



Divina Infantita
(Almería)

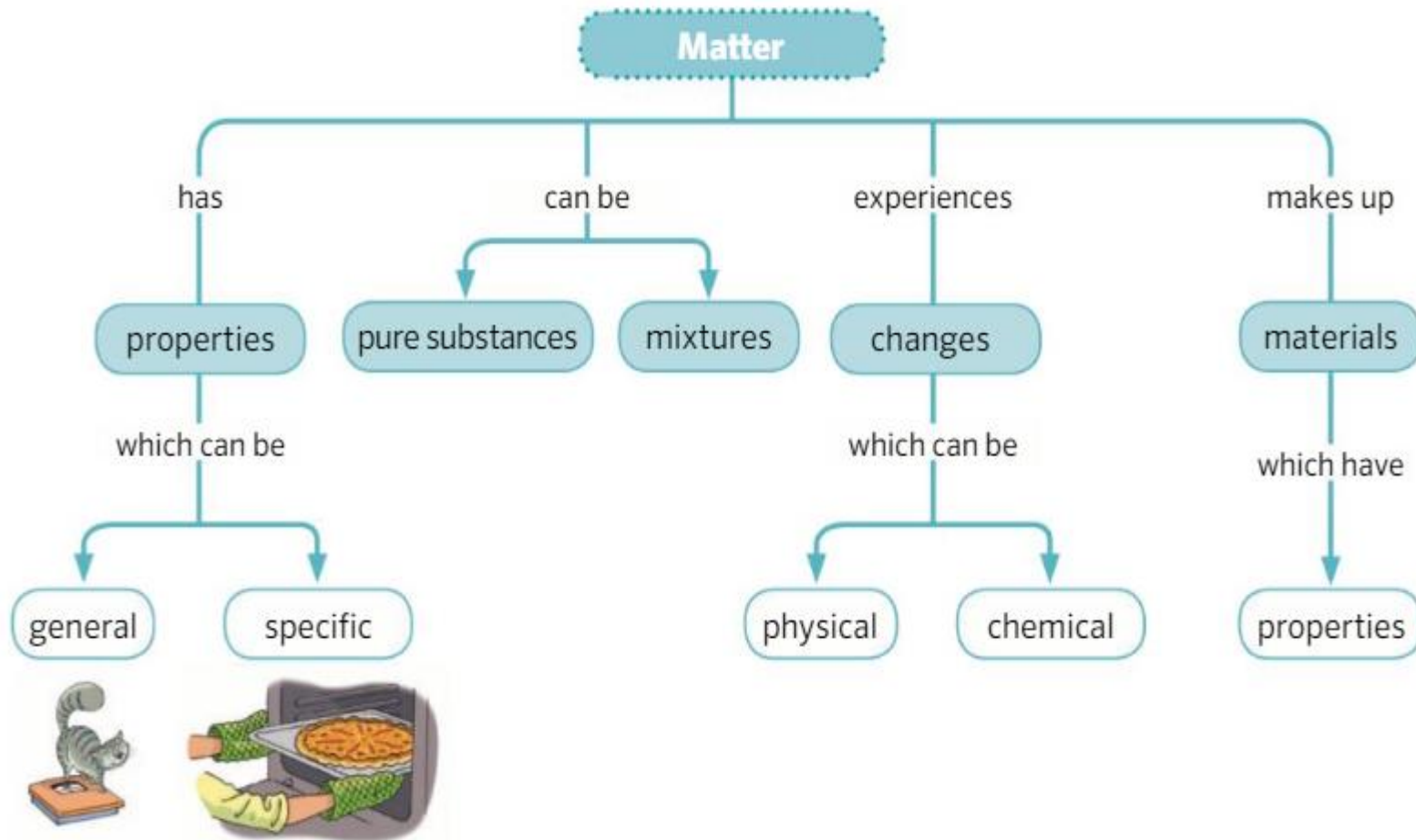
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NATURAL SCIENCE

UDI 5 “Retazos de una época”

UNIT 7-8 . Matter and force / Machines

Mind maps



1. Matter and its properties

a) General Properties of matter

Matter is everything around us that has **mass** and **volume**:

MASS

Is the amount of matter in a body.

We measure mass in grams and kilograms, using a **scales** and **balances**.



VOLUME

Is the amount of space a body occupies.

