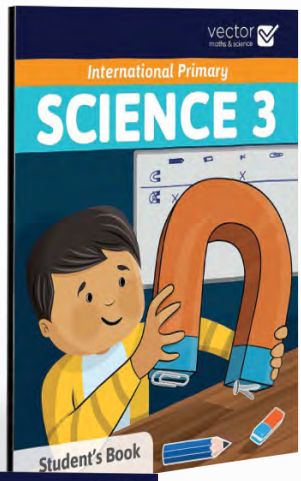
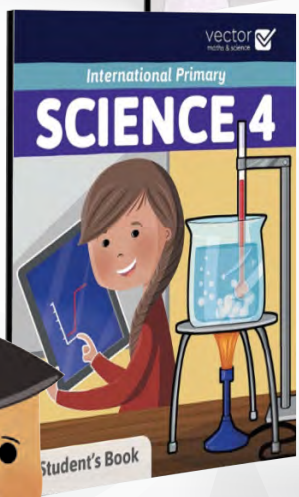
vector
maths & science

International Primary SCIENCE

Worth exploring!





Empreser elt

Series

CEFR
A1 to A2

Levels

6 books

Teaching hours per week:

Starting at 5 hours per week using SB only. Up to 8 if implementing WB and digital components

Main Characteristics

Vector is an exciting brand new six-level course for primary students. It has been designed to engage students, spark their interest in scientific knowledge and equip them with the skills necessary to excel in the modern, ever changing world. The framework provides a comprehensive set of progressive learning objectives for science and helps develop practical skills through scientific inquiry.

Key features:

- pecifically designed to support EAL students (English as an Additional Language).
- Follows the Science Curriculum Framework of Cambridge for Primary Levels (Stages 1-6).
- Follows the 5E Model of teaching.
- Covers three different subjects, Biology, Chemistry and Physics.
- Includes high resolution pictures which facilitate the understanding of scientific knowledge.

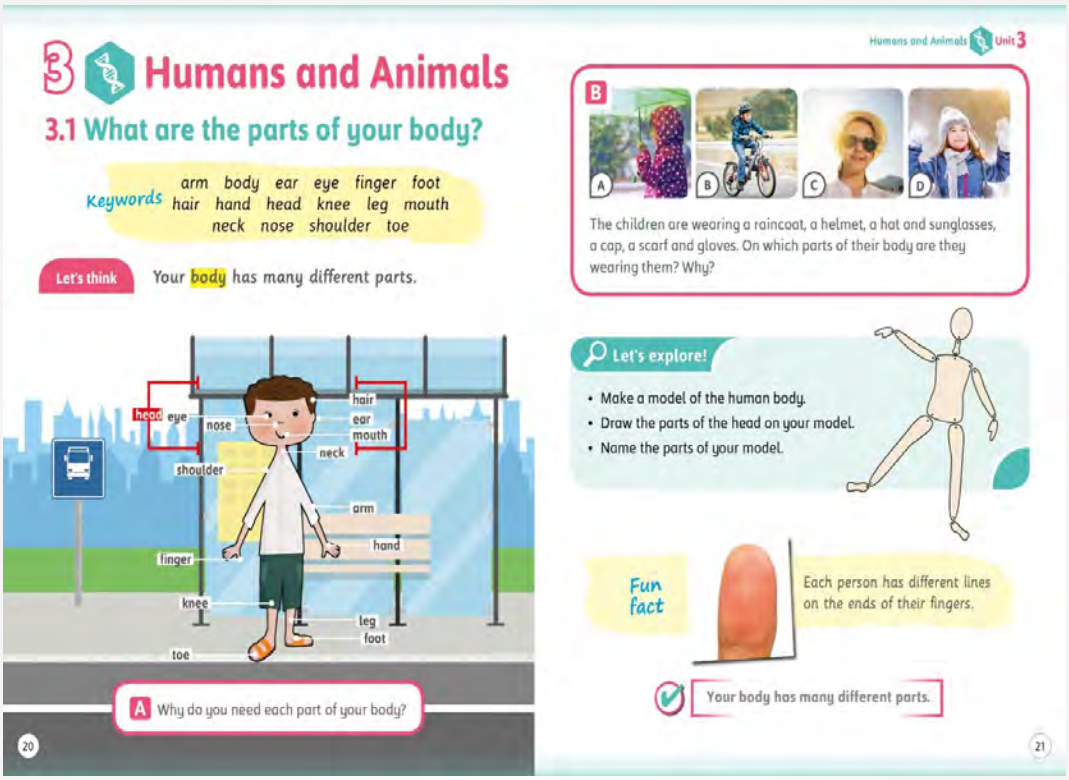
Student's book

Teacher's Resource Disc

Teacher's Book

Workbook

Student's book:



3 Humans and Animals

3.1 What are the parts of your body?

Keywords: arm body ear eye finger foot hair hand head knee leg mouth neck nose shoulder toe

Let's think: Your body has many different parts.

hair, head, eye, ear, nose, mouth, neck, shoulder, arm, hand, finger, knee, leg, foot, toe

A Why do you need each part of your body?

20

Humans and Animals Unit 3

B

A B C D

The children are wearing a raincoat, a helmet, a hat and sunglasses, a cap, a scarf and gloves. On which parts of their body are they wearing them? Why?

Let's explore!

- Make a model of the human body.
- Draw the parts of the head on your model.
- Name the parts of your model.

Fun fact: Each person has different lines on the ends of their fingers.

Your body has many different parts.

21

Humans and Animals Unit 3

B

A B C D

The children are wearing a raincoat, a helmet, a hat and sunglasses, a cap, a scarf and gloves. On which parts of their body are they wearing them? Why?

Let's explore!

- Make a model of the human body.
- Draw the parts of the head on your model.
- Name the parts of your model.

Fun fact: Each person has different lines on the ends of their fingers.

Your body has many different parts.

21

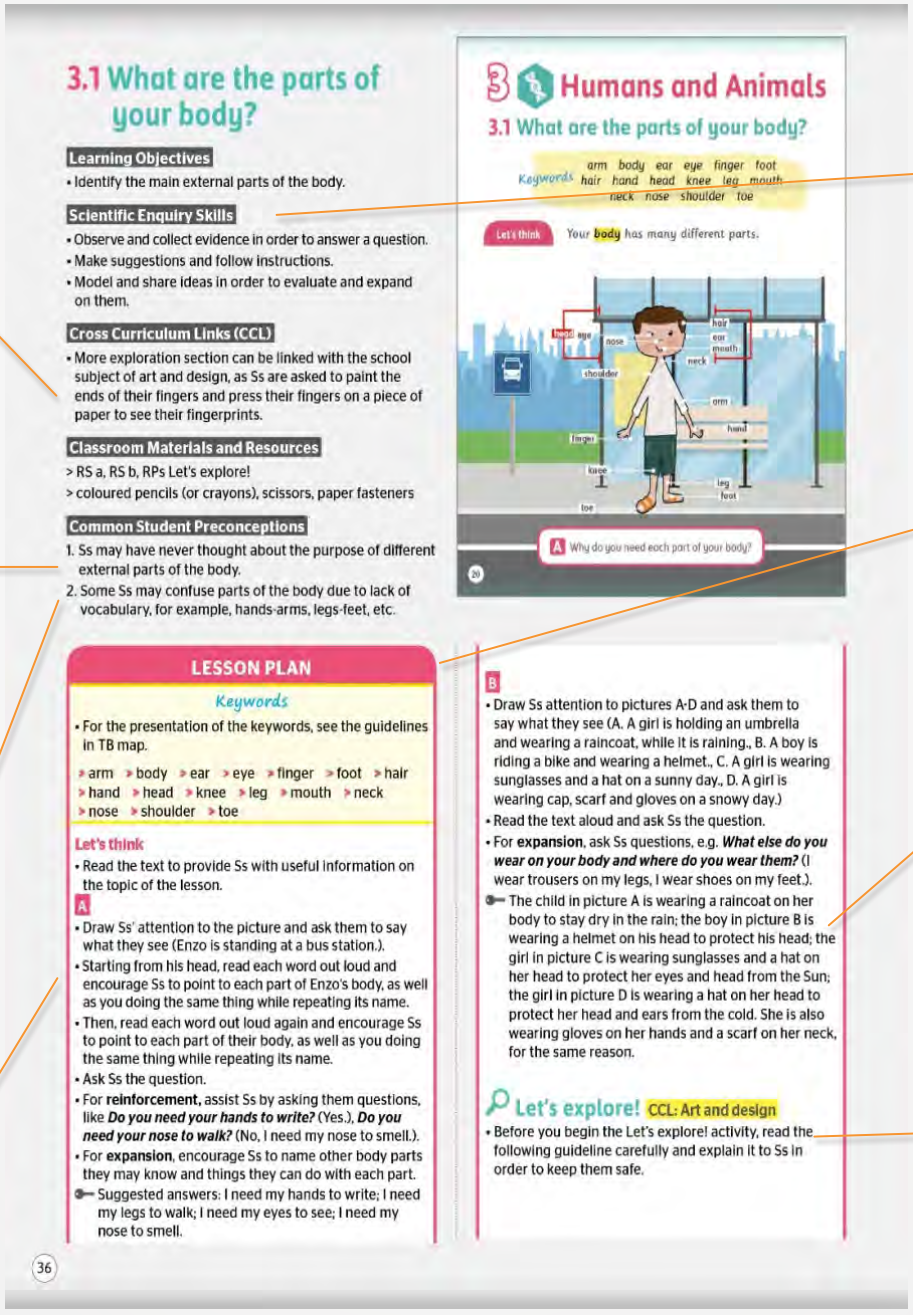
Activities that encourage critical thinking and personal response, and incorporate topics and ideas in real life contexts

Inquiry-based exploration activities, in which students work either independently or in small groups

Extension and application of knowledge in real-life contexts

A description of important concepts and ideas presented in the lesson, used for evaluation

Student's book:



3.1 What are the parts of your body?

Learning Objectives
- Identify the main external parts of the body.

