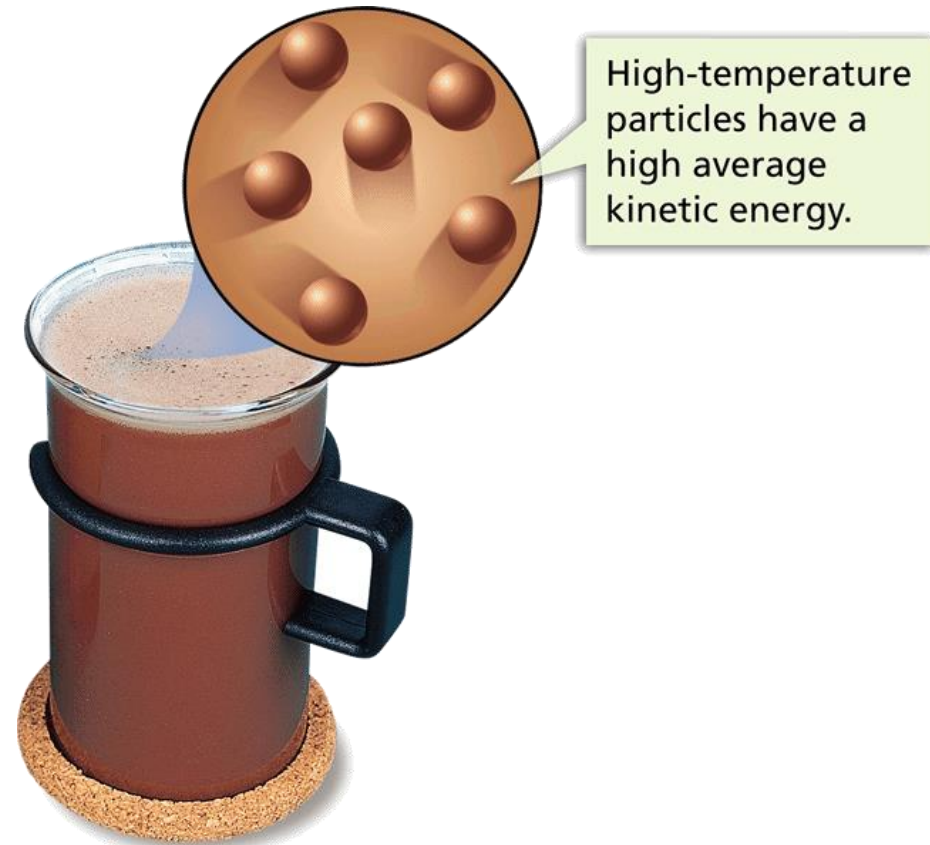
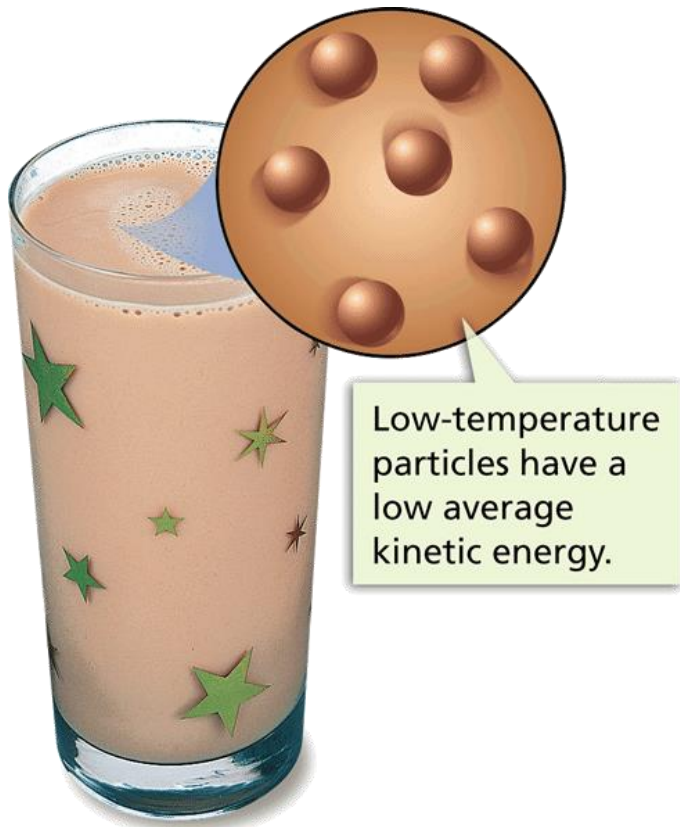


