



MASTER

Kirkcaldy High School



N3/4 Science

Applications of Science

Telecommunications & Materials

Name: _____

Class: _____

Teacher: _____

Expectations and Outcomes Learner Evaluation

Topic: Telecommunications and Materials

	LI	Learning about mobile and handset phones	Date	😊 ? ☹
L1	SC	I can state the parts of a phone handset		
		I can state the function of each part		
		I can state the energy changes that occur in a phone		
		I can state the advantages and disadvantages of mobile phones		
L2	LI	Learning about waves		
	SC	I can define (a) frequency (b) amplitude (c) wavelength		
		I can identify waves with (a) a long and short wavelength (b) high and low frequency		
		I can identify loud and quiet sounds when using an oscilloscope		
L3	LI	Learning about fibre optic communication		
	SC	I can explain how fibre optic cable work		
		I can define, label and measure (a) angle of incidence (b) angle of reflection		
		I can state the advantages and disadvantages of fibre optic cables		
L4	LI	Learning about the electromagnetic spectrum		
	SC	I can define the electromagnetic spectrum		
		I am able to state the relationship between wavelength and frequency		
		I can give uses of parts of the electromagnetic spectrum		
L5	LI	Learning about everyday materials and their uses		
	SC	I can define and give examples of (a) synthetic fibres (b) natural fibres		
		I can give advantages and disadvantages of plastics		
		I can state how the property of a material determines its uses		

Phones

Starter

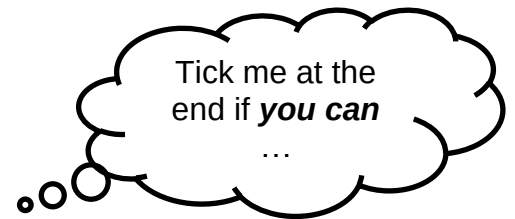
Can you imagine sending a message to your friend who lives far away without using a phone or a computer? How do you think our voices or messages travel through the phone to reach someone else?

Learning Intentions

- To learn about mobile and handset phones

Success Criteria

- ☐ I can state the parts of a phone handset
- ☐ I can state the function of each part
- ☐ I can state the energy changes that occur in a phone
- ☐ I can state the advantages and disadvantages of mobile phones



How does a telephone work?

Telephones change sound signals into electrical signals.

All telephones have 4 main parts:

- Microphone
- Electricity supply
- Transmitter
- Receiver



The Telephone

Read the passage then complete the questions.

In a telephone, sound is changed into an electrical signal at the mouthpiece (the transmitter). The signal is then sent along a wire to an earpiece (the receiver) where it is converted back into sound. The mouthpiece contains a microphone which converts sound into electrical energy. The earpiece contains a loudspeaker which converts electrical into sound energy. The Electrical supply boosts the electrical signals.

Questions

1. Which part of a telephone changes electrical energy to sound energy?

2. What does the mouthpiece do?

3. Complete the table below, matching the parts of a mobile phone to their correct function.

Select from the following functions

- Changes electricity back to sound
- Changes sound into electrical energy
- Boosts the electrical signals
- Transmits signals

Part	Function
Microphone	
Electrical supply	
Transmitter	
Receiver	

4. Label the parts of a telephone using the following words: **earpiece**, **mouthpiece**, **cord**



Advantages and Disadvantages of Mobile Phones

1. Decide whether the following listed on the board are advantages or disadvantages of mobile phones
2. Discuss with your partner and teacher other advantages and disadvantages and include them in your table

Advantages	Disadvantages

Mobile phones research task

Starter

What was the first phone you were given? Can it do all the things your current one can?

Learning Intentions

- To conduct a research task on the evolution of mobile phones

Success Criteria

- ☐ I can use a laptop to research a topic
 - ☐ I can find relevant information on a topic using a browser
 - ☐ I can present my findings in an appropriate manner.
-

Research Project: Exploring the Evolution of Mobile Phones

Overview

This project will allow you to investigate the fascinating journey of mobile phones, from their origins to the current state of advanced smartphones. Through this exploration, you'll understand how mobile phones have transformed over time and their impact on our daily lives.

Objective

1. Understand the history and evolution of mobile phones.
2. Examine the technological advancements that have shaped the development of mobile phones.
3. Investigate the social and cultural changes brought about by mobile phones.



Tasks

1. Research the beginning of mobile phones:

- Identify the first mobile phone ever created.
- Discuss the design, features, and limitations of early mobile phones.
- Understand the challenges faced during the initial development of mobile phones.

2. Examine the key developments in mobile phone technology:

- Identify major innovations in mobile phone technology and the companies or individuals responsible for these advancements.
- Explain how these developments have influenced the design and functionality of modern mobile phones.

3. Explore the impact of mobile phones on society and culture:

- Discuss how mobile phones have changed the way we communicate.
- Investigate the role of mobile phones in our daily lives, including work, education, entertainment, and social interactions.

Resources

- Books on the history of technology.
- Online resources: Reputable technology websites, online encyclopaedias, and articles.
- Interviews or documentaries about mobile phone development.

Presentation

You will be required to present your findings in a structured format. This could be a:

- Written report.
- Poster
- PowerPoint presentation.
- Video presentation.

Your presentation should cover all the objectives and tasks outlined above.

Assessment

You will be assessed on the following criteria:

1. Understanding and knowledge of the topic.
2. Quality and depth of your research.
3. Clear communication of your findings.
4. Creativity in presenting your research.

Tips

- Make sure to note down all your sources. This will help when you need to reference your information.
- Try to make your presentation engaging and interesting. Remember, this is a story about how a piece of technology has changed the world.
- Feel free to use pictures, diagrams, or even real examples of mobile phones (if available) to make your project more interactive.

Notes

Travelling Sounds

Starter

Group these objects into solids, liquids and gases. Add your own in the gaps left.

*Water**Smoke**Juice**Ice**Magnet**Steam**Rain**Log**Air**Sand*

Solids	Liquids	Gases

Learning Intentions

- To describe how sound travels through a solid, liquid and gas.

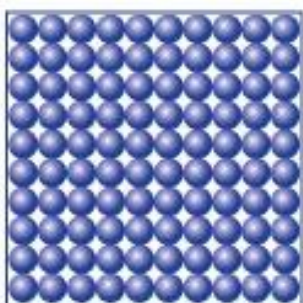
Success Criteria

☐ I can describe how sound travels through a solid, liquid and gas

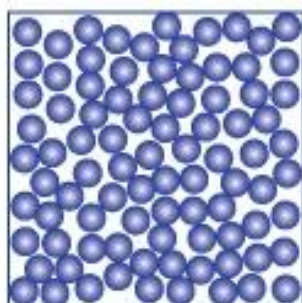
States of Matter

All matter is made up of particles.

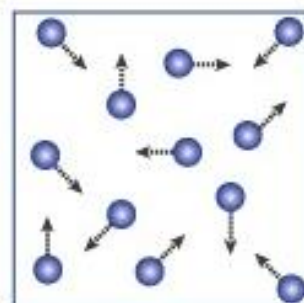
The way particles behave depends on the state of matter. The three states of matter are **solid**, **liquid** and **gas**.



Solid



Liquid



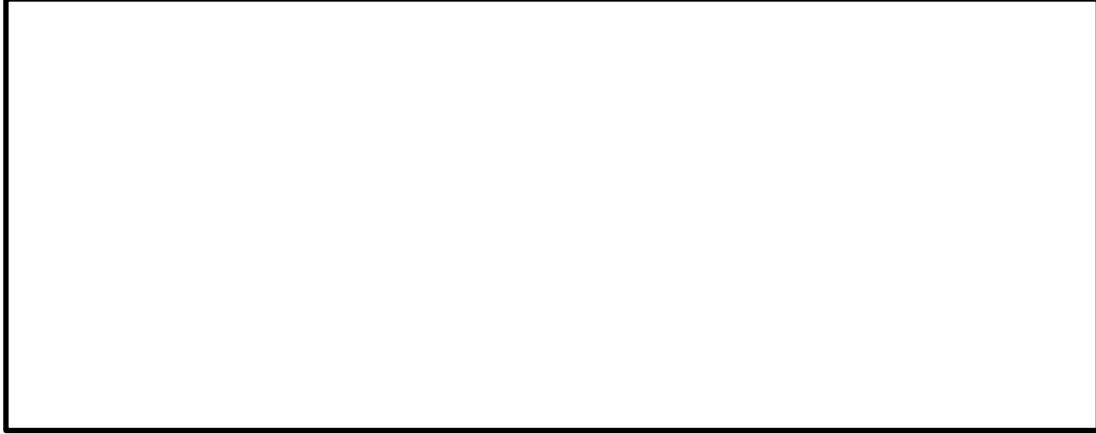
Gas

String Telephone

Aim: To investigate how sound travels through a solid.

Method:

Draw your method below



Results:

Conclusion:

Sound waves

Starter

What happens to the water if a rock is thrown in it or the water in a cup if the table is banged?

