
- Recommend
- Research
- Review

Assessment Criteria

- Reasons for growing vegetables illustrated
- Methods of growing vegetables identified
- Growing medium for vegetable growing prepared
- Safety procedures observed
- Resources used safely
- Seeds or seedlings planted correctly
- Growing seeds/seedlings protected/secured
- Cultural practices carried out correctly and on time
- Resourced used in growing vegetables classified
- Outcome of project evaluated against intended outcomes
- Skills, personal interest/strengths as seen in growing vegetables identified and discussed
- Calculation done correctly
- Measurements done accurately
- Records kept accurately
- Basic analyses of projects done
- Research outcome on related occupation/ careers presented

Learning Outcomes

Students will be able to:

- ✓ Apply design considerations in laying out vegetable garden
- ✓ Select suitable resources for vegetable gardening
- ✓ Provide suitable irrigation and drainage for vegetable garden
- ✓ Prepare medium for growing vegetables
- ✓ Do accurate calculations related to producing vegetables
- ✓ Plant crops in containers (e.g. seeds, seedlings, suckers)
- ✓ Care of plants in containers
- ✓ Collaborate with group members in planning and executing a task
- ✓ Apply competencies/knowledge from other subjects to
- ✓ List occupations associated with plant production

Points to Note

Plants to be used may include vegetables: pak choi, cabbage radish, lettuce, string bean, callaloo, cucumber, tomato, pepper; ornamentals: cacti, flowering plants, foliage plants; herbs/condiments: parsley, celery, thyme, mints, escallion, fennel, leek, aloe vera.

Teacher may need to research resources available in the community, prior to project

Extended Learning

Students practice techniques in establishing and maintain container gardens at home.

Resources

- Natural Resources: Seeds, seedlings, suckers, plant cuttings, soil, potting medium, water, manure/compost,
- Man-made Resources: Various appropriate containers, knife, poly bags, ruler, measuring tape, watering cans, water hose, hand spade, hand fork, fertilizer, detergent, string for lining out

Key Vocabulary

- Container
- Seedling
- Seed
- Suckers
- Cutting
- Ornamentals
- Vegetables
- condiments
- Potting medium
- Manure
- Compost
- Node
- Internode
- Stem
- Setting
- Plant propagation
- Collaboratively/
Collaboration



GRADE 6

RESOURCE & TECHNOLOGY

BUSINESS BASICS
UNITS OF WORK



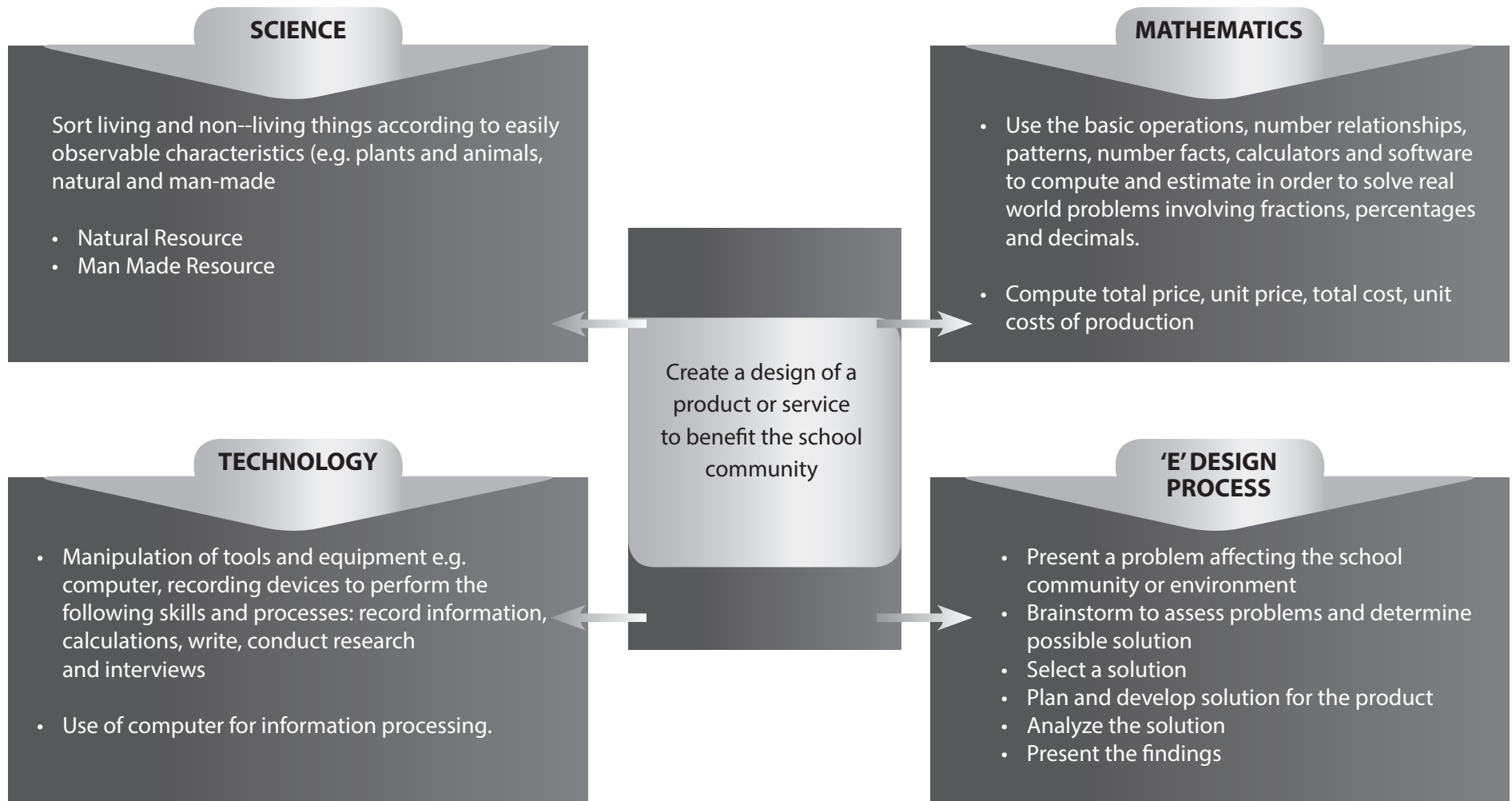
MODULES	UNIT	CONTENT	SKILLS
Business Basics	Early Entrepreneurs	<ul style="list-style-type: none"> • How to set up, operate and manage a business • Sources of raising start-up capital • Real-life problems faced by entrepreneurs • Terms and concepts associated in running a business e.g. capital, interest, entrepreneur, risk • Major functional areas of a business e.g. production, finance, sales, marketing, personnel • Tasks performed by employees in a business • Maintain simple financial records • Gain hands-on experience of operating a business • Careers associated with operating and managing a business • Good customer service skills • Demonstrate leadership skills • Demonstrate teamwork skills • Demonstrate organizational skills 	<p>Analysing</p> <p>Critiquing</p> <p>Discussing,</p> <p>Creating</p> <p>Designing</p> <p>Dramatizing,</p> <p>Organizing</p> <p>Managing</p> <p>Collaborating</p> <p>Observing</p> <p>Browsing</p> <p>Searching</p>

A black and white photograph of a woman with long dark hair, wearing a white blazer, smiling as she uses a smartphone. She is leaning over a railing, possibly on a staircase. The background is blurred, showing what appears to be an office or modern building interior.

GRADE 6

RESOURCE & TECHNOLOGY

EARLY ENTREPRENEUR



ABOUT THE PROJECT

The project aims to promote an entrepreneurial and innovative culture. Students will have the opportunity to turn their business ideas developed at Grade 4 into successful business ventures while at the same time experience some real-life issues associated with operating a business. The project is divided into three phases so that students will develop basic skills in setting up a business, acquiring the necessary business resources and operating a business.

RANGE OF CONTENT

RANGE OF CONTENT are project specific, and cover key concepts, skills, knowledge and attitudes students will learn in Resource & Technology at

Grade 6. • How to set up, operate and manage a business

- Sources of raising start-up capital
- Real-life problems faced by entrepreneurs
- Terms and concepts associated in running a business e.g. capital, interest, entrepreneur, risk
- Major functional areas of a business e.g. production, finance, sales, marketing, personnel
- Tasks performed by employees in a business
- Maintain simple financial records
- Gain hands-on experience of operating a business
- Careers associated with operating and managing a business
- Good customer service skills
- Demonstrate leadership skills
- Demonstrate teamwork skills
- Demonstrate organizational skills

Check that students:

- aware of the steps involved in identifying a business idea (Grade 4)
- of the process of identifying consumer preferences (Grade 4)

STARTING UP

- What type of business will I operate?
- What resources will I need to start the business?
- Where will I locate my business?
- How will I promote the good or service?
- What will be the name of business?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Students will:
Explore different business ideas to identify the most appropriate to meet preferences (needs and wants) of school community

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Students will:
Identify resources required to operate the business

Demonstrate an awareness of safety and hygiene in operating a business

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Students will:
Create a visual image of the business by designing a name/ logo

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Students will:
Discuss some jobs that may be created by a business

THEME: Planning and Organizing My Business

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DIGITAL CITIZENSHIP - Recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.

SCIENCE STANDARDS

Attainment Target 2 – Living Things and Life Processes – Life and Interdependence – Grade 5
Classify living and non- living things

MATHEMATICS STANDARDS

Attainment Target 1 – Number Operation – Grade 5
Use mathematical tools to carry out one step and two step calculations involving all four operations and interpret the display correctly in the context of money.

TECHNOLOGY STANDARD

Students will develop an understanding of the attributes of design

Students will develop the abilities to assess the impact of products and systems

Students will:

- Conduct survey using an appropriate instrument or research online to determine a business idea that can be set up in school community. Select the business idea which will best meet the needs of members of the school community. (Students can vote to select a business idea if several viable options are presented)
- View video presentation of an operating business or use a recording device to record the activities in the school canteen or tuck shop. Playback recording for class critique and discussion. Students will list the resources identified in the business
- Conduct tour of school and identify the most appropriate location from which to operate the business by considering the following factors; safety, hygiene, sanitation, closeness to customers (persons in schools), availability of infrastructure e.g. room for production, water. With teacher's assistance students can use recording device to capture the tour. Students could be asked to make multimedia presentation to the class for discussion.
- View list of business names from presentation software and state if names of businesses match product or services offered e.g. Juici Patties, Honey bun - product forms part of the business name
- In groups design/create a name for the business to be operated
- Evaluate business names created to arrive at the most suitable name
- In groups use any appropriate application software to design a logo for good or service
- View from online and offline resources a variety of promotional strategies used by businesses to promote the goods or services. These could include jingle, banner, flyer, advertisement in school website.
- In groups create promotional strategies using any appropriate software application for the service or good to be produced
- Critique promotional strategies to determine its effectiveness in promoting the good or service in the school community and then select the most appropriate

- Analysing
- Critiquing
- Discussing,
- Creating
- Designing
- Dramatizing,
- Organizing
- Managing
- Collaborating
- Observing
- Browsing
- Searching

Checklist to identify appropriate location to operate business

Effective strategies to promote good/service

Rubric produced to evaluate promotional strategies

Appropriate business name developed

Logo correctly designed to represent business concept

Learning Outcomes

Students will be able to:

- ✓ Identify a business that can be established in school community
- ✓ Create an appropriate name and logo for a business

Points to Note

The following are factors to be considered when choosing a location for a business:

- Nearness to the customers (buyers)
- Nearness to infrastructure e.g. water, electricity, building
- Access to disposal of waste
- Access to raw materials
- Access to labour (persons with the skills needed to perform necessary tasks)

Resources used in a business

- Financial Resources: money to start the business (capital)
- Human Resources: knowledge, skills and attitude required by persons to create the good or service
- Capital (physical) resources e.g. tools, machinery, building, raw materials

Strategies for promoting a good/service

Jingle, flyer, brochure, banner, advertisement, sampling, word of mouth

Business Name – unique name given to identify a business.

Factors to consider when designing a business name:

- should indicate the type of product or service being offered
- appeal to customers/client
- should be short and 'catchy'

Extended Learning

Students interview business persons to find out reasons for:

- selecting the type of business being operated
- setting up business in specific location
- selecting the name which identifies the business

Resources

- Computer, recording devices and any other available technologies, internet

Key Vocabulary

Financial resources, capital, capital resources, human resources, labour, promotional strategies, raw materials, consumers, customers, clients, infrastructure, advertisement, jingle, sampling flyer, brochure, business name, logo

Check that students:

- Some sources from which start-up capital can be raised
- Activities that are performed by employees in a business

SETTING UP MY BUSINESS

- What departments must I set up in the business?
- Who should I employ to work in my business?
- What skills should my employees have?
- How much money do I need to start the business?
- Where will I get money to start the business?
- What level of profit will I be able to make?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Students will:
Explore the different approaches to setting up the business

STRAND 2: APPLY SOLUTION

ATTAINMENT TARGET 3

Students will:
Create a visual image of the business by designing a name/logo

STRAND 3: CAREER PATHWAYS

ATTAINMENT TARGET 3

Students will:
Discuss jobs that will be performed by employees in this business

THEME: Planning and Organizing My Business (Part 2)

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DIGITAL CITIZENSHIP - Recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.