# Heat, Temperature and Conduction

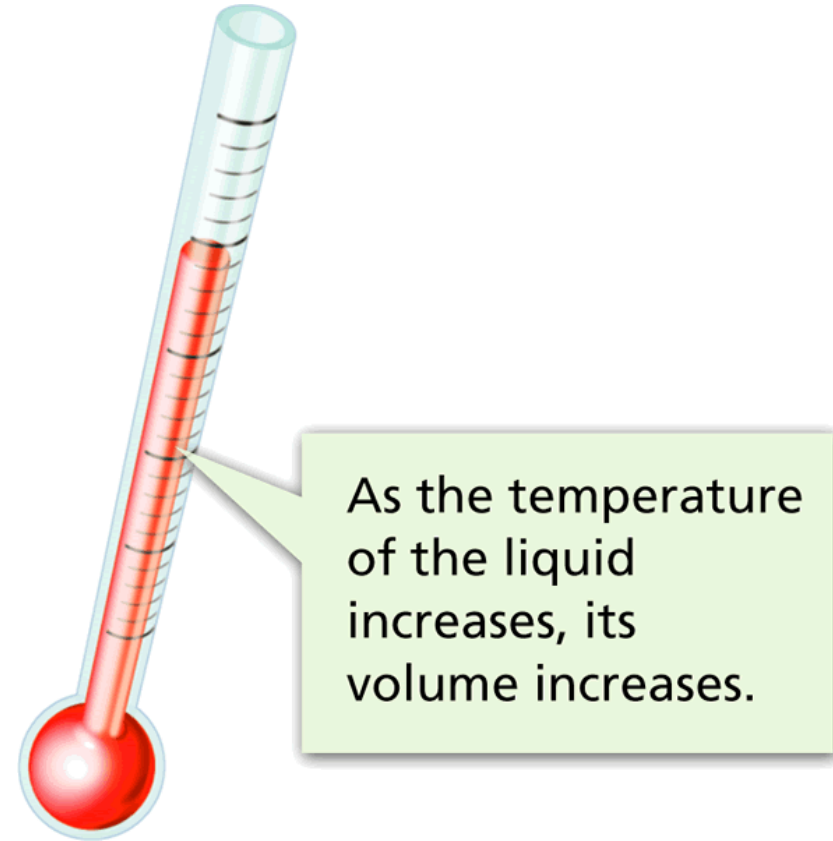
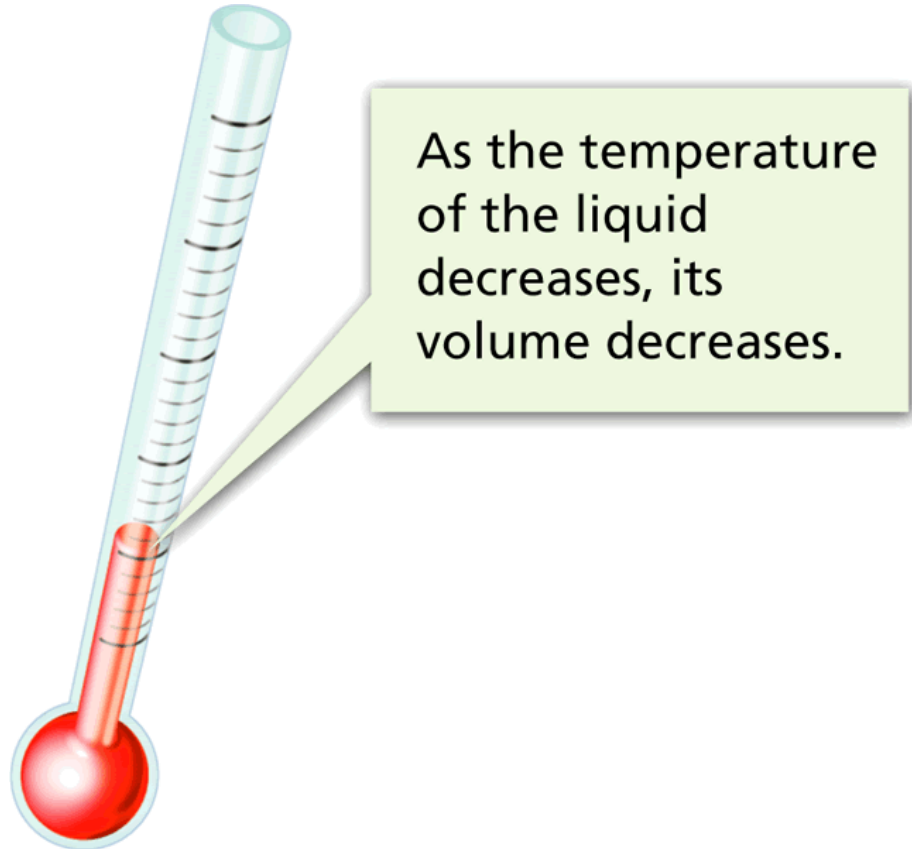
# Temperature