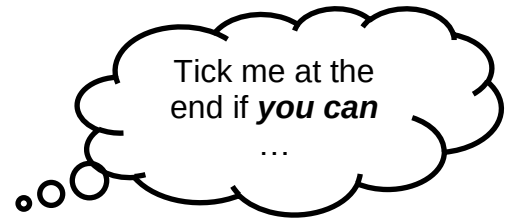
Learning Intentions

- To learn about sound waves.

Success Criteria

☐ I can explain how sound is made.

☐ I can explain how sound travels.



Sound

Sound is a **wave** which transfers **energy** from one place to another.

Sound is produced by the **vibration** of particles through solids, liquids and gases.

Activity 1: Tuning fork in water

What do you notice about the tuning fork when it hits the wooden block?

What happens to the water on the surface?

Activity 2: Ruler on desk

What do you see happening to the ruler?

What do you hear?

Activity 3: Tuning fork and ping pong ball

What happens to the ping pong ball when the tuning fork is moved towards it without striking it first?

What happens to the ping pong ball when the tuning fork is moved towards it after striking it?

Sound patterns

Starter

Pick an instrument and explain why you think it makes a noise.

Learning Intentions

- Investigate what happens when the frequency of a sound wave is changed.
- Investigate what happens when the amplitude of a sound wave is changed.
- Draw and analyse sound waveforms.

Success Criteria

- ☐ I can state what happens when the frequency of a sound wave is changed.
 - ☐ I can state what happens when the amplitude of a sound wave is changed.
 - ☐ I can draw and analyse sound waveforms.
-

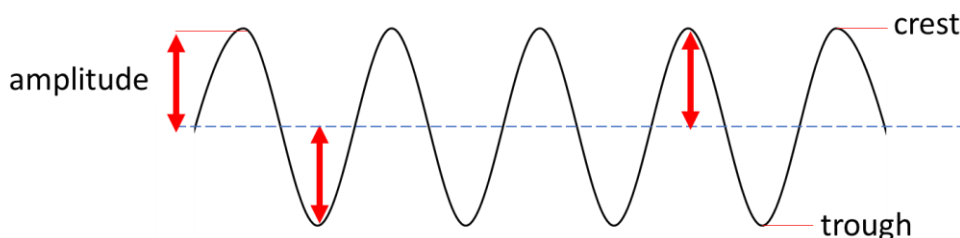
Sound waves

Sound waves have two separate properties which affect what we hear.

Frequency is a measure of the pitch of a sound. The frequency is the number of sound waves that pass a fixed point per second.

Amplitude is a measure of the loudness, or volume of the sound.

Sound waves can be represented by a wave diagram



The **crest** is the highest point of the wave.

The **trough** is the lowest point of the wave.

The **amplitude** is the distance from the middle of the wave to a crest or trough. It is half the total height of the wave

Amplitude and Frequency of Sound Waves – Experiment 1

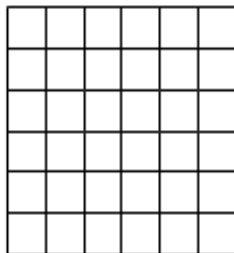
Aim: What happens when we change the volume of the sound produced?

Method:

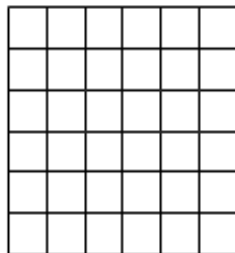
Draw your method below



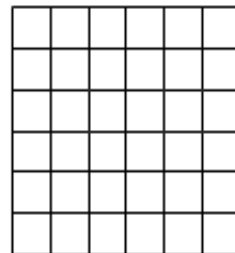
Results:



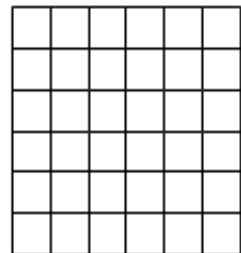
Original sound



Quiet sound



Loud sound



No sound

Conclusion:

When the **volume** of a sound increases, the **amplitude** (height) of the wave **increases**.

There is **no change** to the frequency (pitch).

Amplitude and Frequency of Sound Waves – Experiment 2

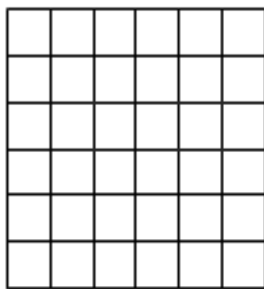
Aim: What happens when we change the pitch of the sound produced?

Method:

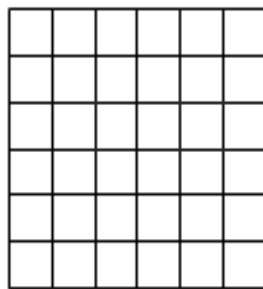
Draw your method below



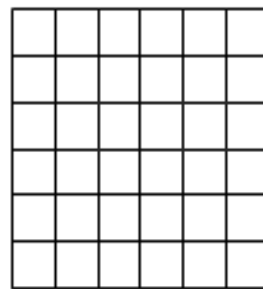
Results:



Original sound



Low pitch sound



High pitch sound

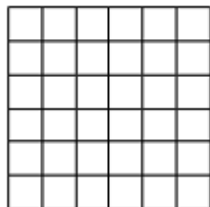
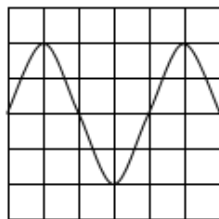
Conclusion:

When the **pitch** of a sound increases, the **frequency** of the wave **increases**.

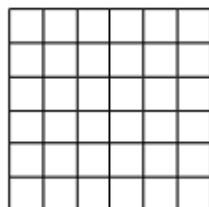
There is **no change** to the volume (amplitude).

Sound Pattern Worksheet

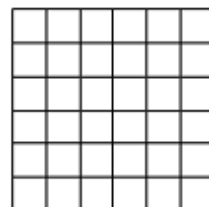
Original Pattern



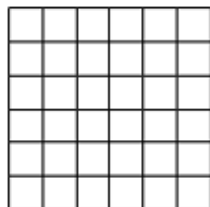
Higher pitch
Same volume



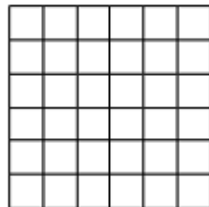
Lower pitch
Same volume



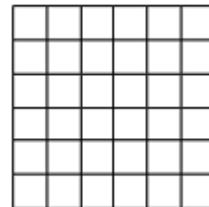
Higher pitch
Quieter sound



Same pitch
Louder sound

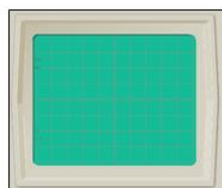


Same pitch
Quieter sound

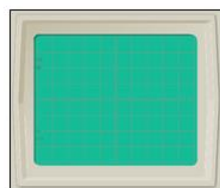


Lower pitch
Quieter sound

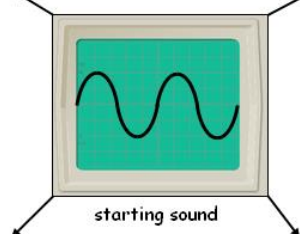
"SOUND PICTURES"



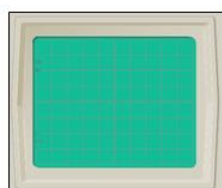
louder



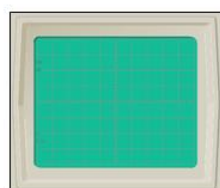
quieter



starting sound



higher pitch



lower pitch

Light and the electromagnetic spectrum

Starter

Write down a type of light other than visible light and what it is used for.

