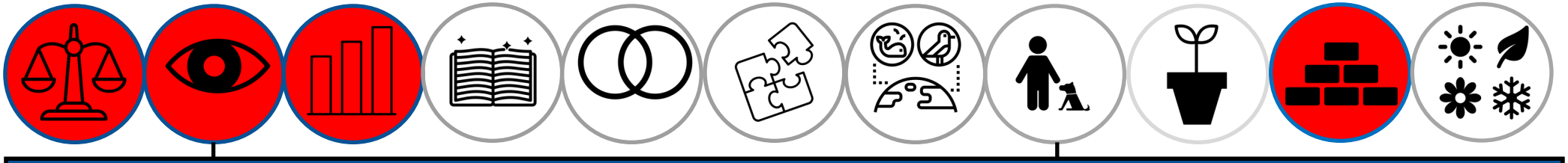
Year 2: Uses of Everyday Materials

SCIENCE CONTEXT: Materials



KEY VOCABULARY:

Names of materials	Wood, metal, plastic, glass, brick, rock, paper and card-board.
Material	Material is the matter from which a thing is or can be made from.
Properties	A property of an object or material is a feature that makes it suitable for a particular use.
Absorbent	Absorbent materials soak up liquid easily.
Opaque	Light cannot pass through an opaque material– you cannot see through it.
Transparent	Light can pass through a transparent material– you can see through it.
Translucent	Some light can pass through a translucent material– you can see through it a little bit.
Rigid	A rigid object or material cannot be easily bent out of shape.
Flexible	A flexible object or material can be easily bent without breaking.
Reflective	Light bounces of reflective material making it bright or shiny.

As Scientists we will...

Pupils should be taught to:

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses,
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Working Scientifically

Pupils should be taught to:

- Ask simple questions and recognise that they can be answered in different ways,
- Observe closely,
- Gather and record data to help in answering questions.

Notable scientist: Charles Macintosh

Key Questions:

1)

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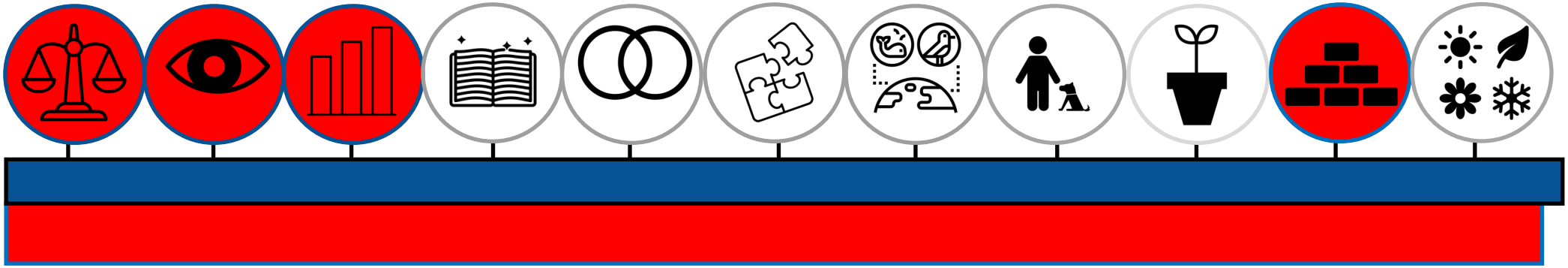

What I need to know:

All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.

Opportunities for science capital:

Invite someone in whose job relies on knowledge of materials– such as a builder– to talk to the class about how they rely on their scientific knowledge of materials to help them with their job.

Alternatively, book a workshop with Sphere Science.

Assessment:

By the end of this unit of study, pupils should be able to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.

They should be able to describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Pupils should be becoming more competent at asking simple questions and recognising that they can be answered in different ways. They should be able to observe closely and they should be gathering and recording data with more independence.