Scientific Enquiry Skills
- Observe and collect evidence in order to answer a question.
- Make suggestions and follow instructions.
- Model and share ideas in order to evaluate and expand on them.

Cross Curriculum Links (CCL)
- More exploration section can be linked with the school subject of art and design, as Ss are asked to paint the ends of their fingers and press their fingers on a piece of paper to see their fingerprints.

Classroom Materials and Resources
> RS a, RS b, RPs Let's explore!
> coloured pencils (or crayons), scissors, paper fasteners

Common Student Preconceptions
1. Ss may have never thought about the purpose of different external parts of the body.
2. Some Ss may confuse parts of the body due to lack of vocabulary, for example, hands-arms, legs-feet, etc.

LESSON PLAN

Keywords
- For the presentation of the keywords, see the guidelines in TB map.

arm › body › ear › eye › finger › foot › hair › hand › head › knee › leg › mouth › neck › nose › shoulder › toe

Let's think
- Read the text to provide Ss with useful information on the topic of the lesson.

A
- Draw Ss' attention to the picture and ask them to say what they see (Enzo is standing at a bus station.).
- Starting from his head, read each word out loud and encourage Ss to point to each part of Enzo's body, as well as you doing the same thing while repeating its name.
- Then, read each word out loud again and encourage Ss to point to each part of their body, as well as you doing the same thing while repeating its name.
- Ask Ss the question.
- For **reinforcement**, assist Ss by asking them questions, like ***Do you need your hands to write?*** (Yes.), ***Do you need your nose to walk?*** (No, I need my nose to smell.).
- For **expansion**, encourage Ss to name other body parts they may know and things they can do with each part.

Suggested answers: I need my hands to write; I need my legs to walk; I need my eyes to see; I need my nose to smell.

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3 Humans and Animals

3.1 What are the parts of your body?

Keywords arm body ear eye finger foot hair hand head knee leg mouth neck nose shoulder toe

Let's think Your body has many different parts.

A Why do you need each part of your body?

20

B
- Draw Ss attention to pictures A-D and ask them to say what they see (A. A girl is holding an umbrella and wearing a raincoat, while it is raining., B. A boy is riding a bike and wearing a helmet., C. A girl is wearing sunglasses and a hat on a sunny day., D. A girl is wearing cap, scarf and gloves on a snowy day.)
- Read the text aloud and ask Ss the question.
- For **expansion**, ask Ss questions, e.g. ***What else do you wear on your body and where do you wear them?*** (I wear trousers on my legs, I wear shoes on my feet.).

The child in picture A is wearing a raincoat on her body to stay dry in the rain; the boy in picture B is wearing a helmet on his head to protect his head; the girl in picture C is wearing sunglasses and a hat on her head to protect her eyes and head from the Sun; the girl in picture D is wearing a hat on her head to protect her head and ears from the cold. She is also wearing gloves on her hands and a scarf on her neck, for the same reason.

Let's explore! CCL: Art and design
- Before you begin the Let's explore! activity, read the following guideline carefully and explain it to Ss in order to keep them safe.

Identification of the learning objectives & development of scientific enquiry skills in each lesson

Links with other science lessons or school subjects

Materials and resources that are needed for the lesson

Lists of common student preconceptions about the topic

Guidance about how to detect students' prior knowledge and experiences by asking appropriate questions

Detailed lesson plan with ideas and suggestions about how to conduct the lesson and develop scientific enquiry

Key to activities

Guidance for the practical activities and development of scientific enquiry skills

Samples pages

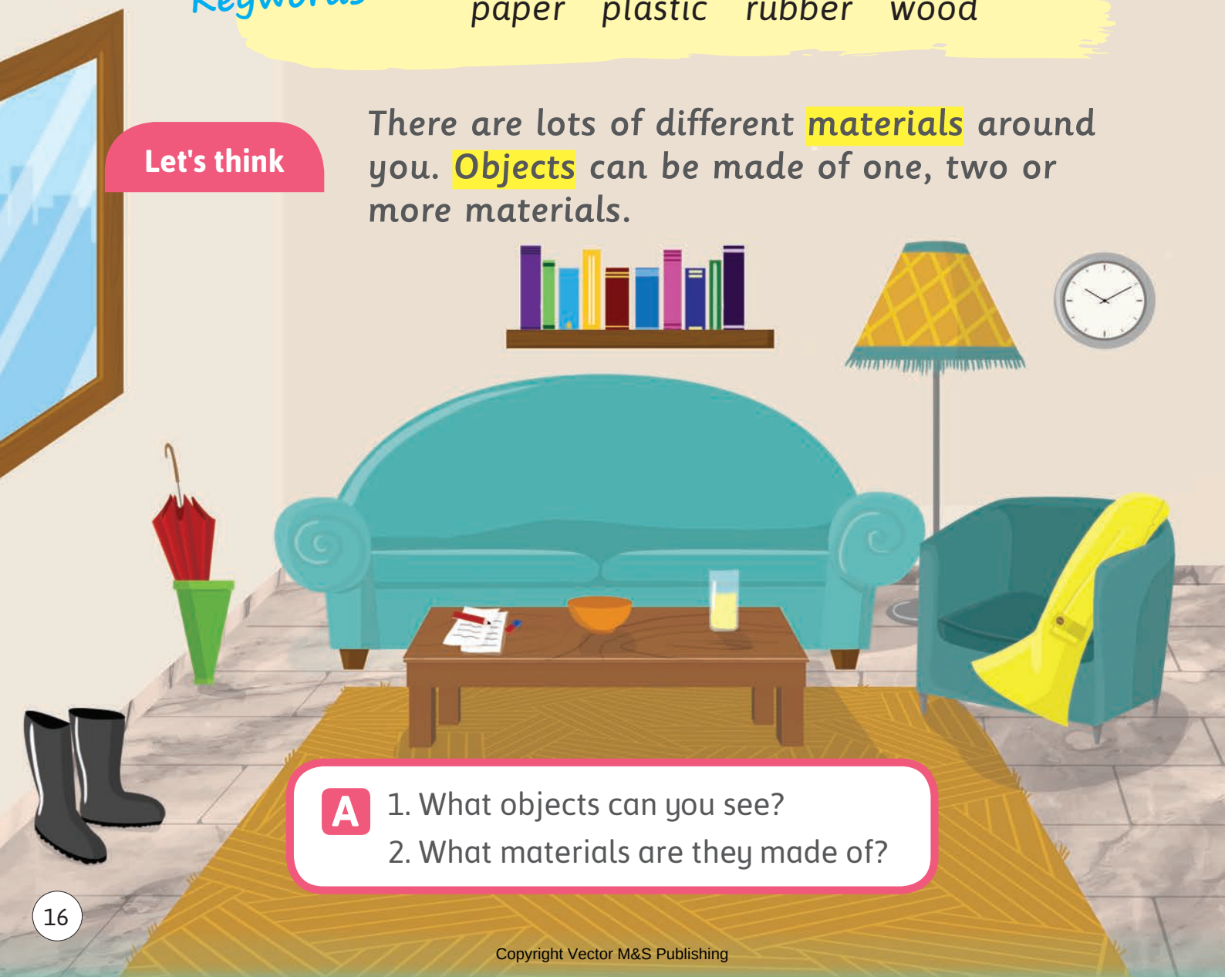
2 Properties of Materials and their Uses

2.1 What are objects made of?

Keywords *fabric glass material metal object paper plastic rubber wood*

Let's think

There are lots of different **materials** around you. **Objects** can be made of one, two or more materials.



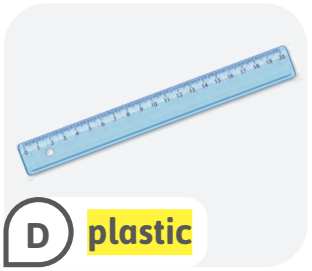
A 1. What objects can you see?
2. What materials are they made of?

B

A metal

B rubber

C paper



D plastic

E wood

F glass

G fabric

Give examples of other objects made of these materials.

Let's explore!

- Draw your school bag and say the materials it is made of.
- What materials do you think you will find inside your school bag?
- Draw and name the objects you find in your school bag and say the materials they are made of.

Fun fact

Silkworms make silk cocoons. People use these cocoons to make silk fabric.

- **There are lots of different materials.**
- **Metal, rubber, paper, plastic, wood, glass and fabric are all materials.**
- **Objects can be made of one or more materials.**

2.2 How do humans sense materials?

Keywords explore hard look property rough shiny smooth soft

Let's think

You can use your senses to explore different materials. Materials are hard, soft, rough, smooth or shiny. These are different properties of materials.

A

1. What are the gloves, the cotton towel, the glass, the spoon and the table made of?
2. What properties do the materials of these objects have?

B

A

B

1. What do you think the bottle and the spinning top are made of?
2. What can you do to find out?

Let's explore!

- Look around your classroom for objects made of different materials.
- Use your senses to explore the properties of these objects.
- Talk about what you found.

Fun fact

Diamonds are very shiny. They are the hardest natural material on Earth.

- **You can use your senses to explore different materials.**
- **Materials have lots of properties.**
- **Materials can be hard, soft, rough, smooth or shiny.**

2.3 How do humans use different materials?

Keywords do the test guess strong waterproof

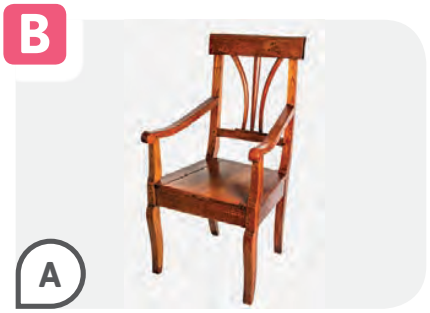
Let's think

Materials have lots of uses because they have different properties. Some materials are strong and some are waterproof.

