

MATERIALS

PROPERTIES OF MATERIALS

Materials are used to make objects. The characteristics of materials are also called the **properties** of the materials. Every material has its own properties. These include **hardness, flexibility, ductility, bouyancy, strength** and **resistance** to wáter.

A material can have one or more properties.

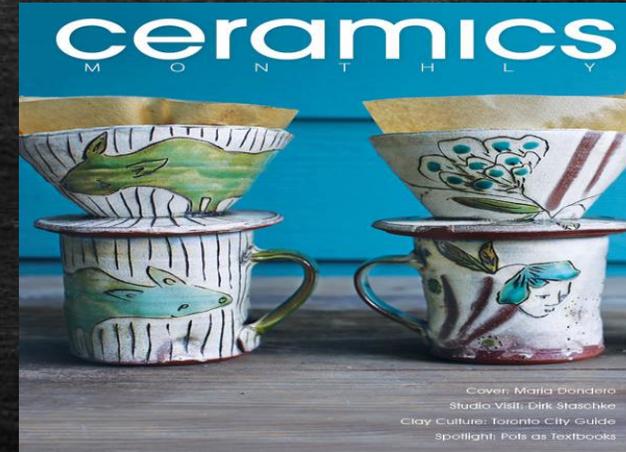


PROPERTIES OF MATERIALS

- **Hardness:** it refers to the ability to *withstand wear* and scratches. for example metal is harder than wood.



- **hard materials:** diamond, glass, ceramic and metals. these are used to make objects that need to be resistant to scratches.



- **soft materials:** Rubber and fabric are examples of soft materials.
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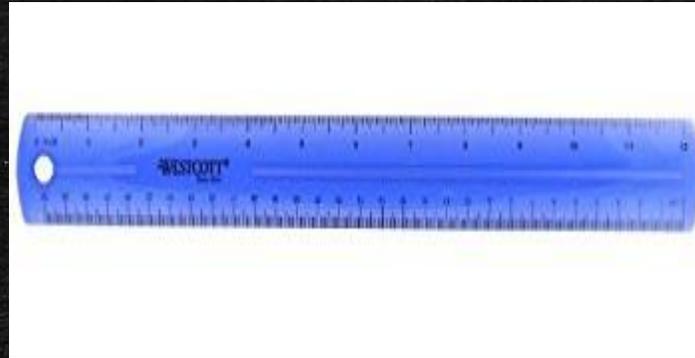
FABRIC COTTON

Flexibility: It refers to the ability of a material to bend without breaking

- **Flexible materials:** These are used to make objects that need to bend easily. Rubber is an example.



The shape of a plastic bag changes with the shape of the object it holds.



A plastic ruler can be bent easily without breaking.



A water hose can be coiled easily.

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- **Rigid materials:** These will break if we try to bend them. For example a glass. Other materials such as: Wood, metal and ceramic are used to be set into specific shapes.