SCIENCE STANDARDS

Students should

- Identify the major departments of a business
- outline roles of employees
- Construct a simple organizational chart to depict the business
- Define terms e.g. capital, profit, interest, financial institutions, loans
- Calculate capital for business
- Outline the various means of raising start-up funds (capital)
- Select the most appropriate source of raising capital
- Calculate selling price

Students will:

- View video presentation of an operating business or use a recording device to record the activities in the school canteen or tuck shop. Playback recording for class discussion.
- Discuss the activities observed being carried out by the employees and ascertain their job titles
- List activities to be undertaken in the business selected e.g. clerical or administrative, buying/producing, selling, record keeping, promoting goods/service (job description)
- Organize activities according to departments in which they will be done e.g. selling of product or service (sales department), purchasing of raw materials, payment of salary or wages (finance department), making of product or service (production department),
- Outline duties of employees within each department and prepare job functions of workers, this could also be done using class blog created by teacher
- Vote to elect persons to perform leadership roles in the business and departments e.g. CEO – Head of the Business, a Vice President for the major functional departments (Finance, Production, Sales)
- Construct a simple organizational chart using computer drawing tools/pens and ruler to show how the business will be organized. Chart should include lines of authority and departments of the business
- Determine the start-up capital by calculating the cost of raw materials and other resources to be purchased for use in the business
- Discuss sources of raising start-up capital e.g. loans, shares
- Select the most appropriate source of obtaining start-up capital
- Source/Acquire start-up capital using the source identified
- Calculate selling price for good/service

- classifying
- constructing
- organizing
- calculating
- discussing
- collaborating
- recording
- analysing
- differentiating
- browse and search

Job description outlines duties to be performed by the various department//employees

Organizational chart outlines positions of employees

Calculation evidences:

- start-up capital
- cost of each share
- selling price for one unit of a good/service

Learning Outcomes

Students will be able to:

- ✓ Identify appropriate sources to raise capital
- ✓ Calculate start-up capital
- ✓ Calculate selling price of a unit of a good/service

Points to Note

Raw Materials refer to anything that will be used in the business to produce a good or service

Capital can be acquired from the following sources: personal savings, selling shares, loans

Shares- start-up capital that is divided among persons who wish to become part-owners of a business

Shareholder – person who contributes to the start-up capital (by sharing in a business)

Selling of Shares- Divide the start-up capital by numbers of students involved in the business activity (equal shares) e.g. Start-up capital (\$2000.00) divided by number of students (20) = \$10.00 per share per student.

Loans can be acquired from school tuck shop

Selling Price is calculated using the following formula:

Cost of raw materials + profit margin (10%-30%) = selling price

Extended Learning

Find out from relatives or business persons:

- how capital was sourced
- about the duties performed by persons in their businesses
- conduct research on sources of raising start-up capital from the internet

Have students find out from parents or relatives if they:

- Own shares in a business
- Obtain benefits from buying shares in a business

Interview entrepreneurs in their community to determine the raw materials used in their business

Resources

- Computer, internet and any other available technologies
- Sample invoices, receipts

Key Vocabulary

Skills, employees, capital, department, production, finance, sales, marketing, share/s, shareholders, loan, raw materials/resources, selling price, savings,

Check that students:

- Reasons why businesses are set up
- Some activities that are performed by a business

OPERATING MY BUSINESS

- Where will I obtain raw materials/resources for my business?
- How much should I produce?
- What records should I keep?
- How will my product/service reach the consumer?
- What will be my profit margin?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Students will:
Prepare simple financial records e.g. invoices, receipts, cash book

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Students will:
demonstrate awareness of safety and hygiene during the production of good/service

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Students will:
Select appropriate materials/resources to be used in the business

Manipulate simple tools, materials and equipment to produce good or service

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Students will:
Apply technological applications to the making of the good or service

Demonstrate an awareness of the range of occupation held by persons in businesses in their school and community

THEME: Producing and Earning

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DIGITAL CITIZENSHIP - Recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.

SCIENCE STANDARDS

Students will:

- Perform desired business activity e.g. procure raw materials/resources to operate the business
- Determine production level
- Select the most appropriate channel for distributing good/service
- Operate business activity for a specified period
- Maintain appropriate business records e.g. simple Cash Book
- Calculate profit
- Calculate share of profit

Suggested Teaching and Learning Activities

Key Skills

Assessment Criteria

Students will:

- Organise themselves in groups/departments
- Prepare the necessary financial documents to acquire raw materials
- Source raw materials needed to operate the business
- In groups/departments participate in assigned business activities (operate the business) e.g.
Production department - producing good/service;
Finance Department - keeping financial records e.g. receipts and invoices
Marketing and Sales - promote and sell good/service
Administrative Department – produce written reports
- Record financial transactions on appropriate software documents
- Promote good or service utilizing promotional activity selected
- Sell good or service produced in school community
- Write up a simple cash book to determine profit using any appropriate application software
- In groups/departments prepare reports highlights performance in each department
- Participate in profit sharing activity

- Managing
- Organizing
- delegating
- Producing
- Recording
- Analysing
- Calculating
- Collaborating
- Reasoning
- differentiating

Checklist to evaluate

- teamwork skills
- Organizing skills
- Planning skills

Invoices completed to purchase raw materials

Completed Cash Book to show profit earned

Calculation showing interest/dividend earned by each student

Learning Outcomes

Students will be able to:

- ✓ Work successfully in teams
- ✓ File accounting records appropriately
- ✓ Write up a simple cash book

Points to Note

Accounting records such as receipts and invoices should be filed in chronological (date) order

Cash Book is a financial journal that contains all cash receipts and payments recorded in chronological (date) order

Extended Learning

Have students:

- find out from relatives who work in various departments of a business or own a business about the tasks/ activities that are performed in the respective department
- collect used samples of receipts/bills and invoices and observe how the information is recorded
- visit businesses in their community and observe and report on activities being performed

Resources

- Sample invoices, receipts
- Cheque to pay dividends
- Sample of a Cash Book
- Digital camera or any other available technologies
- Computer
- Internet

Key Vocabulary

Receipts, invoices, cash book, profit



GRADE 6

RESOURCE & TECHNOLOGY

FAMILY & CONSUMER MANAGEMENT

FASHION AND ME

AIM OF RESOURCE & TECHNOLOGY:

The aim of Technical Vocational Education Training (TVET) integration at this level is to foster students' awareness of foundational technical skills and their relationship to future careers and occupations. In a project-based format students use the design process for problem solving in a range of technology based design contexts. This exposure will continue to be articulated seamlessly into Resource and Technology at the grades 7-9 level.

RANGE OF CONTENT

RANGE OF CONTENT are project specific, and cover key concepts, skills, knowledge and attitudes students will learn in Resource & Technology at

Grade 6. • Key concepts and terms related to the fashion industry

- Fashion personalities and personal styles
- The elements and principles of design
 - Elements: colour, line, texture
 - Principles: balance, rhythm, emphasis
- Tools, materials and equipment used in fashion designing
- How to create a mood board
- Procedures for developing a fashion line
- Career opportunities in fashion

SCIENCE

- Exploring the scientific aspect of the elements and principles of designs
- Understanding the scientific principles of mixing and combining colours used to create fashion

MATHEMATICS

- Estimate of time to complete task.
- Conversion of imperial/ metric
- Measurement used to construct mood board
- Make and explore geometric shapes to layout mood board, poster board and fashion designs.
- Space used to create the kaleidoscope

Fashion design production

TECHNOLOGY

- Designing and presenting mood board
- Manipulation and use of tools, material and equipment to create a fashion line
 - Demonstrate skills in:
 - cutting and pasting of materials to design mood board
 - Assembling fashion line
- Drawing and creating of designs
- Use of the computer for researching and processing information.

'E' DESIGN PROCESS

- Identify fashion related problems that affect children.
- Brainstorm to identify solutions to the fashion problems
- Conduct research on different fashion personalities and personal styles.
- Create individual mood board/collage of personal styles.
- Create a fashion line.
- Evaluate the fashion line
- Present the fashion line publicly

Check that students:

Students are aware of fashion shows and magazines and other sources depicting fashion and styles.

ABOUT THE PROJECT

In the articulation of this project, students will learn how to use their personal styles and preferences to create designs. They will create a mood board and use the mood board to create a fashion lines. This will inspire them as young fashion designers and sensitize them to the growing market of fashion and apparel.

Focus Question 1: How do I create my fashion?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1

Through a project based approach students will be able to apply **Creativity & Innovations** in designing a fashion line.

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2

Through a project based approach students will be able to **Explore Methods & Procedures** in solving fashion problems.

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3

Through a project based approach students will be able to **Apply Solutions** to developing personal style.

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Through a project based approach students will develop awareness of a range of **Career Pathways in the Fashion Industry**.

THEME: Fashion and Me

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DESIGNING AND PRODUCING - use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.



RESEARCH, CRITICAL THINKING, PROBLEM-SOLVING AND DECISION MAKING-use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems, and make informed decisions.

OBJECTIVES:

Students will:

- Define terms and concepts associated with fashion
- Identify personal style.
- Demonstrate an understanding of the principles and elements of designs
- Create a mood board
- Identify and select tools and materials used in fashion designing
- Develop design concepts/sketches
- Design a fashion line inspired by the mood board and personal interest
- Explore careers related to the Fashion Industry
- Demonstrate an appreciation of fashion as an art and business
- Evaluate design against project proposal

SCIENCE STANDARDS:

Use scientific knowledge to form hypothesis, test hypothesis and interpret results. Make a series of measurements of quantities and generalization from their observations in order to make evaluations.

TECHNOLOGY STANDARDS:

Students will develop an understanding of the attributes of design.

Design is a creative planning process that leads to useful products and systems.

ABILITIES FOR TECHNOLOGICAL WORLD

Abilities to apply the design process.

MATHEMATICS STANDARDS:

Use the correct units, tools and attributes to estimate, compare and carry out the process of measurement to give degree of accuracy.

Explore paths, geometric shapes, space and make generalization about geometric relationships within environment.

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Focus Question- 1. How do I create my fashion?</p> <p>Strand 1: Creativity and Innovations</p> <p>Students will:</p> <p>Brainstorm to identify fashion problems affecting children and/or society. (For example boys wear pants below the waist and girls wearing short skirts and revealing designs). Identify creative and innovative solutions to these problems. Post the problems, influences and solutions on a class electronic blackboard or on the walls in the classroom.</p> <p>Read about various fashion terms from teacher handouts and find pictures that illustrate each fashion terms (fad, fashion, style etc). Using a worksheet label pictures with the correct fashion term and definition. Use a vocabulary strategy to reinforce the fashion terms.</p> <p>Watch a video clip of a popular sitcom or movie (for example the Fresh Prince or the Nanny) and discuss the concept of personal style. Identify and discuss the 6 fashion personalities. Self-assess and</p>	<ul style="list-style-type: none"> • Collaborate • Communicate • Critical thinking • Creative thinking • Career skills • Innovate • Collect • Navigate digital content on fashion • Use search engine safely to perform single topic searches • assemble • Research • Sketch • Design 	<p>Students poster identifying fashion problems and giving possible solutions</p> <p>Students' template with pictures illustrating fashion terms. Self and peer assessment of their own work</p> <p>Rubric for grading fashion writer article. Look for proper use of the language, spelling expressions etc.</p> <p>Students' creation and design of brochure and their explanation on how the principles and elements are achieved in the picture.</p>

Focus Question- 1. How do I create my fashion?**Strand 1: Creativity and Innovations**

Students will:

identify their personal style by examining what they like to wear, their favourite colour(s), the things that make them feel comfortable and the accessories they like.

Discuss the elements and principles of design; colour, line, balance, emphasis etc. View a presentation of various styles and discuss examples of how the principles and elements have been incorporated into fashion. Research (online/offline) pictures from fashion magazines that show each of the elements and principles of design. Import pictures into an appropriate publishing software to make an attractive brochure or cut-out, mount and label pictures to create brochure, describe how the principles and elements are achieved in each picture.

- Create document
- Record
- Write
- Evaluate
- Illustrate, Classify, Analyse Interpret
- Cut

Strand 2: Explore Methods and Procedures

Identify tools, equipment, materials and technologies used in fashion designing and discuss use, care and safety when using.

Create a mood board/ collages (actual or virtual). Collect pictures, clipping, fabrics other items that inspires them and paste them onto an 8.5 X 11 inches poster board. They can also include words on their inspiration board

In groups create a kaleidoscope of the individual styles, by arranging their individual mood boards into a large 26" X 33" poster boards (bulletin board or wall) Students will discuss the styles on the mood board to come up with theme for their fashion line.

View examples of designer sketches and pieces from online/offline magazines. Invite a resource person, (artist, fashion designer etc.) from the community to demonstrate and assist students with fashion sketching. Use an image capturing device to record the resource

- Create
- Discuss
- Write
- Evaluate
- Illustrate
- Classify
- Critique

Chart showing tools and equipment there uses and how to care for them.

Student creation of mood/inspiration board/ collages (actual or virtual)

Use of technology to create simulation; sketching and drawing skills, creativity and innovation in fashion line creation.

person presentation (with the permission of the resource person) and play back for class critique and discussion.