We measure volume in litres.



b) Specific properties

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

Flexibility

Cloth is **flexible** because it can **bend** without breaking

Wood is **rigid** because it cannot bend.

Resistance

Brick is **resistant** because it is difficult to break.

Glass is **fragile** because it is easy to break.

Hardness

Steel is **strong** because it is difficult to **scratch**.

Plastic is **soft** because it can be scratched.

Conductivity

Wood is **insulating** because it does not conduct heat.

Metal is heat **conductive** because it transmits heat.



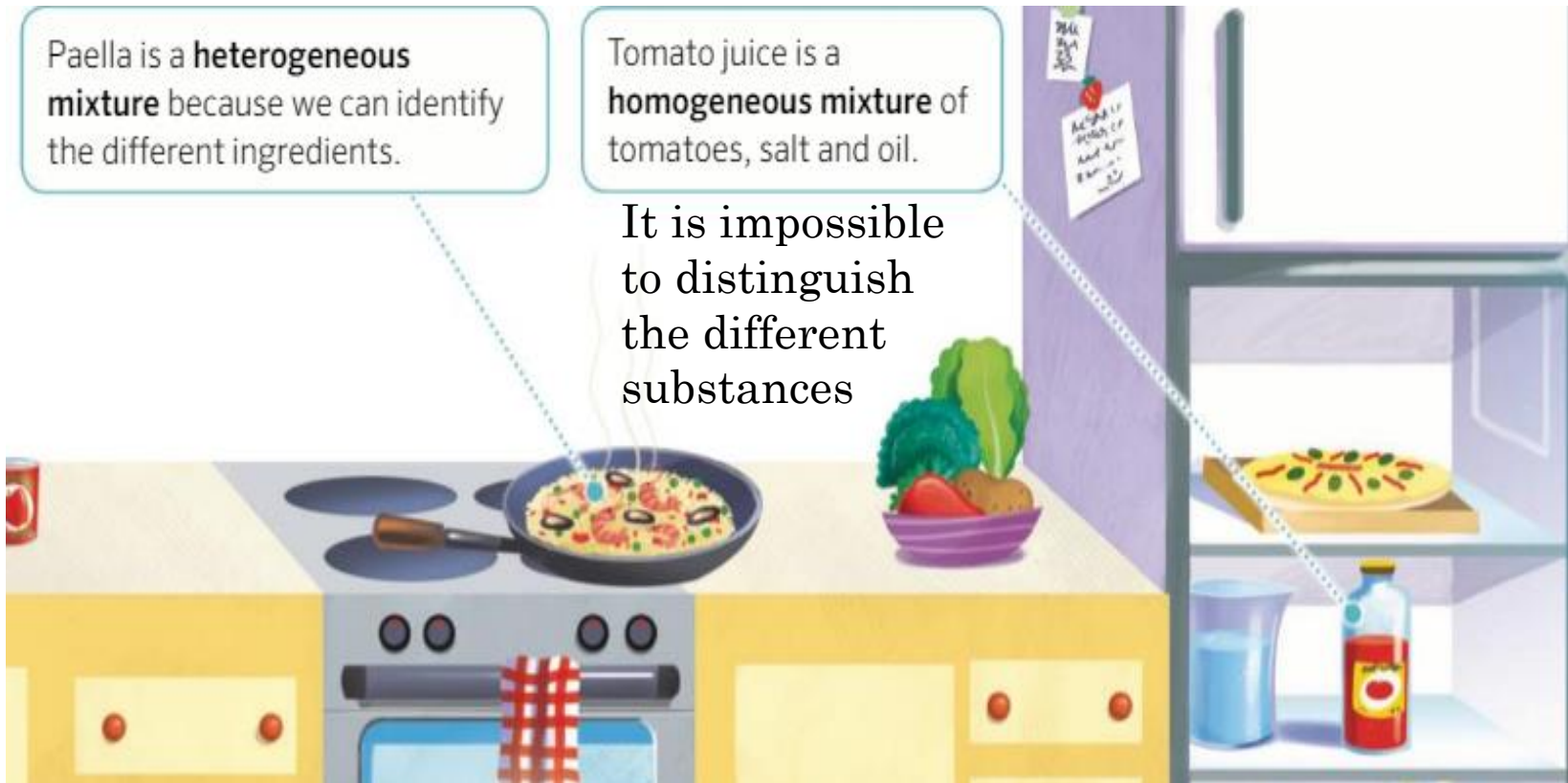
2. Pure substances and mixture

- **Pure substance** is matter made up of a single substance
- **Mixture** is matter made up of several substances. There are two types:

Paella is a **heterogeneous mixture** because we can identify the different ingredients.

