CHAPTER 05

Materials and Things

Properties of Materials:

Different materials have different properties, which is what makes them unique. We group materials based on these properties that make materials suited to different purposes.

Rigid/ hard/ strong:

A table or chair is rigid so it can hold things on the top. If it is flexible, everything will fall. It depends on whether a material will be able to withstand pressure or if it will break easily.

Can you think of other rigid materials now?

Utensils, glass, bricks, plastic chairs etc.

Flexible:

Our track pants and shoe are flexible so that we can them wear easily and walk. Imagine if our shoes are rigid and track pants are made of metal. Can we survive wearing them?

What are the other flexible materials we know?

Fabrics, paper, leather, rubber etc. are flexible.

Heavy / Light: This is if a material will be able to hold something up or if it will buckle under pressure.

Rough / Smooth: Smooth materials are good for things like slides, whereas rough materials are good for things like roads so that cars would not slip everywhere.

Hard / Soft: This is when a material can be squashed easily or if it cannot.

Magnetic / Non-Magnetic: Whether a material will attract other magnetic materials or not.

Transparent / Opaque: This is when you can see through a material like glass or cannot like a brick.

What materials are transparent?

A bus shelter, a window, a glass jar, a bottle of water etc. are transparent.

Our clothes are opaque so we cannot see through clothes. A table, an apple, a coat or sweater, a book etc. are opaque.

Materials can be described by their properties. Understanding a material's properties is important when deciding whether the material is suitable for the use planned for it. Materials may be soft, hard, flexible (bendable), rigid (stiff), transparent (see-through), opaque (meaning light does not shine through it), rough, smooth, shiny or dull.

For example, glass is a transparent, hard and smooth material. It can be moulded into different shapes when it is being made, it is waterproof and it breaks easily. It is used to make windows, containers, eyeglasses and many more objects.

Plastic is another type of material. It is strong, waterproof and durable (long lasting). It can be transparent or opaque. It can be used to make many everyday objects including bottles, bags, toys and computer equipment.

	Hard	Soft	Bendy	Rigid	Smooth	Rough
Glass	yes			yes	yes	
Paper		yes	yes		yes	
Wood	yes			yes		yes
Metal	yes			yes	yes	yes
Fabric		yes	yes		yes	

Transparency:

Whenever we go to shopping, we can observe that dresses and jewelry are displayed in glass chambers to make the models visible to customers right!

Glass is a transparent material. What does that mean?

If an object is transparent it means light completely passes through it and you can see clearly through it. If we can easily see through an object, it is said to be transparent.

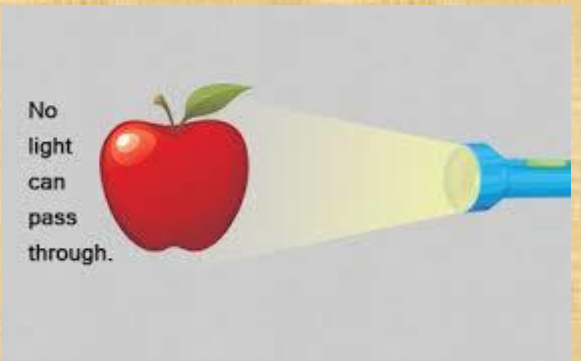
People use transparent objects every day as tools and as protection.

Clear glass windowpane, clear glass light bulb, water and clean air are transparent.

Opaque:

If we cannot see through an object at all, it is an opaque object. If an object is opaque, it means no light can pass through it. It blocks the light.

Anything you cannot see through at all would be considered an example of an opaque object.



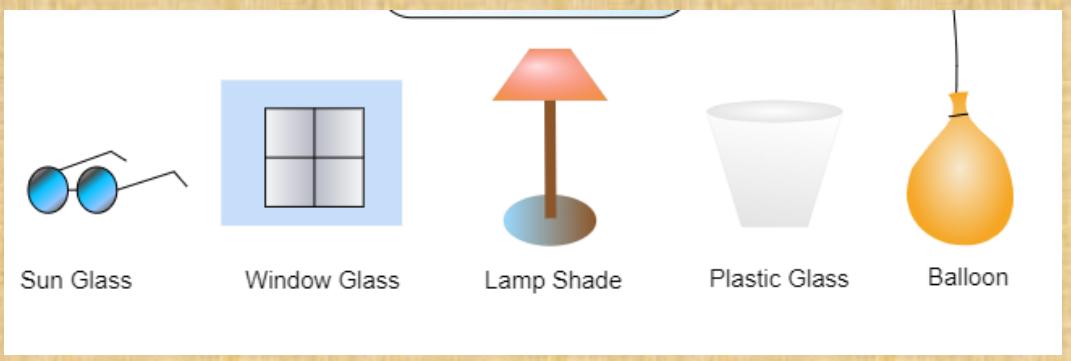
Wooden door, stone wall, metal roof and closed textbook are opaque.

Translucent:

If an object is translucent, it means that some light passes through it but the light is scattered so you cannot see clearly through it.

If we can see up to some extent through an object, it is translucent.

Examples of translucent objects also include everyday materials like frosted glass shower door, tinted car window, sunglasses, single piece of tissue paper and vegetable oil.



Are we able to see through a paper?

Take a sheet of white paper and try to see a lighted bulb through it. Now put a few drops of oil on that sheet and again try to see the bulb through it.

You notice that in the first case, you cannot see the bulb but in second case, you are able to see the bulb. The materials through which we can see objects, but not very clearly are said to be translucent.

Oily paper is an example of a translucent substance. Some glass panes fixed to windows allow some light to come through but you cannot see clearly through them; such type of glass is translucent glass.

Take a torch, switch it on and see.

Does the light pass through the torch glass?

Now cover the torch glass with your palm. What do you observe?

Now cover the torch glass with oily paper. What do you observe? In the above activity, when do you observe transparent, translucent and opaque property?

- Light passing through the torch glass is a transparent property.

- Covering the torch glass with palm do not allow the light to pass through. It is an opaque property.
- Covering the torch glass with an oily paper allows some light to pass through it and gives blur picture is a translucent property.

Finding objects whether transparent or opaque:

Objects	Transparent or Opaque
Plastic	Opaque
Glass jar	Transparent
Steel plate	Opaque
Mirror	Opaque
Wooden door	Opaque
Polythene bag	Transparent
Paper	Opaque