- Temperature is a measure of the average kinetic energy of the individual particles in matter.



# Temperature

- Temperature changes cause the level of the liquid inside a thermometer to rise and fall.



# Thermal Energy

**Thermal Energy**

Total energy of all  
particles in an object

Joules

# Heat

- **Heat** = Thermal energy that is transferred from matter at a higher temperature to matter at a lower temperature.
  - **Conduction** = Type of thermal energy transfer by collision of particles



# Thermal Energy Transfer

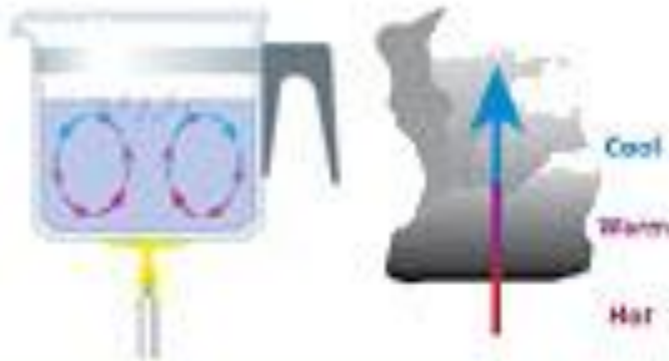
## Conduction

Energy is transferred by direct contact



## Convection

Energy is transferred by the mass motion of molecules



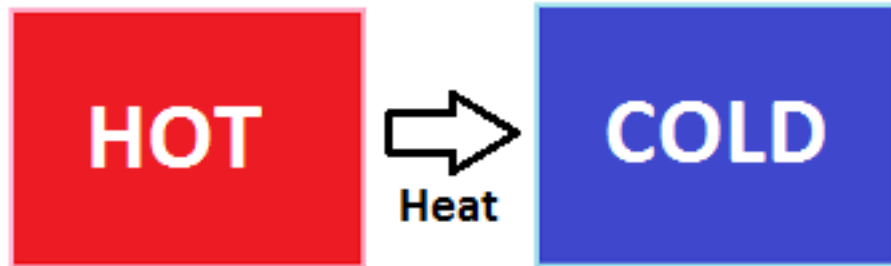
## Radiation

Energy is transferred by electromagnetic radiation

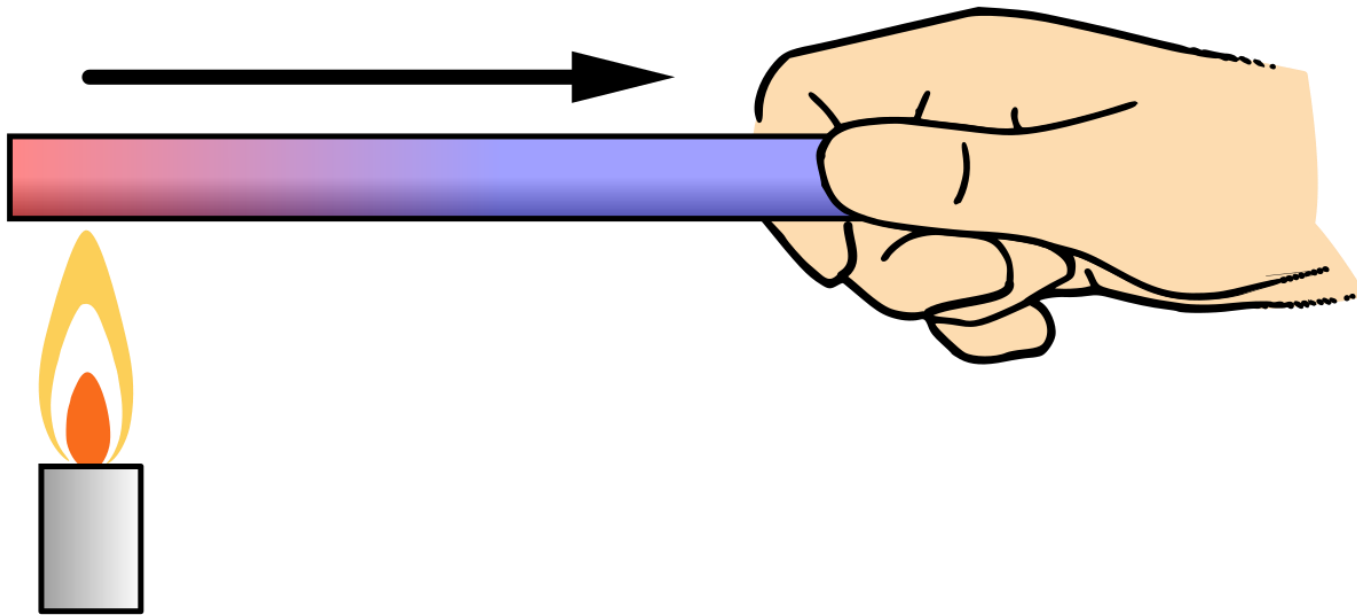
