

Summer Holiday Activity Pack

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Public

What is **STEM**?

Key Words

- **Experiment** – A test completed to make a discovery
- **Observation** – Closely monitor something to gain information about it
- **Create** – To make something new
- **Improve** – To make something better

■ **Science**

- Knowing about the world and how it works.
- Facts are learnt through experiments and observation.

■ **Technology**

- Things that are developed from Maths and Science.
- Engineering makes technology!

■ **Engineering**

- Uses Maths and Science to create, build and improve things.

■ **Maths**

- Learning about how numbers can represent the real world.



The following activities should help you to improve your science skills through experiments and observations!



Activity 1: What is it like?

Year 2

- Find 2 completely different objects around your house
 - For example: a cup and an apple
 - The more different the objects, the better!
- Look at each object very carefully and write as many descriptive words/phrases you can in 1 minute.
- Repeat for another 2 objects
- Things to think about:
 - Are there any words that describe both of the objects?
 - More Advanced (Year 3):
 - What is the name of the material?
 - Why were these materials chosen?

Cup	Apple
Hard	Round
Blue	Red
Light	Slightly Heavy
Has a handle	Has a stem
Shiny	Shiny



Activity 1: What is it like?

For Parents/Guardians

- Encourage your child to pick up the object and look at it from all angles
- Try to hint to your child to use all of their senses to examine the object
 - What does it feel like, look like etc.
- More advanced:
 - Prompt your child with leading questions
 - Types of material: **Glass, Textiles/fabric, Plastic, Metal, Wood**
 - If it was made from a different material with different properties, would it be able to function properly?
 - Could another type of material be used?
 - Which other properties does the object have?
 - Does it float? bounce? Can it break easily?

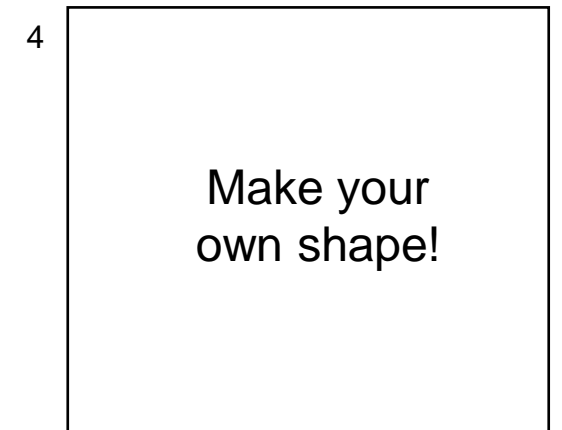
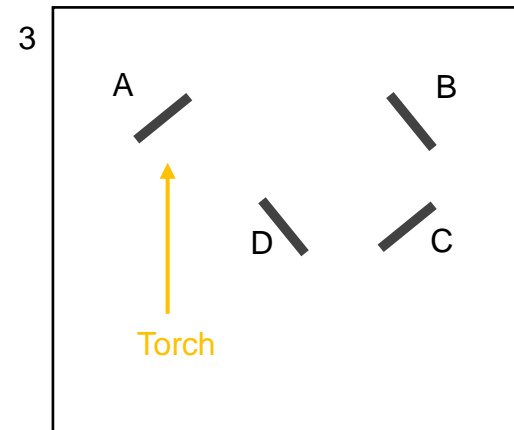
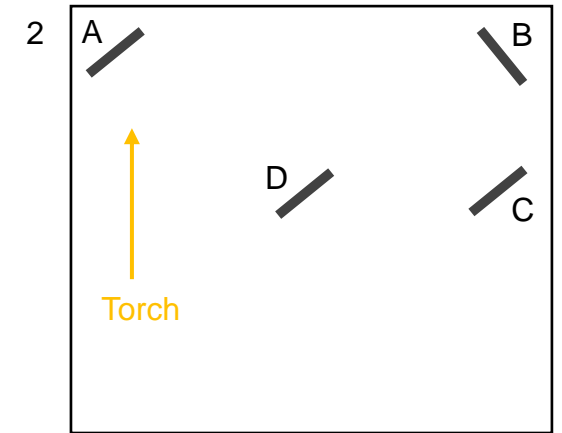
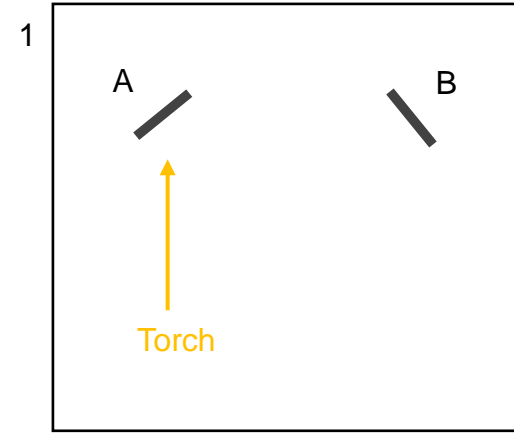
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Activity 2: Light Maze