Design at least three pieces of fashion (including accessories) for a fashion line inspired by their mood board and personal style using the principles and elements of design.

Strand 3: Apply Solutions

Working in groups, simulate a fashion design production line, they will identify their production team (e.g. manager, designer, others) and discuss the roles of each member of the production team. Create a fashion line. Observe safety rules when using tools and equipment.

Design and make a prototype logo and slogan for their design company. They may choose to name it after themselves or select something entirely new. Create a logo using appropriate graphic/drawing software. Print and paste it onto the poster board with their designs.

Present the new fashion line to the classmates; presentation should include displaying the inspiration board and talking about why each aspect inspired the line. Discuss each group's creation. Develop and use a checklist to evaluate designs

Simulate a fashion show using appropriate moviemaker computer software depicting the fashion lines developed. Present the fashion show to the school community e.g. on Open Day. Stream the fashion show online.

Strand 4: Career Pathways

Watch video clips and discuss career opportunities in the fashion industry

Review the role of a fashion writer and write an article about the fashion line.

- Creating multimedia presentations
- Entering text and creating document

Students simulation of Fashion design production and creation of fashion line

Design of prototype logo and slogan for company using appropriate graphic/drawing software.

Group presentation and discussion on fashion line outlining why each aspect inspired the fashion created. Self and Peer assessment of group creation.

Development of Fashion show using computer software (moviemaker, storyboard Power point, others).

Presentation on careers related to fashion Industry.

Written article on Fashion line

Learning Outcomes

Students will be able to:

- ✓ Identify personal styles
- ✓ Identify solutions to fashion problems
- ✓ Create a mood board
- ✓ Create a fashion line using the elements and principles of designs
- ✓ Display and evaluate a fashion line
- ✓ Simulate a fashion show Use computer technology
- ✓ Identify career associated with fashion

Points to Note

This project utilizes concepts taught in Visual Arts, Language Arts, Science, Mathematics and Information Technology.

For example:

- Visual Arts concept of drawing and designing
- Language Arts – descriptive writing
- Science –exploring the scientific underpinnings as it relates to the principles and elements of designs and mixing and combing colours.
- Mathematics – measurements and calculation
- Information Communication Technology – communicating ideas, develop logical process for decision making and problem solving through research and the use of different software for presentations.

Extended Learning

1. Engage family members both local and overseas, about their fashion history, trends and personality.
2. Use electronic media such as the internet to identify fashion trends
3. Use CAD software to create designs

Resources

- Paper
- Pencil
- Computer with internet access to facilitate research and presentation
- Multimedia Projector
- Poster boards
- Fashion magazines and books
- Fabrics and other materials to make designs
- Fashion Videos
- Fabric
- Ruler
- Needle
- Scissors
- Metre stick,
- Fashion Magazines and Books,
- Glue,
- Staples and Staple machine

Key Vocabulary

Elements of design: Colour, Line, Shape, Texture

Principles of design: Emphasis, Proportion, Balance, Rhythm, Harmony

Design

Fashion Personality

Personal Style

Kaleidoscope

Mood Board /Inspiration Board

Fashion

Fashion Show

Style

Prototype

Cultural influences

Production line/ Fashion line

Introduction

Teacher and students will discuss the way children are wearing clothes. They can look at the young men or boys in their community with pants below the waist, young women and girls who wear extremely short skirts, shorts and blouses on the road, see through blouse and other garments that are revealing. Have student identify how they would solve these problems.

Fashion Terms

Teacher will develop a hand-out with key fashion terms to include but not limited to:

- **Fad:** this is a style that is popular for a short period of time e.g.
- **Fashion:** this is a particular style of clothing that is popular for a given time e.g.
- **Style:** this refers to specific characteristics that make a garment unique.
- **Classic:** this is a style that stays in fashion for a long time.
- **Vogue:** In fashion- what is in style at the moment is in 'vogue'

The students will then use fashion magazines, internet, newspaper pictures, and other sources to collect and cut out pictures to illustrate each term. They will then paste pictures on a template created by the teacher and label each picture.

Fashion Personalities

To help students understand fashion personalities, teacher will show a video of a popular sitcom for example Fresh Prince or the Nanny and then have the class discuss the different personal styles observed. To reinforce the video presentation the teacher will show pictures of six fashion personalities, namely:

- **Classic:** these fashion are always in style e.g. straight skirt or pleated skirts and jackets
- **Delicate:** a soft and feminine girlish fashion e.g. caps sleeves, lace trims, Peter Pan collar. In men the use of delicate colours and pin strips
- **Dramatic and Trendy:** these clothing make a statement when worn. They stand out in a crowd. E.g. bright colours, abstract styles, extreme miniskirts. The use of large accessories e.g. earrings
- **Sporty and Natural:** clothing in this area includes sweat suits, tee shirts, shorts, football jersey and polo shirts.
- **Town and Country:** it is a comfortable, tailored and natural wear e.g. denim, garments with lots of top stitching, accessories such as gold chain, leather belt and boots.
- **Romantic:** dressy and formal attire eg lace, ruffles, rhinestones and gems, fabric such as satin and silk; for men tuxedos and cummerbund, black suits.

Elements of Design

Elements of designs are colour, line, shape form and texture.

The principles of designs are guides that tell how the elements of designs should be combined. These are:

- Balance: concept of balance similar to that of a seesaw. This is the arrangement of objects in equal proportion
- Proportion: concern with spaces, size, weights and shape within designs. It is the relationship of one part to another and all the parts to the whole.
- Rhythm: help to make designs more pleasing by creating movement. It is the feeling of movement created by line, colour or shape. Rhythm causes the eye to move smoothly from one part of the design to another, creating an illusion as if everything belongs together.
- Emphasis: this helps to give interest to a design. This is the focal point or centre of interest of a garment

Tools and Equipment

Tools, equipment, material and technology include but not limited to, pencil, ruler, scissors, hip curve, French curve, Computer Aided Designs (CAD) programme sketchbook and mannequin

Mood board

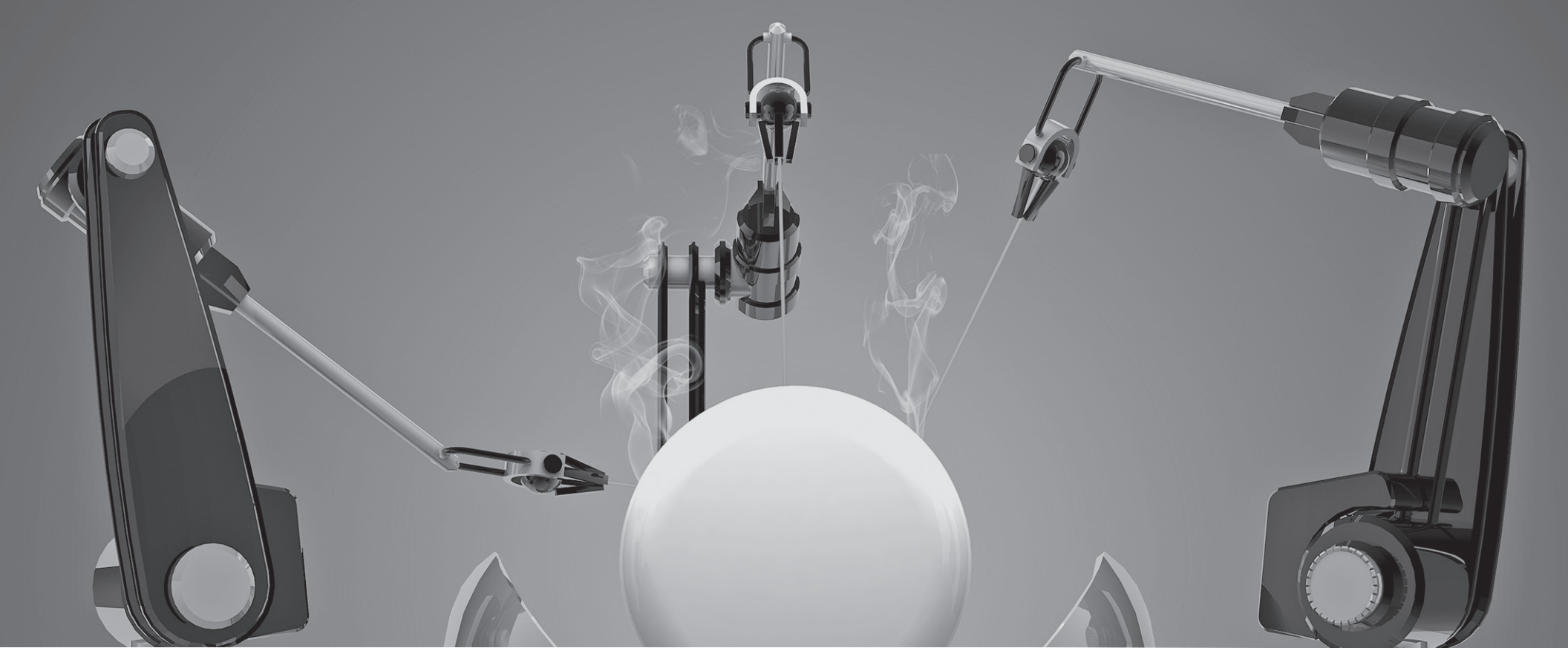
A mood/inspiration board is a collage of pictures, sketches, clippings, fabric swatches and colour samples. A mood board is a tool used by designers to help them get a good idea of what their clients are looking for. A mood board can be actual or virtual. A mood board is used by designers such as those in fashion.

A kaleidoscope operates on the principle of multiple reflections, where several mirrors are placed at an angle to one another. For this assignment the students will arrange their individual styles at different angles on poster boards, bulletin board or wall to ascertain a theme for their fashion line.

An established production team must be identified by each group. Have students research and then select a Manager, designer, other and discuss the different roles of each member.

Students must display their work to the class and have them critique and write about each display. Teacher will design a check list for the students to use as a guide.

Teacher can assist students to use different computer software to showcase their fashion line. If this is not available, the mood boards can be used as display for the school community open day or a mini fashion show may be done.



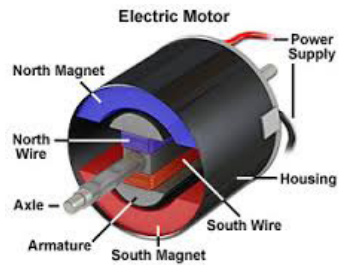
GRADE 6

RESOURCE & TECHNOLOGY

ENGINEERING AND MECHANISMS

PROJECT: LET'S MAGNETIZE TOGETHER

ABOUT THE PROJECT



This is a two part project which involves the use of electrical energy from a source (battery) to create a magnetic field resulting in the movement of a coil. This is intended to expose students to the possibilities that exist in the study of electricity and electromagnetism. Students are expected to be engaged in the process of investigation and discovery in determining how a magnet reacts to objects and metal compounds in the natural environment. Additionally, they will explore how the manipulation of a permanent magnet and or an electromagnet can produce other forms of energy: sound, motion and generation of electrical energy. Opportunities for using materials to construct a basic electromagnetic motor will be undertaken.

RANGE OF CONTENT

RANGE OF CONTENT are project specific, and cover key concepts, skills, knowledge and attitudes students will learn in Resource & Technology at Grade 6. 1. Safety and work

2. Key terms and concepts associated with electricity and magnetism
 - a. Properties of magnets
 - b. Magnetism and the earth's surface
 - c. Magnetic poles
 - d. Magnetic field
 - e. Electromagnetism
3. Laws of magnetic attraction and repulsion
4. Creating a magnetic field
5. Electromagnet applications
6. Basic Electromagnetic motor design and construction
7. Career opportunities in the field of electromagnetism

SCIENCE

Use scientific knowledge to form hypotheses then to test hypotheses and interpret results.

Make a series of measurements of quantities and make generalizations from their observations in order to make evaluations.

MATHEMATICS

Estimate and measure distances to include scale drawings

Identify patterns, describe and predict outcomes from data collected.

Use tables and graphs and solve related problems using data.

What is being assessed?

Using electrical energy from a battery to create a magnetic field resulting in the movement of a coil

TECHNOLOGY

Interpreting and computing data

Sketching/drawing

Design visual representation of the solution

Measuring and laying out of parts and components

Formatting and modifying designs

Using a range of tools to apply appropriate finishes

'E' DESIGN PROCESS

Define problem by exploring the contexts within which the problem exists

Generating ideas by examining the problem and desired solution

Select solutions based on exploration of resources, efficiency, and cost among other factors

Test the solution by examining model, checking online sources, or analysing research findings

Provide/produce solution focusing on safety, accuracy and efficiency

Evaluate solution against the original/modified problem, plan or design

Present results clearly and accurately using ICTs where necessary

Prior Learning

Check that students:

- i. Students are familiar with some of the materials required for this project such as batteries, magnet and copper wire /hook-up wire
- ii. Students have made simple circuits (Grade 5 project: This little light of mine)
- iii. Students are also familiar with using basic tools.

FOCUS QUESTION 1:

- How can we use electromagnetic principles to carry out work?
- What are some of the jobs and careers related to the study and science of electromagnetism?
- What are the steps involved in completing the simple electromagnetic motor?

