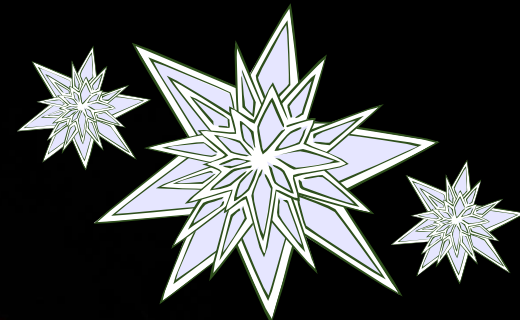
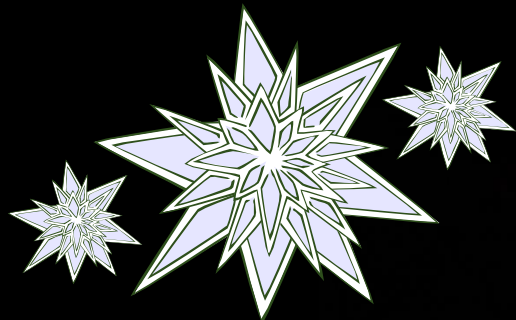


# Jumpstart

- 1) Get the note taking sheet from my front desk.
- 2) Glue it in and get the target and KCQ boxes set up on p.199

# Introduction to Thermochemistry



#1

# Thermochemistry

The study of **ENERGY TRANSFER** in the form of heat during chemical reactions and physical changes.

**Deals with:**

**energy, temperature, heat**

#2

# What is energy?

The ability to do **WORK**

## **Potential Energy:**

Stored energy DUE TO position or  
*composition*

## **Kinetic Energy:**

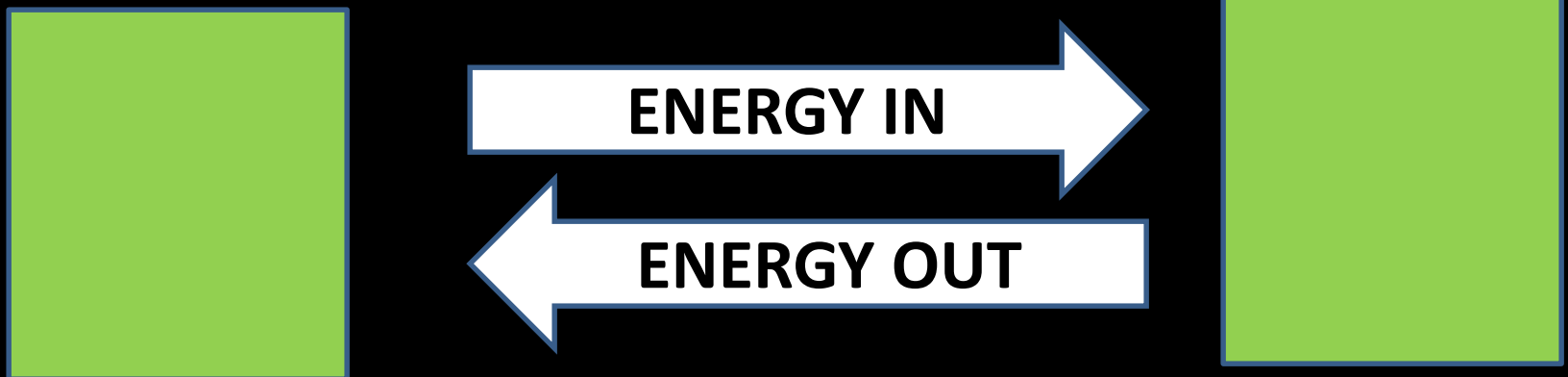
Energy DUE TO motion

#3

*1<sup>st</sup> Law of Thermodynamics is just like the Law of Conservation of Mass!*

You cannot create or destroy energy.

