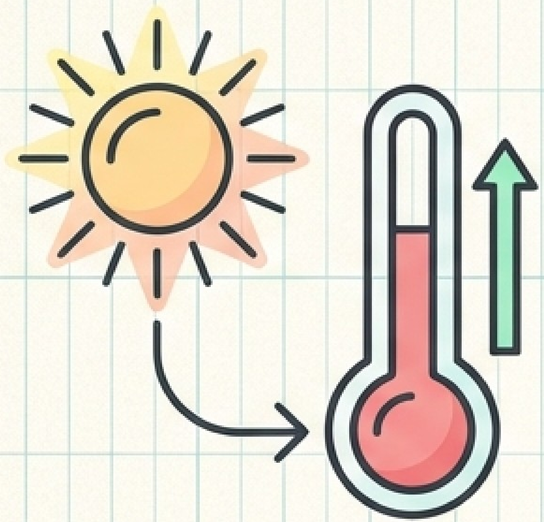

Important exam topic!

Heat and Energy

Understanding the Fundamentals, Effects, and Environmental Impact

Focus on thermodynamics laws and climate link

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Module 1: Physics in the Environment ✓ Oct 26

THE FUNDAMENTALS

ENERGY

Definition: The ability to do work.

Key Concept: Energy exists in many forms (stored or active).

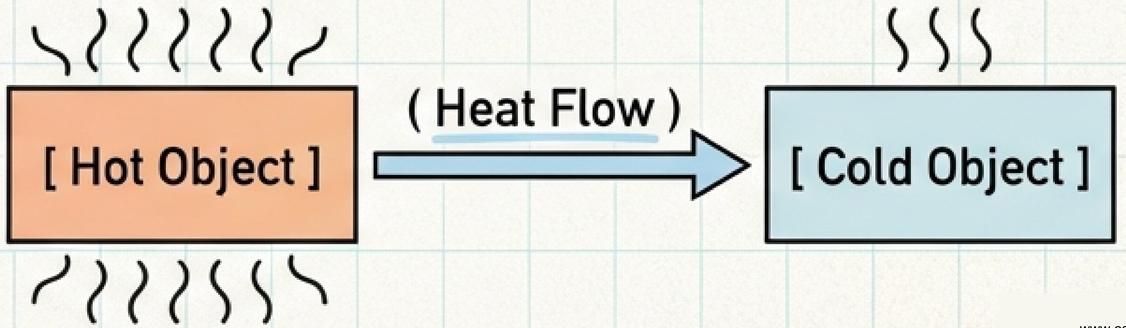
HEAT

Definition: A form of energy that flows.

Remember the rule!

Direction Rule: Flows from a HOTTER object to a COLDER object.

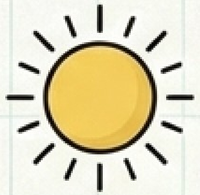
Condition: Flow occurs due to a temperature difference.



FORMS OF ENERGY

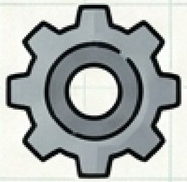
1. **Heat Energy:** Energy due to temperature.

2. **Light Energy:** Energy derived from the Sun.

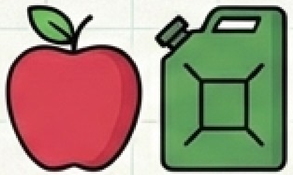


3. **Electrical Energy:** Energy from electric current.

4. **Mechanical Energy:** Energy related to motion and position.



5. **Chemical Energy:** Energy stored in fuels and food.



Remember: Energy can transform from one form to another.

TEMPERATURE AND MEASUREMENT

DEFINITION

The measure of how hot or cold an object is.

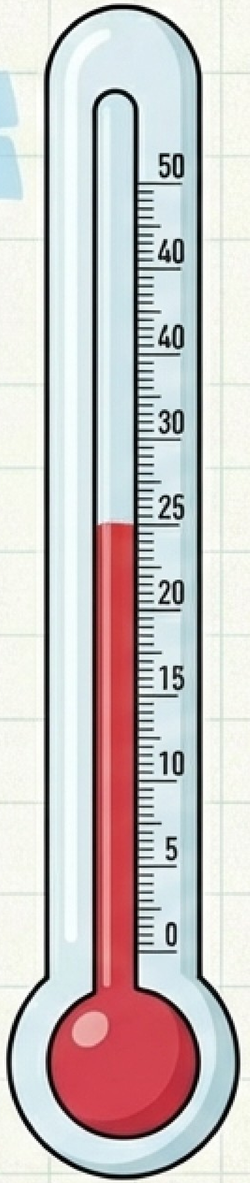
THE TOOL

Measured using a thermometer.

