Year 5:Earth and Space

SCIENTIFIC CONTEXT: Physics

KEY VOCABULARY:

Sun	A star at the centre of our solar system.
Moon	A natural satellite of a planet. The Earth's moon orbits just Earth. It is visible (mainly at night) because of reflected light from the sun.
Orbit	The curved path of an object in space around a star, planet or moon.
Planet	A spherical body that orbits a star. A planet must be big enough that its gravity clears away any objects of a similar size near its orbit.
Star	An astronomical body of a glowing ball of gas. A star produces its own energy.
Solar System	A series of planets which orbits a star. In our solar system the star the planets orbit is the sun.

As Scientists we will:

Pupils should be taught to:

- describe the movement of the Earth and other planets relative to the sun in the solar system
- describe the movement of the moon relative to the Earth
- describe the sun, Earth and moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Pupils should be introduced to a model of the sun and Earth that enables them to explain day and night. Pupils should learn that the sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has 1 moon; Jupiter has 4 large moons and numerous smaller ones).

1) How does the Earth and the other planets in the solar system move?

2) How does the Moon move?

3) How the Moon's appearance appears to change when viewed from Earth.

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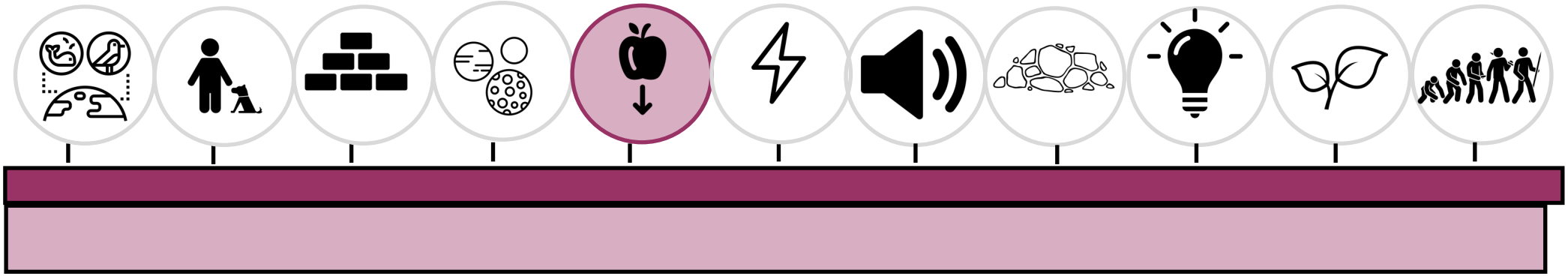

What I need to know?

Our Solar System is a group of eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. All of these planets orbit a star called the Sun. The Earth is known as a "Goldilocks Planet". This is because it is the perfect distance from the Sun to allow animals and plants to grow. It is neither too hot nor too cold. The Earth is the only planet that has an atmosphere containing oxygen. It also has water in all three states (solid, liquid and gas). These factors make it possible for Earth to support life.

The Sun is at the centre of the Solar System and does not move. In other words, the Solar System is heliocentric. The Earth rotates on its axis, taking 24 hours (one day) to make one complete rotation. The half of the Earth that faces the Sun experiences daytime. The half that faces away from the Sun experiences nighttime. The Earth spins anti-clockwise. It orbits the Sun. It takes 365¼ days (one year) for the Earth to make a full revolution around the Sun. A calendar year is 365 days long. This means that every four years, a day (February 29th) is added to the calendar to make up for this "lost" time. We call this year a leap year.

The Earth is made up of different layers. The outer layer, known as the crust, is covered in lands and oceans. The crust is made of huge plates of solid rock that float on a thick layer between the Earth's crust and core. This layer is called the mantle. When the plates rub against each other at fault lines, earthquakes can occur. This rubbing can also cause molten rock, known as magma, to force its way up through plates and escape from volcanoes. The magma escapes as eruptions of lava. Earthquakes can also cause major changes to the Earth's surface. Water erosion is another factor that can cause significant changes to the Earth's surface over time. For example, water erosion can trigger landslides.

The Moon is a satellite of the Earth. It completes its orbit in 29½ days. We call this a lunar month. During this time, we see the Moon's different phases as its shape changes. When the Earth's orbit places it directly between the Sun and Moon, it blocks the light. This is a lunar eclipse. If the Moon passes between the Sun and the Earth, a solar eclipse occurs. Tides are caused in the Earth's seas by the "pull" of the Sun and Moon's gravities.