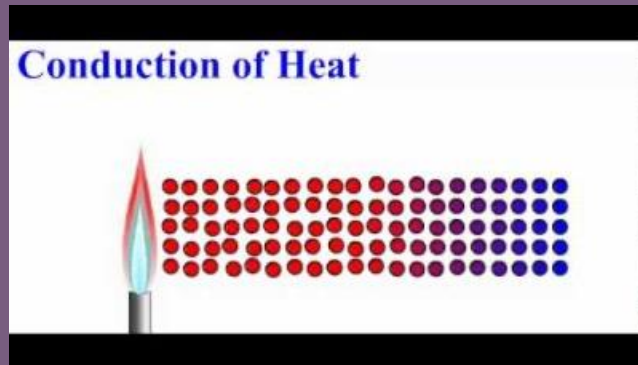


# Heat Moves One Way

- If two objects have different temperatures, heat will flow from the warmer object to the colder one.



# Conduction



- Conduction = The transfer of heat from one particle of matter to another.

- [https://www.fossweb.com/delegate/ssi-wdf-ucm-webContent/Contribution%20Folders/FOSS/multimedia\\_ms\\_1E/ChemicalInteractions/collision/collision.html5.html](https://www.fossweb.com/delegate/ssi-wdf-ucm-webContent/Contribution%20Folders/FOSS/multimedia_ms_1E/ChemicalInteractions/collision/collision.html5.html)

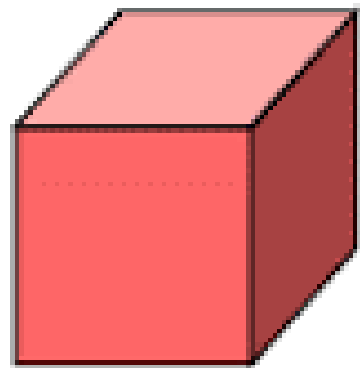
- <https://www.youtube.com/watch?v=qW59Y9IJs08>



# Particle Collision Transfers Kinetic Energy

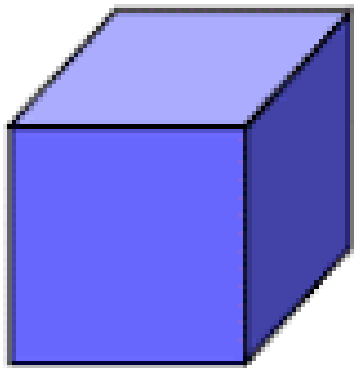


# Conduction



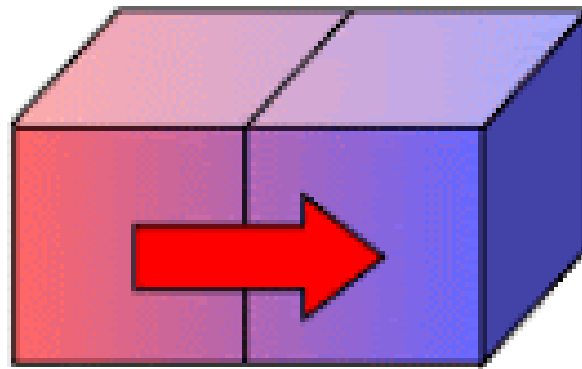
A

(a)



