

Properties of Different Materials

READ ALOUD PASSAGE

Every material has its own set of properties, the characteristics that make it recognizable and useful. You already know the main categories of materials: wood, metal, plastic, glass, rubber, and clay. Properties are what let you tell those categories apart, even with your eyes closed.

Some properties come from your senses. Materials have their own look, texture, and feel. Metal usually feels cooler to the touch, wood feels warmer, and plastic feels somewhere in between. Tapping different materials even produces different sounds, which is one more clue to what something is made of.

Other properties can be tested or measured. Hardness is how much a material resists being scratched or dented. Strength is how well a material holds up against being pulled, bent, or squeezed. Flexibility is whether a material bends without breaking, while elasticity is whether it springs back to its original shape afterward.

A few properties are especially useful for sorting materials. Transparency tells you whether light passes clearly through a material, the way it does through glass. Magnetism tells you whether a magnet will pull on a material, which happens with iron and steel but not with most other metals, like aluminum or copper.

Because so many properties are involved, choosing the right material for a job is rarely simple. An engineer designing a bicycle helmet needs a material that is strong enough to resist a hard knock, light enough not to weigh down a rider's neck, and workable enough to be molded into a curved shape. Weighing tradeoffs like these, between strength, weight, hardness, and workability, is at the center of how engineers pick materials for anything they build.

Activity 1: Word Builder

Answer each question with your own words.

1. List four nouns you could sort by how hard they are.

1. _____

2. _____

3. _____

4. _____

2. List three adjectives that describe how a material feels.

1. _____

2. _____

3. _____

4. _____

Activity 2: Sentence Scramble

These words are mixed up. Put them in order to make a sentence. Start with a capital letter and end with a period.

1. senses / your / some / properties / from / come

Activity 3: Two Into One

Put the two short sentences together into one smooth sentence. If there is a word in the box, use it.

1. Metal feels cool.

but

Wood feels warm.

2. Rubber bends.

and

Rubber springs back.

Activity 4: Brainstorm Details

Read the topic sentence. Write four key words or phrases that could support it. Do not write full sentences.

TOPIC SENTENCE

A bike helmet needs the right properties.

Key words and phrases:

- _____
- _____
- _____
- _____

Activity 5: Sentence Scramble

These words are mixed up. Put them in order to make a sentence. Start with a capital letter and end with a period.

1. properties / tested / be / other / can / or / measured

2. useful / a / for / are / materials / especially / properties / few / sorting