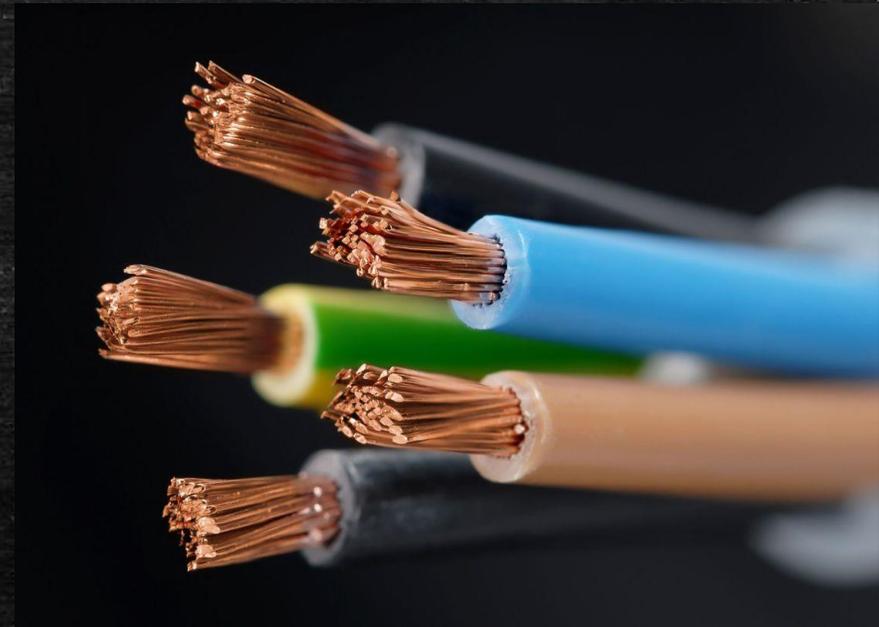


Ductibility: It's the ability of a material to be pulled into wires.

- **Ductile materials:** most metals are ductiles. Examples: gold, copper and aluminium.



Pulled



- **Non ductile materials:** Plastic, Wood and glass. These can not be pulled into wires.



Buoyancy in water: is its ability to float in a liquid or a gas.

- **Materials that are bouyant in wáter:** A material that is bouyant in wáter floats on wáter.



Wood



Plastic

- Materials that are not bouyant in wáter: these sink in water.



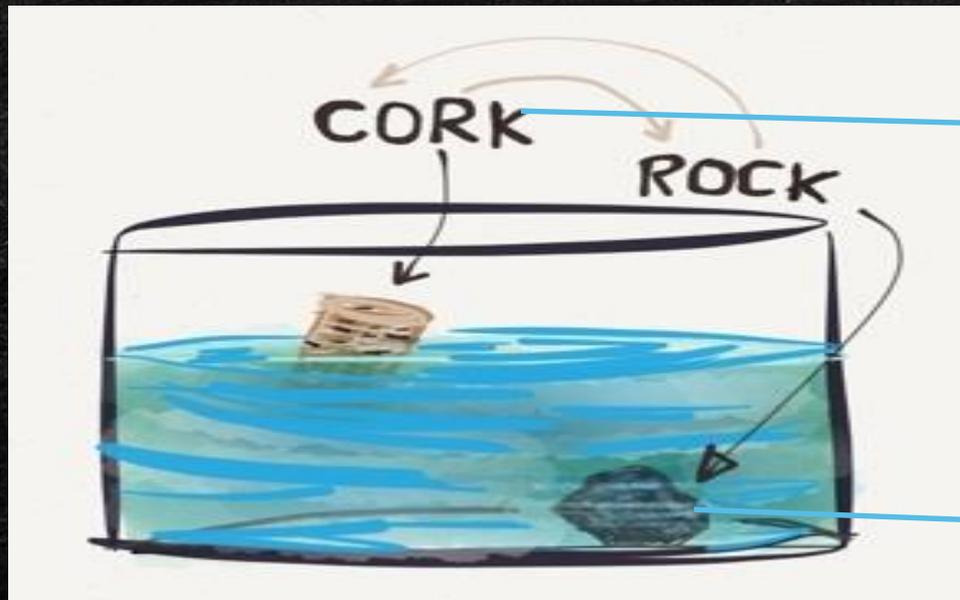
Metal coins



anchor of a ship

Density:

- The buoyancy of a material in water depends on its density. The densities of different materials can be compared to that of water.
- A material that has a lower density than water floats on water. A material that has a higher density than water sinks in water.



Cork floats in water. This is buoyant in water.

Rock sinks in water. This is not buoyant in water.

Compare the masses.

- The rock has a greater mass than a cork.
- Since the cork and the rock are of the same size, this means that they have the same volume.
- Two objects with the same volume but different masses will have different densities. From our observation, the rock has a higher density than the cork.
- The object with a greater mass has a greater density.

Strength: The strength of a material is its ability to withstand a heavy load without breaking or tearing.

- **Strong materials:** Alloys and Wood.