B

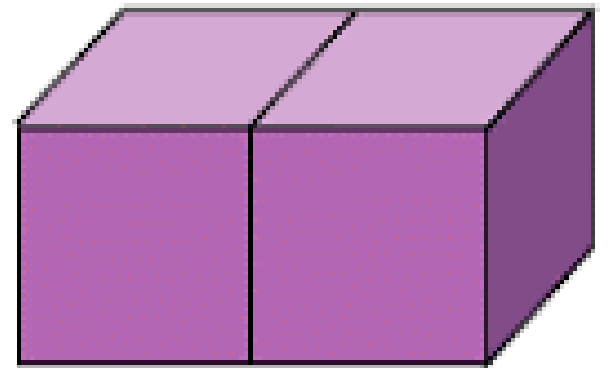
(b)



A

B

(c)

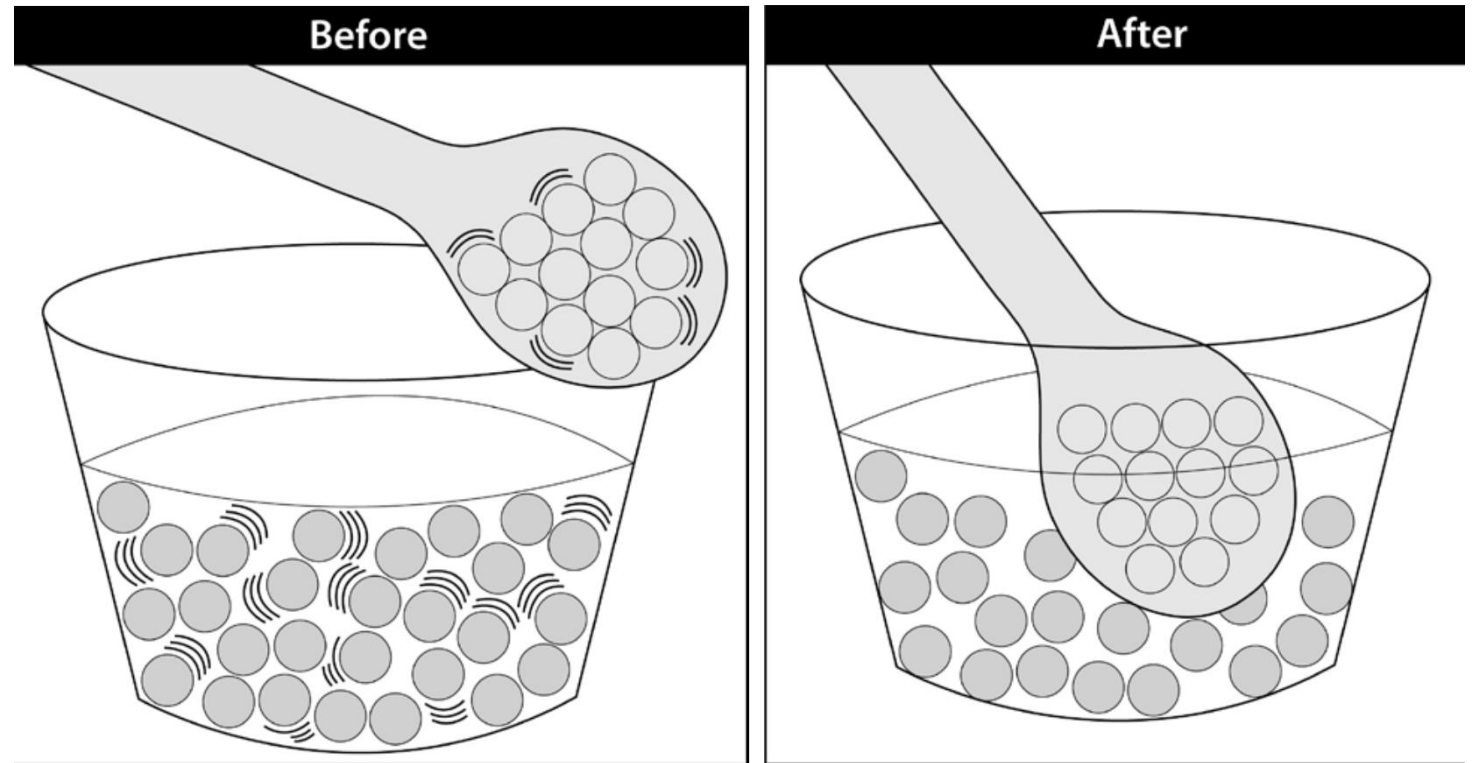


A

B

# Room Temperature Spoon in Hot