

UNIT 7. MATTER AND FORCES



PRIMARY 4/ Natural Science

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MATTER

It is everything around you. **Matter** is anything that has mass and takes up space.

Properties of matter

Volume

Mass



Specific properties of matter

These properties make each type of matter good for some uses but not for others.

It is amount of space a body occupies.

It is the amount of matter in a body.

1 Flexibility

- Cloth is **flexible** because it can bend without breaking.
- Wood is **rigid** because it cannot bend.

2 Resistance

- Brick is **resistant** because it is difficult to break.
- Glass is **fragile** because it is easy to break.

We measure volume with **LITRES**, using instruments like **MEASURING JUGS** and **CYLINDERS**. We use different containers depending on the amount of volume we want to measure.

We measure mass in **GRAMS** or **KILOGRAMS** using **SCALES** and **BALANCES**.

When the two pans are level, the two objects have the same mass.



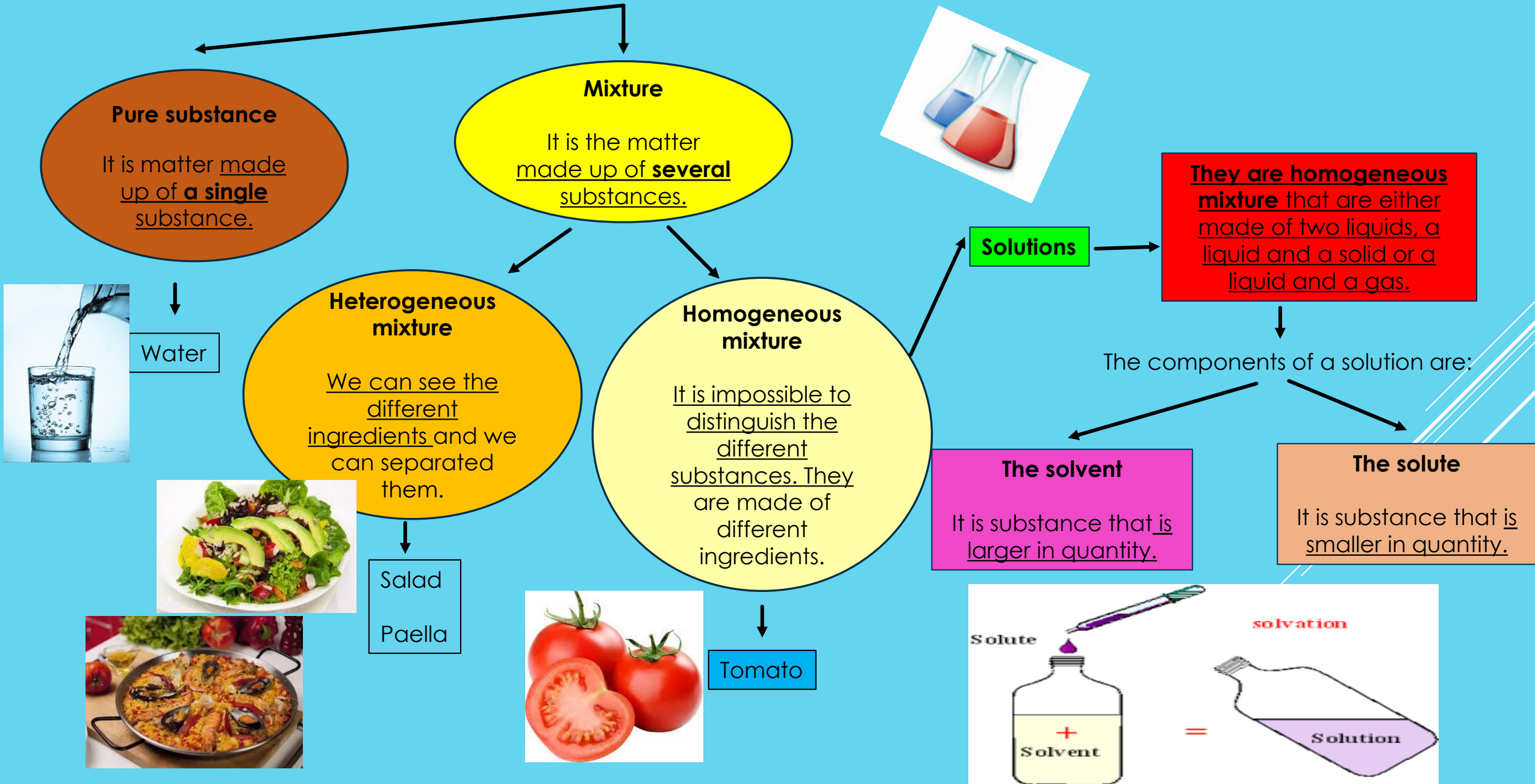
3 Hardness

- Steel is **strong** because it is difficult to be scratched.
- Plastic is **soft** because it can be scratched.

4 Conductivity

- Wood is **insulating** because it does not conduct heat.
- Metal is heat **conductive** because it transmits heat.

PURE SUBSTANCES AND MIXTURES



SEPARATING MIXTURES

Filtration

It is used to separate heterogeneous mixtures of a liquid and a solid, like water and sand.

For example:

Pour the mixture through paper. It lets the water pass through and retains the sand.

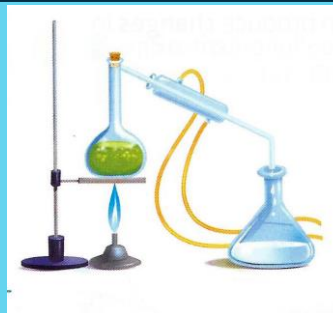


Distillation