- **Weak materials:** These tear or break easily. Example: paper



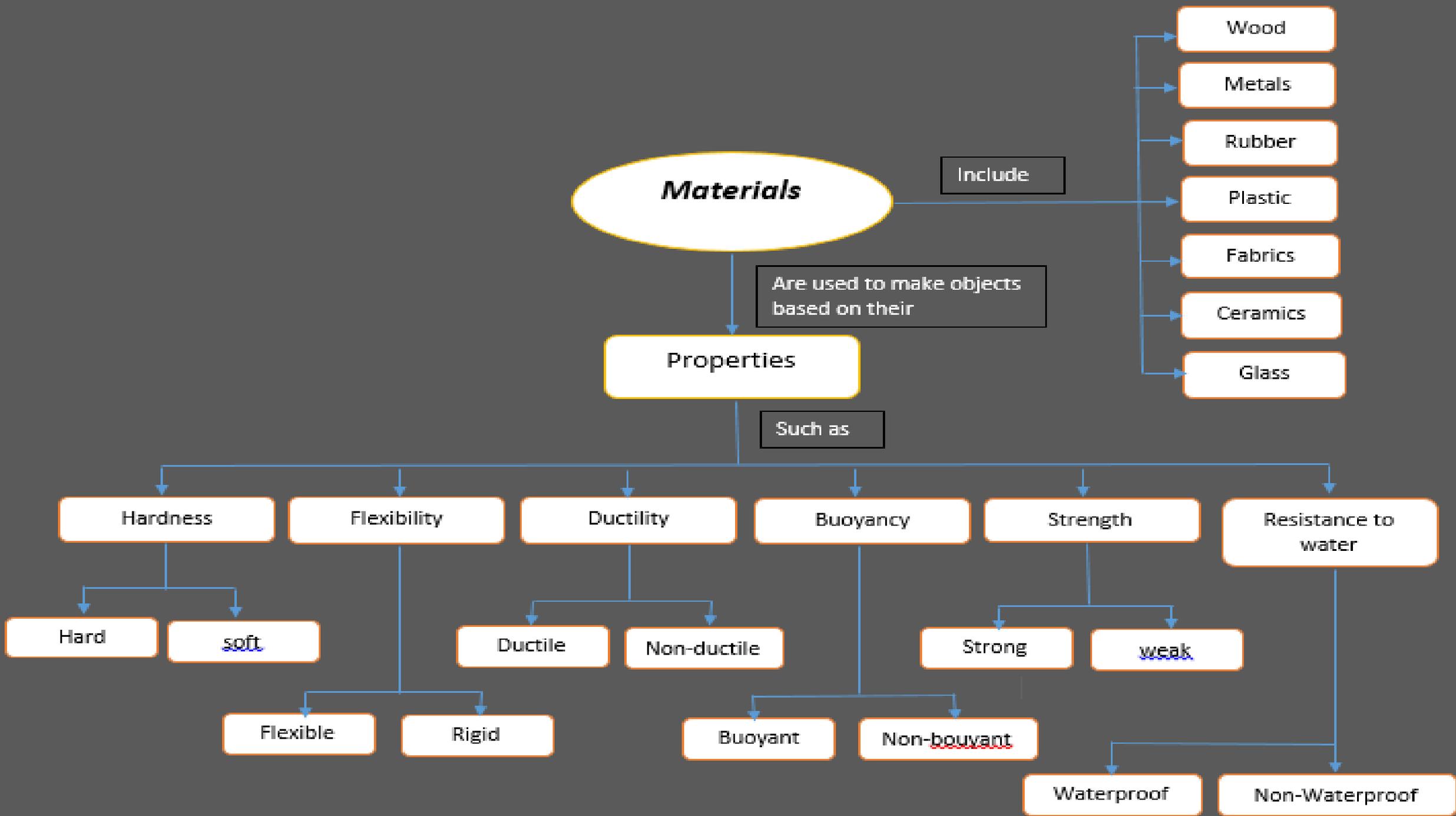
Resistance to water: A material that is waterproof is resistant to water and does not allow water to pass through it.

- **Waterproof materials:** plastics, rubber and fabrics (Nylon).



- **Non-waterproof materials:** Paper and cotton are examples, they are absorbent materials. They become wet after they have come into contact with water.





ACTIVITY 11.1 – 11.2