A

1. What material are the raincoat and the umbrella made of? What property does it have?
2. Why does the plastic bag break?
3. Why is Dennis using rope to carry his books?

B


A


B


C

1. How do you use these objects?
2. What materials are these objects made of?
3. What other materials can we use to make each object? What materials can't we use?

Let's explore!

- What materials are the paper towel, the aluminium foil, the plastic bag, the cotton towel and the rubber gloves made of?
- Guess which of them are waterproof.
- Do the test to find out.
- Talk about what you found.

- **Materials can be strong.**
- **Materials can be waterproof.**
- **Materials have lots of uses because they have different properties.**

2.4 How can you sort materials into groups?

Keywords *flexible* *recycle* *recycling bin* *see-through* *sort* *Venn diagram*

Let's think

You can put objects made of the same materials into the same groups. You can also **sort** different materials that have the same properties into groups.

A 1. How do Dennis, Sono and Samir sort the objects?
2. Can you sort the other objects into these groups?

B

1. People put objects made of the same materials in these bins to recycle them. What materials do people recycle in each bin?
2. What objects can you put in these recycling bins?

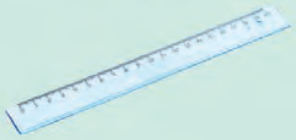
Let's explore!

- Look at the objects you have and ask questions about their properties.
- Make a plan to sort them into groups.
- Do the test to find out.
- Draw a Venn diagram.
- Talk about what you found.

- **Materials can be flexible.**
- **Materials can be see-through.**
- **You can sort objects made of the same materials into groups.**
- **You can sort different materials that have the same property into groups.**

2 Review

1. Circle the object that isn't made of the material in the box.

metal			
wood			
plastic			
glass			
paper			
rubber			
fabric			

2. Circle the property of each object.

1. 
   a. rough
   b. shiny

2. 
   a. rough
   b. smooth

3. 
   a. soft
   b. flexible

4. 
   a. see-through
   b. strong

5. 
   a. waterproof
   b. soft

6. 
   a. shiny
   b. soft

3. Enzo wants to make a raft. Circle the materials he needs.

4. Match. Write 1-3 in the boxes.

1. see-through **2.** waterproof **3.** hard


A


B


C

2 Properties of Materials and their Uses

In unit 2, Ss will examine different materials, name them, explore them and identify their characteristics. Ss are asked to sort materials into groups. Ss will be asked simple scientific questions and will decide what to do in order to answer them. They will also collect evidence by setting up simple tests and suggesting ideas on how to investigate a question. They will make predictions and compare them with their results.
The unit is divided into four lessons:

2.1 What are objects made of?
In this lesson, Ss will explore different materials.

2.2 How do humans sense materials?
In this lesson, Ss observe several different materials, most of which are familiar, and use their senses to explore and identify them.

2.3 How do humans use different materials?
In this lesson, Ss will explore properties of different materials and some of their uses.

2.4 How can you sort materials into groups?
In this lesson, Ss will carry out simple tests to identify some characteristics (properties) of different materials, and then sort them into groups based on these characteristics. By observing objects made from various materials, Ss begin to understand the connection between the properties of a material and the specific purpose for which it is used.

Materials

> aluminium foil > Blu-Tack > coloured pencils (or crayons) > cotton towels > glue > magnifying glasses
> paper towels > plastic bags > plastic bottles
> plastic bowls of water > plastic cup > plastic rulers
> play dough > ropes > rubber gloves > scissors
> silk scarves (or other clothes made of silk)
> sticky tapes > teddy bears > wooden spinning tops

Key Concepts

2.1 All things around us are made of different materials. A material is something made of matter; that means made from molecules, atoms or ions. There are many different kinds of materials. Materials can be solids, liquids or gases. At this age Ss are familiar with solid materials only. The materials covered at this level are:

> rubber > paper > metal > plastic > wood > glass
> fabric

Some materials belong to a superior or superordinate groups of materials, for example, gold, silver and aluminium are metals, and silk, cotton and wool are fabrics.

2.2 We can use our senses to identify some properties of materials, e.g. by 'touch' we can tell if a material is hard, soft, rough or smooth and by 'sight' we can see if a material is shiny or dull. Each material sounds different when we tap it.

2.3 Materials have different characteristics, which are called properties, e.g. most metals are strong, hard and shiny. However, the property refers not only to the material, but to the shape it has as well, e.g. a bar of gold is strong, but a sheet of gold is not. Ss at this stage can investigate if materials are:

> hard/soft > rough/smooth > shiny/not shiny
> strong > waterproof > see-through > flexible

Hard materials are not easy to bend and are not easily broken. Rough materials have a coarse or uneven surface. Shiny materials are bright or glossy in their appearance. Strong materials are very difficult to break. Waterproof materials do not let water through or do not soak up water. Transparent (see-through) materials let light through, which means that you can see through them. Flexible materials are easy to bend. Materials are used to make different kinds of objects. Many objects that have different uses are made from the same material, but the same object can also be made from different materials.

2.4 Objects can be sorted into groups depending on the material they are made of, or the properties of the material. It is very useful to sort materials, as in the case of recycling. Recycling is the process of collecting materials that would otherwise be thrown away, e.g. plastic, and turning them into new products.

2.1 What are objects made of?

Learning Objectives

- Identify common materials.
- Distinguish between an object and the material from which it is made.

Scientific Enquiry Skills

- Observe and collect evidence in order to answer a question.
- Predict outcomes.
- Collect data through observation, investigation and measurement in order to answer questions.
- Compare results and/or observations with predictions.
- Record the steps in a process or task.
- Model and share ideas in order to evaluate and expand on them.

Materials and Resources

> RS a, RS b, WS Let's explore!, WS Assessment
> Let's explore: coloured pencils (or crayons)
> Fun fact: silk scarves (or other clothes made of silk) (1 per group)

Common Student Preconceptions

1. Ss may confuse the scientific term 'material' with the more general meaning of the word 'fabric'.
2. Ss may confuse the name of an object with the material it is made of, especially when both words are the same (e.g. glass).
3. Ss may think that 'material' means building materials, clothing material, writing materials.

LESSON PLAN

Keywords

- For the presentation of the keywords, see the guidelines in the TB map.

> fabric > glass > material > metal > object
> paper > plastic > rubber > wood

Let's think

- Read the text to provide Ss with useful information on the topic of the lesson.

A

- Draw Ss' attention to the picture, and ask them to say what they see (The picture shows a living room. In the living room there is a sofa, an armchair, a table, a lamp, a window, a shelf with books, a pair of boots and an umbrella. On the table there are pieces of paper, a pencil, a rubber, a bowl and a glass of lemonade. On the armchair, there is a raincoat. There is also a clock on the wall. On the floor there is a carpet.).

1

- Ask Ss the question.
- Draw a column on the left side of the board under the heading 'Objects'.
- Write Ss' answers on the board.

2

- Ask Ss the question.
- Draw another column on the left side of the board, under the heading 'Materials'.
- Use the word 'material' repeatedly in a scientific context to help students become familiar with it. Ask Ss questions, like ***What material are the Wellington boots made of?*** (rubber) instead of ***What are the Wellington boots made of?***
- Encourage Ss to mention all the materials one object is made of. Ask Ss questions, like ***What material is the sofa made of?*** (fabric), ***Look at the legs of the sofa. Are they made of fabric, too?*** (No, they are made of wood.), etc.
- Write all Ss' answers on the board, regardless of whether they are right or wrong.
- Do not correct Ss at this point. Ss are not familiar with different materials. It is quite difficult to understand the material each object is made of just by observing the picture.
- Make sure not to erase the lists from the board until the end of the lesson.

1. Objects: window, umbrella, raincoat, Wellington boots, lamp, sofa, armchair, table, glass, paper, pencil, rubber, books, shelf, carpet, clock, bowl.
2. window: glass and wood, raincoat: rubber or plastic, Wellington boots: rubber, lamp: metal and fabric, umbrella: plastic, metal and fabric, sofa: fabric and wood, armchair: fabric and metal, table: wood, glass: glass (or plastic), papers: paper, pencil: wood (and graphite), rubber: rubber, books: paper, shelf: wood, carpet: fabric, clock: metal and glass, bowl: plastic or wood

B

- Draw Ss' attention to pictures A-G, and ask them to say what they see (A. spoon, B. balloon, C. sheet of paper, D. ruler, E. table, F. vase, G. trousers).
- Draw Ss' attention to each picture. Read the materials aloud and ask Ss to make correlations between the materials and the pictures (A. the spoon is made of metal, B. the balloon is made of rubber, C. the sheet of paper is made of paper, D. the ruler is made of plastic, E. the table is made of wood, F. the vase is made of glass, G. the trousers are made of fabric.).
- If Ss cannot make correlations, explain to them that these words are the materials that the objects are made of. This will help **lower-performing Ss**.
- Use the columns from the Let's think A section.
- Write the materials written below the pictures of the objects in the 'Materials' column.
- Ask Ss to give examples of other objects made of these materials.
- Write Ss' answers in the 'Objects' column.
- If Ss refer to an object as being made of a specific

material, e.g. metal, but it is not, then encourage them to compare this object with the object made of the material and in pictures, e.g. with the spoon, in picture A. Ask Ss ***Is it shiny?*** (No.), ***Does it look like the spoon in picture A?*** (No.).

Suggested answers:
objects made of metal: key, ring, coin; objects made of rubber: toy duck, rubber; objects made of paper: magazine, book; objects made of plastic: bottle, ball; objects made of wood: desk, chair; objects made of glass: window, mirror; objects made of fabric: clothes, teddy bear

Let's explore!