THE SCALE

Recorded in degrees Celsius (°C).

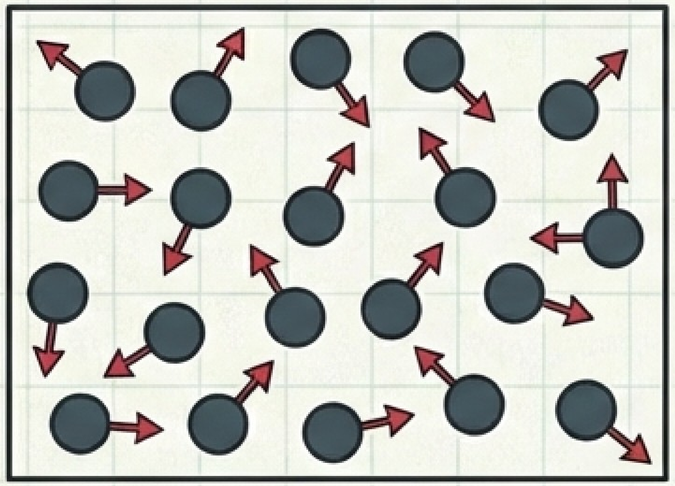
Remember the scale!



EFFECTS OF HEAT ON MATTER

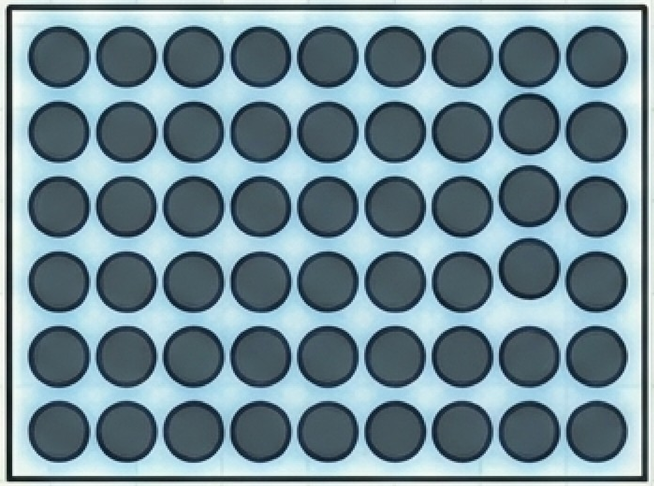
Expansion

Action: Heating →
Result: Most substances expand.



Contraction

Action: Cooling →
Result: Substances contract.



