

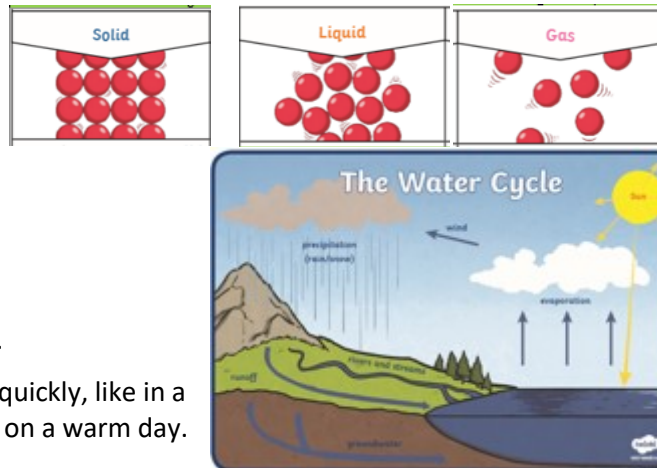
Year 4—Science- Looking at states  
Summer Knowledge Organiser



This Science unit adds to knowledge learnt in Years 1 and 2 about materials and physical properties. The children will learn about different states of matter and how materials change states through condensing, evaporating, freezing and melting. They will also understand how the structure of solids, liquids and gases are different and identify the properties of each. They will be able to answer why the water cycle is so important and how it works, linking back to vocabulary they had learnt earlier in the topic, such as condensation and evaporation.

**Key knowledge**

- Materials can be either a **solid**, **liquid** or **gas**.
- Some materials can change states when they reach their **melting**, **boiling** or **freezing** point.
- The melting point of ice is 0°C.
- The freezing point of water is 0°C.
- The boiling point of water is 100°C.
- Evaporation can either take place quickly, like in a kettle, or very slowly like a puddle on a warm day.



**Key questions**

- What are the properties of solid? What are the particles like within a solid?
- What are the properties of liquids? What are the particles like in a liquid?
- What are the properties of gases? What are the particles like in a gas?
- What are the three states of matter?
- What happens when a solid melts? What is the melting temperature of water?
- What happens when a liquid freezes? What is the freezing point of water?
- What happens when a liquid evaporates? What is the boiling point of water?
- What happens when a gas condenses?
- What do the melting point, freezing point and boiling point of water all have in common?
- What is the basic function of the water cycle?
- Why is the water cycle so important?
- In detail, can you explain how the water cycle works?
- How do you speed up the water cycle?

**Key Vocabulary**

**Solids**—materials with particles that are close together and cannot move (they vibrate). Solids keep their shape unless a force is applied to them and can be hard, soft or squishy.

**Liquids**—particles are close together but can move easily. Liquids take the shape of their container and can flow or be poured.

**Gases**—particles are spread out and can move freely and quickly in all directions. Gases spread out to completely fill the container and do not have a fixed shape.

**Melting**—when a solid is heated to its melting point, the particles move faster until they are able to move around each other.

**Freezing**—the particles in a liquid slow down as they get colder. The particles move on the spot and turn into a solid structure.

**Evaporation**—when water (liquid) turns into water vapour (gas) when it is heated.

**Condensation**—when water vapour (gas) is cooled and turns into water (liquid).

**Water cycle**—A continuous journey of water from the sea, to the sky, to the land and back to the sea. It is vital to support plants and animals.

## Year 4—Science- What's that sound? Summer Knowledge Organiser



Heathfield Schools' Partnership

This Science topic introduces the children to sound and how it is created. It acts as a contrast to what they have learned about light waves, that they travel in straight lines, and the children will be able to compare this to knowledge that the children will learn about sound waves. They will be able to identify how sounds are made and associate this with vibrations. The children will also explore what pitch and volume are and identify how these can be changed in instruments. The children will continue to use science enquiry skills to understand why sounds get quieter over a larger distance.