It is used to separate homogeneous mixtures of liquids.

For example:

Heat the mixture until one of the liquid evaporates. When it cools, it condenses and is collected in liquid form.



Evaporation

It is used to separate homogeneous mixtures of a liquid and a solid, like water and salt.

For example:

Heat the mixture. After a while, the water will evaporate, leaving the salt.



CHANGES IN MATTER

Physical changes

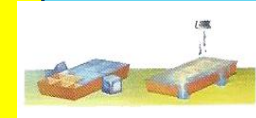
They are changes that **don't vary the composition of matter.**

They can be caused by:

Changes in temperature, which produce changes of state.

Application of forces, which can produce changes in movement or shape of bodies.

- **Fusion:** it is the change from a solid state to a liquid state.
- **Evaporation:** It is the change from a liquid state to a gas state.
- **Solidification:** It is the change from a liquid state to a solid state.
- **Condensation:** It is the change from a gas state to a liquid state.



We can apply a force to matter in order **to move it.**



We can **deform or break matter** if we apply a force to it.



Chemical changes

They are substances which **are transformed into others.**

In these reactions, substances called reactants are turned into different substances, called products.

There are different types of chemical changes

Oxidation
It occurs when a substance combines with the oxygen in the air and **forms a new substance.**



Combustion
It occurs when a material combines with oxygen and **burns.**



Fermentation
It takes place in the absence of oxygen. It **requires the action of yeast or bacteria.**