- Divide Ss into pairs.
- Provide Ss with the WS Let's explore!
- Ask Ss to observe their school bag and have them describe what it looks like (colour, shape, size).
- Ask Ss to draw their school bag and tell their partner the materials it is made of in step 1 of their WSs.
- Ask Ss to think of what materials they can find inside their school bag and write them down in step 2 of their WSs.
- Some Ss may refer to objects rather than the materials they are made of.
- Ask Ss questions so that they name the materials, like ***What material is the ruler made of?*** (plastic), etc. This will help **lower-performing Ss**.
- Tell Ss to look inside their bag and take out the objects they find inside.
- Provide each pair with coloured pencils.
- Ask Ss to draw and name the objects in step 3 of their WSs.
- Then ask Ss to tell their partner the materials these objects are made of.
- Encourage Ss to check their answers in pairs.
- Ask Ss to compare what they found to what they thought. This will challenge **higher-performing Ss**.
- If Ss didn't find a material that they thought they would find in their bag, ask them to name an object made of this material and give a reason why this material isn't in the bag.

WS: 1. Ss are expected to draw their school bag and say the materials it is made of.
2. Ss are expected to write the materials they think they will find inside their school bag.
3. Ss are expected to draw and name the objects they find in their school bag and say the materials they are made of.

Fun fact

- Read the Fun fact about silkworms to Ss.
- Tell Ss that a cocoon is a special cover that protects the silkworm (a kind of caterpillar) as it changes into an adult (a moth) which is like a butterfly.
- Tell Ss that people use silk threads to make clothes.
- Divide Ss into groups.

- Provide each group with one silk scarf (or other type of cloth made of silk) and ask Ss to see and feel the material.

Overview

- Read the check points at the end of the lesson to provide Ss with a brief summary.
- Tell Ss to look at the picture in the Let's think A section again.
- Tell Ss to look at their lists in the Let's think A section. Encourage Ss to correct or complete their lists if necessary.
- Provide Ss with the RSs of the keywords of the lesson.
- Ask Ss to trace the words and cut them out to revise the keywords they have learnt.

Assessment

- Provide Ss with the WS Assessment.
- Ask Ss to go round the classroom, find objects made of different materials and record the objects and the materials on their WSs.
- Divide Ss into pairs.
- Have Ss check their answers in pairs first, then as a class.

WS: Ss are expected to draw and/or name the objects and the material(s) they are made of.

2.2 How do humans sense materials?

Learning Objectives

- Experiment with and discuss different materials using the senses.
- Recognise properties of different materials.

Scientific Enquiry Skills

- Observe and collect evidence in order to answer a question.
- Collect data through observation, investigation and measurement in order to answer questions.
- Record the steps in a process or task.
- Model and share ideas in order to evaluate and expand on them.

Materials and Resources

> RS, WS Let's think A, WS Let's explore!, WS Assessment

> Let's think B: plastic bottles (1 per group), wooden spinning tops (1 per group)

LESSON PLAN

Keywords

- For the presentation of the keywords, see the guidelines in the TB map.

> explore > hard > look > property > rough > shiny > smooth > soft

Let's think

- Read the text to provide Ss with useful information on the topic of the lesson.

A

- Draw Ss' attention to the picture, and ask them to say what they see (A kitchen in which the girls are making a cake.).
- Provide Ss with the WS Let's think A.
- Make a table on the board like the one on the WS.
- Ask Ss to find where the rubber gloves, the cotton towel, the glass, the spoon and the table are in the picture (the rubber gloves are on the wall, to the left of the tap, the towel is hanging on the cupboard, Yin is holding the glass, the spoon is on the table, the table is in the middle of the kitchen.).

1

- Ask Ss the question.
- Draw Ss' attention to one object at a time.
- Write Ss' answers in the 'Materials' column of the table on the board.
- Tell Ss to write down the material that each object is made of and complete the 'Materials' column of the table in their WSs.

• 2

- Ask Ss the question.
- Draw Ss' attention to one object at a time.
- Assist Ss with questions, like ***What does the (glass) feel like?*** (hard and smooth), ***Is the (glass) hard or soft?*** (hard), ***Is the (glass) rough or smooth?*** (smooth).

WORKBOOK

These activities can either be done in class or be assigned as homework.

Activity 1:

	Metal	Wood	Plastic	Paper	Glass	Rubber
	✔	✔	✔		✔	
	✔		✔			
	✔			✔		
	✔					✔

Activity 2: Ss are expected to draw two objects, one made of wood and one made of fabric and name them.

Don't forget to prepare the materials and resources for the next lesson.

- Tick the properties Ss suggest on the table on the board.
- Tell Ss to complete the table of their WSs and assist them if necessary.

1. gloves: rubber cotton towel: fabric glass: glass spoon: metal table: wood
2. rubber (gloves): soft, smooth fabric (cotton towel): soft, rough glass (glass): shiny, hard, smooth metal (spoon): shiny, hard, smooth wood (table): hard, rough or smooth (it depends on the table, both justified answers are accepted)

WS:

Object	Material	Shiny	Hard	Soft	Rough	Smooth
Gloves	rubber			▯		▯
Cotton towel	fabric			▯	▯	
Glass	glass	▯	▯			▯
Spoon	metal	▯	▯			▯
Table	wood		▯		▯ (it depends on the table, both justified answers are accepted)	

B

- Draw Ss' attention to pictures A and B, and ask them to say what they see (A. a bottle, B. a spinning top).

1

- Ask Ss the question.

2

- Ask Ss the question.
- Divide Ss into groups.
- Provide each group with one plastic bottle and one wooden spinning top.
- Ask Ss to find out what material each object is made of.
- Encourage Ss to use their senses to identify the material.
- Have groups report on the material each object is made of and how they found out (bottle: plastic, spinning top: wood).

1. Ss are expected to say that the bottle is made of plastic or glass, and the spinning top is made of plastic or wood.
2. Suggested answers:
   We can touch the bottle and the spinning top.

Let's explore!

- Before you begin the Let's explore! activity, read the following guidelines carefully, and explain them to Ss in order to keep them safe.

> *Ss should not use the sense of taste.*
> *Ss should be careful when using sharp objects.*

- Divide Ss into groups.
- Ask Ss to look around the classroom for objects made of metal, wood, paper, plastic and fabrics, and make a set of objects.
- Provide Ss with the WS Let's explore!
- Ask Ss to take one object from their set of objects, draw it and/or name it in the box in step 1 of their WSs.
- Ask Ss to write down what material the object is made of in step 1 of their WSs.
- Encourage Ss to look at the object and write what it looks like (shiny or not) in step 1a of their WSs.
- Encourage Ss to touch the object and write what it feels like (rough, smooth, hard, soft) in step 1b of their WSs.
- Tell Ss to explore the other objects in the same way and complete the other steps of their WSs.
- Tell Ss to use the keywords in the SB to complete the steps. This will help **lower-performing Ss**.
- Ask Ss to discuss in groups what they found.

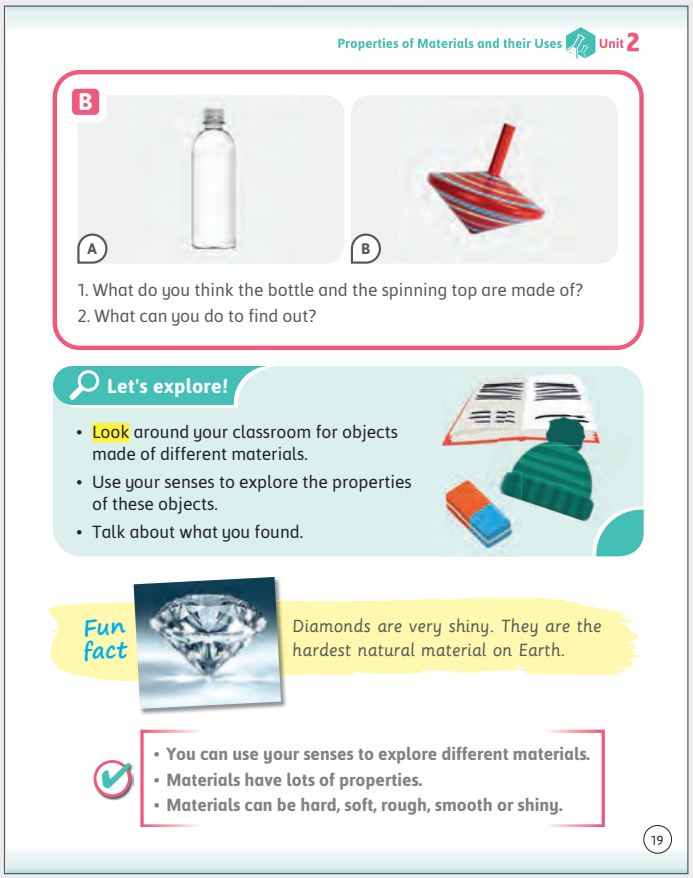
WS: Suggested answers:
1. Object: book.
Material of the object: paper.
a. I see it is not shiny.
b. It feels soft and smooth.

Fun fact

- Read the Fun fact about diamonds to Ss.
- Initiate a short discussion about hard and soft materials and their uses, e.g. diamonds are used to cut other materials; fabric is soft, so it is good for clothing, etc.

Overview

- Read out the check points at the end of the lesson to provide Ss with a brief summary.
- Provide Ss with the RS of the keywords of the lesson.
- Ask Ss to trace the words and cut them out to revise the keyword s they have learnt.



2.3 How do humans use different materials?

Learning Objectives

- Recognise properties of different materials.
- Recognise uses of different materials according to their properties.

Scientific Enquiry Skills

- Observe and collect evidence in order to answer a question.
- Predict outcomes.
- Collect data through observation, investigation and measurement in order to answer questions.
- Make suggestions and follow instructions.
- Record the steps in a process or task.
- Compare and contrast.
- Compare results and/or observations with predictions.
- Model and share ideas in order to evaluate and expand on them.