**If something loses energy, something else has to gain it!**



# *Law of Conservation of Energy and Law of Conservation of Mass*

#3

Energy and Mass are Related!

$$E=mc^2$$

**you can convert between  
energy and mass!**

#4

# Temperature vs. Heat

## Temperature:

A measure of molecular movement

***Deals with: only movement***

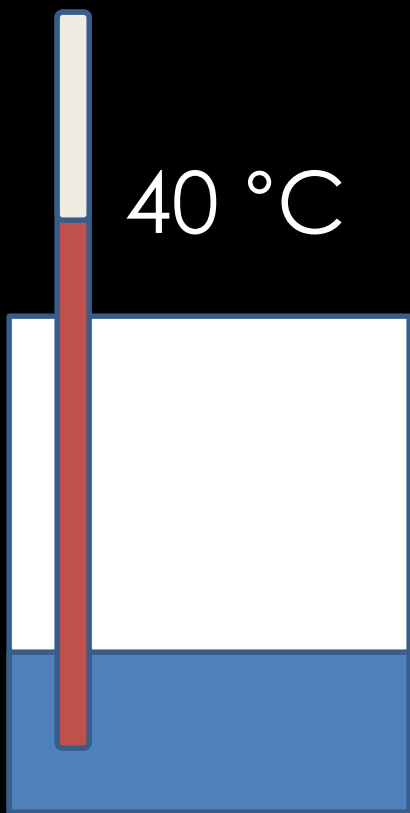
## Heat:

Energy that can be transferred due to the molecular movement.

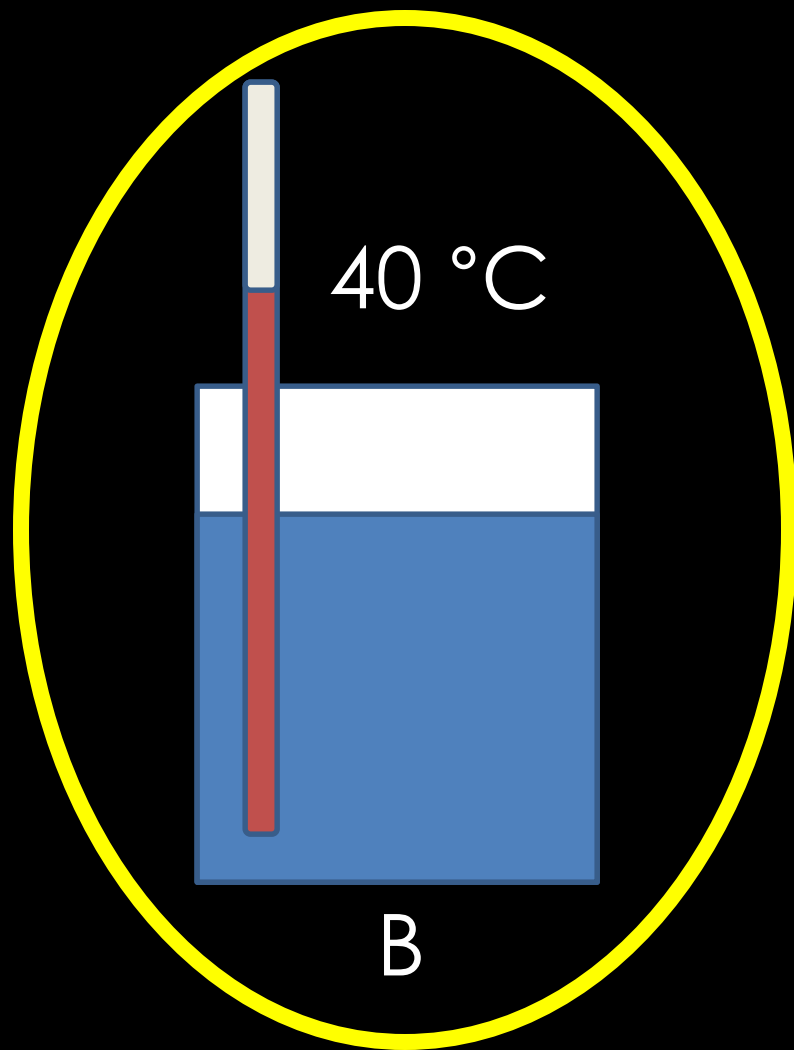
***Deals with: movement AND the amount and type of molecules***

#5

Which has more *heat*?