### Key knowledge

- Instruments create sounds in different ways: the strings of the guitar vibrate when they are plucked., the panpipes are filled with air, which vibrates when they are blown and drums make sounds when they are banged, causing the skin to vibrate.
- Sound travels as a wave, vibrating the solid, liquid or gas it is travelling in.
- Inside your ear, vibrations hit the eardrum and then are passed to the middle and then the inner ear.
- The vibrations change into electrical signals that can travel in your brain.
- Sound energy can travel from particle to particle far easier in a solid because the vibrating particles are closer together than in other states of matter.
- When you change the pitch the following principles always applies: the faster the vibrations the higher the pitch and the slower the vibrations the lower the pitch.
- On a wind instrument, shortening the column of air will create a higher sound, and lengthening the column of air will create a lower sound. This can be done with a sliding mechanism, such as in a trombone. The length of the column of air can also be changed by opening or closing holes in the side of the tube, such as in a recorder.
- On a xylophone, a higher note is created by striking the smaller bars because this causes faster vibrations. Striking the larger bars causes slower vibrations and produces a lower note.
- Sounds travel as vibrations. As the sound waves travel, the particles of whatever they are travelling through vibrate, or move quickly on the spot. The further the vibrations travel, the more they spread out. As they spread out through more and more particles, the vibrations become smaller and smaller. This causes the sound to get quieter and quieter.

### Key Vocabulary

**Sound**—a type of energy created through vibrations.

**Pitch**—a measure of how high or how low a sound is. A whistle being blown creates a high-pitched sound. A rumble of thunder is an example of a low-pitched sound.

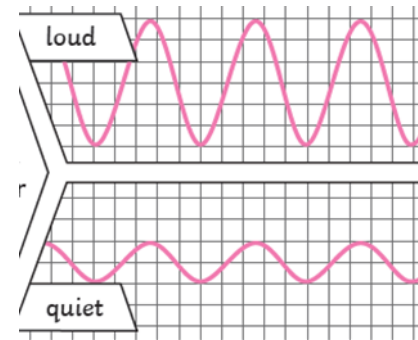
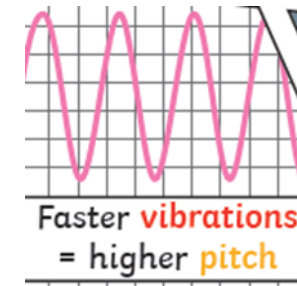
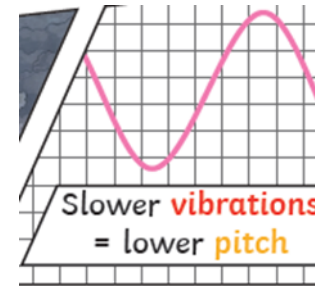
**Volume**—loudness of the sound.

**Amplitude**—the size of the vibration.



## Key questions

- What is sound? How are sounds created?
- Can you explain how a sound is created on a guitar?
- Can you explain how a sound is created on the panpipes?
- Can you explain how a sound is created on a drum?
- What states of matter can sound travel through?
- How does sound travel?
- Explain how the sound travels from a beating drum to your ear and then finally your brain.
- Why can sound travel more easily in a solid?
- What is pitch?
- How do you change the pitch of a stringed instrument?
- How do you change the pitch of a wind instrument?
- How do you change the pitch on a xylophone?
- What are the key principles to determine if the pitch of an instrument will be high or low?
- What is volume?
- What is amplitude?
- What type of amplitude do loud sounds have?
- What type of amplitude do quiet sounds have?
- How do you make a loud sound?
- How do you make a quiet sound?
- Why do sounds get quieter as the distance from the sound source increases?





Scientific enquiry approaches are part of our science curriculum and are the different ways that we can carry out scientific investigations.

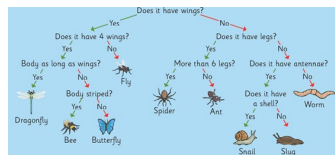
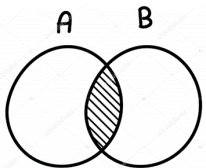
### Observing over time

- Use different senses.
- Observe changes over different periods of time.



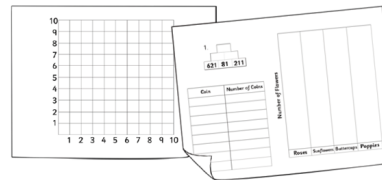
### Identifying and classifying

- Naming and grouping.
- Making connections, looking at similarities and differences.



### Pattern seeking

- All variables cannot be controlled.
- Look for relationships between variables



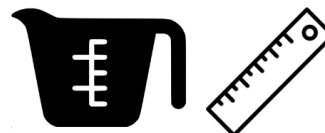
### Researching

- When we cannot investigate in school.
- Books, an expert, the internet.



### Fair testing

- All variables are controlled.
- What you change is in numbers.



### Comparative testing

- All variables are controlled.
- What you change is in words.