STRAND 1: CREATIVITY AND INNOVATION

ATTAINMENT TARGET 1
Students will :

Brainstorm possible solutions for the development both a simple electromagnet and an electromagnetic motor

STRAND 2: EXPLORING METHODS AND PROCEDURES

ATTAINMENT TARGET 2
Students will :

use simple tools to execute the various tasks related to making an electromagnet and a simple electromagnetic motor

Discuss the role of technology in the development of the electromagnetic motor

STRAND 3: APPLY SOLUTION

ATTAINMENT TARGET 3
Students will :

Understand the value and benefits of working as a team to complete a class project

Evaluate the success of processed and solutions in making electromagnet and the simple electromagnetic motor

Create a visual of the electromagnetic motor and design notifications

STRAND 4: CAREER PATHWAYS

ATTAINMENT TARGET 3

Students will :

Observe the rules and procedures of working within a group to complete the assigned project

Discuss some of jobs and

Careers that maybe related to the design, assembly and use of electromagnetic motors

THEME: Fashion and Me

ICT ATTAINMENT TARGETS:



COMMUNICATION AND COLLABORATION - Use technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.



DESIGNING AND PRODUCING - use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.



RESEARCH, CRITICAL THINKING, PROBLEM-SOLVING AND DECISION MAKING-use appropriatedigitaltoolsandresources to planandconduct research, aid critical thinking, manage projects, solve problems, and make informed decisions.



DIGITAL CITIZENSHIP - Recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.

OBJECTIVES:

Students will:

- Observe safety considerations in executing each phase of the project
- Define terms related to magnetism
- State the laws of magnetic attraction and repulsion
- Describe some basic properties of magnets
- Identify everyday items and devices that use magnets
- Differentiate between a permanent magnet and an electromagnet
- Identify factors necessary to create a magnetic field
- Briefly explain “motor effect”
- Differentiate between “magnetism and electromagnetism”
- List the components/parts needed to create an electromagnet
- Use an elastic band, one AA 1.5 battery, one 4” wire nail and 5 meter of copper wire (magnet wire) to create a simple electromagnet

OBJECTIVES CONT'D:

Students will:

- Identify basic materials used in the construction of the simple electromagnetic motors
 - Reproduce a simple schematic diagram of the electromagnetic motor with all the related components correctly and neatly labeled
 - Use the principles of electricity and magnetism to create a simple electromagnetic motor
 - Analyze the operation of the electromagnetic motor
 - Create simple diagrams to illustrate layout of the electromagnetic motor
 - Follow a series of instructions correctly to make each component of the electromagnetic motor as prescribed
 - Use the appropriate materials to produce the various components of the motor
 - Select the most appropriate adhesive/fastener to join the wooden or metal components to the base of the electromagnetic motor
 - Evaluate the final assembled project of the simple electromagnetic motor using a prescribed checklist/rating scale
 - Explore careers related to study of magnetism and electricity
 - Use permanent magnets or the combination of an electromagnet to create other projects, for example: decorative fixtures or a simple speaker
 - Critique the final product for neatness and functionality
-

MATHEMATICS ATTAINMENT TARGETS

Attainment Target 2: Use the correct units, tools and attributes to estimate, compare and carry out the processes of measurement to given Degrees of accuracy

Attainment Target 5: Collect, organize, interpret and represent data and make inferences by applying knowledge of statistics and probability

SCIENCE ATTAINMENT TARGETS

Attainment Target 1: Use scientific knowledge to form hypotheses then to test hypotheses and interpret results. Make a series of measurements of quantities and make generalizations from their observations in order to make evaluations.

TECHNOLOGY STANDARDS

- Students will develop an understanding of the characteristics and scope of technology.
- Students will develop an understanding of the effects of technology on the environment.
- Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Students will:

- i. Use online and offline sources to view selected video presentation on the topic of magnetization. Activity aims at helping students to determine the practical applications of using magnets to solve some of mankind's everyday challenges.
- ii. Students encouraged to make their own notes on points of interest as they watch the video and engage in subsequent discussions.
- iii. Students produce a one page report and an 8 slide multimedia presentation using suitable presentation software highlighting "the use of magnets in human technological development" in teams of two.
- iv. Students conduct experiment using magnets to test the laws of attraction and repulsion.
- v. Making your own magnet (electromagnet). Teacher place students in groups of 2-3 members.
 - a. Students tasked with creating a simple electromagnet.
 - b. Students guided by a series of instructions (verbal and written project notes).
 - c. Students given the following materials: 4"wire nail, one AA battery, 5 meters of copper/magnet wire and a small piece of fine/medium sand paper.
- vi. Teacher demonstrates to students what happens to various ferromagnetic materials (e.g. paper clip) when they come into contact with the electromagnet after it has been energized.
- vii. Students asked to note the level of intensity in terms of the materials attraction to electromagnet from various distances when electromagnet is negatively and positively charged.

- Observe
- Navigate digital content
- Question
- Identify
- Discuss
- Plan
- Report
- Create multimedia presentation
- Draw
- Interpret
- Measure
- Calculate
- Examine
- Cut
- Bore
- Assemble
- Connect components
- Evaluate
- Conduct electronic search
- Collaborate
- Deductive reason
- Analyse
- Using internet

Checklist developed addressing all aspects of the project.

Project subjected to peer assessment. Teacher and students critique project based on functionality and accuracy.

Students conduct self-evaluation (given a basic outline in the project notes)

Students conduct online research on electromagnetism (key features, characteristics, parts and components), and present to class. Teacher evaluates using pre-determined rubric

Students complete portfolio to demonstrate their design and construction of the electromagnet and electromagnetic motor (showing at least 6 pieces of evidence such as pictures, reflection on experience, calculations and design drawings)

Students capture video of motor in action and save video file to computer or removable media. Students post video on class blog or other online source. Post comments or response to comments based on videos posted. Teacher assigns quality marks based on critiques posted by members of the class.

Students will:

- viii. Students conduct online research on teacher selected topics in the fields of electromagnetism.
- ix. Students and teacher engage in further discussions on the application of electromagnets (magnetism and generating electricity) and the careers in the field of electromagnetism engineering and repairs; sound and video production; and storage and communication devices.
- x. Students produce a list of the resources needed to make the electromagnetic motor
- xi. Students engage in making an electromagnetic motor. Teacher illustrates a schematic diagram of the electromagnetic motor. Students asked to reproduce their individual schematic diagrams and make their own notes on the diagram.
- xii. Students prepare the base of the electromagnetic motor using given dimensions from the project notes.
- xiii. Guided by a series of instructions students make the following parts/components of the electromagnetic motor to the suggested sizes and specifications: coil, aluminium brackets, battery housing, and connectors. (Detailed instructions given in the project notes)
- xiv. Use appropriate adhesive and fasteners to join the base and brackets of the electromagnetic motor, while observing the suggested dimensions of the project
- xv. Students check parts made against parts list to ensure that all the components of the motor are made according to the prescribed sizes and other specifications.
- xvi. Students assemble the components of the electromagnetic motor based on given instructions

Operate video capture device
Transfer file between devices
Post comments online

Students will:

- xvii. Energize the electromagnetic motor then observe and record what happens. Comparisons made with original predictions
- xviii. Students tweak (where necessary) the design of the project by adding a simple on and off switch for control purposes
- xix. Test the project for functionality
- xx. Complete project with the necessary labels affixed to the various components of the project.
- xxi. Capture video of motor in action and save video file to computer or removable media.
- xxii. Post video on class blog or other online source. Post comments or response to comments based on videos posted.

Learning Outcomes

Students will be able to:

- ✓ Read simple schematic diagram of the electromagnetic motor
- ✓ Produce a schematic diagram
- ✓ Construct all components for the simple motor
- ✓ Use basic hand tools to carry out simple practical operations
- ✓ Assemble the components of the electromagnetic motor
- ✓ Test project and labelling
- ✓ Conduct online research on electromagnetism
- ✓ Create multimedia presentation on “the use of magnets in human technological development”
- ✓ Post videos of project on class blog or forum

Points to Note

There are opportunities in this section to link with Science, Mathematics, Social studies and Language Arts.

For example:

1. Science related concepts are taught such as force and magnetic attraction and repulsion
2. Language Arts- research and reporting
3. Social Studies – the earth and the solar system and natural resources
4. Technology – using the computer and the internet to conduct research, view pictures and videos and to complete worksheets
5. Mathematics – measurements, calculations and manipulating geometric shapes
6. Students should be encouraged to practice safe behaviour when using digital media or searching for information on the internet.

*Health and Safety issues need to be taken into consideration as students will be using sharp tools in the execution of the project.

Resources

Suggested resources needed for this project will include but are not limited to the following list: (material list is on a per student basis)

- 4 pieces 2 cm X 6 cm of thin aluminum (cut from thin aluminum cookie sheets)
- 1.5 meters of magnet wire (24 or 25 gauge)
- 2 metal tacks
- 2 lengths copper wire, 15 cm
- 1 ring magnet
- 2 AA battery (Do not use any battery rated above 1.5 volts, overheating of coil will result)
- block of wood, 6 cm X 15 cm
- small piece sandpaper
- 1 elastic band.
- Computer
- Internet

Extended Learning

Use permanent magnets or the combination of an electromagnet to create other projects, for example: decorative fixtures or a simple speaker

Organize a presentation from Jamaica Public Service engineering to discuss how motors help to produce electricity

Key Vocabulary

- Magnet
- Electromagnet
- Magnetism
- Repel
- Attraction
- Permanent
- Charge
- Energize
- Rotate
- Magnetic field
- Solenoid
- Motor
- Ferrous metals
- Ferromagnetic materials
- Demagnetize
- Magnetic poles



APPENDICES

TERMS	DEFINITIONS/MEANINGS
Technology	Means by which knowledge, tools, equipment and materials are creatively utilized to solve practical problems
Module	A component or portion of the subject which can be taught independently of the other components, but is an integral part of the whole subject
Resource	The means or material available to solve a problem
Design Process	A strategy that is utilized to solve a problem or meet a need
Skill	Specific ways and means of using knowledge, tools and materials – things learnt to do
Knowledge	Theoretical and practical understanding of what was taught – new things learnt
Attitudes	Positive behaviours that are displayed e.g. following instructions, working harmoniously with others
System	A set of related parts which work together to accomplish some purpose
Student's Log	An on-going self-assessment record of student's own experiences while working through the subject
Aesthetics	Area of design concerned with how a product looks. Also concerned with making products look attractive
Prototype	An accurate, detailed, working model of a product, showing what the design will look like and sometimes, how it will work

TERMS	DEFINITIONS/MEANINGS
Business	An organization or economic system where goods and services are exchanged for one another or for money.
Capital	Refers to wealth that is set aside to further production machines, equipment used in the production of goods and services or money
Entrepreneur	A person who organizes, operates, and assumes the risk for a business venture.
Good	A good is a tangible product
Needs	Needs refers to goods and services that are essential to survival
Service	Service intangible products such as accounting, banking, teaching
Wants	Wants are desire to improving your quality of life
Market	A market is an interaction of buyers and sellers to facilitate trade in goods and services
Marketing	The process of researching, promoting, selling and distributing a product or service.

TERMS	DEFINITIONS/MEANINGS
Deposit	A sum of money paid into a bank account.
Goal	A desired result or possible outcome that a person plans and commits to achieve.
Investing	Investing is the act of putting money or capital to an endeavour with the expectation of obtaining an additional income or profit.
Long-term	Long term is usually five years or more
Medium-term	A period of about 2-5 years
Plan	The activities required to achieve a desired goal
Saving	Saving is putting aside a portion of ones income for future use. Savings is the unspent portion of the income
Short-term goals	Something you want to do or achieve in the near future usually within a year or less.
Withdrawal	A transaction in which a customer receives back money he/she had previously deposited at a bank

TERMS	DEFINITIONS/MEANINGS
Bond Paper	Bond paper is a strong, durable paper especially suitable for electronic printing and use in office machines for letters, invoices, and in business for printing and communication.
Capital	Refers to wealth that is set aside to further production machines, equipment used in the production of goods and services or money
Conservation	The protection of plants and animals, natural areas, and interesting and important structures and buildings, especially from the damaging effects of human activity
Ergonomics	The scientific study of people and their working conditions, especially done in order to improve effectiveness
Flimsy Paper	This is thin paper used for making carbon copies of a letter
Good	A good is a tangible product
Hazards	Refers to anything which could be dangerous to you, your health or safety, or your plans or reputation
Hygiene	Hygiene is the practice of keeping yourself and your surroundings clean, especially in order to prevent illness or the spread of diseases.
Needs	Needs refers to goods and services that are essential to survival
Office Layout	Office layout refers to the systematic arrangement of office equipment, machines and furniture while providing adequate space to office personnel for regular performance of work.
Onion paper	Onion Skin paper is a light weight typewriter paper use for making carbon copies or for airmail letters.
Parchment Paper	This is a waterproof and grease-resistant paper produced by treating ordinary paper with concentrated sulphuric acid.