Water

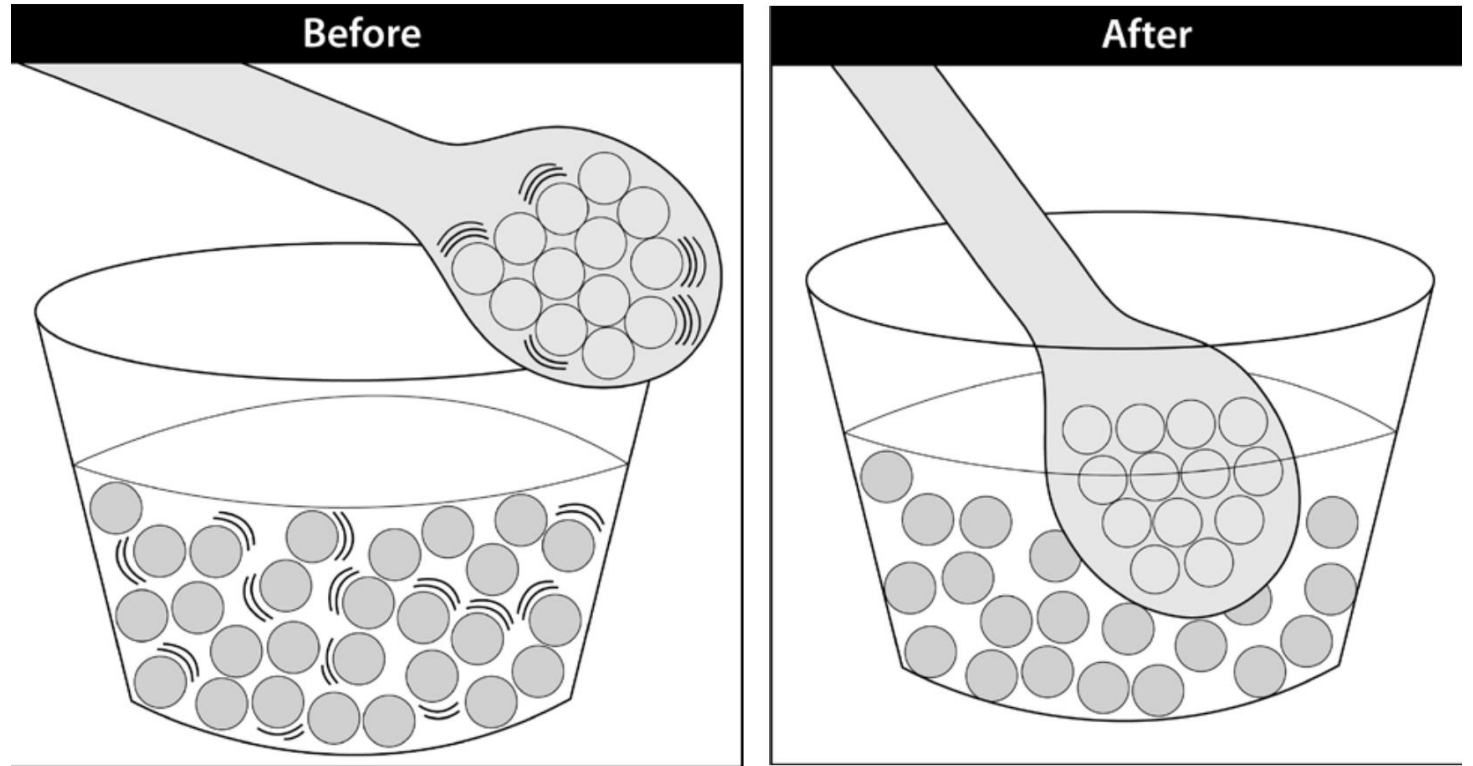
- Before
  - **Water hotter than spoon**
- After
  - How should we draw the motion lines?



