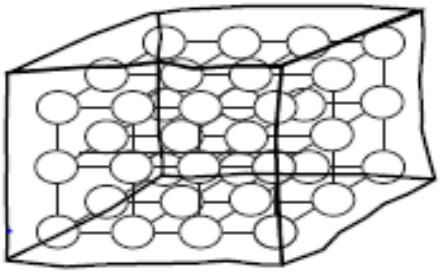
CHANGES OF STATE INCREASE IN ENERGY

SUBSTANCES CAN CHANGE FROM ONE STATE TO ANOTHER. YOU ARE FAMILIAR WITH WATER AS A SOLID, A LIQUID AND A GAS.

WE CALL THESE CHANGES CHANGES IN STATE. A SOLID CAN BECOME A LIQUID, A LIQUID CAN BECOME A GAS.

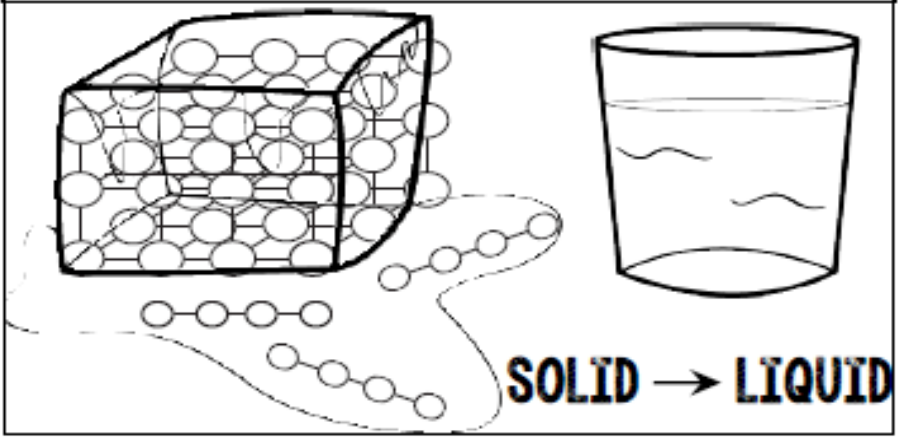
THIS HAPPENS WHEN THERE IS AN INCREASE IN ENERGY E.G. HEAT IS SUPPLIED.

WATER AS A SOLID



WHEN WATER IS A SOLID THE PARTICLES OF WATER ARE PACKED VERY TIGHTLY TOGETHER AND CAN'T REALLY MOVE THAT MUCH. THEY CAN VIBRATE BUT THEY CAN'T MOVE OR CHANGE THEIR POSITION.

IF YOU SUPPLY ENOUGH ENERGY E.G. HEAT, THEN THE PARTICLES CAN VIBRATE SO HARD THAT THEY BREAK AWAY FROM THE MAIN STRUCTURE. THIS ALLOWS THE PARTICLES TO SLIDE OVER EACH OTHER. THIS IS CALLED MELTING.



SOLID → LIQUID

IF YOU SUPPLY ENOUGH ENERGY E.G. HEAT, THEN THE PARTICLES CAN BREAK AWAY FROM EACH OTHER COMPLETELY AND BECOME A GAS. THIS IS CALLED EVAPORATION.

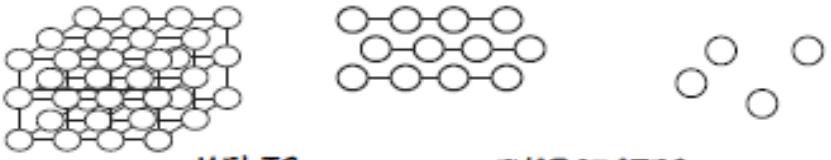
Liquid to Gas

SUBLIMATION

THIS IS WHERE A SOLID CHANGES INTO A GAS WITHOUT BECOMING A LIQUID. SOLID CARBON DIOXIDE (DRY ICE) CHANGES DIRECTLY TO A GAS WHEN HEATED. THAT'S HOW IT GOT THE NAME DRY ICE AS IT NEVER BECOMES A LIQUID (AT LEAST AT ORDINARY PRESSURES).