A

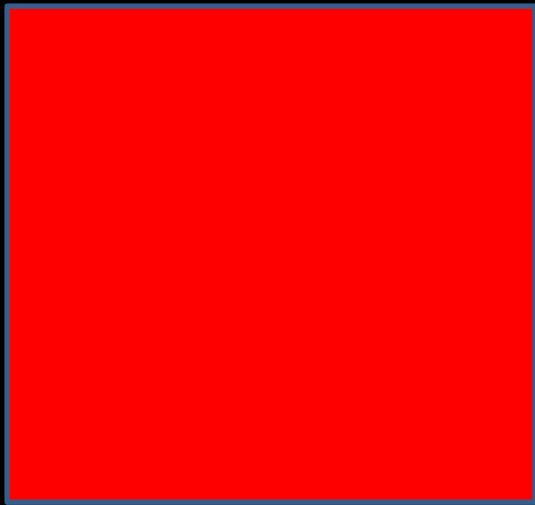


B



Which way does heat flow?

#6



Hot

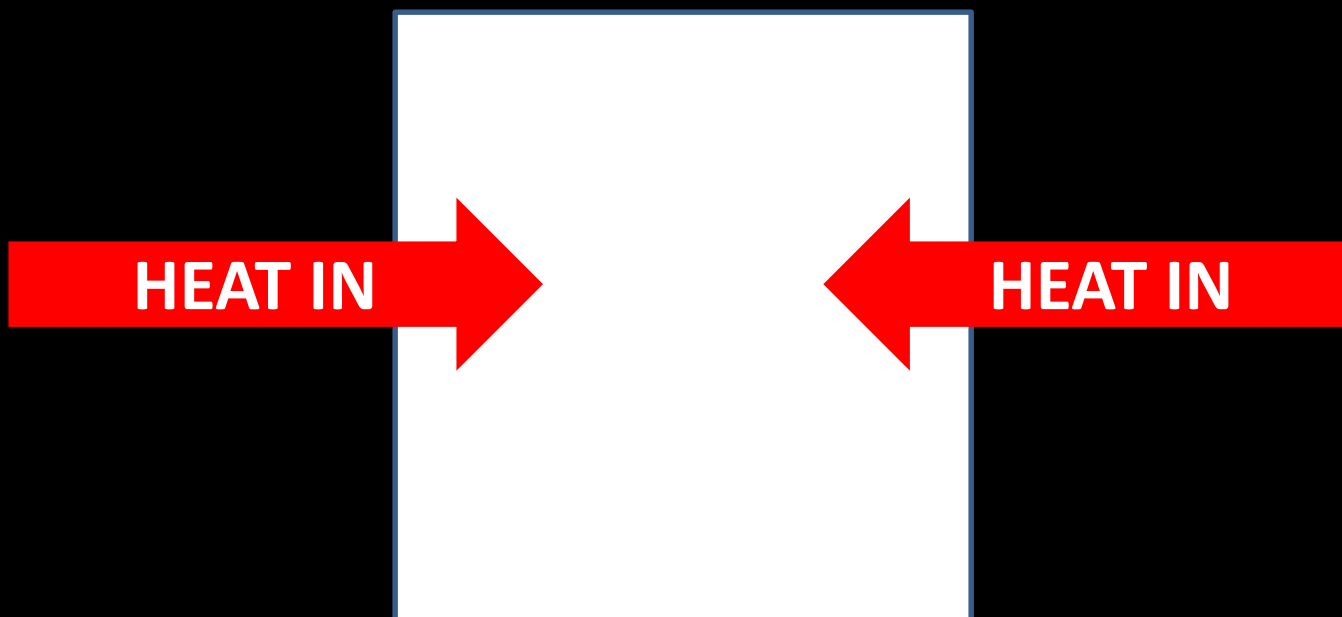


Cold

#7

# Endothermic

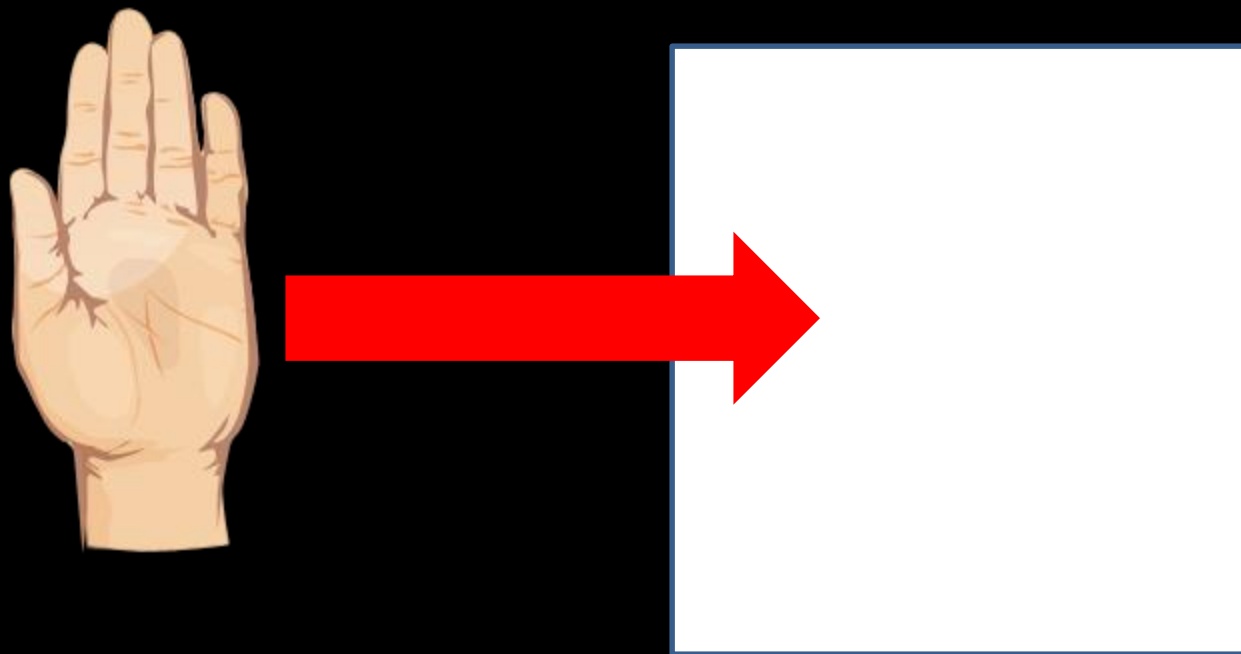
When SYSTEM (reaction) **ABSORBS HEAT**



#7

*What do you feel???*

When a SYSTEM (reaction) **ABSORBS HEAT**  
**FROM YOU** (you are the surroundings)