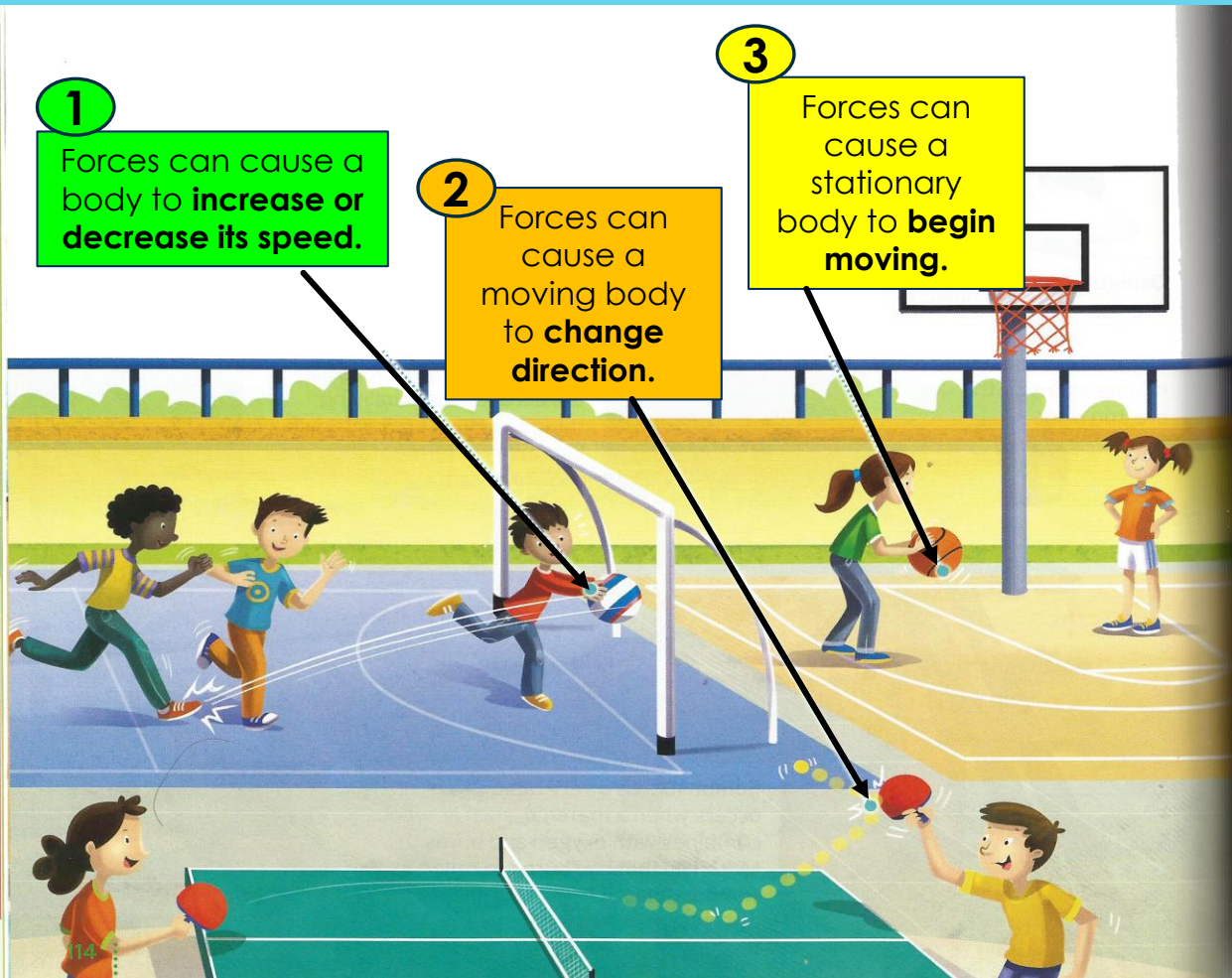
FORCES

CONTACT FORCES: They act when two bodies touch each other. For example: When you push a door with your hand to open it.