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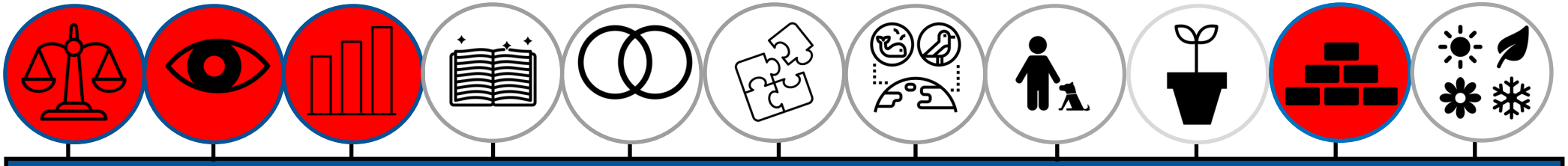

Theme 1: Uses of everyday materials

Starter

Recap Year 1 Learning: name some objects and state what they are made of and identify properties of materials and sort accordingly.

Complete KWL grid

Main

Substantive knowledge:

Discuss the uses of different everyday materials so that pupils become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass).

Disciplinary knowledge:

Working scientifically objective: observe closely, gather and record data.

Today we are materials scientists.

In Year 1 children would have spent some time distinguishing between an object and the material from which it is made. Recap this with the children by identifying and naming a variety of everyday materials in the classroom, e.g. wood, plastic, glass, metal, and rock.

Consider how to classify objects which are made from more than one material e.g. record most important part, or make a 'mixed materials' row on recording table.

Ask groups of children to go on a materials hunt around a designated section of the school/grounds, collecting their findings for different areas on a pre-prepared table and/or using a camera.

Collate class results, noting with the children different ways to record data clearly.

Discuss the uses of different materials around school and consider why different materials are used for different purposes.

See TAPS full plan: Materials hunt

Plenary / assessment.

Go outside of the classroom and compare materials.

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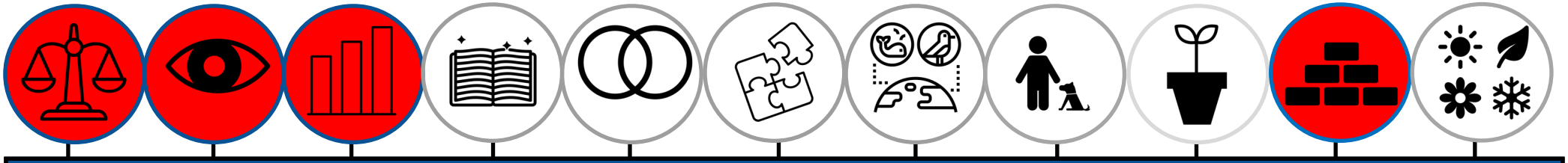

Theme 2: Properties of materials

Starter

Recap Y1 vocabulary for properties: plastic, rock, metal, glass, wood, water, hard, soft, stretchy, floppy, waterproof, absorbent, breaks/tears, rough, smooth.

Set up investigation tables to introduce Y2 properties vocabulary: rigid (stiff), flexible (bendy), reflective (shiny), transparent (see-through), opaque (not see-through), translucent (a little bit see-through). Tables to have key vocabulary on with a range of objects that have these properties (e.g. reflective table may have mirrors etc).

Main

Substantive knowledge:

Discuss that objects are made from certain materials so that the object is suitable for its use, for example, cotton is used for our school jumpers because it is soft and thick so it keeps us warm and is soft on our skin.

Disciplinary knowledge:

Working scientifically objective: observe closely

Set up a range of objects, discuss what it's made from, it's properties and why the properties make it suitable for the job using the sentence starters to structure discussion:

- I found…
- It is made of…
- It is…. (properties)
- It is used to/for…
- It is useful because…

E.g. I found cling film. It is made of plastic. It is flexible and transparent. It is used to wrap around food and keep it fresh. It is useful because it is flexible enough to wrap around different shapes. Because it is transparent, I can easily see what food I have wrapped.

Plenary / assessment.

Agree/disagree, tell me why:

- A brick would be useful to wrap my sandwiches in.
- Glass would be good for building a bridge.
- Cotton would be a good material for a drinks holder.

