

The properties of materials

Technology

The properties of materials

- 1-** Raw materials, processed materials and finished products
- 2-** Technical materials
- 3-** Physical, chemical and ecological properties of materials



1

**Raw materials,
processed materials and
finished products**

The properties of materials

1 A **raw material** is a material that we get directly from nature.



Animal-based



Plant-based



Mineral-based

2 We can **transform** raw materials into different types of processed materials.

3 **Processed materials** are used to make products.

A **finished product** is an object we create to satisfy a need or to improve our quality of life.



2

Technical materials

The properties of materials



Wood



Metals



Plastics



Textiles



Stone and glass



Ceramics



3

**Physical, chemical and
ecological properties of
materials**

The properties of materials

The properties of a material are the set of characteristics that make it behave in a certain way under stimuli such as light, heat, a force or the presence of other materials.

Physical properties



Electrical conductivity
Thermal conductivity
Acoustic conductivity



Toughness/Fragility
Mechanical resistance
Hardness



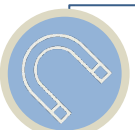
Fusibility
Solderability
Elasticity/plasticity
Ductility
Malleability



Opacity
Translucence
Transparency



Permeability
Porosity



Magnetism



Density

Chemical properties



Oxidation

Ecological properties



Biodegradable



Toxic



Renewable

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Activity 1

Properties	Materials		
	Wood	Metal	Plastic
Electrical conductivity			
Thermal conductivity			
Acoustic conductivity			
Fusibility			
Elasticity/Plasticity			
Ductility			
Malleability			
Toughness			
Mechanical resistance			
Fragility			
Permeability			
Oxidation			

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Activity 1. Solution

Properties	Materials		
	Wood	Metal	Plastic
Electrical conductivity	No	Yes	No
Thermal conductivity	No	Yes	No
Acoustic conductivity	Yes	Yes	No
Fusibility	No	Yes	Some
Elasticity/Plasticity	Yes	Yes	Yes
Ductility	Yes	Yes	Yes
Malleability	Yes	Yes	Yes
Toughness	Yes	Yes	Yes
Mechanical resistance	Yes	Yes	Yes
Fragility	No	No	No
Permeability	Yes	No	No
Oxidation	No	Yes	No

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Activity 2

Classify the following raw materials by putting them in the correct column:

Wool, slate, hides, cotton, wood, granite, gold

Animal-based	Vegetable-based	Mineral-based

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Activity 2. Solution

Animal-based	Vegetable-based	Mineral-based
Wool	Cotton	Slate
Hides	Wood	Granite
		Gold

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Activity 3

Use the raw materials from Activity 1 to complete the sentences.

Wool, slate, hides, cotton, wood, granite, gold

- a) Which ones are used in the textile industry? _____ .
- b) From which one can we obtain paper? _____ .
- c) From which animals can we extract the hide? _____ .
- d) Which ones are used in construction? _____ .

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Activity 3. Solution

- a) Which ones are used in the textile industry? *Wool, hides and cotton .*
- b) From which one can we obtain paper? *From wood .*
- c) From which animals can we extract the hide? *From cows, crocodiles, otters, mink, rabbits, foxes, camels, leopards, seals, martens, marmots, wolves, beavers, squirrels.*
- d) Which ones are used in construction? *Wood, slate and granite.*

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Activity 4

According to the six types of materials, underline the incorrect example in each list.

Rubber

PVC

Aluminium

Cellophane

Latex

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Activity 4

According to the six types of materials, underline the incorrect example in each list.

Chestnut

Fir

Silk

Oak

Planks

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Activity 4

According to the six types of materials, underline the incorrect example in each list.

Paper

Clothes

Carpets

Lycra

Wool

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Activity 4

According to the six types of materials, underline the incorrect example in each list.

Plates

Bricks

Clay

Pottery

Jewellery

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Activity 4

According to the six types of materials, underline the incorrect example in each list.

Glass

Copper

Steel

Rocks

Iron

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Activity 4

According to the six types of materials, underline the incorrect example in each list.

Cement

Oil

Slate

Marble

Windows

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Activity 5

Tell students that you have a big, powerful sound system in your bedroom and that you love playing music very loud. However, your family complains about the noise, and you don't know what to do.

Ask students to suggest things you can do so that you can listen to your loud music without bothering anyone. Write their suggestions on the board and discuss the pros and cons.

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Tell the students that the only solution to your problem seems to be to soundproof your room, but that you haven't got much money so it has to be cheap. Also, you can't change your room too much, so it has to be easy to do.

First, ask students about which materials you should probably choose – they should be able to suggest some from what they have learned about the properties of materials (acoustic conductivity).

Put students into pairs or small groups and ask them to search for cheap and easy-to-install soundproofing material for your bedroom. Tell them to take notes. Ask the pairs and groups to tell the class what they have found and discuss the different options with them.