Materials and Resources

> RS, WS Let's explore!, WS Assessment

> Let's explore!: aluminium foil (1 piece per group), cotton towels (1 per group), paper towel (1 piece per group), plastic bags (1 per group), plastic bowl of water (1 per group), rubber gloves (1 per group), sticky tape

Common Student Preconceptions

1. Ss may confuse strength with hardness.

LESSON PLAN

Keywords

- For the presentation of the keywords, see the guidelines in the TB map.

> do the test > guess > strong > waterproof

Let's think

- Read the text to provide Ss with useful information on the topic of the lesson.

A

- Draw Ss' attention to the picture, and ask them to say what they see (The boys are in a classroom; it is raining outside. Enzo and Samir are walking late into the classroom. Sono is holding a bag that is breaking and Enzo is using rope to tie round some books.).

1

- Draw Ss' attention to Enzo and Samir. Tell Ss that they have arrived late at school because it is raining outside.
- Ask Ss ***What is Enzo wearing?*** (a raincoat), ***What is Samir carrying?*** (an umbrella).
- Ask Ss why they think Enzo is wearing a raincoat and Samir is carrying an umbrella (It is raining outside and the raincoat and umbrella keep them dry.).
- Ask Ss the questions.

Assessment

- Provide Ss with the WS Assessment.
- Ask Ss to draw a circle around the words that match the ruler.
- Then ask Ss to draw a circle around the words that match the spoon.
- Have Ss check their answers in pairs first, then as a class.

WS: Ruler: metal, hard, shiny, smooth
Spoon: plastic, hard, shiny, smooth

More exploration

- Read a story to Ss that includes materials and is somehow linked to their cultural background, e.g. Hansel and Gretel.

WORKBOOK

These activities can either be done in class or be assigned as homework.

Activity 1: Ss are expected to colour in the teddy bear, the balloon and the window.

Activity 2: 1. a 2. b 3. a

Don't forget to prepare the materials and resources for the next lesson.

2

- Draw Ss' attention to Sono and Dennis. Tell Ss that the boys are testing some materials to see if they are strong.
- Draw Ss' attention to Sono.
- Ask Ss the question.

3

- Draw Ss' attention to Dennis.
- Ask Ss the question.

1. The raincoat is made of rubber or plastic. Rubber and plastic are waterproof. The umbrella is made of a type of fabric. This type of fabric is waterproof.
2. The plastic bag breaks because the books are heavy and/or the plastic bag isn't strong.
3. Dennis is using rope because the rope does not break easily / it is strong.

B

- Draw Ss' attention to pictures A-C, and ask them to say what they see (A. a chair, B. a pair of gloves, C. a fork).

1

- Ask Ss the question.

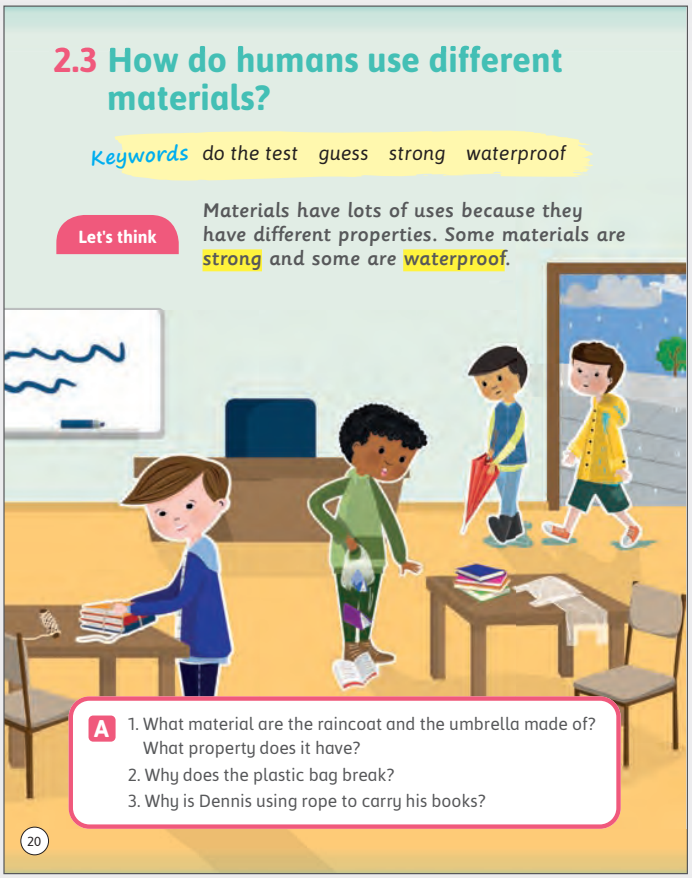
2

- Ask Ss the question.

3

- Objects can be made out of any kind of material. For example, you can find chairs made out of glass or paper, but these are mainly artworks. The aim of the question is for Ss to suggest materials that are appropriate and inappropriate for the objects in pictures A, B and C to be used.
- Ask Ss the questions.
- Some Ss may find it difficult to name other materials that are appropriate or inappropriate for these objects.
- Ask Ss questions, like ***Do people make chairs out of paper?*** (No.) ***Do people make wooden gloves?*** (No.), etc. This will help **lower-performing Ss**.
- Ask Ss to explain their answers by naming the property of the materials suggested. Ask them questions, like ***Why don't people make paper chairs?*** (Paper is not a strong material. If someone sits on a chair made out of paper, the chair will break.), ***Why don't people make a paper umbrella?*** (Paper is not a waterproof material. If someone uses an umbrella made of paper in the rain, the umbrella will fall apart.). This will challenge **higher-performing Ss**.

1. We use chairs to sit on, rubber gloves for cleaning in the home and forks to eat with.
2. A. wood B. rubber C. metal
3. Suggested answers: People can make a chair out of plastic or metal, but not out of glass, paper or rubber. Gloves can be made out of fabric (e.g. wool) but not out of paper, wood or glass. People can make a fork out of plastic, but not out of paper, glass or fabric.

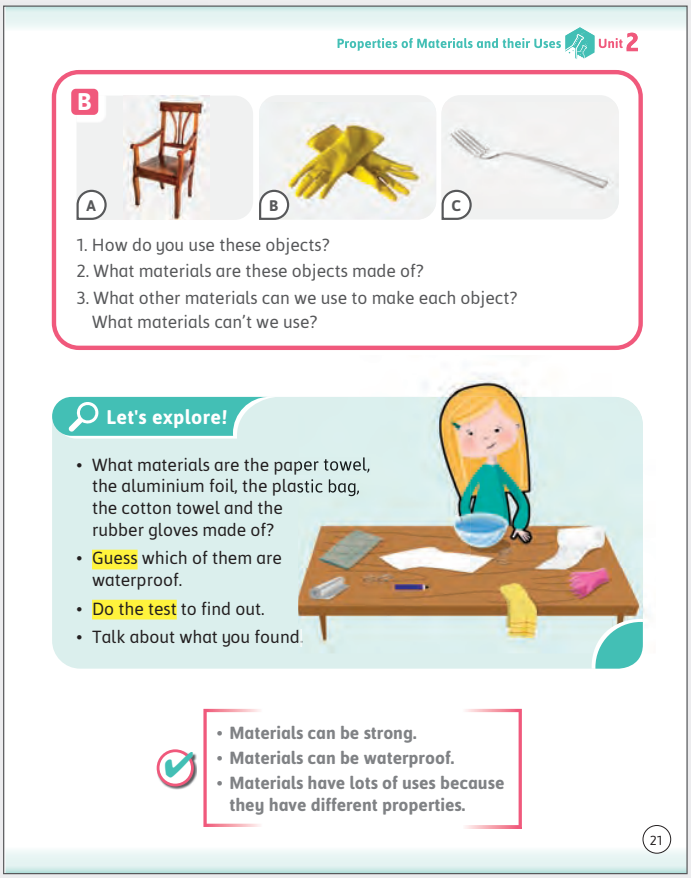


Let's explore!

- Before you begin the Let's explore! activity, read the following guidelines carefully, and explain them to Ss in order to keep them safe.

> *Ss should be careful when experimenting with water.*
> *Ss should not drink any water used in experiments.*

- Divide Ss into groups.
- Provide Ss with the WS Let's explore!
- Provide each group with one piece of paper towel, one piece of aluminium foil, one plastic bag, one cotton towel, one pair of rubber gloves, one plastic bowl of water and sticky tape.
- Ask Ss to look at the objects in step 1 of their WSs.
- Ask Ss to write the materials these objects are made of in step 1 of their WSs.
- Assist Ss with some objects, like aluminum foil if necessary, as they may not recognise the material it is made of. Explain to Ss that aluminium is a metal.
- Ask Ss to write the materials they will test in the 'Materials' column of the table in step 2 of their WSs.
- Ask Ss to guess which materials they think are waterproof and tick them in the 'Materials that I think are waterproof' column of the table in step 2 of their WSs.
- Explain to Ss how they will test the materials to see if they are waterproof. Tell Ss to take an object, e.g. the aluminium foil, wrap it around their hand and secure it well with sticky tape.
- Go round the classroom and make sure Ss have



B

1. How do you use these objects?
2. What materials are these objects made of?
3. What other materials can we use to make each object? What materials can't we use?

Let's explore!

- What materials are the paper towel, the aluminium foil, the plastic bag, the cotton towel and the rubber gloves made of?
- Guess which of them are waterproof.
- Do the test to find out.
- Talk about what you found.

- Materials can be strong.
- Materials can be waterproof.
- Materials have lots of uses because they have different properties.

wrapped the object around their hands properly or else the results will be different from what is expected.

- Then tell Ss to put their hand inside the plastic bowl gently and take it out. Tell Ss not to leave their hand inside the plastic bowl for a long time.
- Have Ss unwrap the object and observe if their hand is dry or not.
- Ask Ss to tick (□) in the 'Materials that are waterproof' column of the table in step 2 of their WSs if the material is waterproof.
- Have Ss follow the same procedure to test the other materials and record what they see in the third column of the table in step 2 of their WSs.
- When Ss complete the activity, ask them to talk in groups about what they found. Ask Ss ***Did you guess the right materials?*** (Yes./No.) ***Did you find it easy to test the property?*** (Yes./No.), etc.