Learning Intentions

- To learn about light and the electromagnetic spectrum

Success Criteria

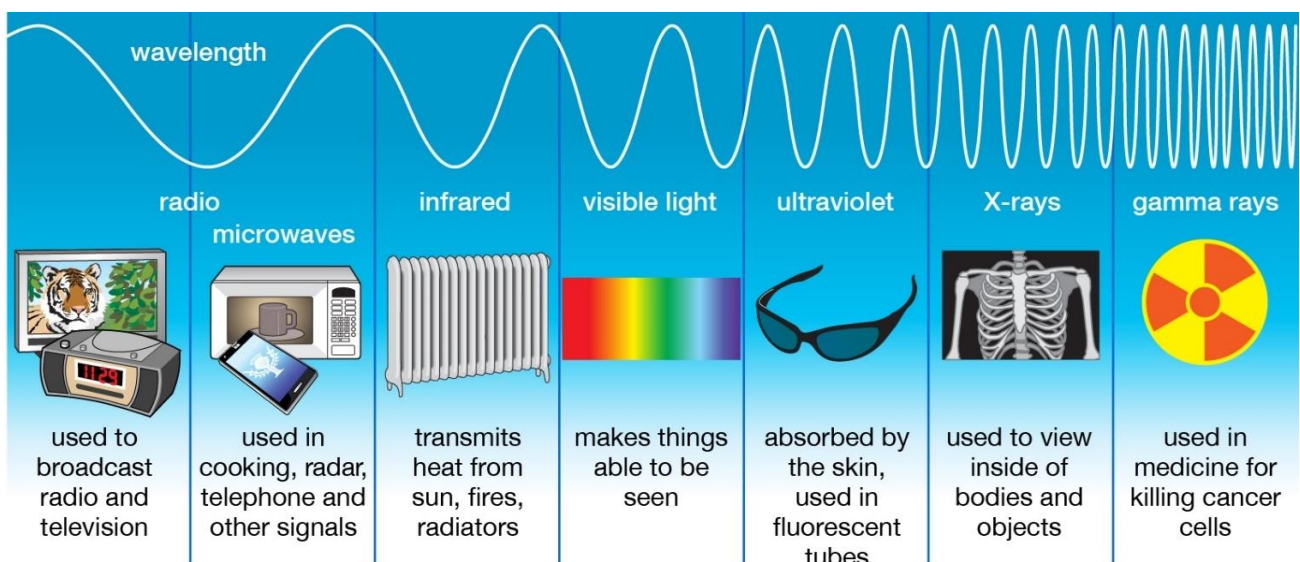
- ☐ I can define the electromagnetic spectrum
 - ☐ I am able to state the relationship between wavelength and frequency
 - ☐ I can give uses of parts of the electromagnetic spectrum
-

Light

Sir Isaac Newton discovered that white light is made of different colours - it disperses into a spectrum of colours when it passes through a **prism**.

In 1800 Sir William Herschel carried out an experiment to measure the temperatures of different colours of light and he discovered there are parts of light that we can't see such as **infrared** radiation, **microwave** radiation and more.

The parts of light we can see are known as the **visible spectrum**. These other parts and the visible spectrum make up the **Electromagnetic Spectrum (EM Spectrum)**



All radiations on the spectrum travel at the **speed of light**. This is **300,000,000 metres per second (m/s)** or approximately 186,282 miles per second! This is useful for communication.

Since microwaves are not inside the 'visible spectrum', they are invisible to us. They also have a **long** wavelength and a **low** frequency.

Questions

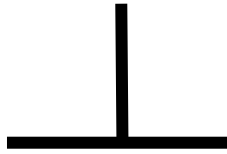
1. The Electromagnetic Spectrum contains radiations that
 - A. travel at the speed of sound
 - B. travel at the speed of light
 - C. travel at different speeds.
2. Circle the correct answer: 'Microwave radiation is **invisible/visible** and it has a **long/short** wavelength. This means they have a **high/low** frequency.'
3. Complete this table for the electromagnetic spectrum

Name of wave	Use 1	Use 2
Radio waves		
Microwaves		
Infrared radiation		
Visible light		
UV rays		
X rays		
Gamma rays		

Reflection

Starter

How are 90° angles drawn on a shape? Draw one on the angle below.



Learning Intentions

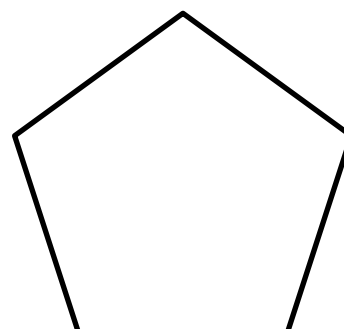
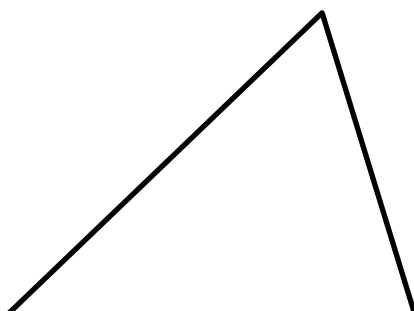
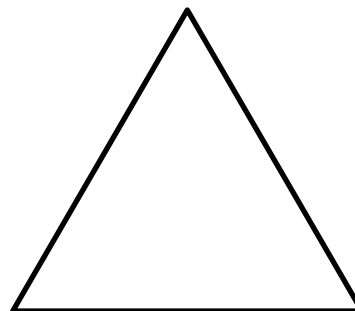
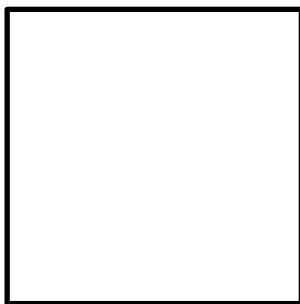
- To investigate the law of reflection.
- To identify applications of reflection.

Success Criteria

- ☐ I can state the law of reflection.
- ☐ I can measure angles using a protractor.

Angle Practice

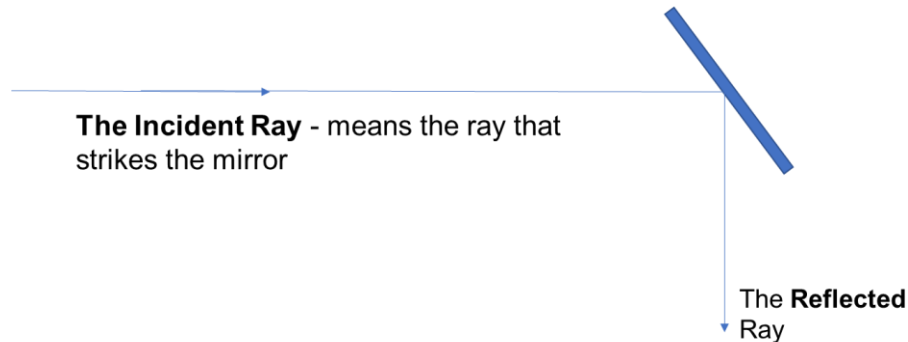
Draw the angles between each point of each of the following shapes



Light

Light is a kind of **energy**.

Light also travels in straight lines and can't go around corners without help. This problem can be solved with the use of a **mirror**.



This is called **reflection**. It happens when light **strikes an object** and rebounds off.

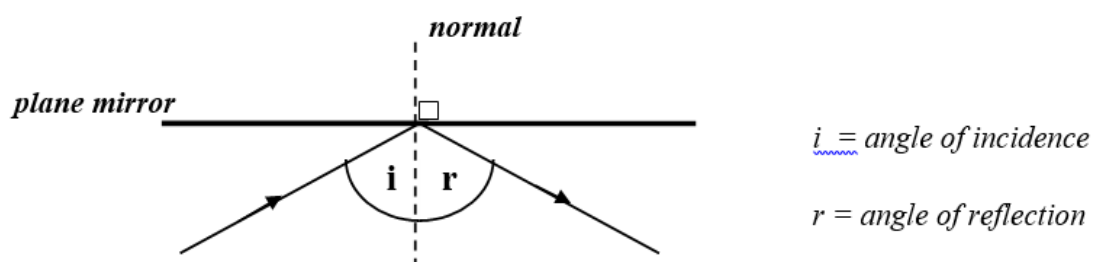
The angle of incidence: the angle between the incident ray and the normal is called the angle of incidence.

The angle of reflection: the angle between the reflected ray and the normal is called the angle of reflection.

The normal: an imaginary line drawn at right angles to the surface at the point where the ray meets the surface. All angles are measured from the normal.

When light is reflected, the angle is always measured between the **light ray** and the **normal**.

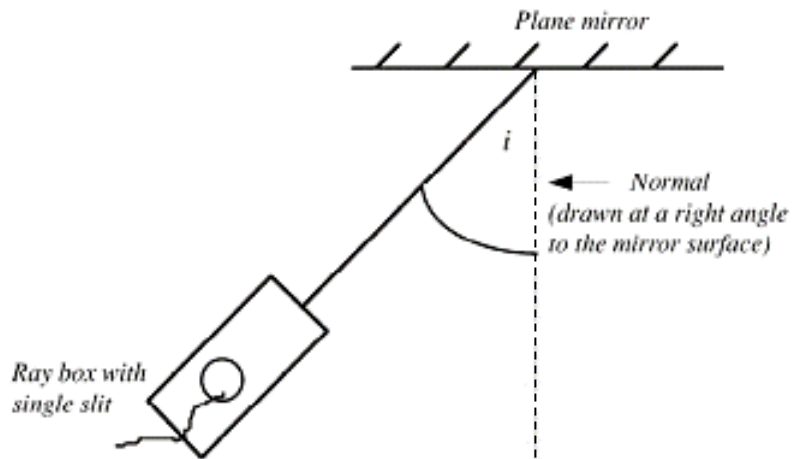
The **normal** is a reference line which is at 90° to the surface of the block.



Reflection Experiment

Aim: To investigate the relationship between the angle of incidence and angle of reflection using a plane mirror.

