

Activity 1

ESL/ELD Stage 1+2: Gr. 7 Science Strand 3: Heat (Vol.1)



Heat Transfer (page 3)

ESL Organize Data, Stg1 + Stg 2

ELD Organize Data, Stg1 + Stg 2

- 1 writes appropriate responses to few written questions
- 2 writes appropriate responses to some written questions
- 3 writes appropriate responses to most written questions
- 4 writes appropriate responses to all or almost all written questions

- 1 unable to organize information using a graphic organizer
- 2 able to organize some information using a graphic organizer
- 3 able to organize most information using a graphic organizer
- 4 able to organize all information using a graphic organizer

Instructions: Name the type of heat transfer in each example.

Waffle Iron

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does it cook the waffles?

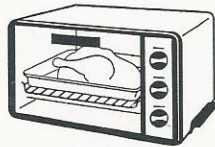


Toaster Oven

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does it cook the chicken?



Rubbing Hands Together

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does the skin feel?



How the Earth is Heated

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does the Earth get heated?

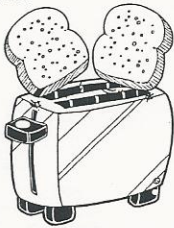


Toaster

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does it toast the bread?



Clothes Iron

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does it iron clothes?



Physical Activity: Running

Type of heat transfer:

- Conduction
- Convection
- Radiation

How do the runners transfer body heat?

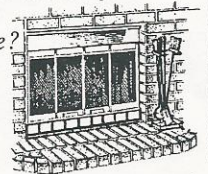


Fire Place

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does the air feel near the fireplace?



Car Tires on a Road

Type of heat transfer:

- Conduction
- Convection
- Radiation

How do the tires feel after a long drive?

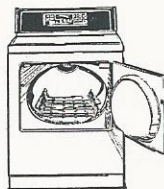


Clothes Dryer

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does it dry clothes?



Hair Dryer

Type of heat transfer:

- Conduction
- Convection
- Radiation

How does it dry hair?

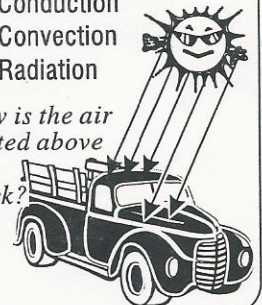


Hot Air Rising From Truck

Type of heat transfer:

- Conduction
- Convection
- Radiation

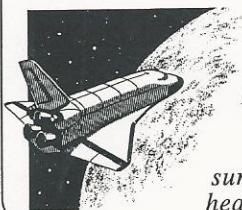
How is the air heated above the truck?



Shuttle's Surface in Space

Type of heat transfer:

- Conduction
- Convection
- Radiation

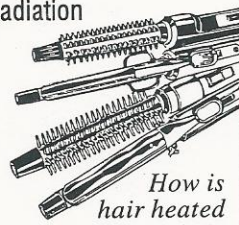


How is the surface heated?

Curling Irons

Type of heat transfer:

- Conduction
- Convection
- Radiation



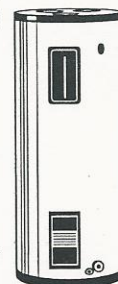
How is hair heated and curled?

Hot Water Heater

Type of heat transfer:

- Conduction
- Convection
- Radiation

How is the water heated?



The Air Above a Fire

Type of heat transfer:

- Conduction
- Convection
- Radiation

How is the air above the fire heated?



Activity 2

ESL/ELD Stage 1+2: Gr. 7 Science Strand 3: Heat (Vol.1)



Learning About Temperature (page 6)

ESL Forms of Writing, Stg1+Stg 2

- 1 rarely uses a variety of forms of writing
- 2 occasionally uses a variety of forms of writing
- 3 often uses a variety of forms of writing
- 4 consistently uses a variety of forms of writing

ELD Forms of Writing, Stg1+Stg 2

- 1 uses a variety of forms of writing with continual guidance
- 2 uses a variety of forms of writing with occasional guidance
- 3 uses a variety of forms of writing with some guidance
- 4 uses a variety of forms of writing with little or no guidance