Tomato juice is a **homogeneous mixture** of tomatoes, salt and oil.

It is impossible to distinguish the different substances



Separating mixtures

Filtration

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



Distillation

It is used to separate **homogeneous mixtures** of liquids.



Evaporation

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

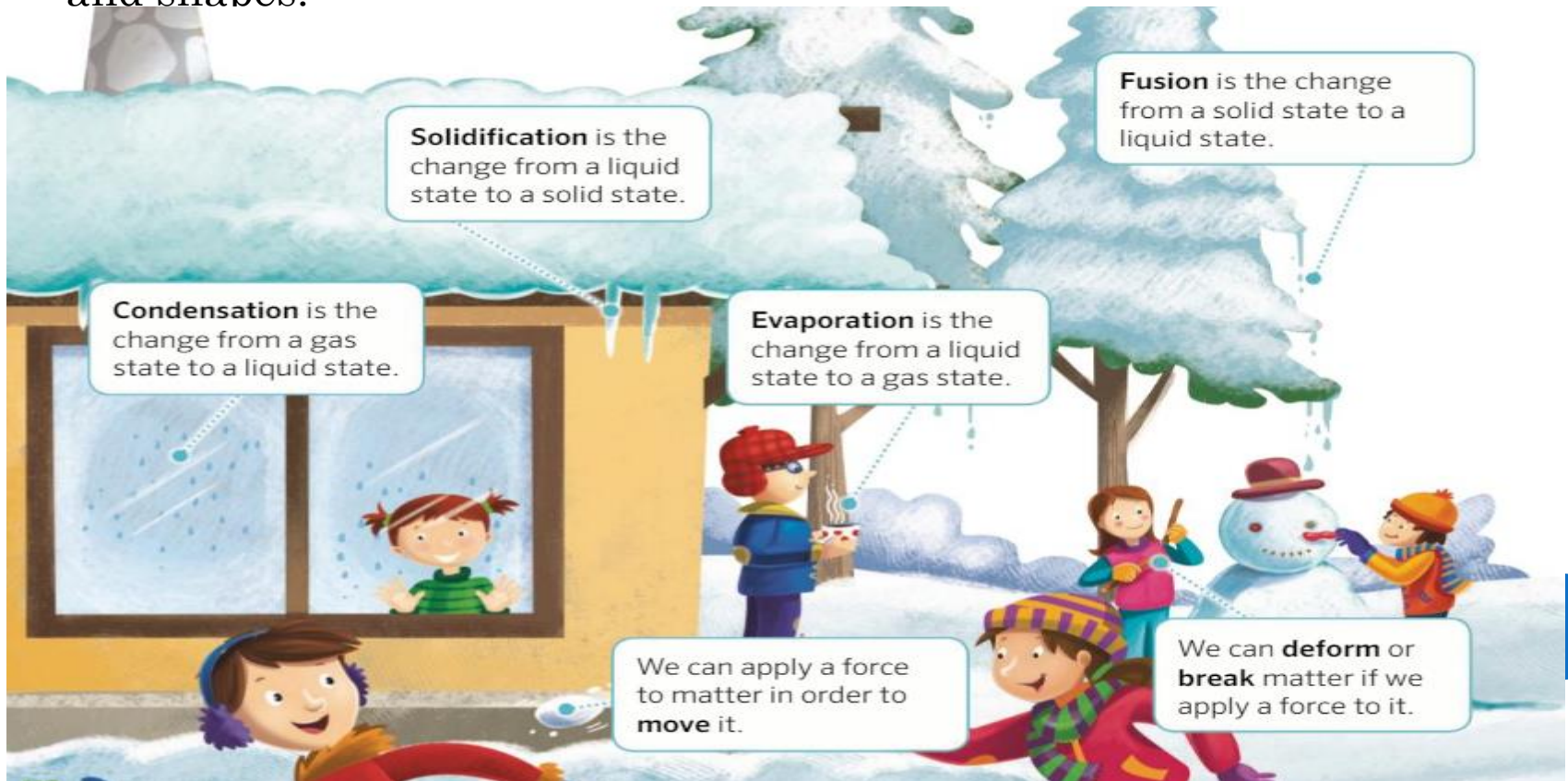


3. Changes in matter

a) Physical matter

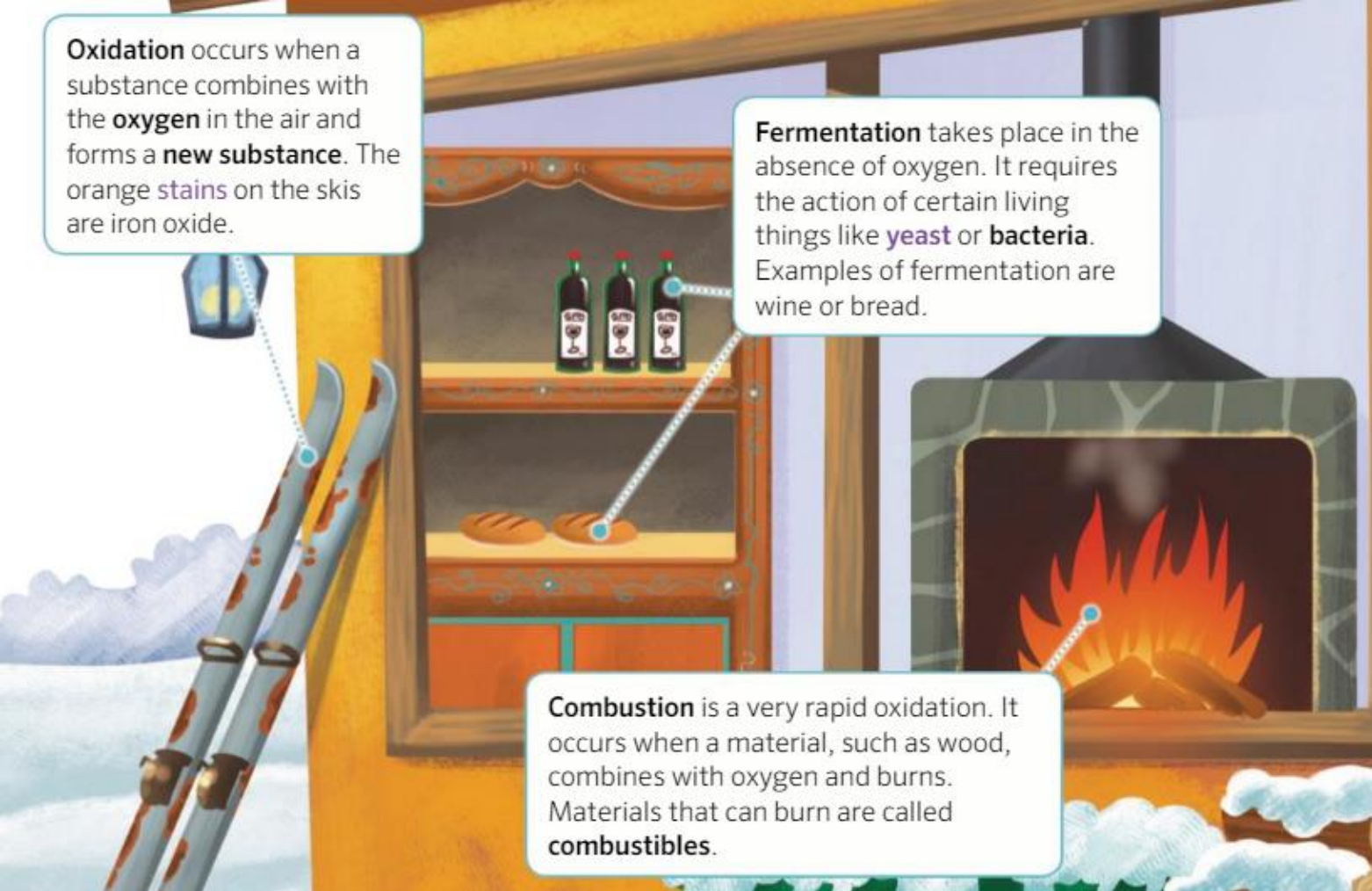
Physical changes can be caused by:

- **Changes in temperature**, which produce changes of state
- **Application of forces**, which produce changes in movement and shapes.



b) Chemical changes

Some substances change and are transformed into others. There are three different types of chemical changes:



Oxidation occurs when a substance combines with the **oxygen** in the air and forms a **new substance**. The orange **stains** on the skis are iron oxide.