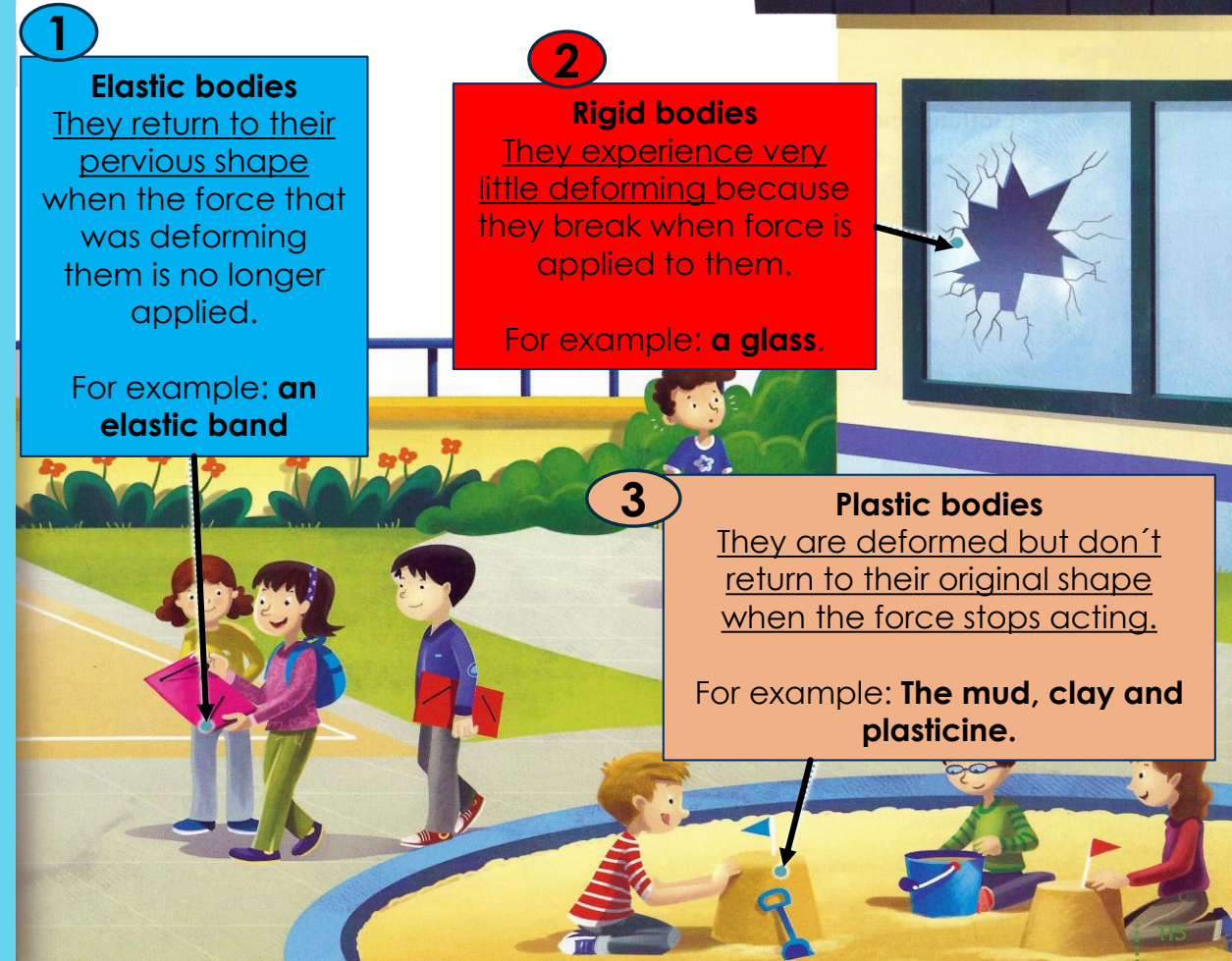
NON-CONTACT FORCES: They don't require the bodies to touch. For example: when a magnet attracts a paperclip or when Earth attracts a ball that is in the air.

They are interactions between bodies. They can be classified as:

Forces change when bodies move



Forces cause deformation and breakage



MATERIALS



The matter we use to make objects is called material. Each material has certain properties that differentiate it from others.

Permeability

- **An impermeable** material doesn't allow liquid to pass through it.
- **A permeable** material allows liquids to pass through it.

Elasticity

- **An elastic** material returns to its original shape after it is stretched or bent.
- **A malleable** material changes its shape.



Strength

- **A strong** material is difficult to break.
- **A fragile** material breaks easily.

Transparency

- **A transparent** material allows light to pass through it.
- **An opaque** material doesn't allow light to pass through it.

HOW MATERIALS ARE USED

Clothing and shoes

They are strong, **elastic, light and smooth** so that they are comfortable.

For example: **cotton and polyester.**

Buildings and roads

They need **strong materials** that can support a lot of weight. They also need to **use impermeable materials to withstand the action of the rain.**

For example: **concrete, asphalt, rocks and clay.**

Machines and tools

They need **strong materials like steel.** However, the parts we touch are made of insulating materials that protect us from heat and electricity.

For example: **plastic and wood.**

