

Name: KEY

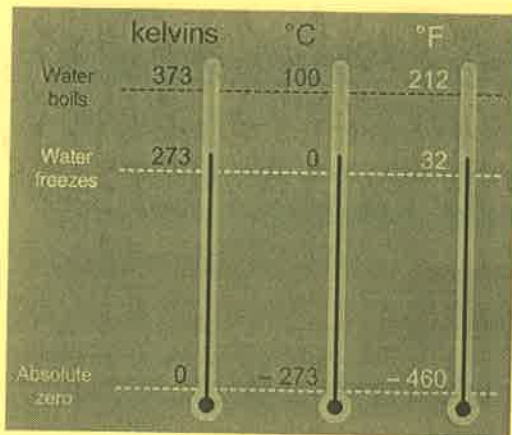
Chapter 6: Thermal Energy, Heat, Temperature

You should be familiar with the following vocabulary words: *temperature, heat, Celsius Scale, Fahrenheit scale, Kelvin Scale, absolute zero, convection, conduction, radiation, convection current, thermal energy, insulator, conductor, thermal expansion*

Use the words above to fill in the following statements:

- 1) The total energy of all particles in an object is called thermal energy.
- 2) The temperature scale used in most of the world is called the Celsius scale.
- 3) Scientists use these two temperature scales most often: Celsius scale
and Kelvin scale.
- 4) Heat is the transfer of thermal energy from warm to cold.
- 5) Temperature is the average kinetic energy of the particles in a substance.
- 6) When there is an absence of energy, this is called absolute zero.
- 7) Heat is transferred directly from one particle of matter to another by the process of conduction.
- 8) Heat that is transferred by the movement of currents within a fluid is called convection.
- 9) Radiation is the transfer of energy by electromagnetic waves.
- 10) A circular flow of warmer fluid and cooler fluid is called a(n) convection current.
- 11) To keep food warm or cool, coolers are made out of materials that are insulators.
- 12) Conductors allow heat to flow easily.
- 13) When particles spread out due to an increase of thermal energy, this is called thermal expansion.
- 14) Heat always flows from warmer objects to cooler objects.

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15a) Which is a higher temperature:

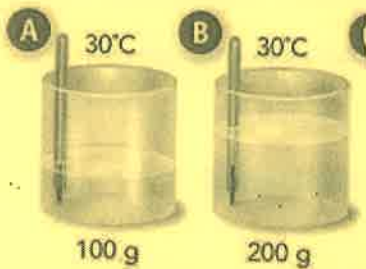
0 K or 0°C? 0°C

b) Which is a higher temperature: 0°C

or 0°F? 0°C

16) Compare and contrast what happens to substances when they are heated and cooled (think about density and their particles)

When substances are heated, their particles expand causing the substance to be less dense. When substances are cooled, they contract + become more dense



17a) Which container to the left has more thermal energy?

Why?

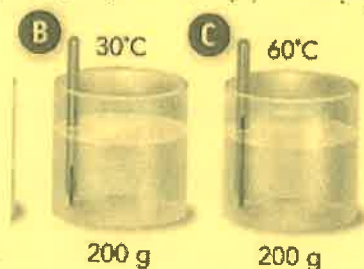
B because there are more particles.

(temp is the same)

b) Which container to the right has more thermal energy? Why?

C because it has a higher temperature.

(# of particles the same)



Identify the following as convection, conduction, or radiation.

18a) Water boiling on a stove convection

b) A lizard basking in the sun radiation

c) Putting ice on a sprained ankle conduction

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19) Explain how a lava lamp works.

The fluid near the heat source gets warm, expands, and becomes less dense. It floats to the top where it cools, contracts, becomes more dense, and sinks to the bottom. This is convection.

20) Describe the difference in how land and water heat and cool (think back to the sand/water lab).

Land heats more quickly & cools more quickly. It is ~~not~~ a conductor. Water heats more slowly and stays warmer longer.

21) Explain why a coat acts as a thermal insulator.

A coat does not allow heat from your body to escape to the outside. It blocks the flow of heat.

Use the formulas below to convert between Celsius and Fahrenheit.

$$F = \frac{9}{5}C + 32$$

$$C = \frac{5}{9}(F - 32)$$

Location	Degree Celsius	Degree Fahrenheit	
Death Valley, CA	56.7	134	$\frac{5}{9}(134-32)$
Athens, Greece	48	118.4	$\frac{9}{5}(48)+32$
Antarctica	-89.4	-129	$\frac{5}{9}(-129-32)$
Tuguegarao, Philippines	42.2	107.96	$\frac{9}{5}(42.2)+32$
Yukon, Canada	-63	-81.4	$\frac{9}{5}(-63)+32$