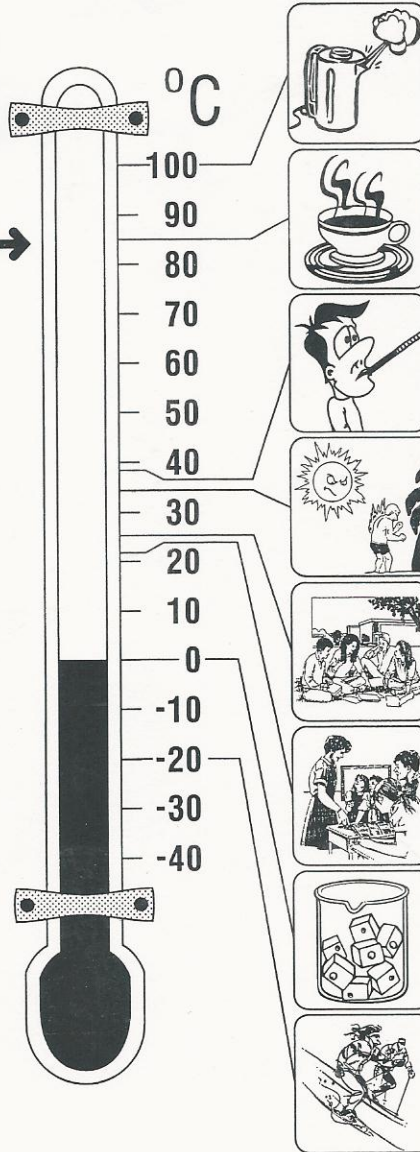
What is temperature?

Temperature is how hot or cold it is.

This is a thermometer →

Instructions:

Use the thermometer to fill in the blanks. →
A thermometer is a thing used to measure temperature in degrees Celsius (°C).



← **Water boils**

The temperature of boiling water is: _____

← **Hot coffee**

The _____ of hot coffee is: _____

← **Body temperature**

The _____ of a body is: _____

← **A hot day**

The temperature on a _____ is: _____

← **A warm day**

The temperature on _____ is: _____

← **Classroom temperature**

The _____ inside a _____ is: _____

← **The temperature when water freezes is:**

Water _____ at: _____

← **A cold day**

The _____ on a _____ is: _____

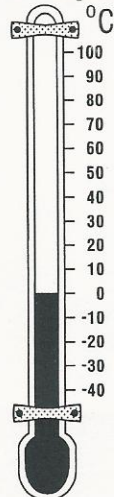
Instructions:

Listen to the teacher, then fill in the blanks. → → →

Teacher led discussion



1 Temperature



Temperature is measured in degrees Celsius (°C). Temperature is recorded in the shade.

Complete the following chart:

- a) water freezes at: _____
- b) water boils at: _____
- c) room temperature: _____
- d) cold winter day: _____
- e) hot summer day: _____
- f) today's temperature: _____
- g) body temperature: _____
- h) air temperature where jet planes fly (10,000 m): _____

Activity 3



ESL/ELD Stage 1+2: Gr. 7 Science Strand 3: Heat (Vol.1)

Learning About Temperature (page 8)

ESL Forms of Writing, Stg1+Stg 2

- 1 rarely uses a variety of forms of writing
- 2 occasionally uses a variety of forms of writing
- 3 often uses a variety of forms of writing
- 4 consistently uses a variety of forms of writing

ELD Forms of Writing, Stg1+Stg 2

- 1 uses a variety of forms of writing with continual guidance
- 2 uses a variety of forms of writing with occasional guidance
- 3 uses a variety of forms of writing with some guidance
- 4 uses a variety of forms of writing with little or no guidance

Instructions: Fill in the blanks using the word list below.

Word list:

- Equator
- South Pole
- North Pole
- very hot
- very cold
- very cold

The temperature at the _____ is _____.

The temperature at the _____ is _____.

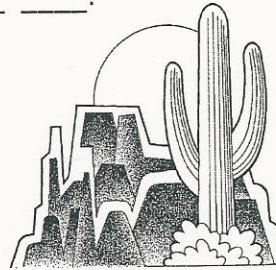
The temperature at the _____ is _____.

