# Properties and changes of materials

*Exploring properties and uses of materials*

*Year 5*
*Age 9 - 10*

**For parents**

*Thank you for supporting your child's learning in science.*

***Before the session:***

- Please read slide 2 so you know what your child is learning and what you need to get ready.
- As an alternative to lined paper, slide 6 may be printed for your child to record on.

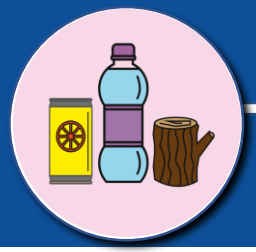
***During the session:***

- Share the learning intentions on slide 2.
- Support your child with the main activities on slides 3-6, as needed.
- Slide 7 is a further, optional activity.
- Slide 8 has a glossary of key terms.

***Reviewing with your child:***

- Slide 9 gives an idea of what your child may produce.

The Association for Science Education



# Properties and changes of materials

*Exploring properties and uses of materials*

Key Learning

- Materials have different uses depending on their properties.
- Properties include hardness, flexibility, absorbency, strength, transparency, electrical and thermal conductivity and attraction to magnets.
- See the word bank of vocabulary on page 3.

I can…

- use Carroll diagrams to classify materials by their properties.

**Activities** (pages 4-6): 30 - 40 mins

Household items to support learning:

- 10-12 items made from different materials. See page 5 for suggestions.
- Use lined paper and a pencil for recording. *Alternatively you may wish to print page 6 as a worksheet.*

**Taking it further…** (page 7): 20 - 30 mins

- You may like to investigate a household object, a toy or a piece of sports equipment made of two or more materials.

# Word bank – properties of materials

materials

elastic

waterproof

opaque

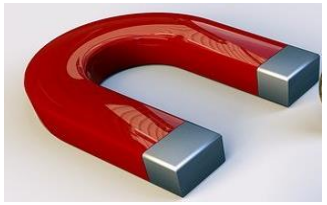
translucent

transparent

flexible

rigid

absorbent



magnetic

brittle

strong

smooth

rough

dull

thermal conductor

thermal insulator

hard

soft

reflective

electrical conductor

electrical insulator

# Explore, review, think, talk...

*What do you already know about the properties of materials?*
*(5 – 10 minutes)*

- Look at these three cups which are made of different materials.
- Which do you think is the odd one out?




There are many possible answers. Think about the properties of the materials to explain your ideas. You can use the word bank on page 3 to help you.

- For example, you may have considered transparency to choose the odd one out.

The **properties** of materials help us to decide which materials are suitable to make a particular object.

- Which important properties do all three cups need to have?

Watch this clip to help you decide:
https://www.bbc.co.uk/bitesize/topics/z4339j6/articles/zx8hhv4

# Properties and uses of materials

*Exploring the materials of household objects*

*(pages 5-6: 20 - 30 minutes)*

- Find 10 - 12 items made of various materials. *For example:*


- Sort the objects into groups. You may like to use the word bank on page 3.

*For example:*

*flexible*

*slightly flexible*

*rigid*

- *Try this three or four times for different properties.*

Classify your household items using two different Carroll diagrams.

You may like to use the example opposite for your first one.

Use what you have learnt and the word bank to help you.

| | |
|---|---|
| waterproof | absorbent |
| rigid | flexible |
| strong | brittle |
| rough | smooth |
| reflective | dull |
| elastic | non-elastic |
| hard | soft |
| magnetic | non-magnetic |
| thermal conductor | thermal insulator |
| electrical conductor | electrical insulator |
| transparent | opaque |
| translucent | |

I can use Carroll diagrams to classify materials by their properties.

| | rigid | not rigid |
|---|---|---|
| opaque | | |
| not opaque | | |

| | | |
|---|---|---|
| | | |
| | | |

# Taking it further...

*Investigate a household object made of two or more materials*
*(20 – 30 minutes)*

Many objects are made of more than one material because different parts need different properties.


Use DK Find Out to explore more materials:
https://www.dkfindout.com/uk/science/materials/

- Choose a household object, a toy or a piece of sports equipment which is made of two or more materials.
- For example, you might like to investigate a bicycle or a skateboard.

- Investigate each material to decide why it has been selected.
- Draw a labelled diagram to explain what you have found out.