Year 3/4

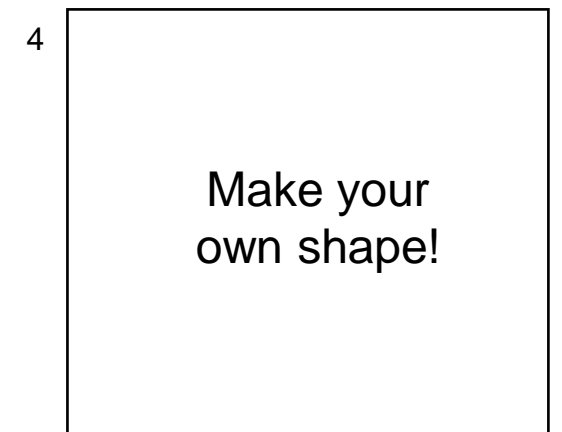
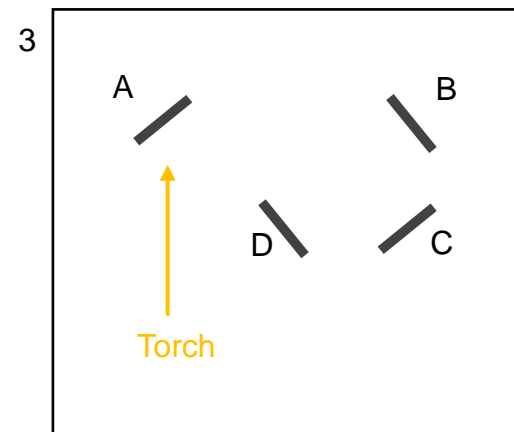
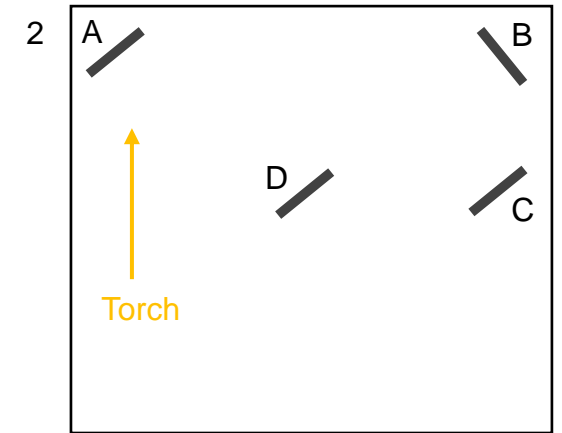
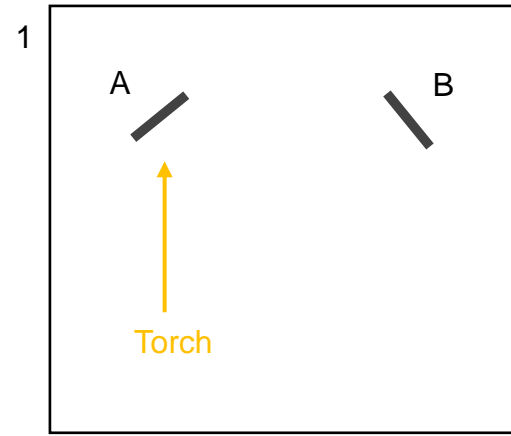
- You will need:
 - Cardboard – an old cereal box will do!
 - Tin foil
 - Torch
 - Scissors – be careful, let your parent/guardian help
- Cut out small rectangles of cardboard from the cereal box and wrap them in tin foil so they are completely covered.
- Arrange the pieces like the pictures on the right
- Shine the torch at the first piece and observe how the light travels
- Have a go at making your own light maze, using different numbers of card
 - Maybe use other objects as obstacles



Activity 2: Light Maze

For Parents/Guardians

- The aim of this activity is to help the children learn that light travels in a straight line
- Use as many foil-covered pieces of card as you like when making your own 'maze'
- For orientations 1-3, the card should be at 90 degree angles with each other
- Experiment with different angles of card and how that affects the path of the light
- Make the activity more challenging by creating a 'maze' with other objects that the light has to travel around.
- Remember to recycle the card and tinfoil when you have finished the activity!