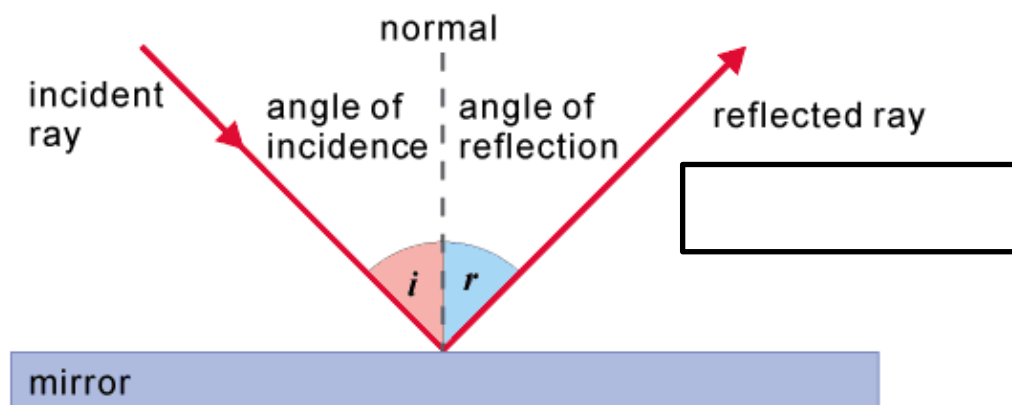
Method:



Results:

Angle of incidence i	Angle of reflection r
20°	
30°	
40°	
50°	
60°	

Conclusion: The **angle of incidence** is **equal** to the **angle of reflection**.



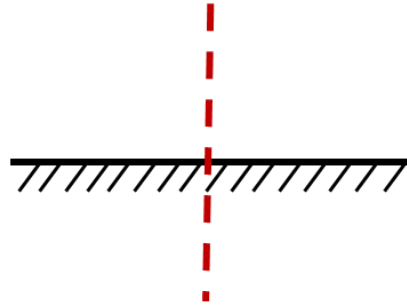
Reflection Practice

1



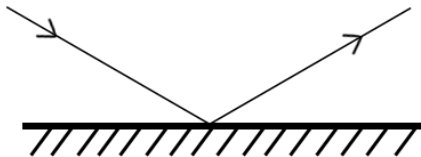
- a) What is this mirror called?:
 - i) A plane mirror
 - ii) A curved mirror
 - iii) A square mirror
- b) Label the front and back of the mirror.

2



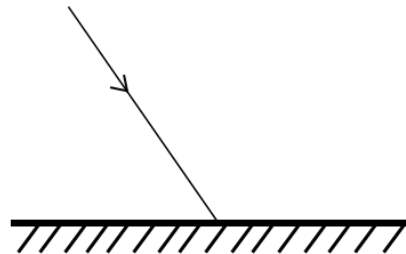
- a) What is the dashed line through going through the mirror called?
- b) What angle is the dashed line at, to the mirror?

3



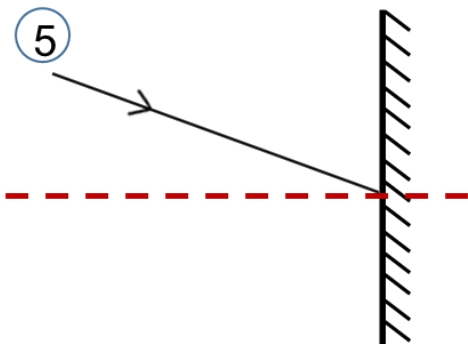
- a) Add a normal line where the ray hits the mirror.
- b) Measure out and label the **angle of incidence** using a protractor. (Check that you measure 60°)
- c) Measure out and label the **angle of reflection** using a protractor.

4



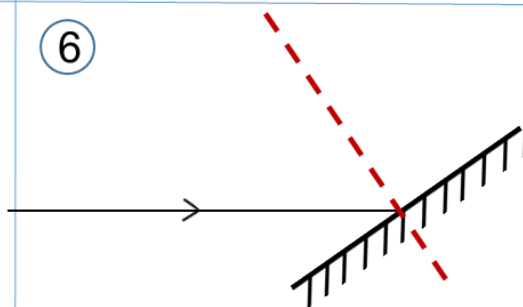
- a) Add a normal line.
- b) Measure out and label the **angle of incidence** using a protractor.
- c) Using the angle of incidence, measure out the angle of reflection which will be same size.
- d) Complete the ray diagram by continuing the light ray. **Remember to add arrows to the ray.**

5



- a) Measure out and label the **angle of incidence** using a protractor.
- b) Complete the ray diagram by continuing the light ray. **Remember to add arrows to the ray and label the angle of reflection.**

6

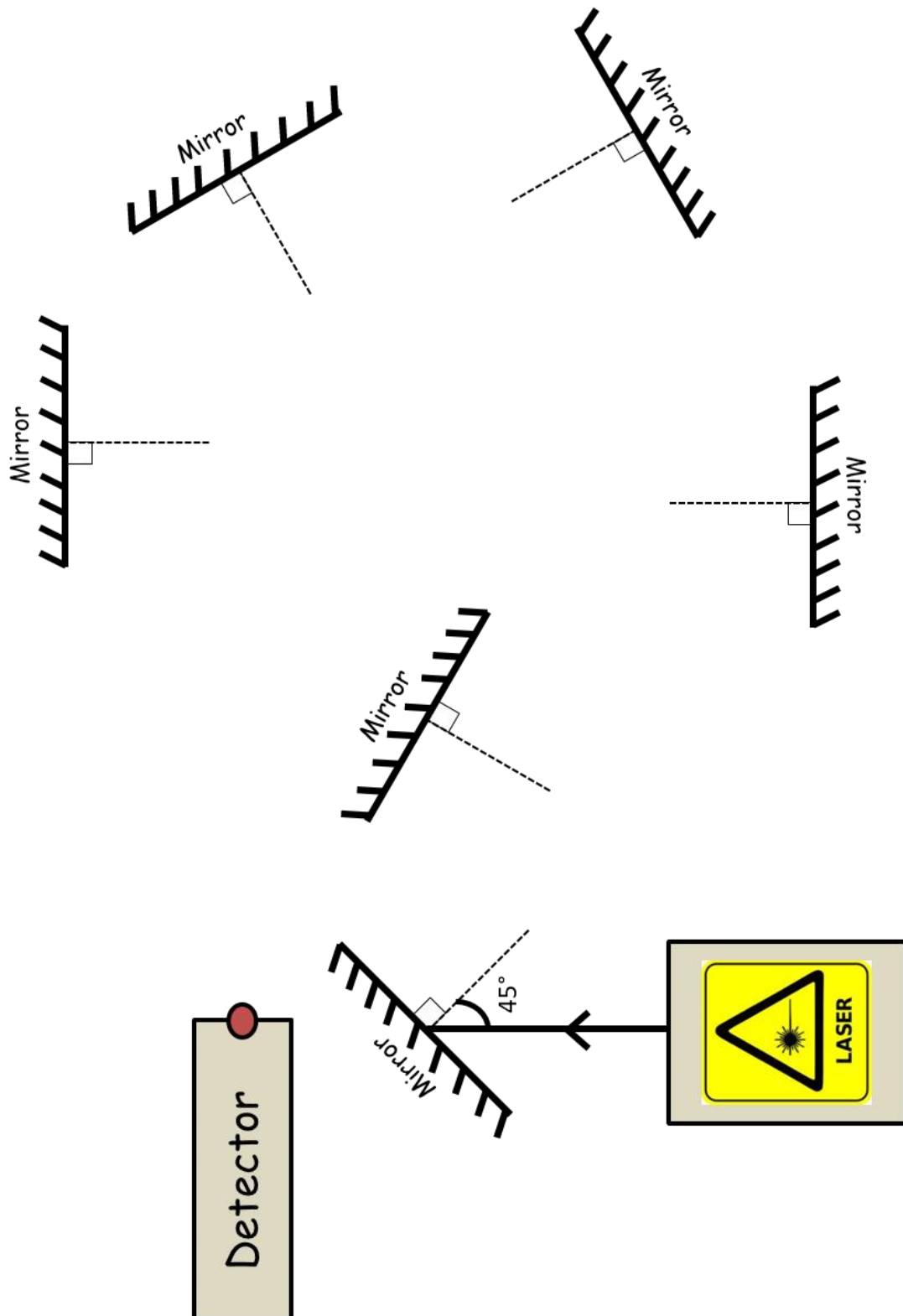


- a) Measure out and label the **angle of incidence** using a protractor.
- b) Complete the ray diagram by continuing the light ray. **Remember to add arrows to the ray and label the angle of reflection.**

Mirror Maze

Can you work out the reflections and show the path of the laser light to the detector?

- Not all mirrors are used.
- Write on the angles of incidence and reflection
- Use arrows to show the direction of the laser light.



How do Mobile Phones Work?

You may wish to use highlighters and a ruler to help you read the passages

The telephone allowed sounds to be converted into electrical signals, and transported through cables underground.

Mobile phone conversations travel through the air, using microwaves. When you speak, the sound is converted into electrical information and coded in a microwave signal.