Fermentation takes place in the absence of oxygen. It requires the action of certain living things like **yeast** or **bacteria**. Examples of fermentation are wine or bread.

Combustion is a very rapid oxidation. It occurs when a material, such as wood, combines with oxygen and burns. Materials that can burn are called **combustibles**.

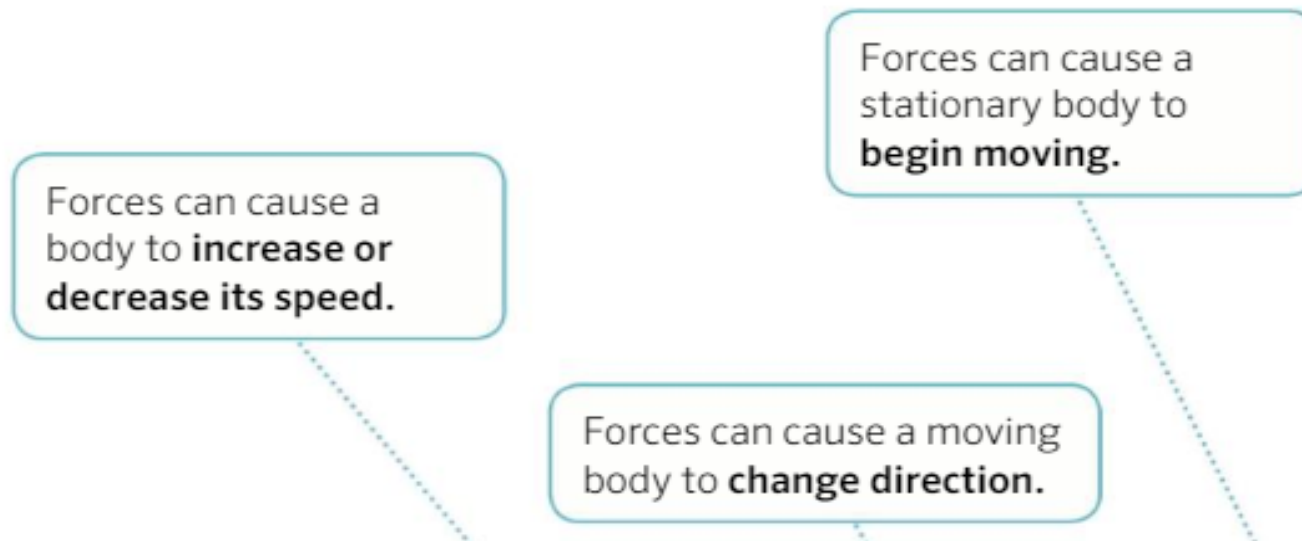
4. Forces

Forces are interaction between bodies. They can be classified as:

- **Contact forces:** when two bodies touch each other.
- **Non-contact forces:** They do not require that bodies to touch.

Forces change how bodies move

Forces may change the way a body moves, or they may cause it to lose its shape or even break.



5. Materials

The matter we use to make objects is called **materials**.

a) Properties of materials

• Impermeability

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.



• Transparency

A **transparent** material allows light to pass through it.

An **opaque** material doesn't allow light to pass through it.

• Strength

A **strong** material is difficult to break.

A **fragile** material breaks easily.

6. Machines

Machines are devices made of different materials. They help us complete tasks with less effort and make our lives easier.

- **Simple machines:** have one or very few parts
 - **Complex machine:** are made up of many parts
- Depending on **the type of energy** they use, can be classified into three groups.

Manual machines

They use **our energy** to work.



Electrical machines

They use **electrical energy**.



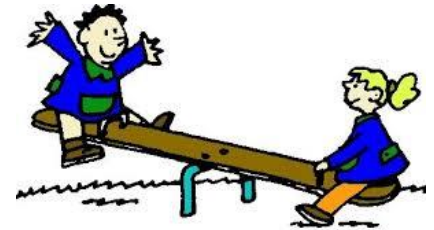
Thermal machines

They use energy obtained by burning **fuel**.



b) Simple machines

- **Lever:** are used to move objects that weigh a lot



- **Inclined plane:** also called ramp. To raise objects with less effort



- **Pulley:** makes it possible to lift weight more easily