WS 1. A. metal B. plastic C. fabric
D. rubber E. paper

2.

Material	Material that I think is waterproof	Material that is waterproof
Metal	Ss are expected to tick the materials they think are waterproof	□
Plastic		□
Fabric		
Rubber		□
Paper		

3. a. metal, plastic, rubber
b. Yes/No

Overview

- Read the check points at the end of the lesson to provide Ss with a brief summary.
- Tell Ss to look at the pictures in the Let's think B section again. Tell Ss to name the properties they have. Encourage Ss to also refer to the properties mentioned in Lesson 2.2.
- Provide Ss with the RS of the keywords of the lesson.
- Ask Ss to trace the words and cut them out to revise the keywords they have learnt.

Assessment

- Provide Ss with the WS Assessment.
- Ask Ss if the Wellington boots are waterproof and have them circle the answer in step 1a of their WSs.
- Tell Ss to write what material the Wellington boots are made of in step 1b of their WSs.
- Ask Ss to complete step 1c of their WSs.
- Ask Ss if the towels are waterproof and have them circle the answer in step 1d of their WSs.
- Tell Ss to write what material they are made of in step 1e of their WSs.
- Ask Ss to complete step 1f of their WSs.
- Have Ss check their answers in pairs first, then as a class.

WS: a. Yes
b. rubber
c. We wear rubber boots when it rains to keep our feet dry.
d. No
e. fabric
f. We use towels for drying our hands and bodies when they are wet.

WORKBOOK

These activities can either be done in class or be assigned as homework.

Activity 1: Ss are expected to draw two objects, a waterproof object and a strong object. They should then write the materials that the objects are made of in the boxes A and B.

Activity 2: Suggested answers:
1. a. my school bag
b. fabric and metal c. It is strong.
2. a. a raincoat b. rubber or plastic
c. It is waterproof.

Don't forget to prepare the materials and resources for the next lesson.

2.4 How can you sort materials into groups?

Learning Objectives

- Recognise properties of different materials.
- Classify objects based on the properties of their materials.

Scientific Enquiry Skills

- Observe and collect evidence in order to answer a question.
- Decide what steps to take in order to answer a scientific question.
- Collect data through observation, investigation and measurement in order to answer questions.
- Make suggestions and follow instructions.
- Record the steps in a process or task.
- Model and share ideas in order to evaluate and expand on them.

Materials and Resources

> RS, WS Let's think A, WS Let's think B, WS Let's explore!, WS Assessment, RPs Let's think A

> Let's think A: Blu-Tack, scissors

> Let's explore!: teddy bears (1 per group), play dough (a piece per group), plastic bottles (1 per group), plastic cups (1 per group), plastic rulers (1 per group), ropes (1 per group), rubber gloves (1 per group), magnifying glasses (1 per group)

> Overview: glue (1 per pair)

LESSON PLAN

Keywords

- For the presentation of the keywords, see the guidelines in the TB map.

> flexible > recycle > recycling bin > see-through
> sort > Venn diagram

Let's think

- Read the text to provide Ss with useful information on the topic of the lesson.

A

- Draw Ss' attention to the picture, and ask them to say what they see (Dennis, Sono and Samir are in the classroom and they are looking at different objects. In front of each boy, on the desk, there is a box and there are also other objects on the desk.).

1

- Draw Ss' attention to Dennis. Ask Ss to tell you what they think he is doing (Dennis is holding a piece of rope, he is changing its shape and he is saying that it is flexible.).
- Draw Ss' attention to the box in front of him. Ask Ss what is inside the box (rubber gloves).
- Draw Ss' attention to Sono. Ask Ss to tell you what they think he is doing (Sono is looking through a magnifying glass and he is saying it is see-through.).
- Draw Ss' attention to Samir. Ask Ss to tell you what they think he is doing (He is holding a plastic ruler and he is looking at it and changing its shape. He is saying that it is flexible and see-through.).
- Ask Ss the question.
- Explain to Ss that the boys are sorting the objects by placing them inside a box. The speech bubbles will guide Ss to find the common property of the objects in each group.

2

- Ask Ss the question.
- Draw Ss attention to the objects that are on the table outside the boxes and explain that they are going to put these objects into the groups of 'flexible', 'see-through' and 'flexible and see-through'.
- Divide Ss into pairs.
- Provide Ss with the WS Let's think A.
- Ask Ss to go to the WB and find the RPs Let's think A.
- Ask Ss to cut out the pictures from the RPs.
- Ask Ss to sort the cut-outs into the groups of 'flexible', 'see-through' and 'flexible and see-through'.
- Tell Ss to put the cut-outs in the right columns using Blu-Tack.
- Do not correct Ss at this point.
- Ask Ss ***Do some objects belong in both groups?*** (Yes, the plastic ruler and the plastic bottle.). This will help **lower-performing Ss**.

1. Dennis is sorting the objects that are flexible. Sono is sorting the objects that are see-through. Samir is sorting the objects that are are flexible and see-through.
2. Group 1: flexible: play dough, teddy bear, rope, rubber gloves
   Group 2: see-through: magnifying glass, glass
   Group 3: flexible and see-through: plastic bottle, plastic ruler

B

1. People put objects made of the same materials in these bins to recycle them. What materials do people recycle in each bin?
2. What objects can you put in these recycling bins?

Let's explore!

- Look at the objects you have and ask questions about their properties.
- Make a plan to sort them into groups.
- Do the test to find out.
- Draw a Venn diagram.
- Talk about what you found.

- Materials can be flexible.
- Materials can be see-through.
- You can sort objects made of the same materials into groups.
- You can sort different materials that have the same property into groups.

Group 1: flexible	Group 2: see-through
	
Group 3: flexible & see-through	
	

B

- Draw Ss' attention to the picture, and ask them to say what they see (There are four bins of different colour. Each bin has a label: glass, plastic, paper and metal).

1

- Read the first sentence aloud.
- Have a short discussion in the class about what recycling is. Explain to Ss that people recycle different materials to make new objects from them and use the materials again. This is very important for the environment.
- Ask Ss the question.
- Ask Ss to read the label on each bin. This will help **lower-performing Ss.**

2

- Ask Ss the question.
- Provide Ss with the WS Let's think B.

- Tell Ss that they have to colour the recycling bins with the appropriate colour and then match the objects with the recycle bins, by drawing lines.
- Go round the classroom and make sure Ss have matched the objects with the correct bins.
- Divide Ss in pairs.
- Have Ss check their answers in pairs first, then as a class.

1. In the green bin people recycle glass, in the yellow bin they recycle plastic, in the blue bin they recycle paper and in the red bin they recycle metal.
2. Suggested answers:
   green bin: a glass, glass bottle, yellow bin: plastic bottle, ketchup bottle, blue bin: newspaper, paper bag, red bin: fizzy drink can, food can

WS:

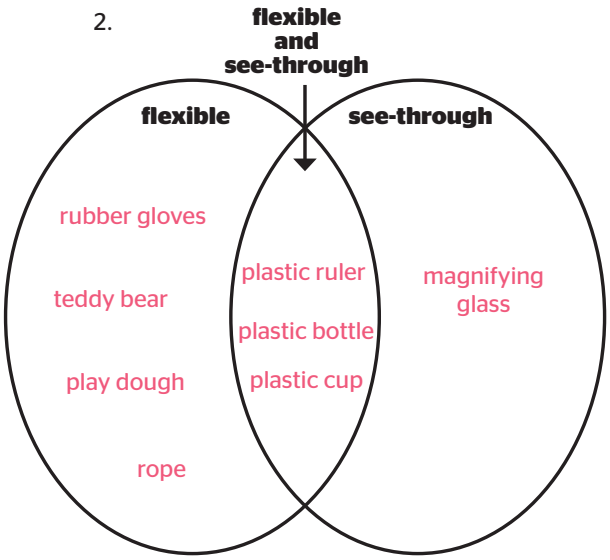
Let's explore!

- Before you begin the Let's explore! activity, read the following guideline carefully, and explain it to Ss in order to keep them safe.
  > *Ss should be careful when using objects made of glass.*
- Explain to Ss that in this activity they have to use their senses in order to sort objects in groups.
- Divide Ss into groups.
- Provide each group a teddy bear, a piece of play dough, a plastic bottle, a plastic cup, a plastic ruler, a rope, rubber gloves and a magnifying glass.
- Provide Ss with the WS Let's explore!
- Draw Ss attention to the picture in the Let's explore! section.
- Draw Ss' attention to Yin and read what Yin is saying.
- Ask Ss to say what Yin is doing to answer her question (She is trying to see through the magnifying glass.).
- Draw Ss' attention to Luna.
- Ask Ss to say what Luna is doing (She is changing the shape of the ruler.).
- Ask Ss ***What do you think Luna is testing the ruler for?*** (to see if it is flexible).
- Ask Ss to look at the objects they have.
- Elicit through class discussion that Ss will test the objects to see if they are flexible, see-through or both flexible and see-through.

- Ask Ss to decide what to do to answer if an object is see-through and write it in step 1a of their WSs.
- Tell Ss to test their objects for that property and complete step 1b of their WSs.
- Go round the classroom and make sure Ss have understood the activity. Assist Ss if necessary.
- Ask Ss to decide what to do to answer if an object is flexible and write it in step 1c of their WSs.
- Tell Ss to test their objects for that property and complete step 1d of their WSs.
- When Ss finish testing the two properties ask them ***Do some objects belong in more than one group?*** (Yes.).
- Go to the Work like a scientist section and explain to Ss what a Venn diagram is.
- Explain to Ss that they will put the objects that are both flexible and see-through in the part of the diagram where the two circles overlap. That means that these objects belong in both groups. This will help **lower-performing Ss**.
- Ask Ss to complete step 2 of their WSs in their groups.
- Ask groups to show and compare the diagrams they made with their classmates.