Instructions: Fill in the blanks using this word list: very hot, very hot, hot, hot, hot, cold, cold, very cold, very cold

1 The temperature is _____.



2 The temperature is _____.



3 The temperature is _____.



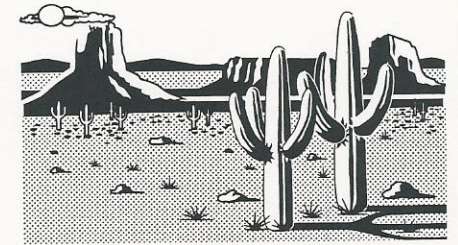
4 The temperature is _____.



5 The temperature is _____.



6 The temperature is _____.



7 The temperature is _____.



8 The temperature is _____.



9 The temperature is _____.



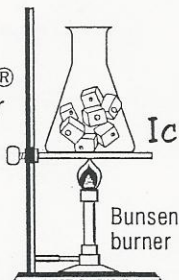


Changes in States of Matter

SOLIDS

Little thermal energy (heat) is stored in a solid

Pyrex® beaker



Ice

Bunsen burner

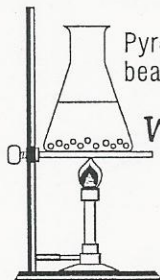
Heat added: melting

Heat removed: freezing

LIQUIDS

More thermal energy (heat) is stored in a liquid

Pyrex® beaker



Water

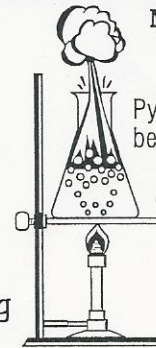
Heat added: boiling

Heat removed: condensing

GASES

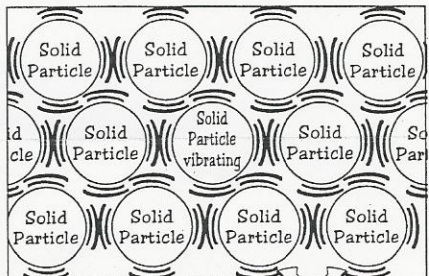
Much thermal energy (heat) is stored in a gas

Pyrex® beaker



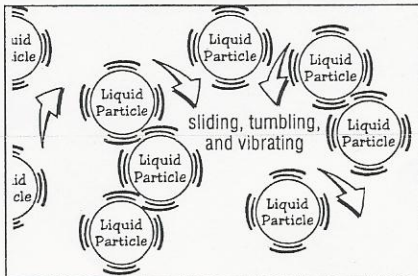
Gas

How the particles look in a solid.



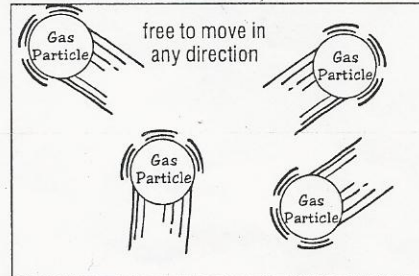
vibrating action

How the particles look in a liquid.



sliding, tumbling, and vibrating

How the particles look in a gas.



free to move in any direction

1. What is volume?

Volume is the space occupied by a solid, gas or liquid.

2. What happens to the volume of a solid when heat is added?

Adding heat to a solid increases particle activity causing its volume to expand slightly.

3. How do particles behave in a solid?

- are close together
- are packed in regular rows
- held together very tightly
- are free to move apart from their position, but they vibrate in their position

4. Does a solid have a defined shape (e.g., square, sphere)?

Yes solids hold their shape.

1. What is volume?

Volume is the space occupied by a solid, gas or liquid.

2. What happens to the volume of a liquid when heat is added?

Adding heat to a liquid increases particle activity causing its volume to expand more than most solids.

3. How do particles behave in a liquid?

- are not arranged in regular rows
- held together loosely
- are free to move apart from their position by sliding, tumbling and vibrating

4. Does a liquid have a defined shape (e.g., square, sphere)?

No - flows into shape of container.

1. What is volume?

Volume is the space occupied by a solid, gas or liquid.

2. What happens to the volume of a gas when heat is added?

Adding heat to a gas increases particle activity causing its volume to expand more than most liquids.

3. How do particles behave in a gas?

- are far apart
- randomly arranged
- not held together
- are free to move apart from their position in any direction and occasionally colliding

4. Does a gas have a defined shape (e.g., square, sphere)?

No - flows into shape of container.