TERMS	DEFINITIONS/MEANINGS
Production	This is the process of converting raw materials into finished products. It is the creation of goods and services to satisfy the needs and wants of consumers
Recycle	To treat or process (used or waste materials) so as to make suitable for reuse
Resource	Refers to anything that can be used to produce or create goods and services to satisfy human wants and needs
Service	Service intangible products such as accounting, banking, teaching
Technology	This is the use of knowledge, skills, tools and materials and equipment to solve practical problems or to satisfy a need.
Threats	A statement of an intention to inflict pain, injury, damage, or other hostile action on someone
Wants	Wants are desire to improving your quality of life
Workstation	an area with equipment for the performance of a specialized task usually by a single individual

TERMS	DEFINITIONS/MEANINGS
Business	An organization or economic system where goods and services are exchanged for one another or for money.
Capital	Refers to wealth that is set aside to further production machines, equipment used in the production of goods and services or money
Cash Book	A book in which receipts and payments of money are recorded.
Customer	A person who buys goods or services from a business.
Entrepreneur	A person who organizes, operates, and assumes the risk for a business venture.
Invoice	A document prepared by the Accounts Departments that lists items sold or services provided, and says how much money you owe for them.
Leadership	The action of leading a group of people or an organization
Liquidation	Is the act of turning assets into cash.
Loan	An amount of money that is borrowed and has to be paid back.
Marketing	The process of researching, promoting, selling and distributing a product or service.
Profit	The surplus (money) remaining after total costs are deducted from total revenue
Receipt	A written acknowledgment that a person has received money in payment following a sale or other transfer of goods or provision of a service.
Risk	The possibility of loss, injury, or other adverse or unwelcome circumstance.
Sales	The exchange of a product or service for money.
Shares	Are units of ownership or interest in a company.

PERSPECTIVES OF SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS & THE AESTHETICS (STEM/STEAM) IN RELATION TO THE NATIONAL STANDARD CURRICULUM (NSC)**INTRODUCTION & BACKGROUND**

The integration of theoretical principles that relate to STEM/STEAM Education in the NSC began in June 2014. This move was influenced by recommendations of the STEM Steering Committee that emphasized the need to develop learners who are not just productive, but who would also be innovative Jamaicans. STEM integration was also regarded as one of the strategic long term means of addressing the economic challenges being faced by Jamaica using education as a primary vehicle for the implied transformational change to happen, beginning from short term efforts.

Initial discussions and deliberations promoted an emphasis on STEM rather than STEAM Education. However, critical analysis of the conversations conveyed the perspective of STEM as a collection of related disciplines that all learners should have the opportunity of pursuing, to develop the competencies they offer and as a consequence be able to gain employment or become employers in STEM related areas. As stakeholders from different backgrounds processed their understanding of STEM, new meanings of the concept emerged from the discussions. One was the perspective of STEM as a methodology. There was, however, concern about the exclusion of “A” in STEM. This “A” component however, brought to the discussion, multiple meanings. In some Aesthetics as a field and was considered an important component to be included if educators are serious about issues of discrimination, holistic learning and current research on the iterative function of the brain that warrants attention to brain based learning and the role of the Arts in promoting knowledge integration to cater to multiple domains of learning. There was also discontent about neglecting the Performing Arts when related creative industries contribute significantly to economic development. The concern was that the role of the Arts to economic development was being trivialized.

The call for the integration of the Aesthetics or Art forms became more pronounced as STEM took on more national significance. This was supported by research that indicates the importance of the Aesthetics in developing values and attitudes, in promoting holistic learning and in serving as drivers of innovations. By integrating principles from STEM with those from the Arts/Aesthetics, the approach to problem solving would encourage greater appreciation for and reliance on the interdependent nature of knowledge when science and arts intersect. Additionally, STEAM as a methodology encourages the harmonizing of the cognitive and the emotional domains in the problem-solving process.

The concept of STEAM was adopted in 2015, as an integrative approach to education and a methodology that pays attention to the benefits to be derived from the inclusion of the Arts or Aesthetics with STEM related principles. These collective benefits are supported by Jolly (2014), Sousa and Pilecki (2013) and include divergent thinking; differentiated learning; Arts integration; focus on intrinsic motivation and informed decision-making.

PERSPECTIVES OF STEM/STEAM IN THE CONTEXT OF THE NSC

In the context of the NSC, STEM/STEAM is used in a number of ways. These include:

STEM/STEAM as an integrative learning approach and methodology in facilitating learning. This perspective places emphasis on STEM/STEAM as a means of helping learners become creative or innovative problem solvers and lifelong learners who rely on scientific principles (laws and theories) to address issues/concerns or to deal with observed phenomenon that are puzzling for them or that inspire interest. As an approach, the focus is on solving problems based on principles. As methodology, the focus is on the system of practical procedures to be used to translate principles into the problem - solving processes or to choose from available problem- solving models.

STEM/STEAM as an Experiential-Vocational Learning Framework that is based on problem solving through the project-based approach. Emphasis is placed on solving real life problems in a context that requires learners and their facilitators to observe work-based principles. The primary purpose for this focus is for learners to: (i) become employable (ii) prepare for further education and/or for occupational or work readiness.

STEM as types of institutions in which learning is organized as a meta-discipline as described by Morrison and Bartlet (2009). Based on this perspective, STEM facilitates the demonstration of knowledge in a manner that removes the boundaries of each discipline for application to problem as would be practised in the real world.

IMPLICATIONS OF PERSPECTIVES OF STEM/STEAM IN LIGHT OF THE NSC

Since the NSC is based on Constructivism principles, STEM/STEAM as an approach and methodology, has to be established on post-positivistic thinking. From this position, STEM/STEAM influences the kind of practice that promotes collaboration, negotiation of meaning and openness to scrutiny.

The NSC developers selected a Constructivist approach that included the deliberation, designing and development stages of the curriculum process. Evidence of the influence of Constructivism can be seen the NSC Framework Document that conveys the following emphasis:

- (i) **The element of objectives** is presented in two forms; firstly as **Learning Objectives** to focus attention on process and experience rather than product. Secondly as Learning Outcomes that serve as some of the outputs of the process. They include the basic understandings, skills and dispositions anticipated from learners' engagement in the planned experiences.
- (ii) **The element of content** is treated as contexts for learners to think critically, solve problems creatively while developing their identity as Jamaicans. Content is not expected to be treated as disciplines to be mastered but as areas that contribute knowledge, skill sets and attitudes that form the composite of competencies to be acquired from their integration in the learning situations.
- (iii) **The element of learning experiences (method)** is presented as a set of learning activities that serves as a source of problems to be addressed as a part of the learning process. These real-life activities provide the scope of knowledge, skills and required dispositions or character traits for learners to make sense of that aspect of life or the world that they represent. They are the threads that connect all the other elements of the curriculum and allow for the integration of STEM/STEAM in the following ways:
 - Identification of activities that are presented as problems to be solved using the STEM/STEAM approach based on contextual factors that include the profile of the learner, the learning conditions and the anticipated impact.
 - Integrating activities to form a real problem to be solved as a short, medium or long term project to which the project based learning would be applied.
 - The examination of learning activities by learners and teachers as co-learners through multiple lenses using content of science, technology, mathematics and the humanities that they have already explored to engage in the problem identification and definition processes.
 - Extending learning in the formal setting to the informal by connecting co-curricular initiatives that are STEM/STEAM based that learners are undertaking at the institutional level through clubs and societies, as whole school projects or in partnership with external stakeholders.
 - Using the learning activities to review STEM/STEAM initiatives that form a part of the informal curriculum to and for reflection on action.

- Using activities as springboards for reflecting on career or occupational interest in STEM/STEAM related areas.
- (iv) The element of evaluation is communicated in two major ways; firstly as prior learning which serves diagnostic purpose and secondly as an on-going developmental process. This formative focus is indicated by the inclusion of explicitly stated assessment criteria that are to be used alongside the learning activities. The use of assessment criteria as counterparts of the learning activities also indicates that assessment is learner centred since it is serving developmental rather than promotional purpose and as a consequence, allows learners to self-correct as they use feedback to develop feed-forward capabilities. Evidence of learning, based on the learning outcomes, can be collected from various types of assessment methods that emphasize the learner centred constructivist orientation. This brings to the fore the need for serious consideration to be given to differentiation in assessment for fairness and credibility of claims about learners' capabilities and to inform decisions that will impact their educational journey.

In general, this integrated approach, which is the context of STEAM, is aimed at improving the quality of the educational experience for learners while influencing the achievement of the aims of education that relate to productivity and creativity as part of the profile of the Jamaican learner.

REFERENCES

- Jolly, A. (2014). *STEM vs. STEAM: Do the Arts belong?* Retrieved from: <http://www.edweek.org/tm/articles/2014/11/18/ctq-jolly-stem-vs-steam.html>
- Morrison, J., Raymond, V. & Barlett, B. (2009). *STEM as a curriculum: An experiential approach*. Retrieved from: <http://www.edweek.org/ew/articles/2009/03/04/23bartlett.h28.html>
- Sousa, D., Pilecki, T. (2013). *STEM to STEAM: Using brain compatible strategies to integrate the Arts*. London: SAGE Publications Ltd.
- Trochim, Williams, M.K., (2006). *Positivism & post-positivism*. Web Centre for Social Research Methods. Retrieved from: <http://www.socialresearchmethos.net/kb/positivism.php>

The 5Es Overview: “The 5E Learning Cycle”

What is a 5E Learning Cycle?

This model describes an approach for facilitating learning that can be used for entire programmes, specific units and individual lessons. The NSC supports the 5E constructivist learning cycle, as it places emphasis on the processes that may be used to help students to be personally involved in the learning situation as they are guided to build their own understandings from experiences and new ideas.

5E Instructional Model

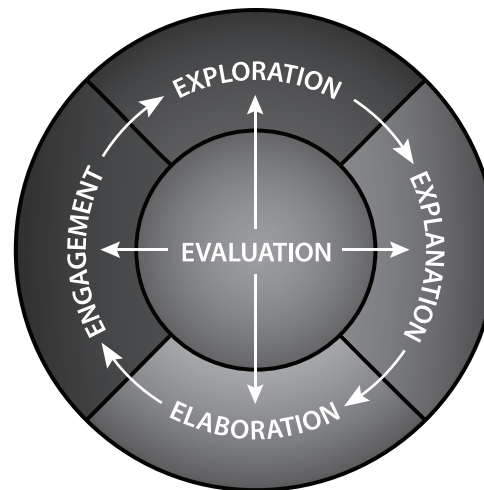


Figure 1. Illustrating one version of the 5E model that conveys the role of valuation as an interconnecting process that is at the core of the learning experience.



Figure 2, illustrating a cyclical perspective of the model with each process being given similar emphasis in contributing to the learning experience on a whole.

EXPLANATION OF THE INSTRUCTIONAL MODEL

What are the 5Es?

The 5Es represent five key interrelated processes that provide the kind of learning experiences for learners to experience the curriculum or planned learning episodes: Engage, Explore, Explain, Extend (or Elaborate), and **Evaluate**.

ENGAGE: The purpose of the ENGAGEMENT dimension is to help students to be ready intellectually, socially, emotionally etc. for the session. Attention is given to the students' interests and to getting them personally involved in the lesson, while pre-assessing prior understandings, attitudes and/or skills. During the experience, students first encounter and identify the instructional task and their roles and responsibilities. During the ENGAGEMENT activity, students make connections between past and present learning experiences, setting the organizational groundwork for upcoming activities. The engagement activity may be used to (a) help student unearth prior knowledge (b) arouse their curiosity (c) encourage students to ask questions as a sign that they have wonderments or are puzzled.

EXPLORE: The purpose of the EXPLORATION dimension is to get students involved in solving a real problem that is based on a selected context. EXPLORATION provides them with a chance to build their own understanding of the phenomenon being investigated and the attitude and skills involved for arriving at a workable solution. In exploring the students have the opportunity to get directly involved with the phenomenon and materials. As they work together in learning teams or independently, the need to share and communicate becomes necessary from the experiences. The teacher functions as a facilitator, providing materials, guarding against obstacles to learning and guiding the students to operate based on agreements. The students become inquirers and co-owners of the learning process. In exploring, they also ask questions, formulate hypothesis, search for answers or information/data, reflect with others, test their own predictions and draw conclusions.

EXPLAIN: The purpose of the EXPLANATORY dimension is to provide students with an opportunity to assess their thinking and to use intellectual standards as critical thinkers to communicate their perspectives and/or the meaning of the experiences. They rely on communication tools and their skills as Language users to: (a) organize their thoughts so that they are clear, relevant, significant, fair, accurate etc. (b) validate or affirm others (c) self-motivate. Reflection also occurs during the process and may cause students to adjust their perspective or justify their claims and summarise the lessons being learned. Providing explanations contributes to vocabulary building and self-corrective actions to deal with misconceptions that they become aware of from feedback of their peers and/or their facilitator.

EXTEND: The purpose of this dimension is to allow students to use their new knowledge and continue to explore its significance and implications. Students work independently or with others to expand on the concepts and principles they have learned, make connections to other related concepts and principles within and/or across disciplines, and apply their understandings in new ways to unfamiliar situations.