Microwaves are found on the electromagnetic spectrum with lower frequencies than infrared and visible light, ranging from 300MHz to 300GHz. Microwaves, because of their higher frequency, can carry more information than radio waves. Their shorter wavelength means their transmitters can be smaller.

But their shorter wavelength also creates a problem. They do not diffract (bend) well over land, so cannot travel as far around the world as radio waves.

To solve this problem, base stations are used to receive the microwave signals, operating in what are called 'cells'. Each cell covers a certain area and its base station is capable of receiving and transmitting a certain number of calls. In the countryside there is a

base station every 5km. With higher demand, urban areas often have base stations every 500 metres.

Once the microwave signal arrives at the base station, it is transferred back into an electrical signal and passed on to the main telephone network. It then travels via cables to a landline, or to another base station, to be transmitted to a recipient mobile phone. So when you can't make or receive any calls, it's because there isn't a base station nearby, or too many people are clogging up the lines.

Questions

1. How are sounds converted into electrical signals for transportation in the telephone?

2. How do mobile phone conversations travel?

3. What is the range of frequencies for microwaves on the electromagnetic spectrum?

4. How do microwaves differ from radio waves in terms of carrying information?

5. What is the disadvantage of microwaves in terms of traveling long distances?

6. What are base stations used for in the context of mobile phone communication?

7. How frequently are base stations typically found in rural areas and urban areas?

8. What happens to the microwave signal once it arrives at the base station?

9. How does the electrical signal from the base station reach a recipient mobile phone?

10. What are some reasons why you might experience difficulty making or receiving calls?

Fibre Optic Communication

Starter

How do you listen to music through headphones? Is it wired or wireless? How do you think the sound is transmitted to your ears?

Learning Intentions

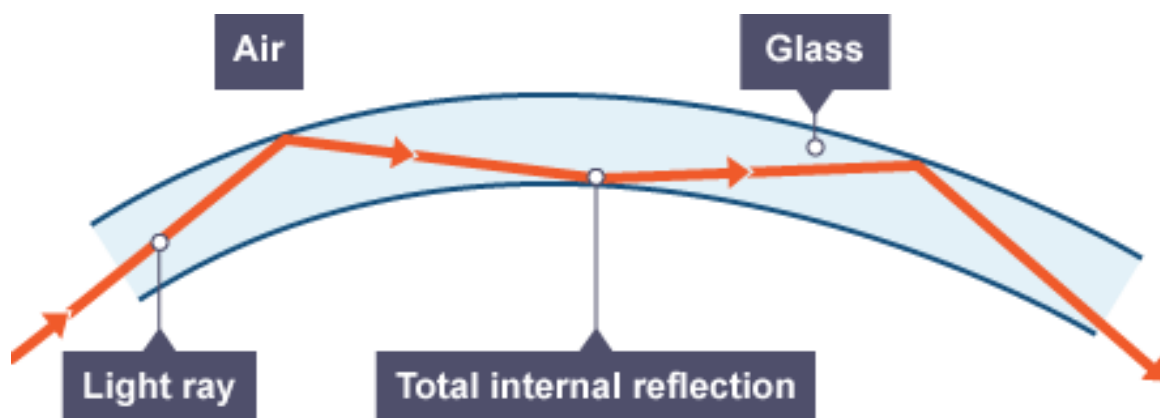
- To learn about light and the electromagnetic spectrum

Success Criteria

- ☐ I can explain how fibre optic cables work
 - ☐ I can define, label and measure (a) angle of incidence (b) angle of reflection
 - ☐ I can state the advantages and disadvantages of fibre optic cables
-

Optical Fibre

An optical fibre is a thin rod of high-quality **glass**. Very little light is absorbed by the glass. Light getting in at one end undergoes repeated **reflection**, even when the fibre is bent, and emerges at the other end. They are able to **transmit** data at very high speeds.



Light can be **reflected** when it hits a shiny, reflective surface.

Optical Fibres and Copper Fibres

Read the passage below and answer the following question:

Fibre optic cables are used to send information along thin flexible glass fibres at close to the speed of light, considerably faster than traditional copper cables. The distances which information can be sent is also significantly different with copper cables limited to transmitting information over 100m whereas fibre optic cables are suitable for sending information over distances up to 24 miles.

Further advantages of optical fibres include the ability to transfer a larger quantity of data optical cables and they are cheaper than copper cables.

Questions

1. What are fibre optic cables used for?

2. Are fibre optic cables faster than traditional copper cables?

3. How far can information be sent using copper cables?

4. Can fibre optic cables transmit information over longer distances than copper cables?

5. Besides speed, what are some advantages of fibre optic cables?

6. What material are the thin flexible fibres in fibre optic cables made of?

7. Why are fibre optic cables cheaper than copper cables?

8. Do fibre optic cables allow for the transfer of larger quantities of data compared to copper cables?

9. Are fibre optic cables better for long-distance communication?

10. Can you think of a situation where fibre optic cables would be a better choice than copper cables?

Morse Code

Starter

What's your understanding of Morse Code? When was it mostly used?

Learning Intentions

- To learn about morse code and how to read it

Success Criteria

- ☐ I can state why Morse code is useful.
- ☐ I can code my name and date of birth using Morse code.



Morse code

Morse code is a system of communication that was invented by Samuel Morse and Alfred Vail during the 1830s for use with their new invention, the telegraph. This system represents letters and numbers through a series of dots, dashes, and spaces.

Each letter or number is assigned a unique combination of dots (short signals) and dashes (long signals). For example, the letter 'A' in Morse code is represented as '.- ', which is a dot followed by a dash. The number '1' is represented as '.----', which is a dot followed by four dashes.

This code was originally used to send messages across long distances using telegraph wires. Even though we don't use Morse code much today, it's still important in certain areas like aviation and amateur radio. Plus, it's a cool secret language you can learn!

Just remember, in Morse code:

- Dot (.) is a short signal.
- Dash (-) is a long signal.

And every letter and number has its own unique combination of these signals. It's like a secret puzzle for each letter and number!

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A ● ■
B ■ ● ● ●
C ■ ● ■ ●
D ■ ● ●
E ●
F ● ● ■ ●
G ■ ■ ●
H ● ● ● ●
I ● ●
J ● ■ ■ ■
K ■ ● ■
L ● ■ ● ●
M ■ ■
N ■ ●
O ■ ■ ■
P ● ■ ■ ●
Q ■ ■ ● ■
R ● ■ ●
S ● ● ●
T ■

U ● ● ■
V ● ● ● ■
W ● ■ ■
X ■ ● ● ■
Y ■ ● ■ ■
Z ■ ■ ● ●

1 ● ■ ■ ■ ■
2 ● ● ■ ■ ■
3 ● ● ● ■ ■
4 ● ● ● ● ■
5 ● ● ● ● ●
6 ■ ● ● ● ●
7 ■ ■ ● ● ●
8 ■ ■ ■ ● ●
9 ■ ■ ■ ■ ●
0 ■ ■ ■ ■ ■

Use the codes above to write your name and date of birth below:
(Test it using: <https://morsecode.world/international/translator.html>)

Name: _____

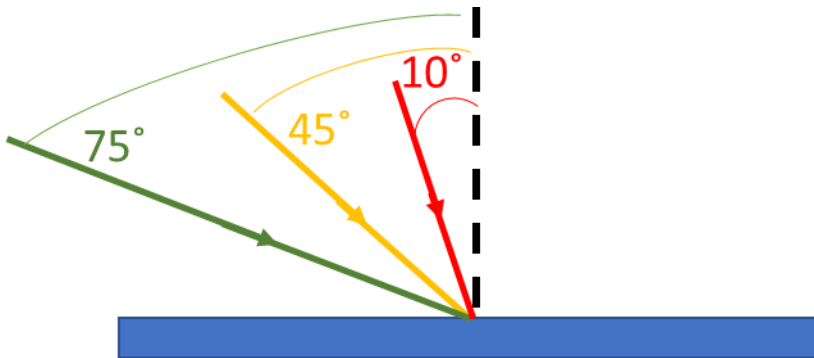
Date of birth (dd/mm/yy): _____

Satellites and curved reflectors

Starter

1. State the law of reflection

2. A pupil investigating the law of reflection arranges a ray box with a ray of light incident on a plane mirror. The diagram shows the angles of incidence light. What are the expected values for the matching angles of reflection?



Angle of reflection:

Green =

Yellow =

Red =

Learning Intentions

- To learn about curved reflectors.
- To learn about satellites.