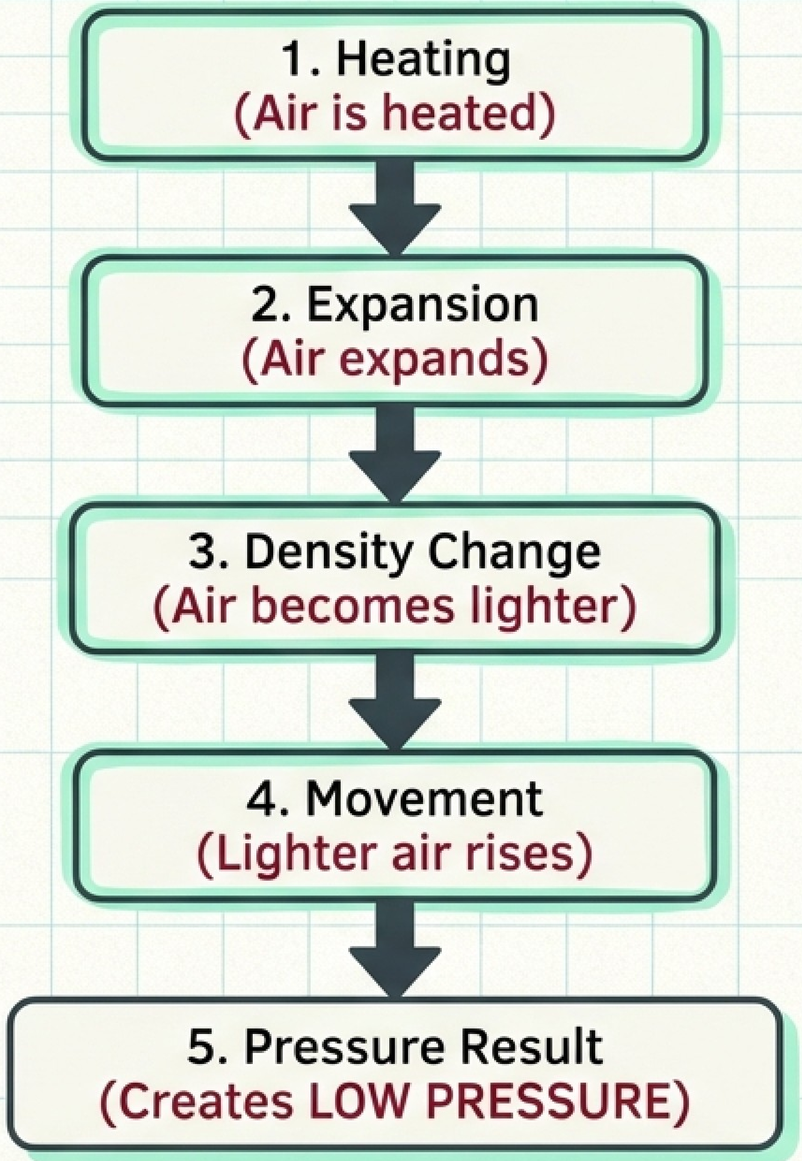
Change of State

Solid → Liquid:
Defined as Melting.

Liquid → Gas:
Defined as Evaporation.

Important! This also applies to gases!

TEMPERATURE EFFECT ON AIR

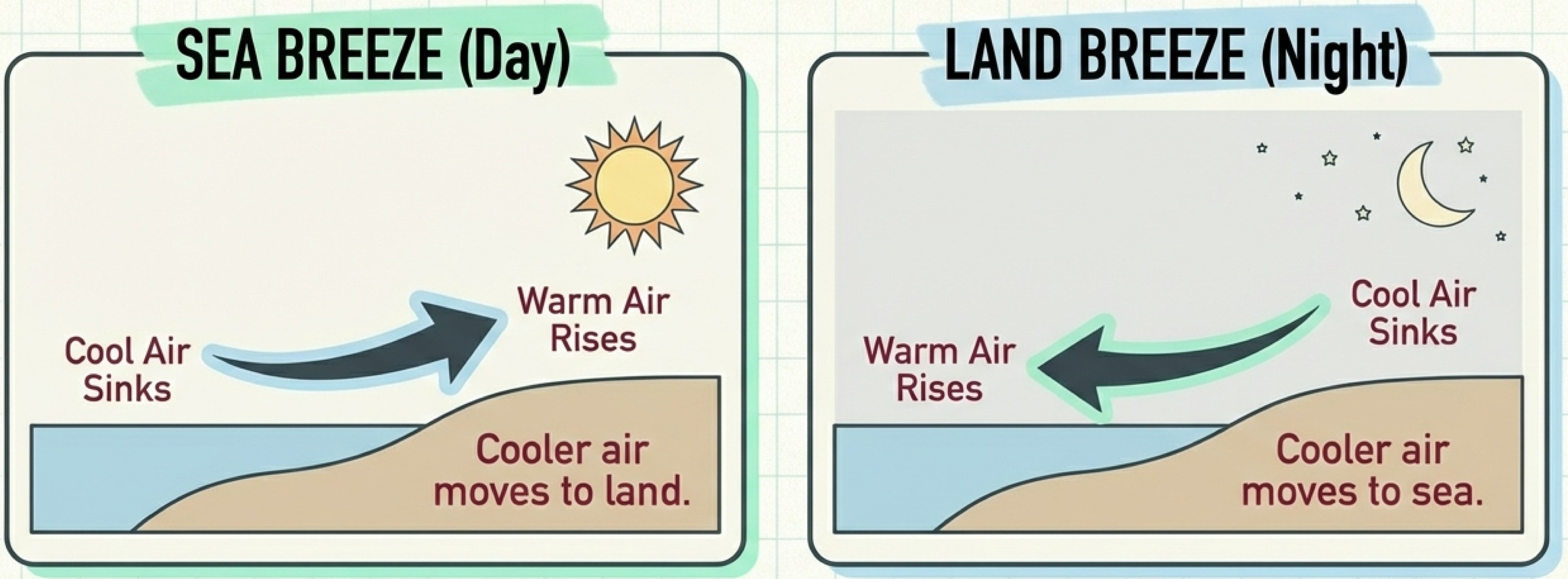


Key Concept!