EVALUATE: The purpose of the EVALUATION dimension is for both students and facilitator to determine progress being made or the extent to which learning has taken place based on the stated objectives or emergent objectives. EVALUATION is treated primarily as an on-going diagnostic and developmental process that allows the learner to become aware of gaps to be treated and progress made from their efforts to acquire the competencies that were the focus of the session. Examples of competencies include understanding of concepts, principles and processes and demonstrating various skills. Evaluation and assessment can occur at different points during the learning episode. Some of the tools that assist in this diagnostic and formative process include rubrics, teacher observation log, self-inventories, peer critique, student interviews, reflective presentations, displays/expositions,

portfolios, performances, project and problem-based learning products. Analysis of reflections, video recordings are useful in helping students to determine the depth of their thinking and understanding and the objectives they have or have not achieved.

Who developed the 5E model?

The Biological Science Curriculum Study (BSCS), a team led by Principal Investigator Roger Bybee, developed the instructional model for constructivism, called the “Five Es”.

The Link between the 5E model and Types of Learning Activities

The five (5) types of Learning Activities purported by Yelon (1996) can be integrated with the 5E’s so as to enrich the teaching and learning process. He noted that every instructional plan should include the following learning activities

1. Motivation Activities: Intended to help learners to be ready for the session
2. Orientation Activities: Inform students of their roles and responsibilities based the purpose or objectives of a learning episode.
3. Information Activities: Allow students to manipulate current knowledge, access/retrieve and generate new ideas
4. Application Activities: Allow for the use of knowledge and skills in novel situations
5. Evaluation Activities: Allow for reflection, corrective actions and sourcing of evidence to confirm/refute claims about learning.

These activities can be planned to serve one of the purposes of each dimension of the 5E model. For example, ENGAGEMENT may be comprised a Motivation Activity and an Orientation Activity. EXPLORATION and EXPLANATION require an Information Activity, while EXTEND requires an Application Activity. EVALUATION requires the kind of activity that will contribute to the collection of data for assessing and arriving at a conclusion about performance based on stated or expected purpose for which learning is being facilitated.

REFERENCES

- Meegan, G. (2017). *The Intellectual Standards*. Retrieved from <https://theelementsofthought.org/the-intellectual-standards/>
- The 5 E Model (n.d.). Retrieved from <http://tiny.cc/7ogijy>
- The 5 E Model (n.d.). Retrieved from <http://tiny.cc/oogijy>

GRADE 4

LESSON PLANS

GRADE:	4
SUBJECT:	Resource and Technology
MODULE:	Family and Consumer Management
TOPIC:	Classifying and sorting waste Materials
LESSON DURATION:	1 hour
FOCUS QUESTION:	Why is it important to sort waste?
STRAND 1:	Creativity and Innovation

RESOURCE & TECHNOLOGY ATTAINMENT TARGETS

Attainment Target 1

Through a project-based approach students will be able to apply creativity and innovation to designing solutions to the problem of environmental waste

ICT Attainment Target:

Use technology to communicate ideas, information and understandings for a variety of purposes

Mathematics Standards:

Basic calculation and computation of collected recyclable items

Science Standards:

Recycling and its link to pollution in the environment

Technology Standards:

Use of computer for research and information processing

Resource Materials:

Computer, waste materials of different types, gloves, plastic aprons, plastic bins/, transparent garbage bags, masks, wide-brim hats, hard-wear shoes, soap, hand-sanitizer, paper towels

LEARNING OBJECTIVES:

At the end of the lesson students will:

1. Define the term 'Waste Materials' and give examples.
2. Classify 'Waste Materials' according to types.
3. Sort 'Waste Materials' according to types
4. Create an inventory of recycled materials

Classroom Safety:

- Students will use safety gears and adhere to hygiene practices while sorting and doing inventory.

ACTIVITY HIGHLIGHTS:

Engagement:

<https://www.youtube.com/watch?v=WeRtfAm-Ub8>

Student will view a video clips entitled 'nuhdutty up Jamaica', identify the types of waste materials and discuss why is it important to sort waste?

Exploration:

Based on the video viewed students will now be required to do the following group activities:

- In group, students will go on a treasure hunt around the school and collect waste/ recyclable materials
- Classify and sort the materials collected

Explanation:

- In groups, students will present their findings to the class using technology for e.g. the photographs, tablets. flip charts, pictures,
- Student will be required to answer questions, clarify and explain concepts based on their presentations.

Extension/Elaboration:

In groups, students will:

- Create an inventory
- Mount a display of the waste/recyclable materials

Evaluation

- Presentations and displays will be evaluated using a rubric.

SUBJECT: Resource and Technology
MODULE: Business Basics
TOPIC: Roles and Functions of Business
GRADE: 4
DURATION: 40 minutes

FOCUS QUESTION: How do I determine the type of business activity I should set up? What type of business should I choose?

PRIOR LEARNING

Students should be aware of the role of businesses in the immediate community and the specific needs and wants that are met by businesses.

R & T STRAND: Creativity and Innovation

ATTAINMENT TARGET: Brainstorm to identify possible business solutions to satisfy wants or needs identified in the school community.

SCIENCE STANDARD

Attainment Target 1. Exploring Science and the Environment – Earth’s Resources – Grade 3

Recognise how some activities can harm the environment.

MATHEMATICS STANDARD

Attainment Target 5. Collect, organise, interpret and represent data and make inferences by applying knowledge of statistics and probability - Data Handling and Probability Grade 3

Interpret data presented in simple tables, pictographs and bar graph using horizontal and vertical representations.

TECHNOLOGY STANDARD

T&S Standard 5

Student will develop an understanding of the characteristics and scope of technology.

RESOURCE MATERIALS:

Computer, projector, internet access, hand-outs/books

LEARNING OBJECTIVES:

Students will be able to:

1. define the terms business, role, functions, needs and wants
2. identify businesses in their community that provide goods and services to satisfy needs and wants
3. differentiate between goods and service
4. explain at least four roles of a business
5. evaluate the importance of a business to their community

Classroom Safety e.g. Students will

- use tools and equipment in a safe manner and assume responsibility for their safety and safety of others.
- demonstrate courtesy in regard to the ideas expressed by classmates and will show appreciation for the efforts of others

ACTIVITY HIGHLIGHTS

Engagement

Students will view a video presentation at <https://http://www.youtube.com/watch?v=XD-HIDbMvbo> depicting a business operation. After viewing the video, they will be asked to tell what they observed in the video. With guiding questions and prompts from the facilitator, it is anticipated that the concept of business, goods, wants and needs will come up in the discourse.

Exploration

Using the video presentation as a prompt, facilitator will engage students in a class discussion to bring out the difference between goods and services and the roles and functions of a business. As part of the activity, students will conduct research via internet and textbooks/ hand-outs to get information about the concepts.

Explanation

In groups, students will make a glossary of key terms or concepts relating to the roles and functions of business based on the previous activities. They can make reference to the internet and printed material to aid in their explanations.

Extension/Elaboration

Students will identify businesses in their communities and determine to what extent they are fulfilling the roles and functions discussed and share with the class. They will also discuss contributions these businesses are making to the community.

Evaluation

With the use of a checklist students will evaluate the glossaries prepared by their peers. Facilitator will give feedback on the process. Use the telephone directory (Yellow pages) to identify businesses and tell whether they provide goods or services

Enrichment

Students will visit businesses in their community and interview the manager/proprietor to determine the extent to which they are fulfilling their roles and functions.

GRADE 5

LESSON PLANS

DATE:	July 2017
SUBJECT:	Business Basics
GRADE:	5
UNIT TOPIC:	Saving and Investing
SUB-TOPIC:	Reasons for Saving and Investing
LESSON DURATION:	1 hour

PRIOR LEARNING

Students may have been exposed to saving in a piggy bank at home or hear parents talk about savings. Some may even be involved in some saving activity at school.

Big Idea: Saving is important.

Attainment Target:

Strand 1: Creativity and Innovation

Attainment Target: Students will: Devise a successful business plan to achieve their financial goals

Strand 2: Explore Methods and Procedures

Attainment Target: Students will: Examine various ways of savings and identify similarities and differences between savings and investments.

ICT attainment targets:

- o Communication and Collaboration- Using technological tools to communicate ideas and contribute to others learning.
- o Research, critical thinking, problem solving and Decision Making- Using digital tools to conduct research for analysis and make informed decisions.

SCIENCE

AT1 Exploring Science and the Environment – grade 3

Students should Measure quantities to make comparisons and contrasts, identify simple relationships, draw conclusions from results and begin to use scientific Knowledge to suggest explanations.

TECHNOLOGY

T&S Standard 5

Student will develop an understanding of the characteristics and scope of technology.

MATHEMATICS

AT1 Number Operation and application – Grade 3

- Use the basic operations, number relationships, patterns, number
- Calculators and dynamic software to compute and estimate in order to
- Solve real world problems involving fractions, percentages and decimals.
- Identify the value of notes and coins in the Jamaican currency and apply these values to the use of money to everyday situations using various combinations to show \$1000.

MATERIALS / RESOURCES NEEDED:

- Computer
- Multimedia Projector
- Whiteboard
- Marker
- Handouts
- Blank sheets

SPECIFIC OBJECTIVE(S):

At the end of the lesson students will be able to:

1. Explain the reasons people save
2. Define the terms associated with savings
3. List the ways in which people save
4. Identify various sources of savings

CONTENT OUTLINE

Saving is putting aside a portion of ones income for future use. Savings is the unspent portion of the income

Savings – is generally to meet goals and is used to acquire inexpensive items or pay for emergencies.

Goal – A plan outlining how something desired would be achieved. A desired result or possible outcome that a person plans and commit to achieve.

Plan – The activities required to achieve a desired goal.

People save for many reasons. These include: emergency situations, education, to buy a house or motor car etc.

Sources of savings include: from lunch money, chores gifts, running errands, salary/wages, partner plans.

CLASSROOM SAFETY

Students should take care when using electronic devices to carry out exploration activities. Eg. Safeguarding cables and extension cords and observe safety procedures for the use of electrical outlets.

ACTIVITY HIGHLIGHTS

ENGAGEMENT

Students will view an audio-visual presentation of the story of “The Ant and The Grasshopper” <https://youtu.be/ripQ9jJnw1c>. Students will be questioned about their views and thoughts on the story.

Students will respond to probing questions related to the video to in order to emphasise the concept of saving.

SAMPLE QUESTIONS

- Why do you think it is important for the grasshopper to store or save food for the winter season?

EXPLORATION

In groups student will use hand out provided and the internet to gather additional information on the definition of savings, reasons why people save; ways of saving and sources of saving.

EXPLANATION

Students will present their findings in the form of a dub poetry, song or role-play. Students will listen, watch and give feedback. Students will record summary notes from the various presentations.

ELABORATION

Students will postulate ways in which these reasons can help individuals in achieving their goals. Student will set a realistic personal saving goal and complete the following Personal Saving form.

PERSONAL SAVING FORM

NAME

PERSONAL SAVING GOAL

SOURCE OF MONEY

WAYS OF SAVING THE MONEY

REASON FOR SAVING

.....

.....

.....

EVALUATION

Students will write a composition on the importance of saving and ways in which people save.

LESSON EVALUATION

GRADE 6

LESSON PLANS

GRADE:	6
LESSON DURATION:	40 minutes
BIG IDEA:	My name is Important to Me
LEARNING OBJECTIVES:	
OBJECTIVES: STUDENTS WILL:	
	<ul style="list-style-type: none">• Create a name for a business to be operated• Design a logo for the business

RESOURCE & TECHNOLOGY ATTAINMENT TARGETS

STRAND 1: CREATIVITY AND INNOVATION

Attainment Target

Students will: Explore different business ideas to identify the most appropriate one to meet the preferences of the school community

STRAND 2: EXPLORE METHODS AND PROCEDURES

Attainment Target

Students will: Demonstrate an awareness of safety and hygiene in operating a business

STRAND 3: APPLY SOLUTION

Attainment Target

Students will: Create a visual image of the business by designing a name/logo

STRAND 4: CAREER PATHWAYS

Attainment Target:

Students will: Demonstrate good interpersonal relationship

Practise good team spirit

SCIENCE STANDARDS:**Science Application and Design Practice - Grade 4****Attainment Target 1. Exploring Science and the Environment**

Appreciate the importance of scientific methods and be aware of safety procedures to be taken when using equipment and materials.

MATHEMATICS STANDARDS:**Technology Standards:**

T&S Standard 13

Student will develop an understanding of the attributes of design

Resource Materials:

Blank paper, crayon, writing instruments,

Tools/materials/equipment

Scissors, rulers, computers, printers,

Materials**Classroom Safety e.g. Students will**

Observe the use of tools and equipment in a safe manner and assume responsibility for their safety and safety of others

Demonstrate courtesy and show appreciation for the efforts of others

ACTIVITY HIGHLIGHTS**Engagement**

View a list of business names from presentation software/online sources/photos, brochures etc

Critique the business name/logo

Students will be engaged in a discussion to determine if the name of the business matches the product or service offered.

Exploration

In groups students will identify a need or wants in their community and brainstorm possible product or service to satisfy the need or wants identified.

Create a business name and/or slogan for the business to be operated

EXPLANATION

Students will evaluate the names created to arrive at the most suitable name for the business.

Students will discuss why the particular name was selected and determine whether it is appropriate for the business.

EXTENSION

In groups students will use appropriate application software/writing tools to design a logo for the business.

Student will observe safety and hygiene practices in the design process.