Success Criteria

- ☐ I can describe how light is reflected in different curved reflectors
- ☐ I can explain how satellites and satellite dishes aid communication

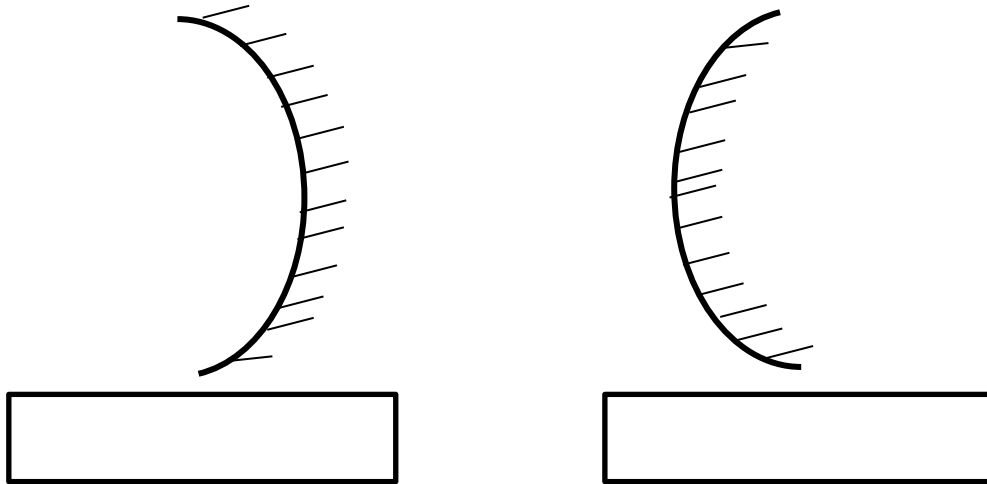
Curved reflectors

Curved reflectors are **shiny** surfaces that, instead of being **flat** like a mirror in your bathroom, are **bent** or **curved**. They can be either **concave** (curving inward like a bowl) or **convex** (bulging outward like a ball).

Now, the cool thing about these curved reflectors is the way they **bounce** light differently compared to flat mirrors. When light hits a curved mirror, the rays are **reflected** and can either **spread** apart or **focus** at a point depending on the type of curve.



Concave and Convex

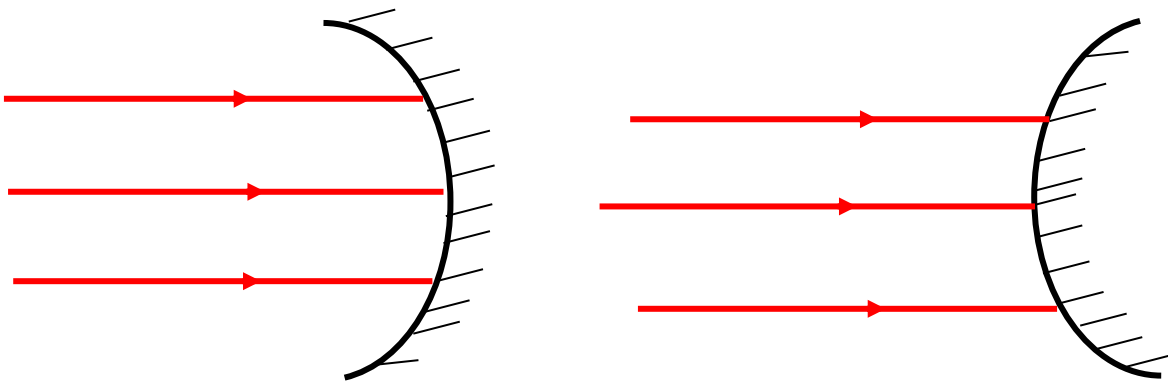


Curved reflector investigation

Aim: To investigate how light is reflected off a concave and convex mirror.

Method and results:

Label the diagrams before starting the experiment, then, using a ruler draw where the laser lines reflect off, include an on those lines in the opposite direction.



Conclusion:

Concave mirrors reflect light to a **focus**. The rays **converge**.

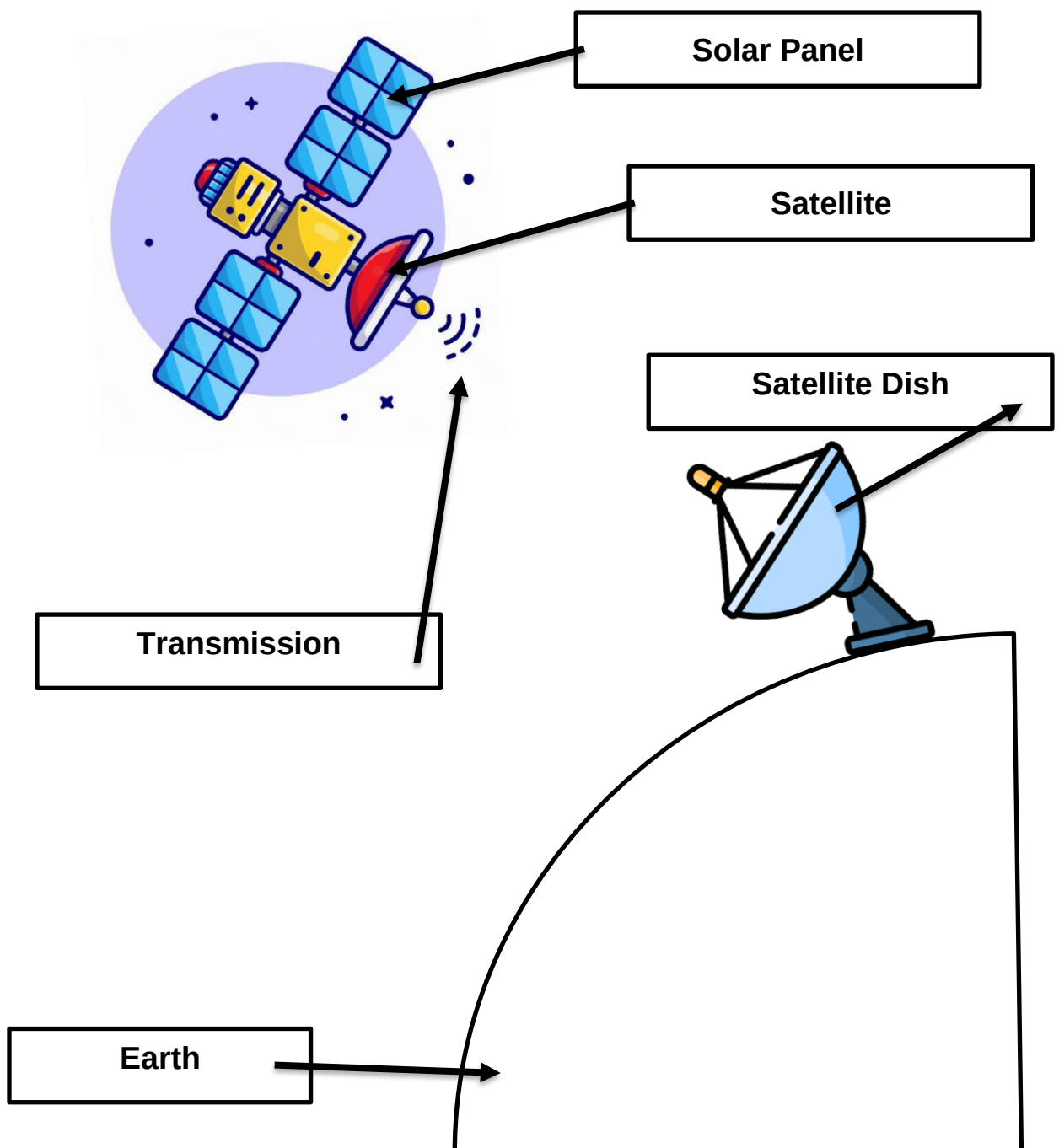
Convex mirrors reflect light so that it **spreads light outwards**. The rays **diverge**.

Satellites

Satellites are man-made objects launched into space, orbiting the Earth. They vary in size and perform numerous functions such as helping global **communication**, monitoring Earth's **climate**, and conducting space **exploration**.

Satellite dishes, on the other hand, are **terrestrial** (on Earth) devices with **curved** reflective surfaces, designed to receive and **transmit** (send) signals to and from satellites. These dishes play crucial roles in applications such as:

- satellite TV
- internet services
- space communication.



Satellite Research Project

Project Title: Satellites: Past, Present, and Future

Objective: This project will guide you to explore the historical development, current uses, and an interesting news story related to satellites and satellite dishes.

Task 1: Tracing the Journey – The History of Satellites

- Using your laptop, research and find out who launched the first satellite and when.

- Write a brief timeline of the significant events in the history of satellites.

Task 2: In Action – Current Uses of Satellites and Satellite Dishes

- Now, focus on the present. Identify five different ways satellites and satellite dishes are used today.

- Choose one use and elaborate on how it works and why it is important.

Task 3: In The News – An Interesting Story about Satellites

- Search for a recent and interesting news story about satellites or satellite dishes. This could be a new satellite launch, a major scientific discovery made through satellites, or an interesting event related to them. Write the headline below.

- Write a summary of the news story and explain why it intrigued you.

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Final Presentation: *Combine all your findings into a multimedia presentation. This could be a slide show, video presentation, or digital poster. Be sure to include images and interesting facts.*

Materials

Starter

Pick an object and explain why it was made out of that material.