Opportunities for Science Capital

We are the Curious Planetarium visit
Earth, Sun and Moon workshop at We are the Curious
Launch it science show at We are the Curious

Workshops with *Working Science*

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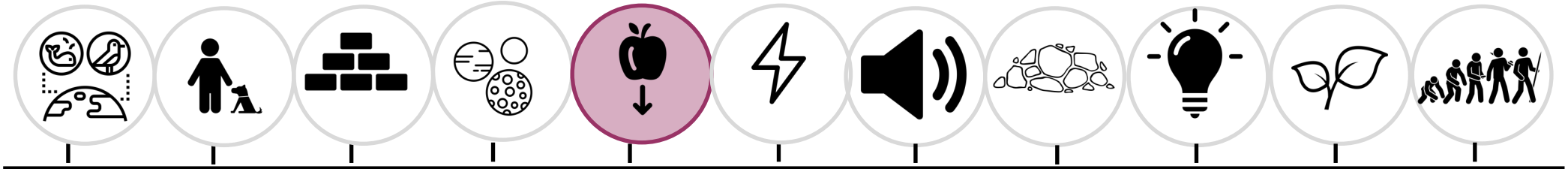

The Solar System

Starter

https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00316/activities/starter

Main

https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00316/activities/main

Explain to the children that it is impossible to draw the Solar System to scale in the classroom, due to the enormous measurements involved. For example, if we used a scale where Mercury was drawn as a 3.4mm diameter circle, the Sun would be 1m in diameter and they would need to be placed 45.5m apart. We can, however, draw the planets to scale with each other. **Note:** Using this scale, the Sun would be 4m in diameter!

This activity is a great way for the children to gain some understanding of the scale of the Solar System.

1. Ask one child to represent the Sun and eight children to represent each of the planets in the Solar System.

Ask the children to look at the Modelling the Solar System activity sheet. Use the trundle wheel to measure out the scale distance between Mercury and the Sun, and ask the child representing Mercury to stand in position. **Note:** Data for three different scales is provided. You can use whichever your space permits.

Repeat this for the other seven planets in the Solar System.

Fair testing: craters

Research: solar system

Plenary

Example diagnostics: Day& night, Earth Moon, Shape&size, Solar system

https://explorify.uk/en/activities?search

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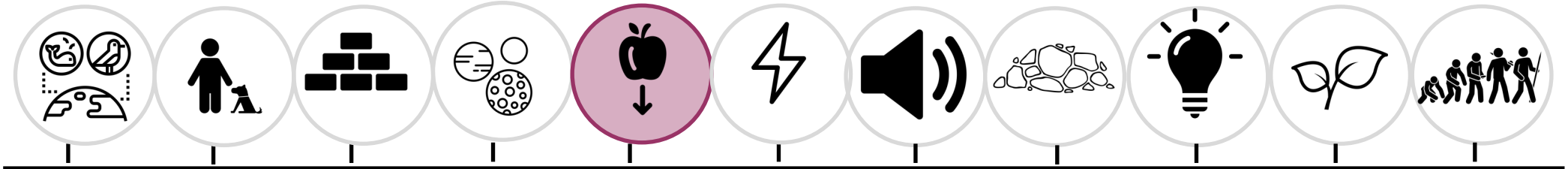

Sun and Earth

Starter

How far do you travel in one day?

Answers may vary anywhere between a few hundred metres to many miles.

- Let the children discuss their ideas with a partner for a few minutes. Encourage them to share and explain their ideas. Note each idea on the whiteboard.
- Ask the children why their answers vary so much. Did you expect them all to be similar? What is the cause of the greatest variation?

Write the number "2,500,000+" on the whiteboard. Explain to the children that everyone travels over 2.5 million kilometres each day.

Main

https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00317/activities/main

Practical: Night and Day

https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00317/activities/practical/ACTVTY00533

- Ask the children to find out about elliptical motion. This is the shape of the Earth's orbit.

Ask the children to find out the history of different calendars. Why is February the shortest month?

Observe over time: shadows in the playground, shadow clocks

Plenary

Example diagnostics: Day& night, Earth Moon, Shape&size, Solar system

Explorify Earth video- day & night

what if the sun rotated but the earth didn't?

https://explorify.uk/en/activities?search

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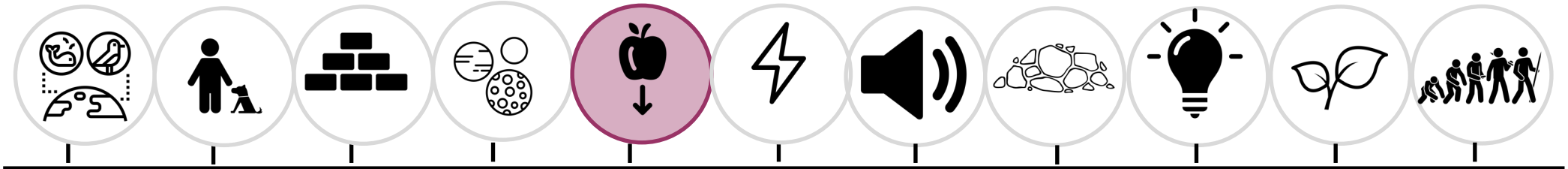

The Moon

Starter

RECAP

- Arrange the children into groups of four or five. Give each group a sheet of paper and pencils/ pens.
- Ask the children to draw the Moon in the centre of the page, and then write, or draw, every-thing they know about the Moon around it.
- Draw an example on the whiteboard to get the groups started. Encourage the children to think creatively about the task. Give the children around 10 minutes.

Ask some of the children to share their ideas with the class.

Main

https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00318/activities/main

Practical: Showing the Phases of the Moon

Plenary

Example diagnostics: Day& night, Earth Moon, Shape&size, Solar system

https://explorify.uk/en/activities?search