[https://www.middleschoolchemistry.com/h  
tml5\\_animations/heated\\_spoon/](https://www.middleschoolchemistry.com/html5_animations/heated_spoon/)

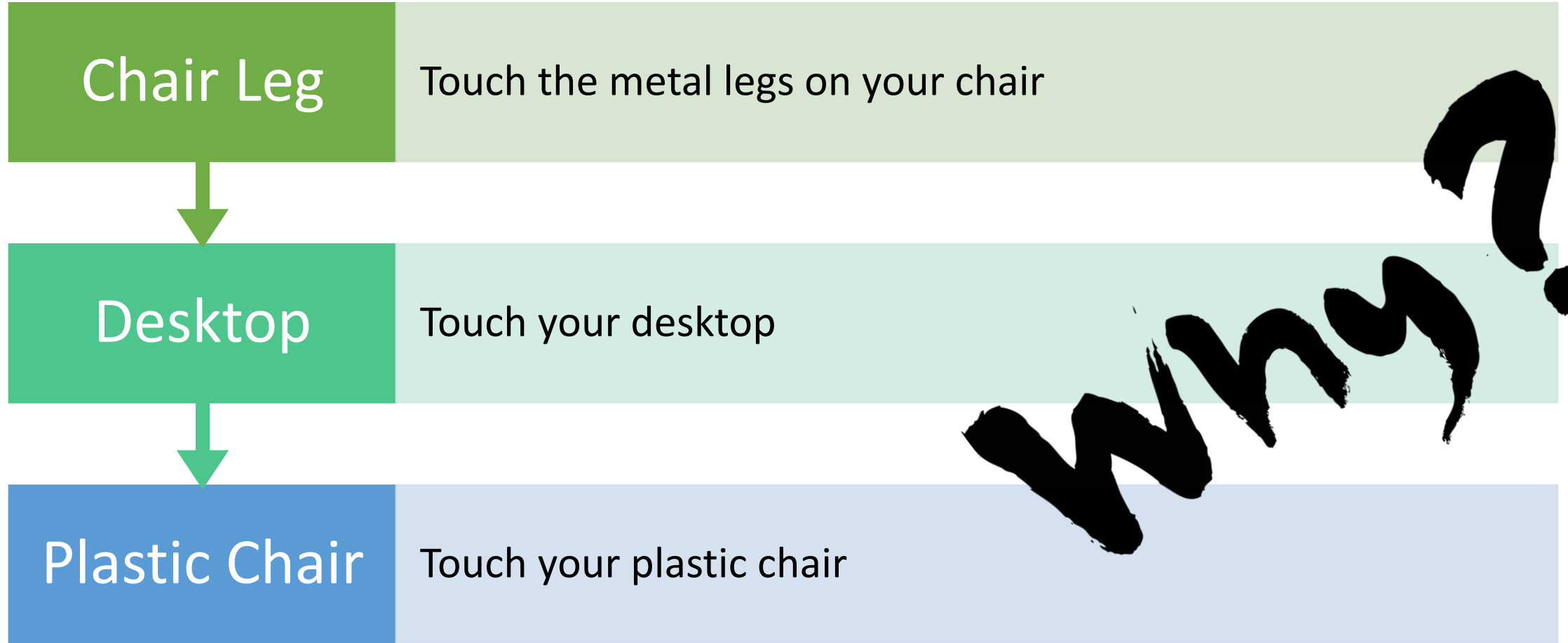
# Hot Spoon in Room Temperature Water

- Before
  - **Water colder than spoon**
- After
  - How should we draw the motion lines?



[https://www.middleschoolchemistry.com/h  
tml5\\_animations/cooled\\_spoon/](https://www.middleschoolchemistry.com/html5_animations/cooled_spoon/)

# Take It Further





# Conduction Demo