Learning Intentions

- To learn about different types of materials

Success Criteria

- ☐ I can define and give examples of (a) synthetic fibres (b) natural fibres
 - ☐ I can give advantages and disadvantages of plastics
 - ☐ I can state how the property of a material determines its uses
-

Materials

Natural fibres come from plants or animals. They are easily **renewable** and **biodegradable**.

Cotton



Silk



Wool



Synthetic fibres are made mainly from **non-renewable** coal and oil **refined** into **polymers** and do not **degrade** easily.

Nylon



Polyester



Elastane



Properties and Uses of Materials

Different materials have different properties.

- A washing-up bowl may be made from the plastic poly(ethene), commonly called polythene, because this material is waterproof and can be melted and reformed into the desired shape.
- A bicycle tyre is made from rubber because it needs to be flexible and tough.
- A pair of tights may be made from nylon fibres because these are flexible and elastic.

Materials and their properties

	Leather	Polythene	Rubber	Wood
Flexible				
Hard				
Tough				
Heavy				
Durable				

Suitable materials for making the uppers of shoes are:

_____ or _____ or _____ or _____

They are flexible, tough and light. Wood is too heavy and inflexible.

_____ and _____ are both good materials for making the soles of shoes because they are flexible and durable i.e. hard-wearing. Cotton and polythene are flexible but not durable enough, and wood is durable but not flexible enough.

Discuss with your neighbour examples where the following properties are useful and complete the table.

Property	Meaning	Example
Magnetic	Attracted to metals	
Waterproof	Repels water	
Insulator	Does not let heat or electricity pass through	
Absorbent	Takes in water	
Transparent	Allows light to pass through	
Conductor	Heat or electricity can pass through	
Opaque	Does not allow light to pass through	
Flexible	Easy to bend	
Rigid	Not easy to bend	

Plastics

Plastics are materials made from chemicals and are not found in nature. They are strong and waterproof, and can be made into any shape by applying heat. Plastics can also be dyed different colours or made to be **transparent**.

Plastic is not magnetic. It is a good electrical insulator as it does not conduct heat or electricity.

Plastics are used to make all sorts of things, such as bags, bottles and toys.

Advantages and Disadvantages of Plastics

With your neighbour complete the table below.

Advantages	Disadvantages

Creation Junction - Crafting with Leather, Plastic, Rubber, and Wood

Introduction

Welcome to the 'Creation Junction' project! We're about to embark on a fun and exciting journey exploring four different materials: faux leather, recyclable plastic, elastic bands, and popsicle sticks.

Task 1: Know Your Materials

First, let's get to know our materials. We will talk about each material's properties and safety measures when handling them.

Task 2: Gather Your Materials

Next, gather your crafting tools and materials. Here's what you need:

- Faux leather
- Recyclable plastic
- Elastic bands
- Popsicle sticks or balsa wood
- Scissors
- Glue
- Markers
- Rulers

Task 3: Material Exploration

Now, it's time for our 'touch and feel' session. Explore each material's texture and flexibility and think about what each material might be good for. Use your imagination!

Task 4: Plan Your Creation

Your creation must be Science related. There are some ideas below. OR you may come up with your own idea. Remember, there's no right or wrong in creativity. Let your imagination run wild!

Toy Boat: Use plastic as the hull, wood for the deck, elastic bands for the propellers, and faux leather as the sail.

Water Filter: Create a basic water filter using a plastic bottle filled with different layers of materials such as sand, pebbles, and charcoal. You can add a layer of faux leather or fabric at the top to filter out larger debris.

Mini Greenhouse: Use a clear plastic container as a miniature greenhouse, use popsicle sticks to create plant labels and use faux leather to create a small watering mat to keep the soil moist.

Elastic Band Powered Car: Build a small car using plastic or wood, and use elastic bands to power the car, demonstrating potential and kinetic energy.

Pulley System: Use plastic pulleys and wooden sticks to create a simple pulley system. You can use the elastic bands as the ropes in the pulley system. This would demonstrate mechanical advantage and force distribution.

Balloon Powered Boat: Create a boat using a plastic bottle or wood. Attach a balloon to an elastic band and secure it to the boat. The force of the air exiting the balloon propels the boat forward.

Sketch out your amazing ideas on a show me board then draw a final sketch below.. Make a simple plan or blueprint of what you want to create. Remember labels!



Task 5: Building Time

Cut and shape your materials based on your design. Remember to ask for help if you need it, especially when using scissors. Start putting your project together. Be patient, take your time, and remember - it's about the journey as much as the final product. Carefully glue each part and watch your creation come to life!

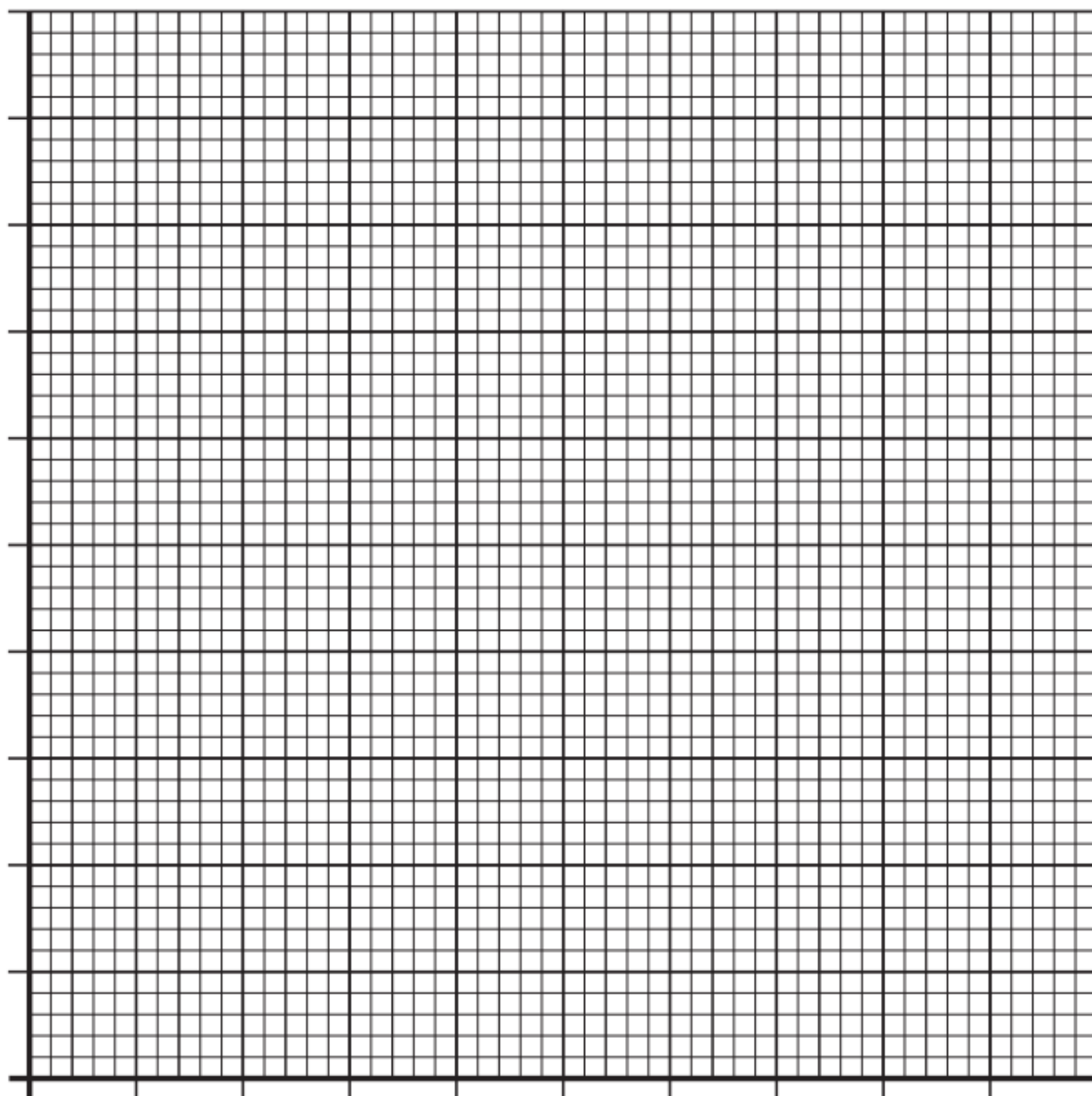
Task 6: Present Your Masterpiece

Once you've completed your creation, it's time to show it off! We'll have a show-and-tell where you can present your project and see if it works. You can talk about the process, the challenges you faced, and how you overcame them.