The Inverse: Cool air air is heavier –> It sinks -> Creates HIGH PRESSURE.

Weather Patterns: Wind Formation

Case Study: Coastal Breezes

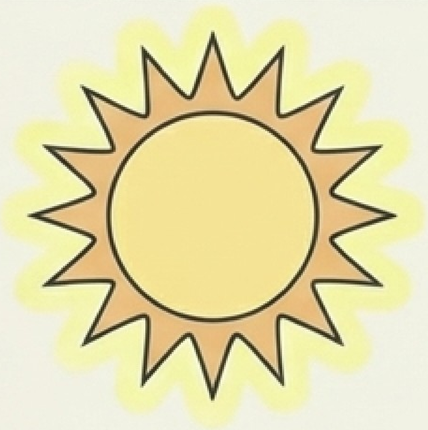


Core Concept: Uneven heating causes air movement.

Sources of Heat Energy

1. THE SUN

The main source of heat energy for the Earth.



2. BURNING FUELS

Chemical energy released from coal, petrol, and diesel.

3. ELECTRICITY

Used in heaters and appliances.

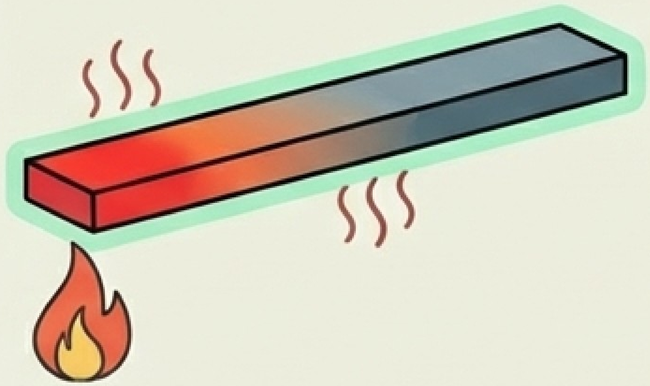
4. FRICTION

Heat generated by motion, such as rubbing hands together.

Modes of Heat Transfer

CONDUCTION

Occurs through SOLIDS.



Heat transfer via direct contact.

CONVECTION

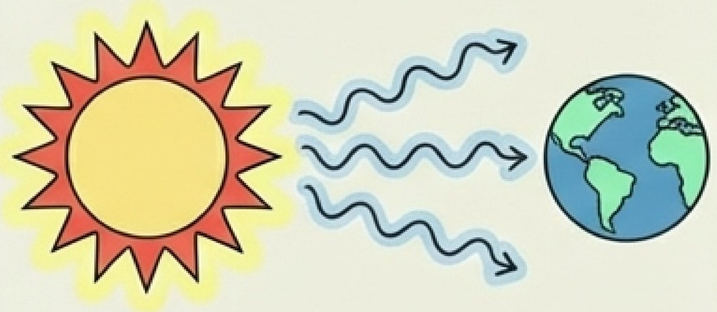
Occurs through FLUIDS (Liquids & Gases).

Fluid movement carries heat.

RADIATION

Occurs through EMPTY SPACE.

Travels from Sun to Earth.



No medium required.

Core Concept: Heat moves in different ways depending on the medium.

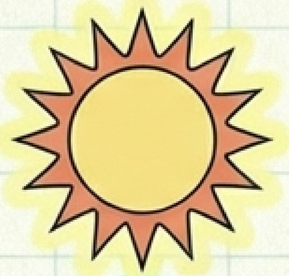
Heat and the Environment: Essential Systems

Solar heat is the engine that drives planetary systems.

Water Cycle

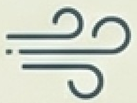
Powered by solar heat (Evaporation).

Clouds & Rain!



Wind Formation

Driven by uneven heating of air.



Air currents & storms.

Climate Patterns

Established by global heat distribution.