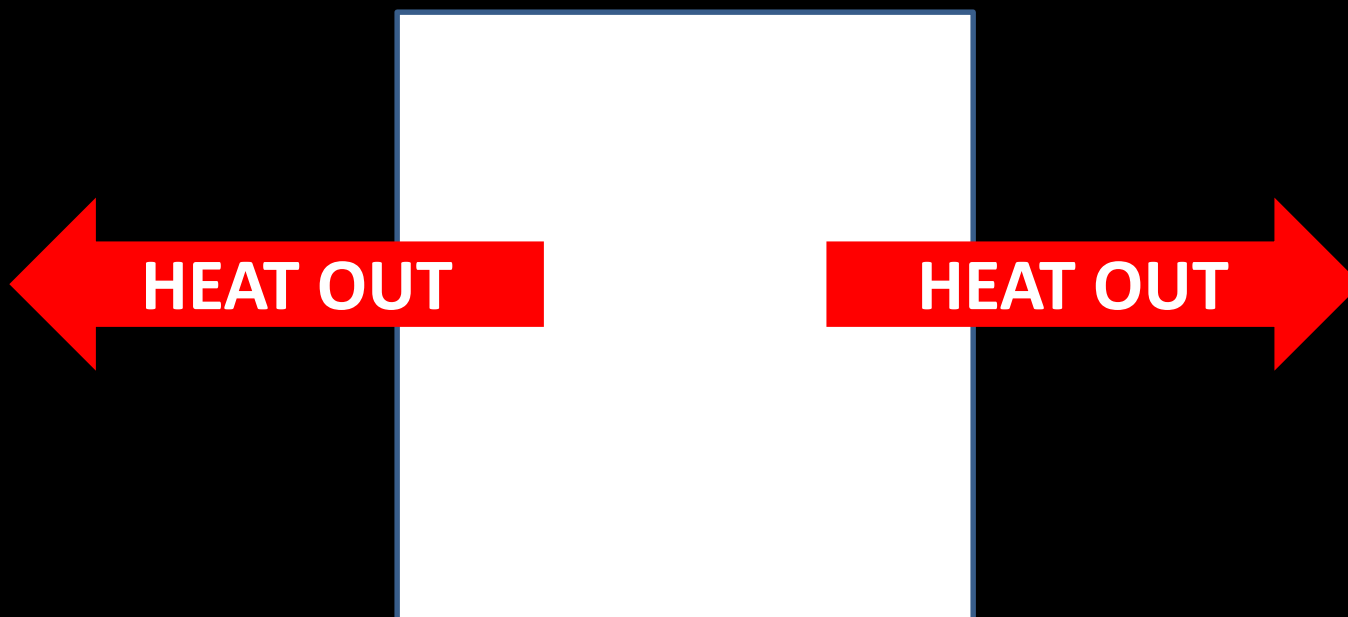


**YOU FEEL COLD!!!!!!**

#8

# Exothermic

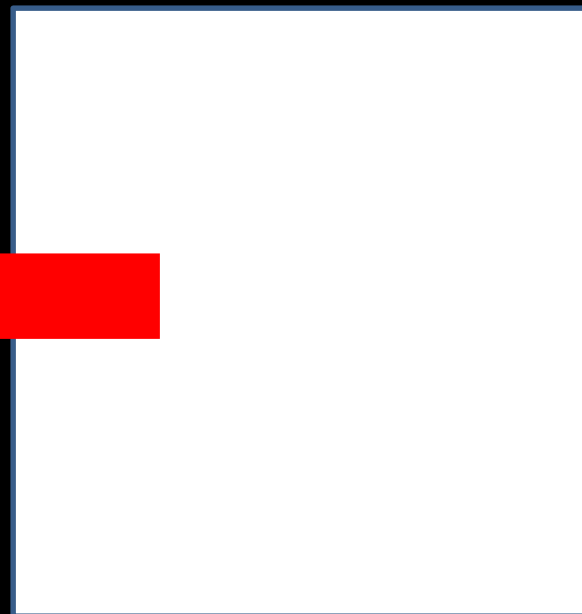
When a SYSTEM (reaction) **RELEASES HEAT**



#8

*What do you feel???*

When a SYSTEM (reaction) **RELEASES HEAT**  
**TOWARDS YOU** (you are the surroundings)



**YOU FEEL HOT!!!!!!**

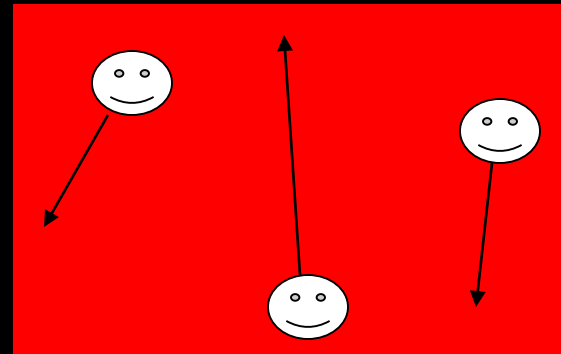
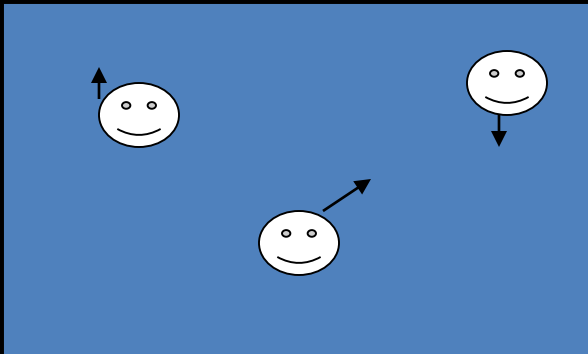
Hot or Cold ALL  
depends on  
PERSPECTIVE!!!

Yours or the reactions?

#9

# Temperature

- Average amount of energy in motion
  - Measured with a thermometer



Hotter → higher temp → more motion  
Colder → lower temp → less motion

#9

# Which unit for temperature?

## Fahrenheit

Too annoying to use! Forget about it!

## Celsius

Usually used in science class.

Easy to remember freezing and boiling point.