WS: 1. a. I will look at the objects and try to see through them.
b. Group 1: Ss are expected to write: plastic cup, plastic bottle, magnifying glass, plastic ruler
c. I will try to bend the objects.
d. Group 2: Ss are expected to write: plastic ruler, teddy bear, rubber gloves, plastic bottle, plastic cup, play dough, rope

2.



Overview

- Read the check points at the end of the lesson to provide Ss with a brief summary.
- Divide Ss into pairs.
- Provide each pair with glue.
- Ask Ss to look at the groups of objects they made in Let's think A section, in their WS Let's think A and check if everything is grouped properly.
- Tell Ss to replace any misplaced objects.
- Have Ss check their answers in pairs first, then as a class.
- Tell Ss to glue the cut-outs onto their WS.
- Provide Ss with the RS of the keywords of the lesson.
- Ask Ss to trace the words and cut them out to revise the keywords they have learnt.

Assessment

- Provide Ss with the WS Assessment.
- Ask Ss to draw lines from the objects to the property (flexible or see-through) or the properties (flexible and see-through) they have.
- Have Ss check their answers in pairs first, then as a class.

WS: 1. flexible: B, C, E, F
2. see-through: D, H
3. flexible and see-through: A, G

More exploration

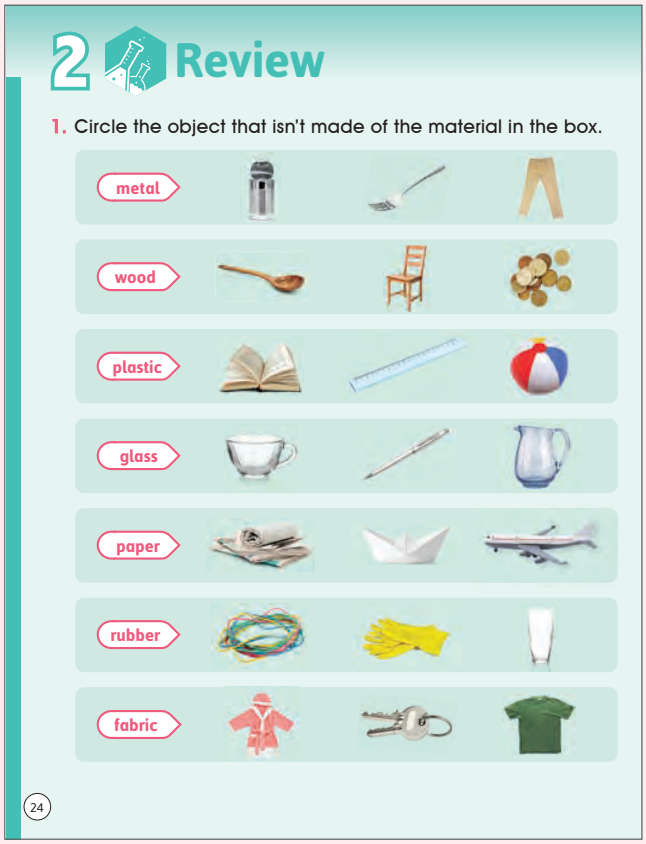
- Tell Ss to bring an object made of a material that can be recycled (glass, plastic, paper or metal) from home and discuss the properties that they have (e.g. hard, soft, smooth, rough, shiny, etc.). Ask Ss to sort the objects into groups based to one or two properties they have in common.

WORKBOOK

These activities can either be done in class or be assigned as homework.

Activity 1: 1. C 2. A 3. A 4. D 5. B 6. D 7. A 8. B 9. C

Activity 2: A. 2 B. 1



1.

- Draw Ss' attention to the pictures of one row at a time and ask them to say what they see (metal: tin can, fork, trousers; wood: spoon, chair, coins; plastic: book, ruler, ball; glass: cup, pen, jug; paper: newspaper, paper boat, toy plane; rubber: rubber bands, gloves, glass; fabric: bathrobe, keys, T-shirt).
- Ask Ss to read the word in the box and circle the object that is not made of this material.
- Give Ss some time to do the activity.
- Use the recommended procedure presented in the Introduction of the TB to assess Ss' answers. Ask Ss questions, like ***Why did you circle the coins?*** (Because they are not made of wood.), ***What material are they made of?*** (The coins are made of metal.). This will help **lower-performing** Ss.

Ss are expected to circle:
metal: trousers wood: coins plastic: book glass: pen
paper: toy plane rubber: glass fabric: keys

2.

- Draw Ss' attention to pictures 1-6, and ask them to say what they see (1. a towel, 2. a glass, 3. a spring, 4. a rope, 5. a T-shirt, 6. a diamond)
- Have Ss read the properties and circle a or b accordingly.
- Give Ss some time to do the activity.
- Use the recommended procedure presented in the Introduction of the TB to assess Ss' answers.

1. a 2. b 3. b 4. b 5. b 6. a

3.

- Draw Ss' attention to the picture, and ask them to say what they see (Enzo is on a beach. He is thinking of making a raft. On the beach, there are many objects, like thin pieces of wood (;sticks), thick pieces of wood (;tree logs), rope, rocks, a table cloth, a plastic ball and a palm tree).
- Ask Ss to guess what the activity is going to be about (It is about finding the materials that Enzo will need to make a raft).
- Explain to Ss that Enzo wants to make a raft and he needs different materials. Tell them to find these objects on the beach and circle them.
- Give Ss some time to do the activity.
- Use the recommended procedure presented in the Introduction of the TB to assess Ss' answers.

Ss are expected to circle:
the thin pieces of wood (;sticks), the thick pieces of wood (;tree logs) the rope, the tablecloth.

4.

- Read out the words 1-3 in the box. For each property, ask Ss to tell you what it means (See-through is something that you can look through, waterproof is something that doesn't let water pass through it, hard is something that doesn't break easily).
- Draw Ss' attention to groups of pictures A-C, and ask them to say what they see (A. boots, gloves, B. spoon, chair, C. bottle, window).
- Explain to Ss that each group has a common property and ask them to write the number 1-3 in the boxes A-C accordingly.
- Give Ss some time to do the activity.
- Use the recommended procedure presented in the Introduction of the TB to assess Ss' answers.

A. 2 B. 3 C. 1

Don't forget to prepare the materials and resources for the next lesson.

2 Properties of Materials and their Uses

2.1 What are objects made of?

1. What are these objects made of? Tick (✔) the materials.

	Metal	Wood	Plastic	Paper	Glass	Rubber
						
						
						
						

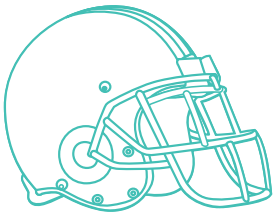
2. Draw an object made of each material. Then write the name of the object in the box.

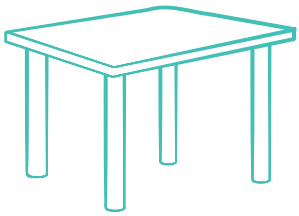
Object made of wood	Object made of fabric
A	B

2.2 How do humans sense materials?

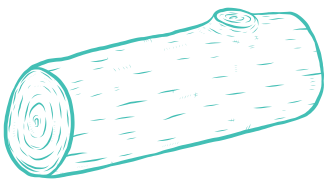
1. Colour in the object that has each property.

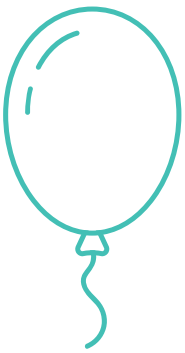
soft

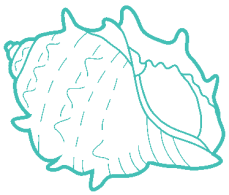




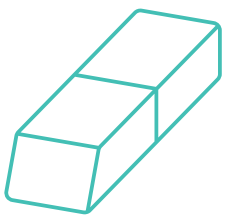
smooth







shiny



2. Circle the property of each object.

1.

a. hard

b. soft

2.

a. smooth

b. rough

3.

a. shiny

b. soft

2.3 How do humans use different materials?

1. Draw an object with each property. Then write the material of the object in the box.

Waterproof	Strong
A	B

2. Answer the questions.

1. a. What can you use to carry your books? _____

b. What material is it made of? _____

c. What property does it have? _____

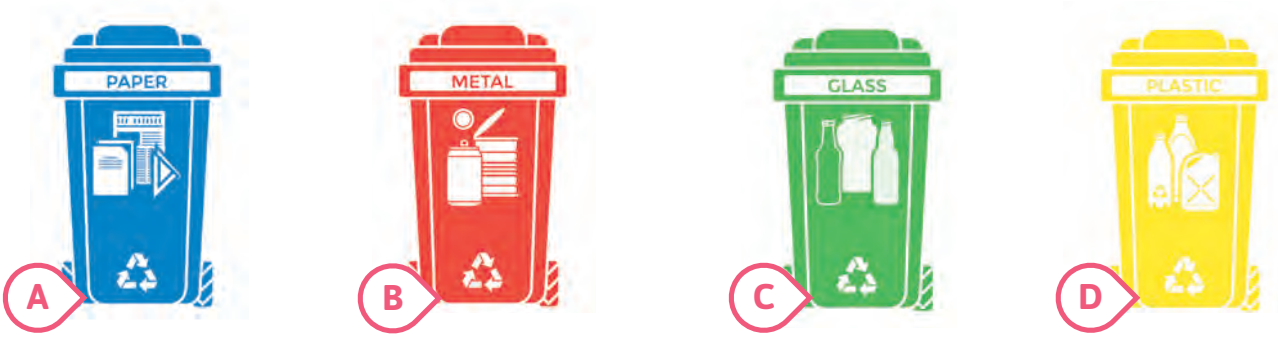
2. a. What can you use to stay dry in the rain? _____