EVALUATION

A rubric will be designed and used to assess:

Format/use of design principles

Originality & simplicity

Company's image – colour, graphics & design

Overall impression of the logo designed

Team spirit

ENRICHMENT

Student conduct research to determine ways of protecting business name created. (Copyright, patent etc.)

DATE: MAY 25TH 2017
GRADE: 6
SUBJECT: BUSINESS BASICS
TOPIC: SETTING UP A BUSINESS
SUB-TOPIC: FUNCTIONAL AREAS OF A BUSINESS
LESSON DURATION: ONE HOUR

PRIOR LEARNING

Students are already aware of the various reasons why businesses are set up; they are also aware of some activities that are performed by a business.

Big Idea: Anyone can start a business.

Purpose of Lesson: Students will develop the skills involved in setting up their business ideas.

ATTAINMENT TARGET:

1. Explore the different approaches to setting up the business
2. Discuss jobs that will be performed by employees in the business

SCIENCE STANDARDS:

Sort living and non-living things according to easily observable characteristics (e.g. plants and animals, natural and man-made

- Natural Resource
- Man Made Resource

MATHEMATICS STANDARDS:

Use the basic operations, number relationships, patterns, number facts, calculators and software to compute and estimate in order to solve real world problems involving fractions, percentages and decimals.

- Compute total price, unit price, total cost, unit costs of production

TECHNOLOGY STANDARDS:

- Manipulation of tools and equipment e.g. computer, recording devices to perform the following skills and processes: record information, calculations, write, conduct research and interviews
 - Use of computer for information processing.

RESOURCE MATERIALS:

Computer, internet, work sheet

LEARNING OBJECTIVES

Students will:

1. Identify the major departments of a business
2. Outline the functions carried out by each department
3. Outline roles of employees in each department
4. Construct a simple organizational chart to depict the major departments business

CONTENT OUTLINE:

Departments in a business such as:

Duties/Responsibilities

Marketing/Sales – responsible for promoting and selling goods and services.

Purchases/Production – responsible for the buying or creation of those goods needed by the business for resale.

Finance/Accounting – deals with the recording of financial information in a business.

Personnel/Administrative- deal with all matters involving employees eg. Hiring, training etc; produces written reports etc.

Staffing for each department

CEO/manager – head of the organization

Assistant manager

Marketing/Sales Department – Marketing/Sales Manager& Sales representative

Production/Purchases Department – Production/Purchasing manager and purchasing clerk

Finance/Accounting Department- Chief Accountant, payroll clerk, cashiers etc.

Personnel Department – Human Resource Manager

The organisational chart is a diagram showing graphically the relation of one worker/department to another.

CLASSROOM SAFETY:

ACTIVITY HIGHLIGHTS:

Engagement

Students will watch a video highlighting the various departments that are needed to set up a business https://youtu.be/ai6b8c7_Ktk; The video will highlight the following departments: Sales/Marketing, Production/Purchases, Finance/Accounting and Personnel. Following the video presentation student will respond to the following questions:

1. What was the video about?
2. Is there anything in this video that you can relate to when you visit any business organization?
3. What were the departments identified in the video?

EXPLORATION

Students will read a story containing information about the marketing/sales, production/purchases, accounting and personnel department. Students will ascertain information about the functions of the various departments, the positions that comprise these departments as well as the duties of these individuals. Students will be provided with clues to assist them.

Or

The class will be divided into groups of four; each group will be given a story board (see attachment) depicting one department that is needed when setting up a business eg (sales/marketing, production/purchases, finance/accounting and personnel). Students will examine the storyboard to ascertain information about the functions of the various departments, the persons who comprise these departments as well as the duties of these individuals.

EXPLANATION

Groups will be required to make a 3 minute presentation on their findings. They will state the departments depicted in the story/story board along with its function; groups will also be required to discuss the duties to be performed by the employees in each department. At this time students' misconceptions will be clarified and additional information will be provided if necessary.

ELABORATION/EXTENSION

In their groups, students will identify a business that they would like to start, plan and present a role-play depicting the various departments that would be needed to start that business as well as the duties to be carried out by the persons in the department.

EXPLORATION

Students will view a comic piece depicting the concept of organizational chart. The students will ascertain what is an organizational chart, its purpose and how the chart is prepared.

EXPLANATION

Students will be selected randomly to give their explanation what is an organisational chart, purpose of the chart and how the chart should be drawn. Any misconception will be clarified.

ELABORATION/EXTENSION

In groups of four, students will identify a business that they would like to start, and draw the organizational chart depicting the four major functional areas.

EVALUATION

1. Students will complete a short answer work sheet relating to the departments needed to set up a business; functions of the departments, the duties to be performed by the employees in the departments and the concept of organizational chart.
2. Students will identify one department and one employee required by the department. They will then write an advertisement inviting persons to apply for that position. The advertisement should state the duties of the individual

ENRICHMENT

Students will search for 8 advertisements in the newspaper depicting the 4 functional areas of business. Classify the advertisement appropriately under each heading in the scrap book.

Or

Students will make their own story board depicting one department that they would like to work in the near future and show the roles that they would be required to perform.

Or

Students will design a model for their business depicting the four major functional departments and outline the roles and responsibilities of the personnel working in each department. They will also be required to draw the organizational chart for the business.

a) Project-Based Approach

The content associated with each of the modules of Resource and Technology is delivered in a context as a real life problem or need to be met. Usually a scenario depicting a real life problem is developed to introduce each project. For example, in introducing the Grade 4 Agriculture project 'Create an Ornamental Garden' students could be presented with a real life situation in their school environment of an area which has become a haven for garbage presenting an unattractive and unhygienic area. Students brainstorm and research to identify and develop solutions to the named problem and then plan, design and create high-quality, authentic products and presentations using 21st century skills of critical thinking, collaboration, communication and Information Technology. Projects should be carefully planned, managed, and assessed to help students learn the content relevant to each discipline. The following features should guide the learning process utilizing project based learning:

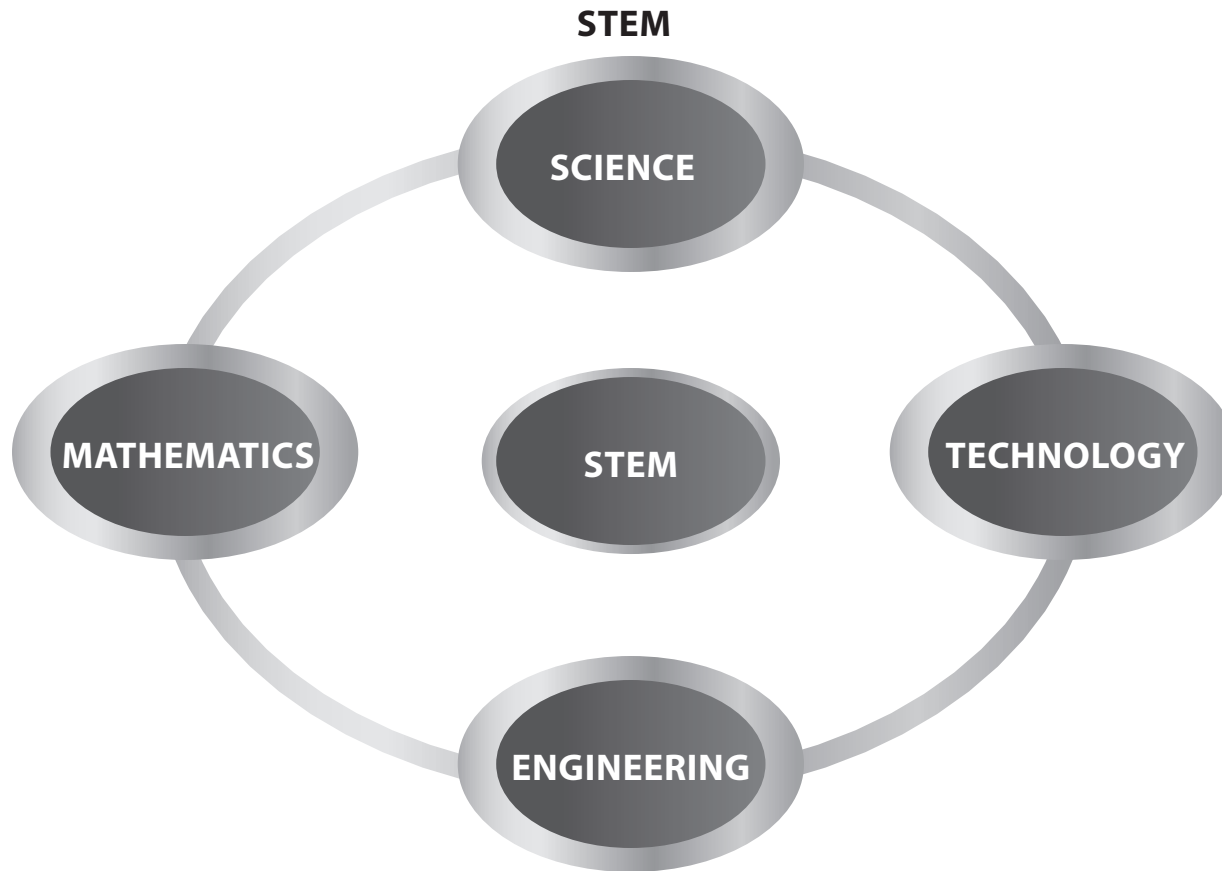
- problem-based – students develop imaginative solutions to presented or observed problems
- Reality-based – students work in real-life/world learning environments
- decision-making – students have choices about what they learn, make choices within their learning environment and set personal goals
- design driven – students develop an awareness of design principles and elements for creating their own work and interpreting the work of others
- aesthetically aware – students learn through their senses and learn to control elements/factors appropriate to the project
- technology-based – students understand the relationship between materials, systems and processes

Teachers should ensure that the problems and solutions presented are in keeping with the content/knowledge, skills and attitudes illustrated in the Teachers' Guides.

b) Integration of STEM

The integration of STEM/STEAM principles is utilized in the delivery of the Resource and Technology programmes. STEM/STEAM education is an approach to teaching and learning that integrates the content and skills of Science, Technology, Engineering and Mathematics. Content is delivered through action-based activities that involve the use of skills, processes, tools/equipment and materials to design and develop solutions to authentic tasks.

Designing is an important aspect of the creation of solution. Hence the emphasis on developing design layout using the elements and principles of Design Arts



EXPLANATION OF THE ACRONYM 'STEAM'

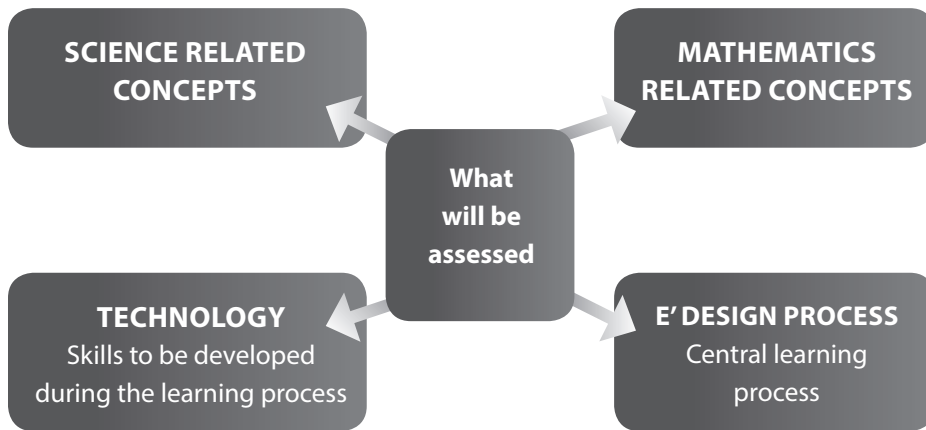
'S' – Science concepts specific to the topic to be presented is integrated in the lesson

'T' - Technology combined use of skills, attitude, knowledge and resources to create things that people need and want to make life easier and better

'E' – Engineering Design Process –

'A' – the use of the aesthetics to create aesthetically pleasing products

'M' - Mathematical concepts specific to the lesson being taught is integrated in the lesson



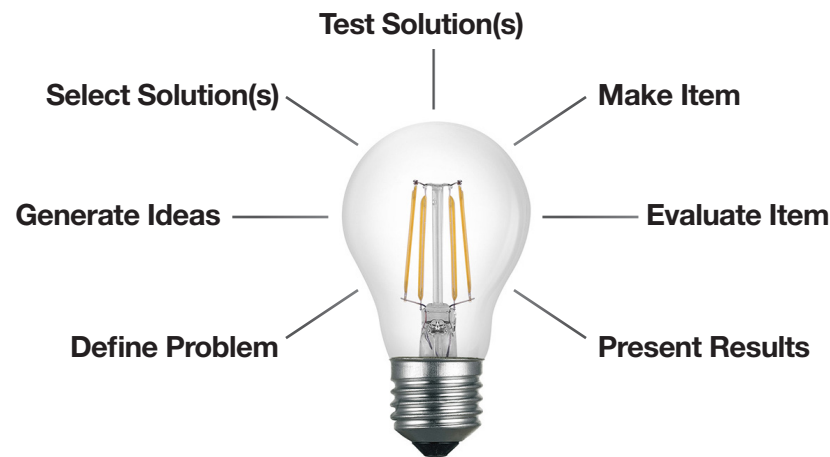
ATTRIBUTES OF A STEM LEARNING ENVIRONMENT

- Utilize the engineering design process ('E')
- Engage in the scientific process
- Apply mathematical practices
- Explore appropriate uses of technology
- Support collaboration and communication
- Encourages risk taking
- Align STEM lessons with real life context

c) 'E' Engineering Design Process

The Design Process is a systematic problem solving strategy which is used in the delivery of Resource and Technology programme to solve practical problems. This process is similar to other problem solving processes but this particular process was adopted because of its design feature which ensures that student will use materials, tools and equipment in problem solving

