Properties of Materials

How to use the activity

The Materials activity allows children to compare the properties of different types of materials found in everyday life. The activity uses Robot Smudge - a robot version of Smudge to smash, bend, stretch or scratch each item, and as a robot, he will perform each test in exactly the same way - a 'fair' test.

For each of the tests, there are three (optional parts): **predict**, **test** and **classify**.
In **predict**, children can sort a number of different items of materials on how they think each material will respond to the test;
Children can use **test** to test each of the items by dragging and placing the item between Robot Smudge's hands, and seeing how it responds to the test
In **classify**, children can place each item of material according to how it performed in the test and compare it to their predictions.

In the 'one materials' option, where an individual type of material can be selected, and then subjected to each of the four tests, and children can record how the material performed in each category using a number of sliders.

Option Menu

The Option Menu allows the activity to be tailored for different ages and abilities, by changing the following parameters;

Sound:
On or Off
Language:
English or Spanish
Level of Difficulty:
Easy or Hard: The hard level includes items that could go into either category
Use predict / test / classify:
Allows each part to be switched off (see 'How the activity could be used in the classroom')

Only test items if used in the previous stage:

On/off

Learning Outcomes

Children will be able to identify and name a range of different types of everyday material.

Be able to distinguish between an object and the material is it made from.

Children will be able to describe the properties of different materials are like (hard, bendy, breakable).

Realise that different materials are useful for different purposes.

To understand the concept of a “fair test”.

How the activity could be used in the classroom

We use many different materials in our everyday lives (such as metal, glass, wood, plastic and ceramics) each of which have different properties. This activity allows children to explore these properties to find out which ones can be bent, stretched, smashed or scratched.

In the activity, the option menu allows the test option to be turned off, so that the actual test could be performed using real items, and the activity used to for children to **predict** and **classify** how objects behave.

Ideas for work away from the computer

Year 1 children may retell the story of the three little pigs using their knowledge of materials, and discuss the reasons for and against each pigs' choice of materials.

Children could collect small objects and classify them, for example as paper, wood, plastic, metal and fabric. This could lead onto work about recycling.

Sort these, or other objects, on the basis of being hard/soft, stretchy/bendy/floppy/stiff etc.

Children can point out different objects in the classroom (or outside), and discuss what material(s) they are made from

Describe the properties of everyday materials (e.g. a wooden chair, a jumper)

Children can go on to discuss which objects around the school and their home are made from different materials (for example: chairs and desks are made from wood; knives, forks and spoons are made from metal)

Find things that are made from natural materials (stone, metal, wood etc.), and find objects that are made by man-made materials (plastic, glass, ceramic materials etc.)

Explore why these materials are used for certain purposes, and which properties make them suitable. What would be unsuitable choices of materials for things (eg chairs made of paper), and why?

Create a list or poster of materials (wood, metal, paper, cardboard etc.) or everyday items and describe the properties of each: strong, weak, hard, soft, shiny, dull, brittle, flexible, breakable, transparent, opaque, rough, smooth, waterproof, absorbent, warm, magnetic, conducts electricity, recyclable etc.

Discuss what materials might be best for certain purposes, such as:
- a cup, a door, a jumper; and give reasons for these choices

Discuss why people might want to recycle materials.

Support resources
Complimentary resources (interactive, online)
- our naming parts of a plant

Weblinks
Videos
The Everyday Materials Song explores some everyday materials, natural and man-made, such as glass, stone, wood, brick and snow. The video names these everyday materials and hints at their properties and uses.
https://www.youtube.com/watch?v=ErmhTr0A9pw

Year 1 - Materials and their Properties
https://www.youtube.com/watch?v=C4UlCEMlo9k

Video showing different materials being tested for real.
https://www.youtube.com/watch?v=TzR9fXL-Obo

This video's focus is on sorting and describing the features and characteristics of materials. Children use their senses to see what materials look and feel like in order to find out more about them and convey this knowledge.

https://www.youtube.com/watch?v=phqK2DWOeqE

Links to Curricula

England - Science National Curriculum

Everyday Materials	Year 1	Identify and name a variety of everyday materials
Everyday Materials	Year 1	Describe simple properties of a variety of everyday materials
Everyday Materials	Year 1	Compare and group together similar everyday materials
Uses of Everyday Materials	Year 1	Compare suitability
Uses of Everyday Materials	Year 1	Find out how shapes can be changed
Working scientifically	Lower KS2	Gathering, classifying and presenting data to answer questions
Working scientifically	Lower KS2	Use of a fair test
Working scientifically	Lower KS2	Record findings, identifying differences
Properties and changes of Material	Year 5	Compare and group together everyday materials and their properties

Wales

Enquiry	KS2	Pupils should be given opportunity to carry out different types of enquiry
Sustainable Earth	KS2	Comparison and properties of some natural and man made materials
Outcomes, Knowledge of the World	Foundation Phase, outcome 3	Sort objects and materials according to specific criteria

Northern Ireland

The World Around Us - Progression	Foundation Stage	Identify similarities and differences between materials

NGSS

2-PS1-1		Conduct an investigation to describe and classify different types of materials
2-PS1-2		Analyse data from testing different to determine their properties
PS1A		Matter can be described and classified by its observable peoperties

Australia

Year 1	ACSSU018	Everyday materials can be physically changed in a variety of ways
Physical Sciences	ACSH081	Science involves testing predictions

Year5&6

Sequence of Achievement:	Year 2	Students describe changes to objects, materials and living things
	Year 4	Apply the observable properties of materials
	Year 5	Students will be able to classify substances according to their observable properties or behaviour
	Year 6	Students will be able to compare and classify types of change to materials

New Zealand

Material World Property and Change of Matter	Levels 1 & 2	Observe, describe and compare the physical properties of common materials
Material World Property and Change of Matter	Levels 3 (Y4-Y8)	Group materials in different ways, based on observations and measurements of the physical properties of a range of materials

Singapore

Diversity	P3 & P4	Compare the physical properties of materials