Activity 5

Grade 7 Science and Technology Strand 3: Pure Heat

CLASS EXPERIMENT



The Effect of Heating and Cooling on the Volume of a Solid, a Liquid and a Gas (page 16)

Inquiry and design skills (including skills in the safe use of tools, equipment, and materials)

- 50 - 1 applies few of the required skills and strategies; shows little awareness of safety procedures; uses tools, equipment, and materials correctly only with assistance
- 59% 2 applies some of the required skills and strategies; shows some awareness of safety procedures; uses tools, equipment, and materials correctly with some assistance
- 60 - 3 applies most of the required skills and strategies; usually shows awareness of safety procedures; uses tools, equipment, and materials correctly with occasional assistance
- 69% 4 applies all (or almost all) of the required skills and strategies; consistently shows awareness of safety procedures; uses tools, equipment, and materials correctly with little or no assistance
- 70 - 3 applies most of the required skills and strategies; usually shows awareness of safety procedures; uses tools, equipment, and materials correctly with occasional assistance
- 79% 4 applies all (or almost all) of the required skills and strategies; consistently shows awareness of safety procedures; uses tools, equipment, and materials correctly with little or no assistance
- 80 - 4 applies all (or almost all) of the required skills and strategies; consistently shows awareness of safety procedures; uses tools, equipment, and materials correctly with little or no assistance
- 100% 4 applies all (or almost all) of the required skills and strategies; consistently shows awareness of safety procedures; uses tools, equipment, and materials correctly with little or no assistance

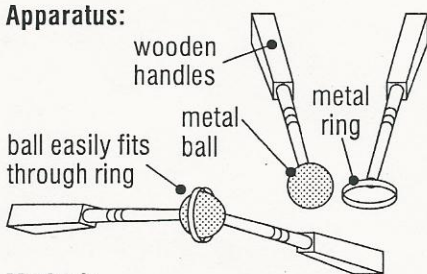
SOLIDS

Experiment: to heat and cool a solid.

Purpose: to describe the effect of heating/cooling on the volume of a solid.

Your Hypothesis:

Apparatus:



Method:

- 1) Pass the metal ball through the ring.
- 2) Heat the metal ball over a candle for three to five minutes. Attempt to pass the metal ball through the ring.
- 3) Let ball cool, try to pass through ring.

Observations: (draw your observations)

Conclusion:

- 1) Why did the heated ball not fit through the ring? (see page 15)

- 2) Why did the cooled metal ball pass through the ring?

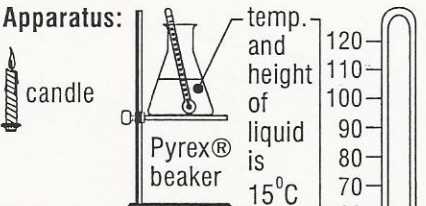
LIQUIDS

Experiment: to heat and cool a liquid.

Purpose: to describe the effect of heating/cooling on the volume of a liquid.

Your Hypothesis:

Apparatus:



Method:

- 1) Place thermometer in cool water, record height (temperature) of liquid in thermometer.
- 2) Heat water over a candle.
- 3) Record height (temperature) of liquid in thermometer.

Observations: (draw your observations)

Conclusion:

- 1) Why did the thermometer's liquid rise when heated? (see page 15)

- 2) Why did the thermometer's liquid fall when cooled?

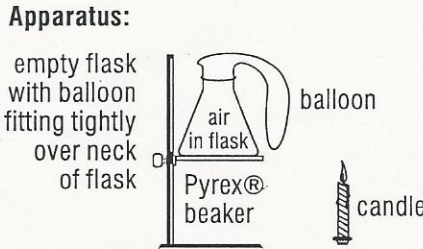
GASES

Experiment: to heat and cool a gas.

Purpose: to describe the effect of heating/cooling on the volume of a gas.

Your Hypothesis:

Apparatus:



Method:

- 1) Attach a balloon over an empty flask.
- 2) Heat the flask over a candle for three to five minutes.
- 3) Remove the candle, let the flask cool, observe balloon.

Observations: (draw your observations)

Conclusion:

- 1) Why did the balloon expand when the flask was heated? (see page 15)

- 2) Why did the cooled flask cause the balloon to shrink in size?