b. What material is it made of? _____

c. What property does it have? _____

2.4 How can you sort materials into groups?

1. Match. Write A-D in the boxes.



1.  ⬡

2.  ⬡

3.  ⬡

4.  ⬡

5.  ⬡

6.  ⬡

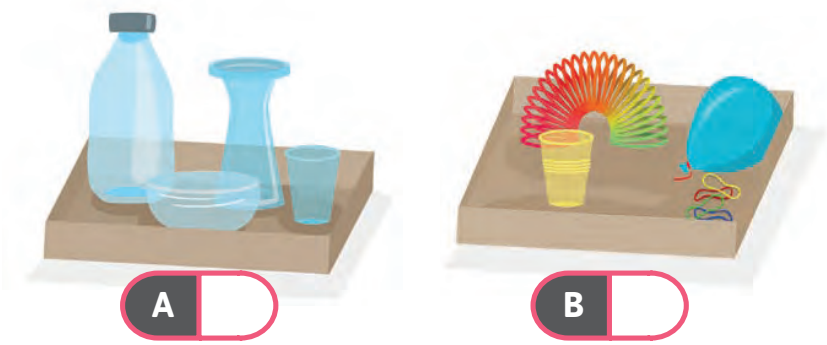
7.  ⬡

8.  ⬡

9.  ⬡

2. Match. Write 1 or 2 in the boxes.

1. flexible **2.** see-through



Name: _____ **Date:** _____

1. Draw your school bag and say the materials it is made of.

2. What materials do you think you will find inside your school bag?

_____ _____ _____

_____ _____ _____

_____ _____ _____

3. Draw and name the objects you find in your school bag and say the materials they are made of.

Name: _____ **Date:** _____

1. What materials are the objects made of?

Object	Material

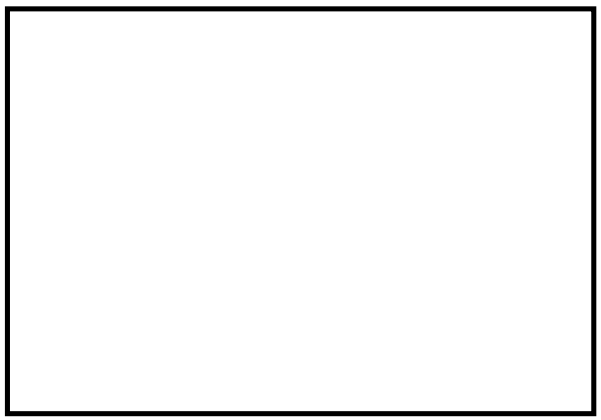
Name: _____ **Date:** _____

1. Complete the table. Write the material(s) the objects are made of in the 'Material' column. Then tick ( ) the properties each object has.

Object	Material	Shiny	Hard	Soft	Rough	Smooth
Gloves						
Cotton towel						
Glass						
Spoon						
Table						

Name: _____ **Date:** _____

1. Material of the object: _____



a. I see it is _____

_____.

b. It feels _____

_____.

2. Material of the object: _____

a. I see it is _____

_____.

b. It feels _____

_____.

3. Material of the object: _____

a. I see it is _____

_____.

b. It feels _____

_____.

Name: _____ **Date:** _____

1. Circle the correct words for each object.

metal

plastic wood

paper soft hard shiny

rough smooth

fabric

metal

plastic wood

paper soft hard shiny

rough smooth

fabric

Name: _____ **Date:** _____

1. Write the materials the objects are made of.


A _____


B _____


C _____


D _____


E _____

2. a. Write the materials of the objects in step 1 in the 'Material' column of the table.

b. Which materials do you think are waterproof?

Tick ( ) the 'Material that I think is waterproof' column.

c. Which materials are waterproof?

Do the test and tick ( ) the 'Material that is waterproof' column.

Material	Material that I think is waterproof	Material that is waterproof

3. Talk about what you found.

a. Which materials are waterproof? _____

b. Did you guess the materials that are waterproof? Circle. **Yes / No**

Name: _____ **Date:** _____

1. Answer the questions for each object.

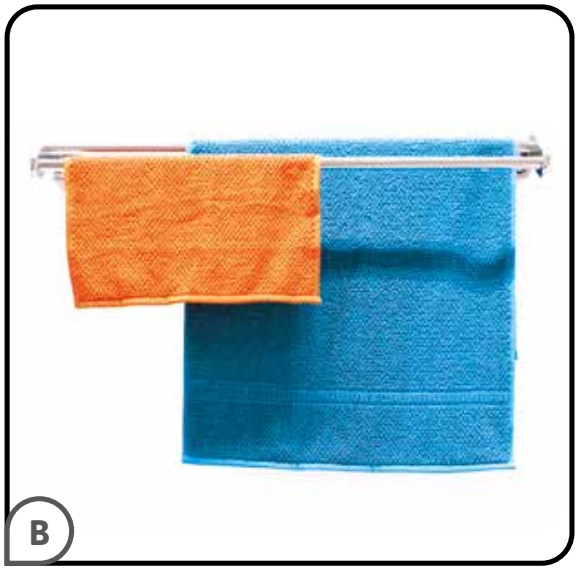
a. Are the boots waterproof?
Circle.
Yes / No

b. What material are they made of?

_____

c. When do we use them?

_____



d. Are the towels waterproof?
Circle.
Yes / No

e. What material are they made of?

_____

f. When do we use them?

_____

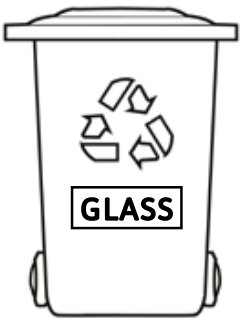
Name: _____ **Date:** _____

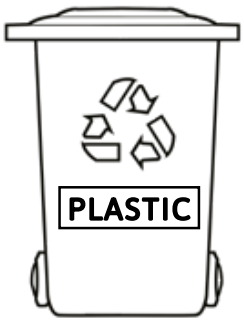
1. Sort the objects made of materials that are flexible and/or see-through into groups.

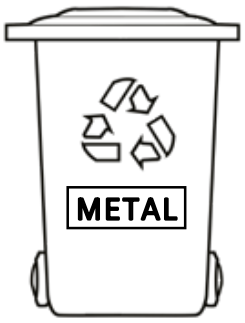
Group 1: flexible	Group 2: see-through
Group 3: flexible and see-through	

Name: _____ **Date:** _____

1. Colour in the recycling bins with the right colour. Then draw lines to match the objects with the recycling bins.







Name: _____ **Date:** _____

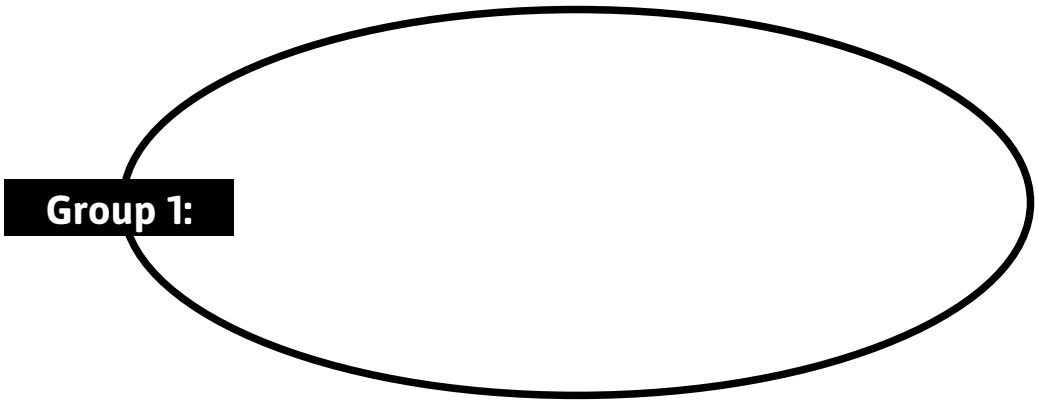
1. Sort the objects that are made of materials with the same properties into groups.

Question 1: Are the objects see-through?

a. What will you do to answer this question? _____

_____

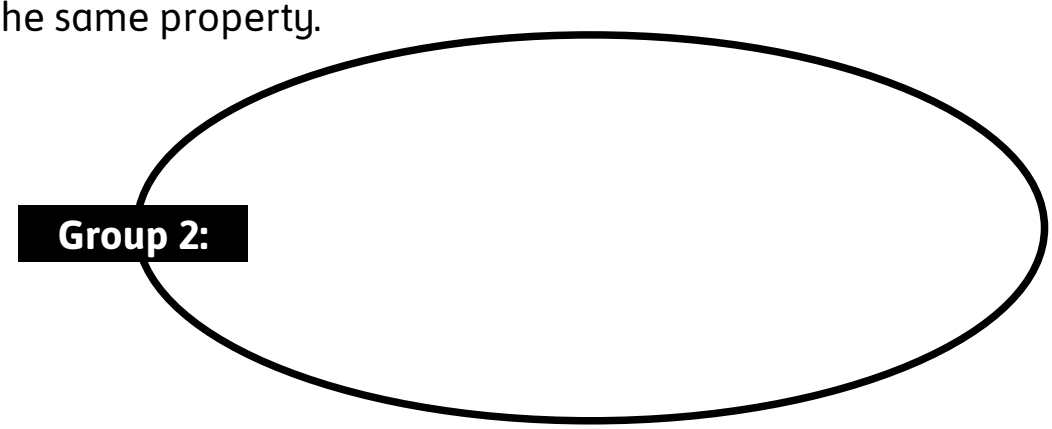
b. Test the objects and write the ones that are made of materials with the same property.



Question 2: Are the objects flexible?

c. What will you do to answer this question? _____

d. Test the objects and write the ones that are made of materials with the same property.



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