## Kelvin

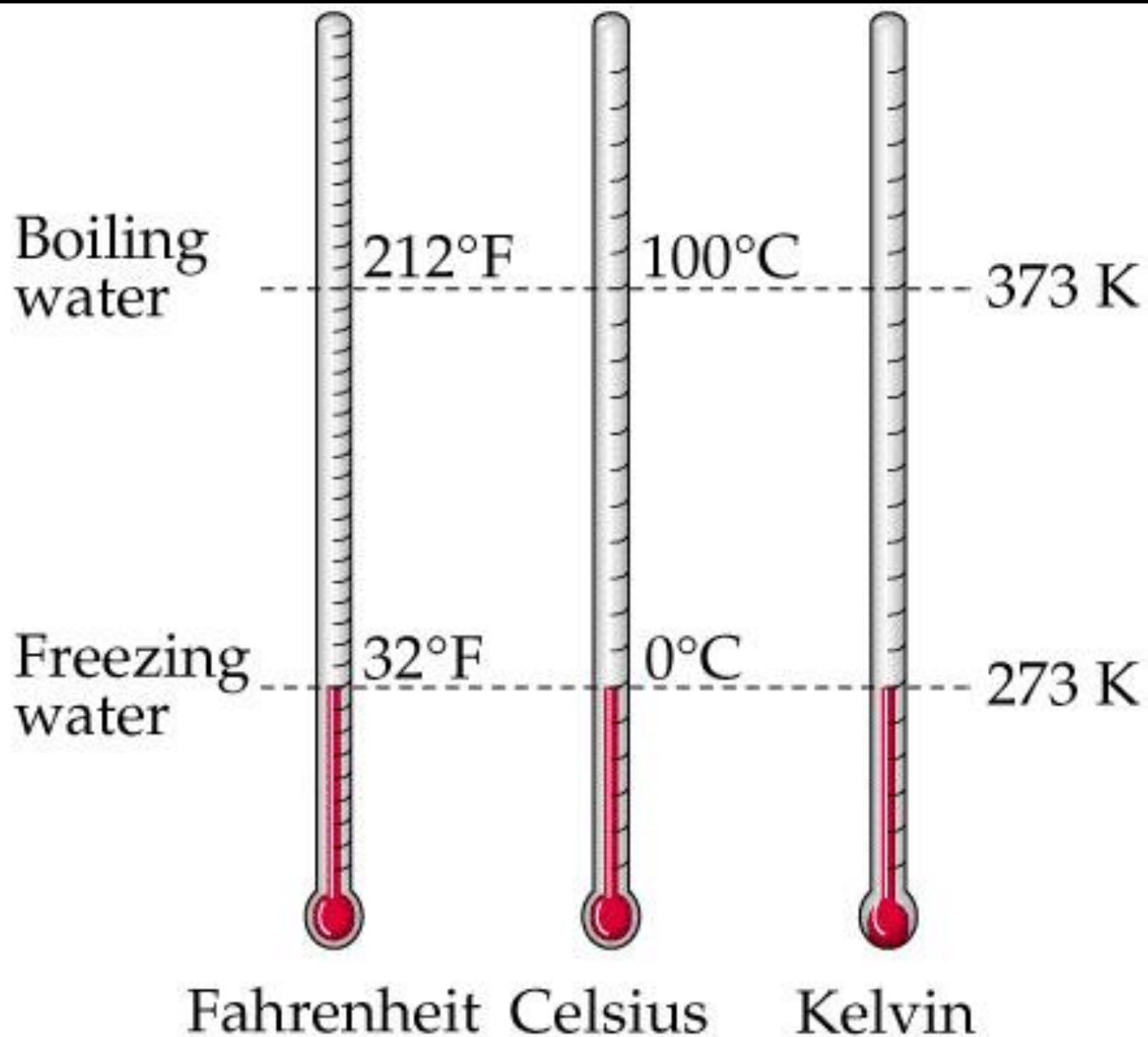
An “absolute” temperature scale.

