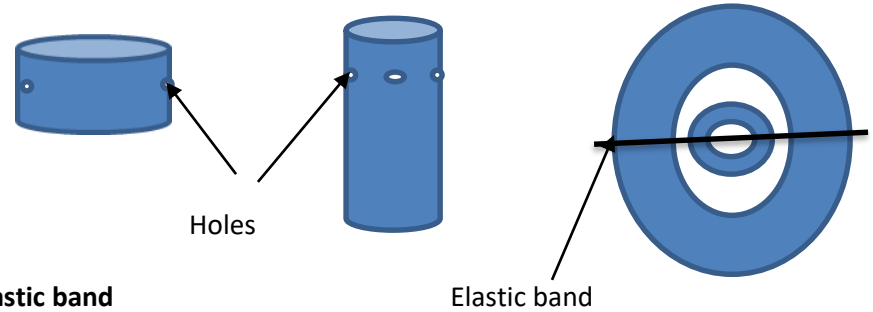
Session Title	Motion and work
Objectives:	**Real-world Content/Context**
1. Infer that work is done when a force causes movement	Measuring amounts is one way of knowing something is fair. Students will learn that scientists also measure amounts when carrying out tests. In this case they will be measuring force and distance.
2. Deduce when work/no work is done, even with forces acting	
3. Make and repeat measurements to ensure accuracy of results	
4. Consider patterns in results in order to draw conclusions	
5. Show objectivity by using data and information to validate observations and explanations about forces	
Life Skills	
Collaboration	Think Pair share
Problem-solving	Inductive Scientific Method/Engineering Design Process
Communication	Explain their ideas during phase 3 of the 5Es lesson
Creativity	Make predictions and communicate through creative writing and art work

Content Notes

- When a force causes motion, work is done.
- Some types of forces are friction, gravity, magnetic, air resistance and upthrust.
- Friction is the force that opposes the motion of one object against another. Friction reduces motion by slowing down the object or causing it to stop.
- Friction can be useful in daily life, seen in everyday tasks such as walking, driving and writing. Friction can also cause machines to be less efficient as more energy is needed to operate while energy can also be lost as heat.
- The effects of friction can be reduced by using lubricants (oils) and grease on machine parts (e.g. brake fluids in cars).

Attention Igniter (AI)

The Blower Game:	**Questions**
• **Put a 20-dollar coin on one end of a desk** • **Ask who can the coin straight to the other end?** • **Let a few students play the game**	1. What kind of force caused the coin to move, push, pull or twist? 2. Who was able to create the greater force? 3. How can you measure force?

ENGAGE (Demonstration) • **Now place a1 liter bottle filled with water in a box on the table.** • **Measure the length of the table** • **Tell the students you want to find out how much force is required to move water from one end of the table to the other.** • **Provide them with an elastic band to pull the box** • **Now add another liter bottle full and pull again** • **Add a third and pull**	1. Let the students infer that a pull force is being used 2. Let students infer that more forec is required each time the mass in increased
EXPLORE	**Instructions**
20 cm ½ inch pvc pipe (4 holes bored at one end at perpendicular diameters)) **10 cm ¾ inch pvc pipe (2 holes bored at one end at diameter)**  **5 cm elastic band** **2 paperclips** **5 cm string**	**1. Each group is supplied with the materials listed** **2. Provide instructions to the students on how to make the force meter using the parts shown (see instructions)** **3. Develop a plan to measure the force required to move various masses down the length of the table.** **4. Share your plan with your teacher** **5. Carry out the plan** **6. Record the results**
15 feet of smooth cord **15 feet of rough cord** **1 long balloon** **1 straw** **Bowl of water** **Small stone**	**1. Each group is supplied with the materials listed** **2. Develop a plan to measure the effect of friction on motion** **3. Share your plan with your teacher** **4. Carry out the plan** **5. Record the results** **1. Almost fill the bowl with water**

	2. Place the straw on the **3. Place the stone on the water** **4. Place the balloon (inflated on the water** **5. Try to force the balloon to sink** **6. Record your results**
EXPLAIN:	
Answer the following questions: **1. Wat causes an object to move?** **2. How does mass affect the motion of an object?** **3. How does friction affect the movement of an object** **4. Why do objects float or sink?** **5. Write a poem about your task today**	
ELABORATE • **Using the formula Work done = Force x Distance to calculate the work done in each of the cases above** • **What if distance is 0 how much work is done?** • **Say how much work is done if you push hard against a wall that does not move.**	**Teacher should guide the discussions here to ensure that students understand no work is done without movement.**

EVALUATE

	Describe the learning experience. Say what you thought about the task and what you expected going in. How were those expectations met or impacted?	2
	Interpret the experience discussing what you found challenging. Discuss in depth any insight(s) obtained. Support your insight(s) with examples.	3
	Relate specifically what you have learnt from the experience. Make any possible connections to content previously learnt.	2
	Provide a detailed account of how what you have learnt will influence your work/professional/personal practices for the future.	3