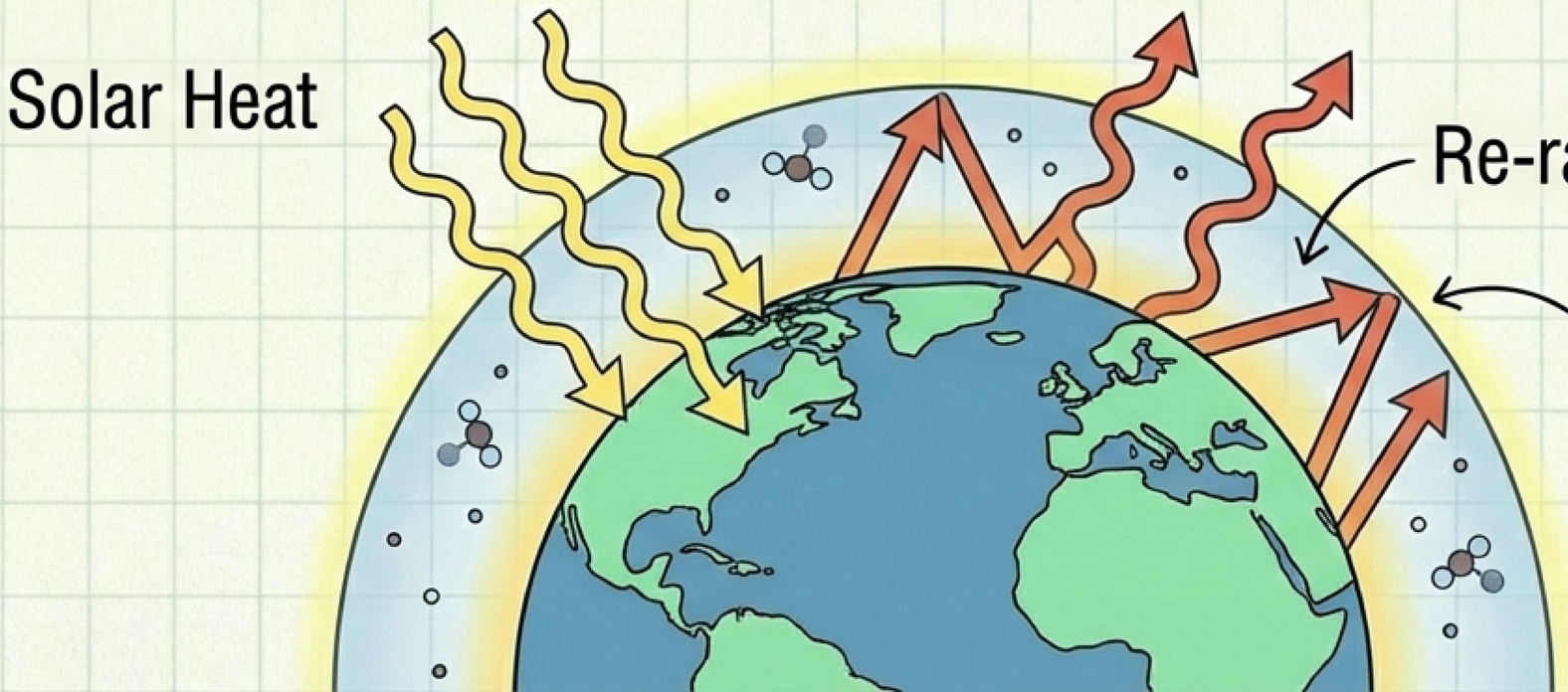
Polar vs. Tropical zones.

⚠ Environmental Impact: Global Warming

The Problem: Excess heat is being trapped in the atmosphere.

The Cause: The presence of greenhouse gases.

The Result: A global rise in temperature known as **GLOBAL WARMING.**



Knowledge Check: Quick Quiz

Q1: Heat flows from:

a) Cold to hot
b) Hot to cold ✓
c) Same temperature
d) None

Q2: Warm air rises because it is:

a) Heavier
b) Lighter ✓
c) Colder
d) Denser

Q3: Heat from the Sun reaches Earth by:

a) Conduction
b) Convection
c) Radiation ✓
d) Friction

Self-assessment! Check your understanding.

Answers highlighted.

Knowledge Check: Answer Key

Answer 1:

b) Hot to cold ✓

Why? Heat flows due to temperature difference.

Answer 2:

b) Lighter ✓

Why? Heated air expands and becomes less dense.

Answer 3:

c) Radiation ✓

Why? Travels through the empty space of the vacuum.

Review your notes if you got any wrong!

Great job! Keep learning!

Revision Summary

'Heat is a flowing form of energy that shapes our environment—from the molecular movement in solids to the global patterns of our climate.'

End of Revision Notes