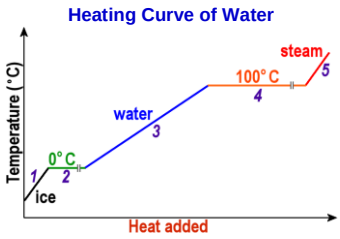

Molecules are always vibrating.

Solid: Molecules cannot move freely

Liquid: Molecules slide past each other

Gas: Molecules are largely not in contact with each other

Plasma: Electrons begin to leave atoms

Faster vibrations

Slopes1, 3, & 5 indicate all added energy is being used to make the molecules move faster (increasing their KE) and thus increasing the substance's average temperature; bonds between molecules remain unchanged.

Plateaus indicate all added energy is being used to weaken the bonds between molecules, thus increasing the molecules' PE; substance remains at a constant average temperature. State 2 is melting; state 4 is vaporization (boiling); state 6 (not shown) is ionization, before the water turns into plasma.

Heating Curve of Water
Temperature (°C)
steam
100° C
4
5
water
3
0° C
1
2
ice
Heat added

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