Etc.

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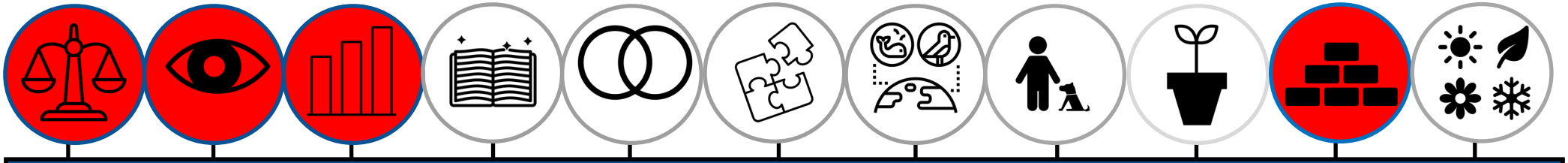

Theme 3: Squash, bend, twist and stretch

Starter

Recap activity

Explorify: Odd one out Unusual houses

Main

Substantive knowledge:

Put the words bend, twist, stretch and squash on the board and encourage children to share any knowledge they already have. Explain that we are going look at the different objects made of different materials and discover which ones will change shape if we bend, twist, and stretch or squash them. Demonstrate the actions on various materials.

Disciplinary knowledge:

Working scientifically objective: gather and record data

Give each group: playdough, rubber, sponge, ball, elastic band elastic band, drinking straw, wooden block , stones.

1. Ask the children to look (without touching) at the items and predict which will bend, twist, and stretch or squash and explain why they have made those predictions.
2. The children shall manipulate each of the objects in turn and complete the table on their worksheet as they do this.
3. When all the materials have been investigated, they should count their results and record them in the appropriate box on the table.

Worksheet available from: https://stem.wsc.ac.uk/wp-content/uploads/2020/09/Changing-Shape-Portfolio-2018.10.pdf

Plenary / assessment.

Discuss their findings, how many objects could stretch, twist, bend or squash?

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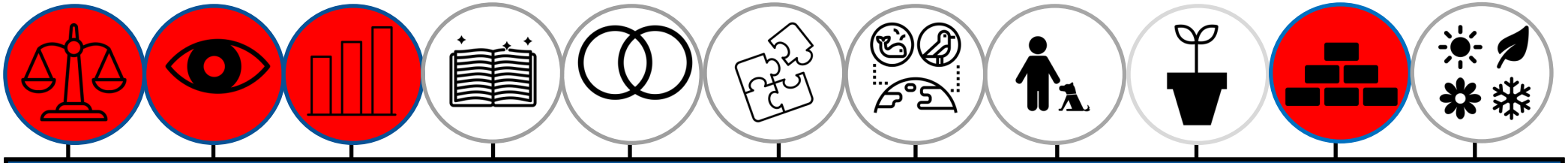

Theme 4: Charles Macintosh

Starter

Recap activity

Substantive knowledge:

Go through presentation on: https://bpes.bp.com/super-scientists-charles-macintosh-primary

(teaching notes available on slides. See SB for login details).

Main

Disciplinary knowledge:

Comparative test

Working scientifically objective: ask simple questions and recognise they can be answered in different ways.

Today we are going to be material engineers and we're going to help Charles Macintosh design a new waterproof coat. Provide a collection of different types of materials. Today we want to know the 'best' for waterproof coat. Using the comparative test planning grid, discuss how to compare how waterproof the different materials are, for example:

Drip water onto the material until it seeps through

Pour a set amount of water onto the material

Wrap up a cotton ball in the material & put into water

Children decide on and carry out a simple test to measure the waterproofness of different materials – groups try different ways to answer the question.

Discuss as a class the different ways in which groups tested waterproofness.

Adult collect utterances or ask target children or those who have not worked with an adult. These could be recorded in floorbooks or annotated photos.

See full TAPS plan on Y drive.

Plenary / assessment.

Charles Macintosh quiz available from: https://bpes.bp.com/super-scientists-charles-macintosh-primary

(See SB for login details.)

Complete KWL