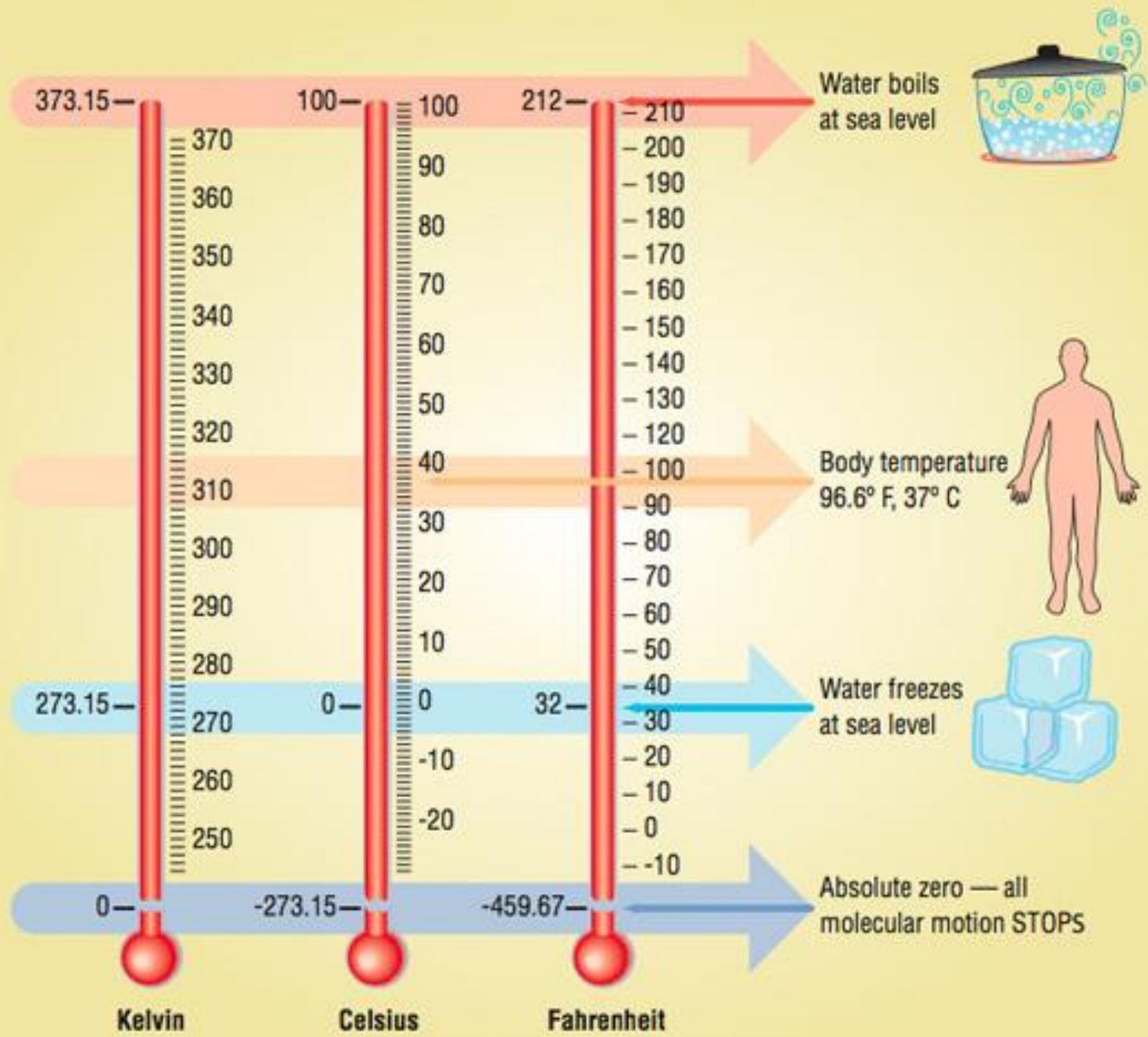
0 K means NO molecular motion!

“Zero means zero!”

Used for some specific calculations







#9

*Converting  
between C and K*

$$K = ^{\circ}C + 273$$

#10

# Practice!

1)  $45\text{ }^{\circ}\text{C} \rightarrow \text{K}$

2)  $-20\text{ }^{\circ}\text{C} \rightarrow \text{K}$

3)  $350\text{ K} \rightarrow\text{ }^{\circ}\text{C}$

4)  $125\text{ K} \rightarrow\text{ }^{\circ}\text{C}$

#10

# Practice!

1)  $45\text{ }^{\circ}\text{C} \rightarrow \text{K} = 318\text{ K}$

2)  $-20\text{ }^{\circ}\text{C} \rightarrow \text{K} = 253\text{ K}$

3)  $350\text{ K} \rightarrow ^{\circ}\text{C} = 77\text{ }^{\circ}\text{C}$

4)  $125\text{ K} \rightarrow ^{\circ}\text{C} = -148\text{ }^{\circ}\text{C}$