The Design Process as illustrated in the diagram below comprises seven (7) stages or aims. Students may begin with Stage 1 – define or identify the problem and continue in order to Stage seven (7)



STAGES IN THE DESIGN PROCESS

Other approaches are also valid. Students may start by:

- Evaluating an existing product/system e.g. assessing the nutritional value of a favourite snack or rules that are in place to ensure safe and hygienic learning environments and continue by
- Suggesting ways to improve the product or system
- Planning to make a new version
- Making it and
- Evaluating it against the original
- Present results (orally or written)

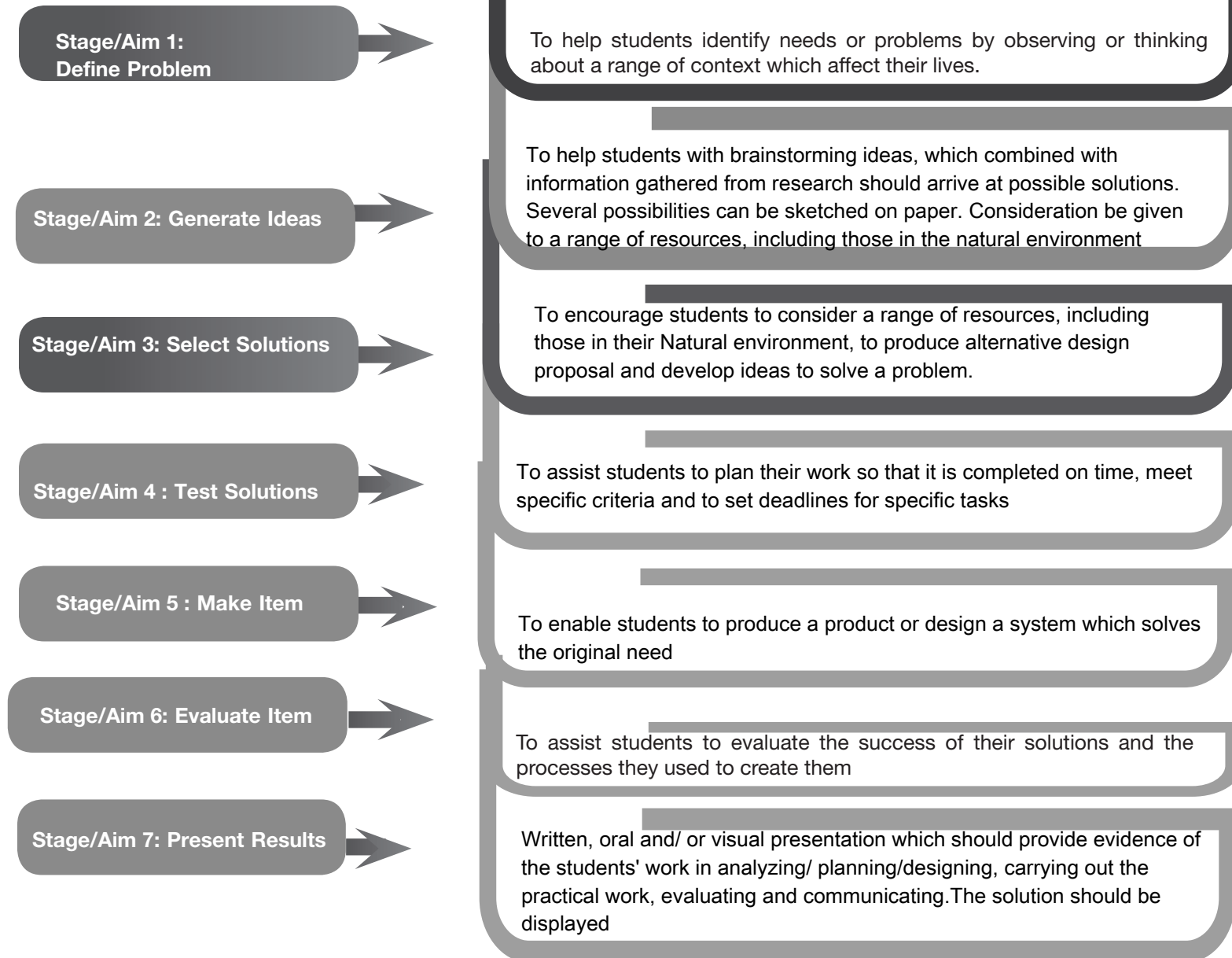
For younger students, the teacher might produce a partly completed product e.g. a partly completed bird house. Students could:

- Discuss how it can be developed/completed
- Plan ways of improving it
- Make their own version
- Evaluate the product
- Present results (orally or written)

It should be noted that if students are to develop problem solving skills, focus must be placed on all stages of the design process. The majority of time must not be spent of making the products/systems but equally on the knowledge, skill and attitude so that students acquire the necessary competencies related to the task or project. Given that the Design Process is seen as the central learning process for all students, the role of the teacher is to guide pupils through the process

AIMS OF THE DESIGN PROCESS

There are seven major aims of the Design Process



Given that the Design Process is seen as the central learning process for all students, the role of the teacher is to guide pupils through the process

Project-based learning (PBL) demands excellent assessment practices to ensure that all learners are supported in the learning process. With good assessment practices, PBL can create a culture of excellence for all students and ensure deeper learning for all. Assessment should be integrated seamlessly into the projects, measuring students' understanding from the beginning to the end of the project.

Assessing Learning Outcomes

From Grades 4-9 student achievement should be one of continuous assessment and based on the learning outcomes selected for each project to ensure that students acquire the necessary knowledge, skills and attitudes. In other words, the assessment should be based on what each student can do. No more than ten learning outcomes or 'can' statements should be selected for each project of unit of work.

No more than ten learning outcomes should be selected of a project or unit of work. This will help to keep the assessment and recording process to a manageable size for the teacher.

Assessment should be developed on a four-point scale;

I	Can do with a lot of help
II	Can do with some help
III	Can do with very little help
IV	Can do independently

Assessment conducted in this manner will provide a picture of exactly what each student can and cannot do or how much assistance will be needed to develop the competencies.

This form of assessment is more informative and useful than those which grade students on a scale of 1-10 at the end of a project. Teachers and individual students should discuss the assessments and agree on the next learning steps. A record of assessments should be kept in a mark book or file set out as shown on the next page.

Supporting knowledge and understanding can be assessed in the traditional way, that is by objective tests such as multiple choice.

Assessing the End Product or System

All aspects of the Design Process are to be assessed. Teachers should observe what students do in an effort to create a solution to a need or problem. This would involve the activities such as collaborating with each other, conducting research, planning, designing and making the final product or system. Evidence of students' work throughout the project or unit work should be filed.

A sample rubric is presented below to assess the end product, article or system made for a project.

SAMPLE | RECORD OF ASSESSMENT OF LEARNING OUTCOMES

STUDENTS' NAMES		LEARNING OUTCOMES			
	performs safe and healthy practices related to gardening functions	Can select appropriate materials and tools to create an ornamental garden	Can perform mathematical functions to design and create an ornamental garden	Perform procedures and processes for preparing an ornamental garden	Perform procedures and processes for preparing an ornamental garden
John Allen					
Rupert Bonnett					
Nayla Burnett					

KEY TO SCALE

I	Can do with a lot of help	30-49
II	Can do with some help	50-64
III	Can do with very little help	65-79
IV	Can do independently	80-100

SAMPLE RUBRIC FOR ASSESSING END PRODUCT FOR A PROJECT

Descriptors	No progress (0)	Introductory (1)	Emergent (2)	Proficient (3)	Mastery (4)
Plan	Student's work demonstrates no understanding or progress towards achievement of the outcome.	Student does not understand problem and cannot identify data or create plan	Student understands problem but cannot identify necessary data or create plan to so	Student understands problem but can only identify some necessary data or create a slightly inaccurate plan to	Student understands problem, identifies necessary data for solving and create an accurate plan to solve problem.
Research	Student's work demonstrates no understanding or progress towards the achievement of the outcome	Student used only the reference provided by teacher	Student used at least one credible additional sources of data collection	Student used at least two credible additional sources of data collection	Student used at least three credible additional sources of data collection
Process	Student's work demonstrates no understanding or progress towards achievement of the outcome.	Student's work demonstrates no sequencing to achieve expected outcome	Student's work demonstrates limited sequencing to achieve expected outcome	Student's work demonstrates adequate sequencing to achieve expected outcome	Student's work demonstrates logical sequencing to achieve expected outcome
Application	Student's work demonstrates no understanding or progress towards achievement of the outcome.	Student demonstrates limited mastery of the relevant skills	Student demonstrates mastery of 50% of the relevant skills	Student demonstrates mastery of 70% of the relevant skills	Student demonstrates mastery of all the relevant skills necessary

SAMPLE RUBRIC FOR ASSESSING END PRODUCT FOR A PROJECT

Descriptors	No progress (0)	Introductory (1)	Emergent (2)	Proficient (3)	Mastery (4)
Safety	Student work demonstrates no understanding or progress towards achievement of the outcome.	Student does not adhere to appropriate safety guidelines	Student adheres to a few of the appropriate safety guidelines.	Student adheres to most of the appropriate and relevant safety guidelines.	Student adheres to all appropriate and relevant safety guidelines.
Product/service	Student work demonstrates no understanding or progress towards achievement of the outcome.	Product/service is complete but cannot satisfy its intended purpose	Product/service can satisfy few of its intended purpose	Product/service can satisfy most of its intended purpose	Product/service can satisfy its intended purpose
Explanation/presentation	Student demonstrates no understanding or progress towards achievement of the outcome.	Student can explain only limited aspects of the work logically	Student can explain the solution but cannot explain why the methods work.	Student can explain how to solve problem and why the chosen methods work; but did not provide alternate solution.	Student can explain thoroughly how to solve the problem and provided alternate solutions to the chosen methods.
Collaboration	Student demonstrates no understanding or progress towards achievement of the outcome.	Students worked independently	Students worked together on few occasions.	Students worked well together most of the times with most members making valuable contribution.	Students worked well together to achieve objectives with each member making valuable contribution.
Design	Student work demonstrates no understanding or progress towards achievement of the outcome.	Student has made an incomplete attempt to create a design, working-drawing, plan or chart of solution	Student creates design working-drawing, plan or chart that is not logical to the solution	Student creates a reasonable design working-drawing, plan or chart for the solution	Student creates a logical diagram, working-drawing, plan or chart to help solve problem.

MAINTAINING A STUDENT'S LOG

Resource and Technology must be delivered as a student centred subject. Therefore any assessment of students' performance should include their own assessment of work and progress.

The student's log is one way to secure this kind of self-assessment. The next page carries a recommended format for the student's log. Students are encouraged to note what they learnt and their overall experiences when they complete a topic and problem. They should provide their frank and honest assessment. Individual sheets of the student's log can be produced and given to students. They, in turn, should secure these in a file folder to be kept for inspection and assessment by the teacher.

Information to Students

This log is for your personal use. You are to write down what you have learnt and how you feel about each topic covered. A topic may cover more than one class. Therefore, your log should be written up at the end of the last class on each topic.

FORMAT OF A STUDENT'S LOG

PROJECT: _____

PROBLEM: _____

SKILLS	KNOWLEDGE	ATTITUDES
PERSONAL COMMENT (Verbal & or Graphics)		

NAME: _____

GRADE: _____ DATE: _____

MANAGING RESOURCE AND TECHNOLOGY IN A PRIMARY SCHOOL

As each school in Jamaica currently has different facilities and equipment, access to different material and different level of staff expertise, it will be necessary for each school to manage the Resource and Technology programme slightly different.

It will not be possible for all schools to follow precisely the same plan of work or to make the same products, nor is desirable as it would suppress the creativity of teachers and learners. However, it is important every school pursues the aims of Resource and Technology, covers the core content and helps its learners to achieve the desired learning outcomes and skills set out.

Each school should implement the programme by adhering to the following the recommendations:

1. Select one project per term from any of four projects.
2. Selection of a project should be determined by teacher specialization and competence to guide the process to achieve the expected outcome
3. Students' interest
4. Availability of resources
5. A minimum of two periods per week should be dedicated to the delivery of each module.

GRADE	Agriculture and the Environment	Business Basics	Family & Consumer Management	Engineering & Mechanisms
4	Create an Ornamental Garden	Creating Entrepreneurial Ideas	The Environment and Me	Keep the Wheels Turning
5	How to Establish and Maintain a Basic Container Garden	Saving and Investing	Product Development	This Little Light of Mine
6	Growing Selected Vegetables	Early Entrepreneurs	Fashion and Me	Let's Magnetize Together