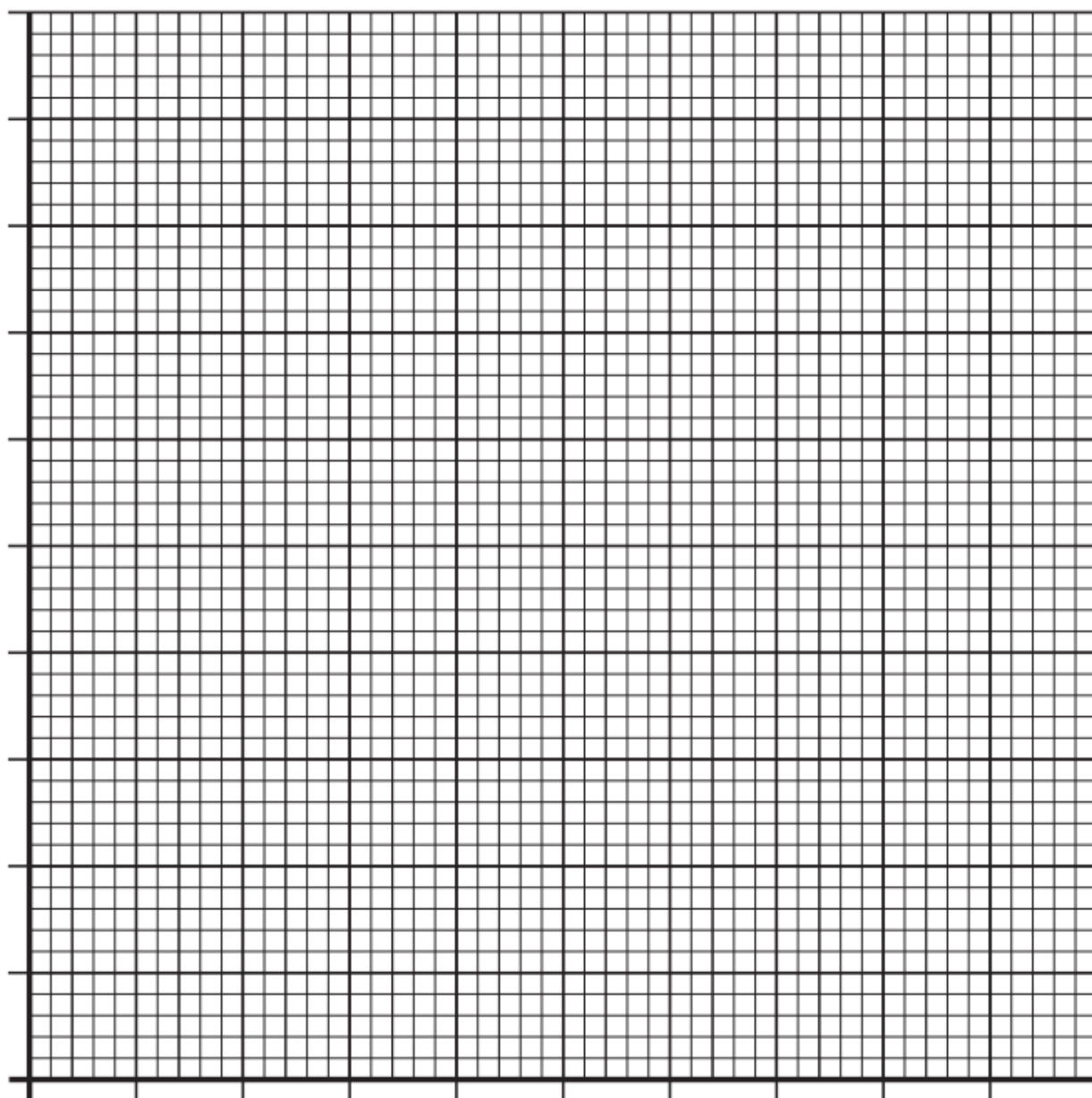
Reflection

At the end of this project, think about what you've learned. What was your favourite part of the process.

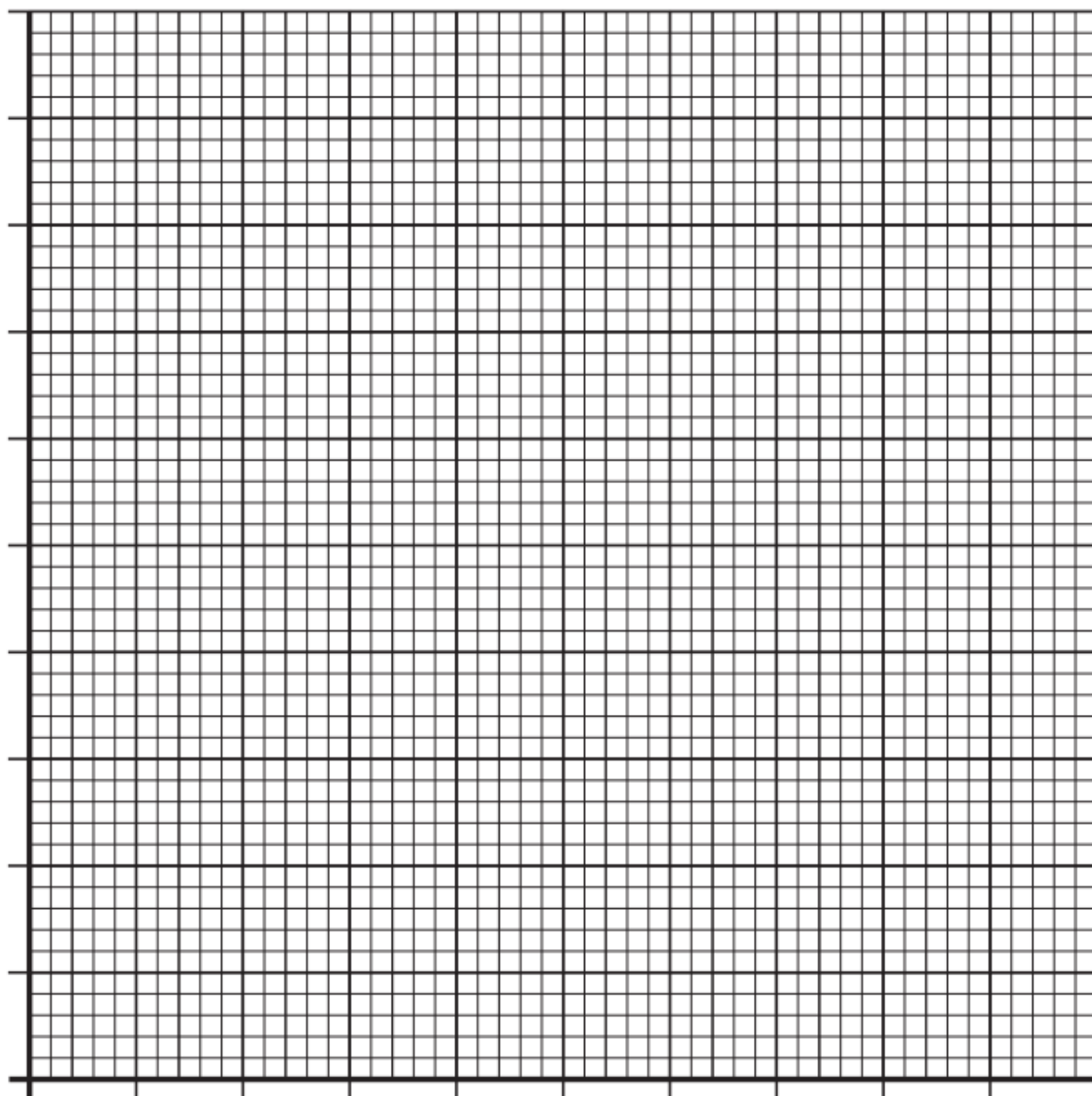
Additional graph paper for numeracy tasks:



Additional graph paper for numeracy tasks:



Additional graph paper for numeracy tasks:



Extension Tasks

Word Search

Telecommunications

L	L	F	B	P	E	I	O	P	T	I	C	A	L
T	I	Y	C	N	E	U	Q	E	R	F	R	T	R
R	S	G	F	L	E	X	I	B	L	E	E	E	E
A	M	M	H	L	I	B	E	E	M	I	F	L	W
N	A	I	I	T	T	E	A	I	A	N	L	E	A
S	T	C	E	L	I	B	O	M	N	S	E	P	V
M	E	R	L	M	O	S	T	U	T	U	C	H	E
I	R	O	U	A	L	R	A	I	V	L	T	O	S
T	I	P	U	B	M	E	E	T	O	A	E	N	L
T	A	H	M	A	B	R	E	S	S	T	D	E	C
E	L	O	T	W	N	E	O	V	O	O	B	E	P
R	S	N	X	O	U	G	R	N	U	R	R	C	L
L	T	E	E	O	T	I	L	I	N	I	R	A	I
I	N	C	I	D	E	N	T	E	D	I	E	C	B

MOBILE
WOOD
REFLECTED
OPTICAL
RUBBER
FREQUENCY
LIGHT
WAVES
MATERIALS
TRANSMITTER
SOUND
TELEPHONE
INSULATOR
NORMAL
FLEXIBLE
INCIDENT
ANGLE
MICROPHONE

Draw a comic strip on one of the topics. Ask your teacher for ideas.