SOLID → GAS

CHANGES OF STATE



MELTS EVAPORATES

SOLID → LIQUID → GAS

INCREASE IN ENERGY →

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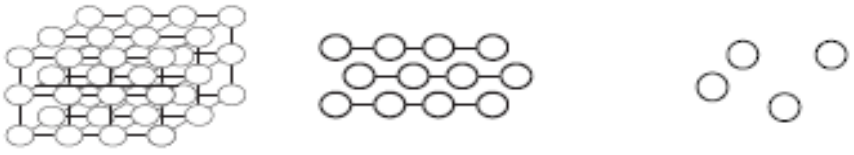
WATER AS A SOLID

SOLID → LIQUID

SUBLIMATION

SOLID → GAS

CHANGES OF STATE



INCREASE IN ENERGY →

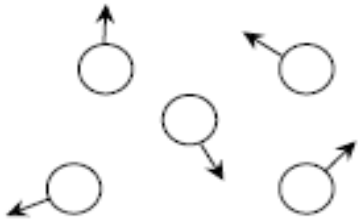
CHANGES OF STATE DECREASE IN ENERGY

WHEN THERE IS A DECREASE IN ENERGY E.G. WHEN HEAT IS REMOVED FROM AN OBJECT THE SUBSTANCE CAN CHANGE FROM ONE STATE TO ANOTHER.

A GAS CAN BECOME A LIQUID, A LIQUID CAN BECOME A SOLID.

LET'S LOOK AT WHAT HAPPENS WHEN ENERGY IS REMOVED.

WATER AS A GAS

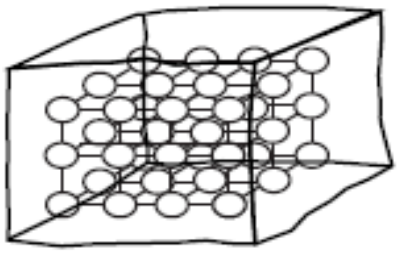


WHEN WATER IS A GAS THE INDIVIDUAL MOLECULES ARE FREE TO MOVE IN ANY DIRECTION. THEY HAVE LOTS OF ENERGY AND MOVE VERY FAST.

GAS → LIQUID

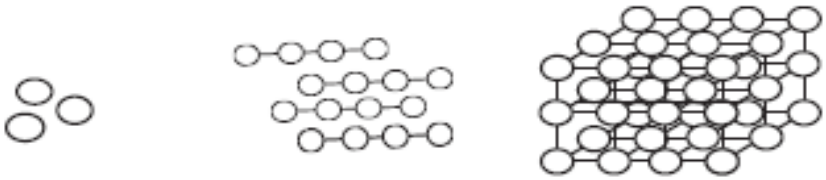
IF YOU LEAVE A COLD BOTTLE OF WATER IN A WARM ROOM YOU'LL SEE DROPLETS APPEAR ON THE OUTSIDE OF THE GLASS. WATER VAPOUR IN THE AIR LOSES ENERGY WHEN IT TOUCHES THE COLD BOTTLE AND THE VAPOUR CONDENSES INTO A LIQUID.

LIQUID → SOLID



IF YOU REMOVE ENOUGH ENERGY THEN THE PARTICLES CAN LOSE MOTION TO BECOME A SOLID. THIS IS CALLED FREEZING.

CHANGES OF STATE



CONDENSES

FREEZES

GAS → LIQUID → SOLID

DECREASE IN ENERGY

DIFFERENCE BETWEEN BOILING AND EVAPORATION

BOILING IS DIFFERENT FROM EVAPORATION. EVAPORATION ONLY OCCURS AT THE SURFACE OF A LIQUID. E.G. A PUDDLE OF WATER WILL EVAPORATE IN THE SUN.

BOILING IS WHEN EVERY PARTICLE IN THE LIQUID HAS ENOUGH ENERGY TO BECOME A GAS.

CHANGES OF STATE
DECREASE IN ENERGY

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WATER AS A GAS

GAS → LIQUID

LIQUID → SOLID

CHANGES OF STATE

CONDENSES →

FREEZES →

DECREASE IN ENERGY ⇒

DIFFERENCE BETWEEN BOILING AND EVAPORATION