**Glossary of terms**

**Absorbent:** An **absorbent** material is able to soak up liquid easily.

**Brittle:** A **brittle** material is usually hard but can break easily, like china or glass.

**Electrical conductor:** An **electrical conductor** allows electricity to flow through it.

**Electrical insulator:** An **electrical insulator** does not allow electricity to flow through it.

**Flexible:** A **flexible** object or material can be bent easily without breaking.

**Material:** **Material** is the matter from which a thing is or can be made.

**Opaque:** Light cannot pass through **opaque** material.

**Property:** A **property** of an object or material is a feature that makes it suitable for a particular use.

**Reflective:** Light bounces off **reflective** material making it bright or shiny.

**Rigid:** A **rigid** object or material cannot be easily bent out of shape.

**Thermal conductor:** A **thermal conductor** allows heat to pass through it easily.

**Thermal insulator:** A **thermal insulator** does not allow heat to pass through it easily.

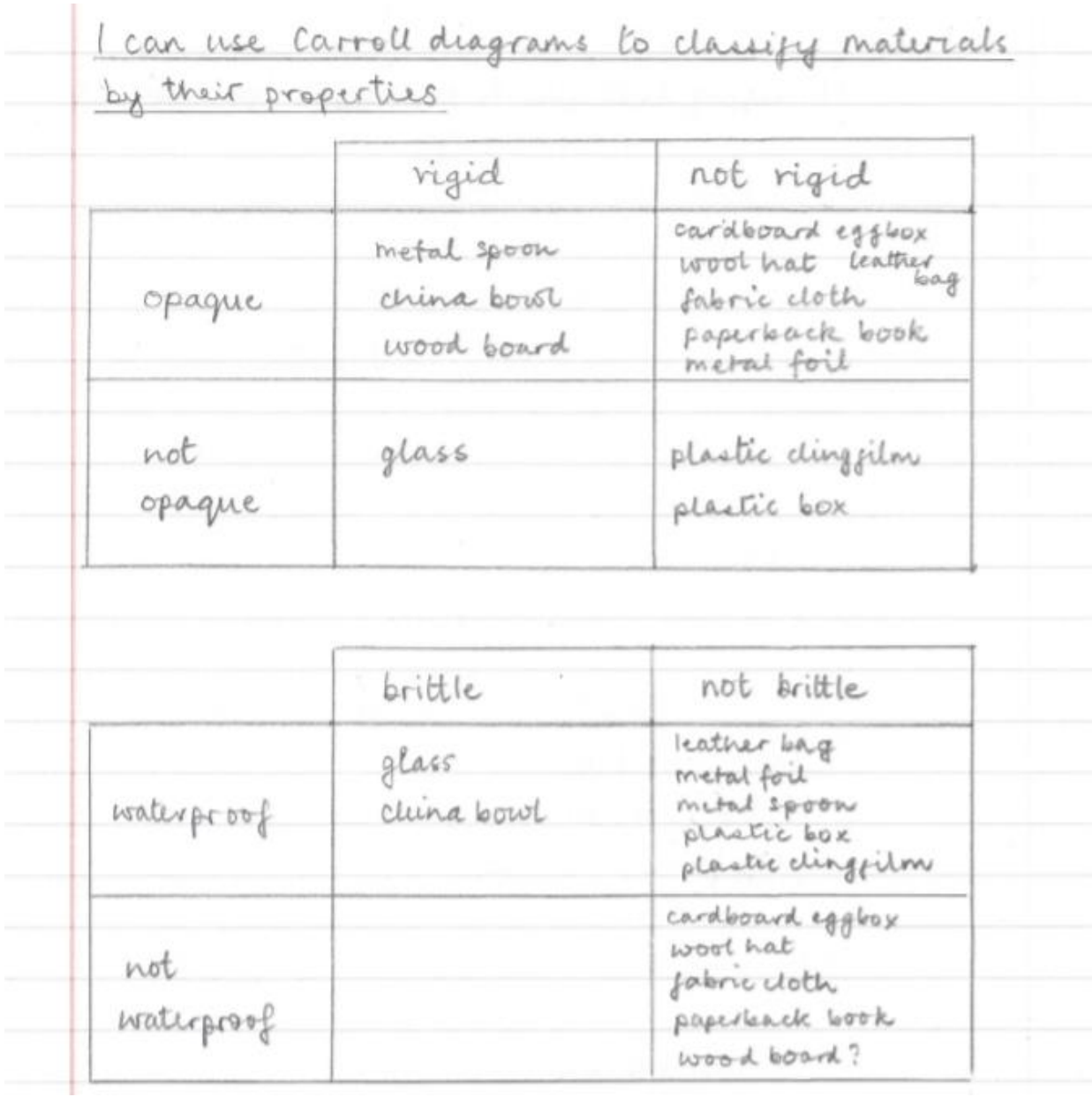
**Translucent:** Some light can pass through **translucent** material.

**Transparent:** Light can pass through **transparent** material.

There are many possible outcomes for this activity.
Try to use the name of the material and the object, for example ‘metal spoon’.

You may find there is a Carroll diagram quadrant with no objects. For example, here there are no objects which are both ‘brittle’ and ‘not waterproof’.

## Possible learning outcome for reviewing your work:



I can use Carroll diagrams to classify materials by their properties

| | rigid | not rigid |
|---|---|---|
| opaque | metal spoon<br>china bowl<br>wood board | cardboard eggbox<br>wool hat<br>leather bag<br>fabric cloth<br>paperback book<br>metal foil |
| not opaque | glass | plastic clingfilm<br>plastic box |

| | brittle | not brittle |
|---|---|---|
| waterproof | glass<br>china bowl | leather bag<br>metal foil<br>metal spoon<br>plastic box<br>plastic clingfilm |
| not waterproof | | cardboard eggbox<br>wool hat<br>fabric cloth<br>paperback book<br>wood board? |

It may be difficult to classify some objects. For example, a cardboard egg box needs to be fairly rigid but it has a flexible hinge so the lid can open easily.

These Carroll diagrams only have two options. If the property selected in the first column is ‘rigid’, the second column should be labelled ‘not rigid’.