Activity 3: Musical Ruler

Year 4

- You will need:
 - A 30 cm ruler
 - A table
- Place half of the ruler on the table and half of the ruler off the edge of the table
- Using one hand to hold the ruler against the surface of the table, use your other hand to press down on the end of the ruler that is off the edge of the table.
- Let go of the pressed end of the ruler and hear the noise it makes!
- Experiment using different lengths of the ruler and observe how that affects the sound.
- Can you make a song?



Activity 3: Musical Ruler

For Parents/Guardians

- This activity aims to demonstrate vibration
- Varying the length of the ruler changes how it behaves
 - The longer the ruler, the larger and slower the vibration is
 - The shorter the ruler, the smaller and quicker the vibration is
- Large, slow vibrations make a lower-pitch sound
- Small, quick vibrations make a higher-pitch, quieter sound
- Ask your child what they think will happen when they change the length of the ruler before they try it and why



Activity 4: Falling Objects

Year 5/6

- You will need:
 - 3 different items e.g. a pen, a teabag and a t-shirt
- Before the experiment, guess which item of the three you have chosen will hit the floor first.
- With the help of a parent/guardian, drop the three items from 2 metres above the floor at the same time
- Which object hits the floor first? Why?
- Swap and replace the objects with others around your house to find which object falls the quickest and which falls the slowest
 - Be careful not to choose something that will break easily – ask for advice from your parent/guardian.



Activity 4: Falling Objects

For Parents/Guardians

- This activity aims to demonstrate the force of gravity and how object properties affect how fast something falls
- Gravity pulls everything towards the surface of the earth
- Shape and size affect the speed at which an object falls
 - the heavier an object, the quicker it will fall because of there being less air resistance
 - The lighter an object, the slower it will fall
- If air resistance controls the speed at which objects fall, what happens when there is no air?
 - This is an advanced question
 - All objects would fall at the same speed



Activity 4: Lights Out

Year 6

- You will need:
 - 2 tealights
 - Matches/lighter – be careful, let your parent/guardian help
 - Glass jam jar
- Light the 2 tea lights and place them next to each other on a protected surface
- Place the jam jar over one of the tealights
- Observe what happens and try to explain why



Activity 4: Lights Out

For Parents/Guardians

- The activity aims to show the fire triangle in action
 - Fire needs oxygen, fuel and heat to burn
 - The jam jar restricts the oxygen to one of the tealights, making it go out
- Fundamentals of combustion/how fuel burns in an engine
 - Cummins turbochargers give the fuel more oxygen so it can burn better
- Encourage your child to make predictions about what will happen
 - Which tea light will burn longer? And why?
 - What does the jam jar do?



Helpful Resources and Cummins Links

- Engineering Links

- <https://youtu.be/Ra7Bax6rGoQ> - Engineer Song (Heriot Watt University)
- <https://www.youtube.com/watch?v=RUAy2q7qy5c> – How a Turbo Works
- <https://www.youtube.com/watch?v=vmWEXronSrM> – Every Part Has a Purpose: Pistons
- <https://www.youtube.com/watch?v=l1zHKXEdfhc&list=RDCMUCY1hwEOVMAZZmxG0JfJzz9Q&index=5> – Reman process: Turbo
- https://www.youtube.com/watch?v=motPvysbl_U&list=RDCMUCY1hwEOVMAZZmxG0JfJzz9Q&index=4 – QST30 Time Lapse

- Diversity & Inclusion Links

- <https://www.cummins.com/careers/diversity-equity-inclusion> - Diversity, Equity & Inclusion Website page
- <https://www.youtube.com/watch?v=n4c3OXAVNtk> – Cummins Powers Women
- **CUMMINS POWERS WOMEN**
 - Building prosperous communities has been part of who we are since our company's founding. We are proud to continue this legacy with Cummins Powers Women, our most ambitious community initiative ever. An \$11 million (and growing) global grant commitment to engineer solutions to gender inequality, the investment supports a range of effective programs, including grassroots teaching and mentoring, financial advancement through entrepreneurship, leadership training and strategic guidance to nonprofit leaders.
 - In its first two years, Cummins Powers Women has impacted more than 100,000 people and resulted in eight laws or policies promoting gender equality - and we're not stopping there.
- <https://www.cummins.com/company/global-impact/corporate-responsibility/community-impact/cummins-powers-women> - Cummins Powers Women Website page

- Environment Links

- <https://www.cummins.com/company/esg/environment> - Environment Website page
- <https://www.youtube.com/watch?v=Y2ItWA3f8pw> – Transforming a Dirty Waste Product into Clean Energy
- <https://www.youtube.com/watch?v=WZ7njl9wF0> – Destination Zero
- <https://www.cummins.com/company/esg/environment/planet-2050> - Planet 2050 Website page