Science and Technology in Everyday Life

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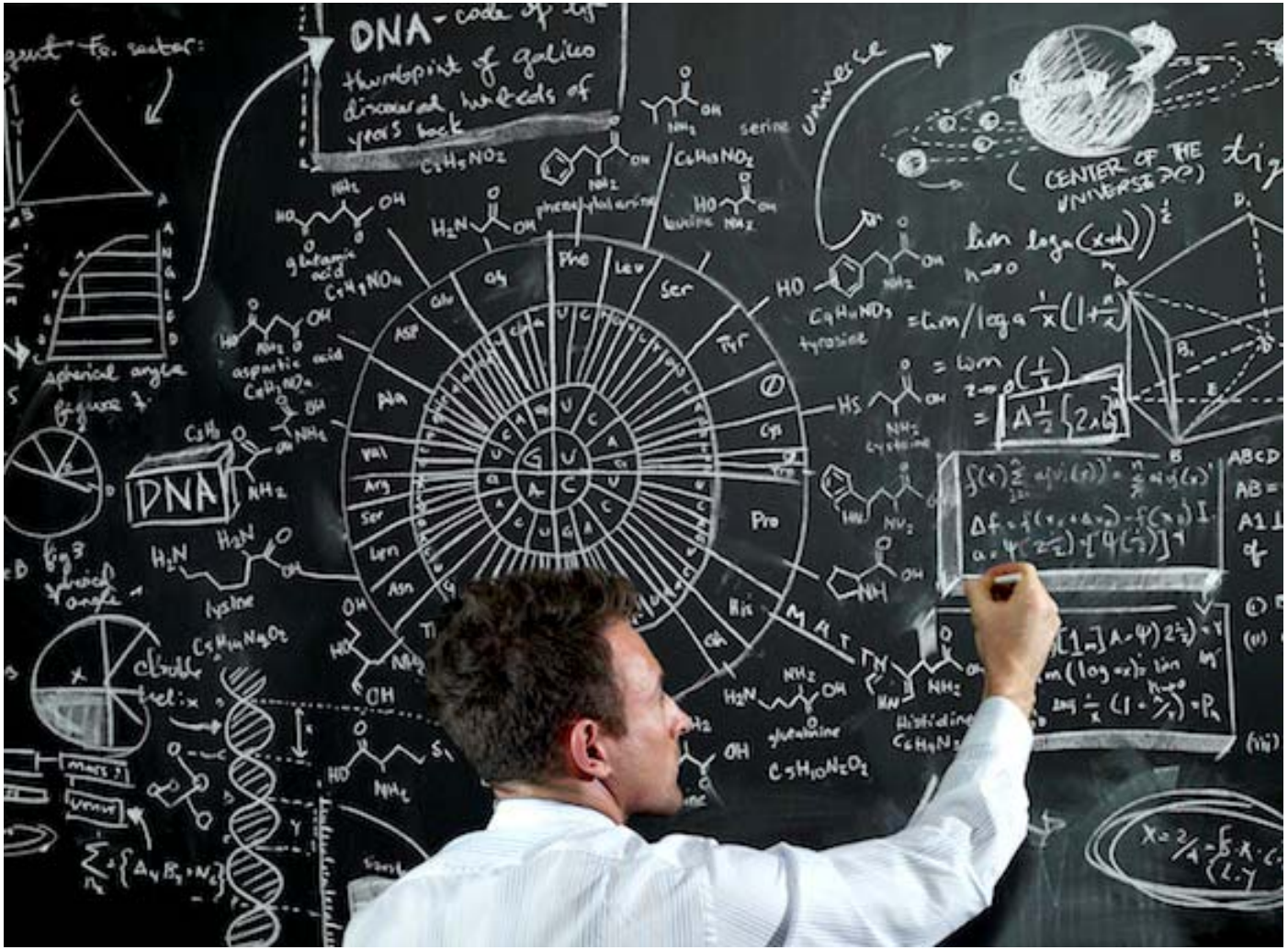
What is Science and Technology?



SCARY?

Science & Technology is Anywhere & Everywhere

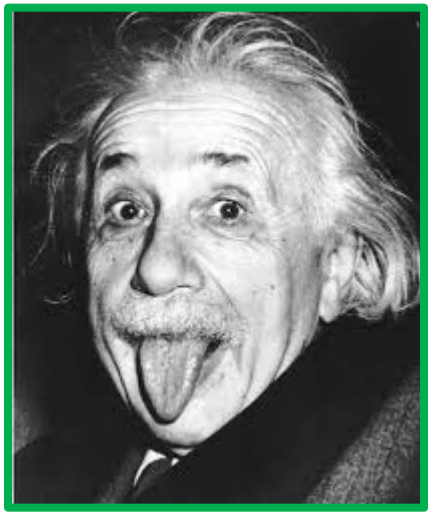
Do not be afraid of Science

Science is Fun

Scientists are not all serious

They are fun too

Name the Scientists

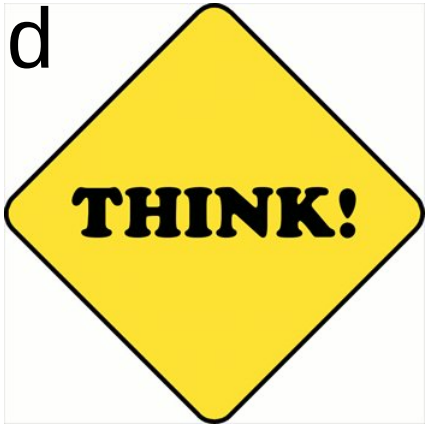


Isaac Newton, C. N. R. Rao, C. V. Raman, Albert Einstein

Science is about making observations and ask the following questions:

Why and How

Logic & Reasoning are heavily utilized in Science



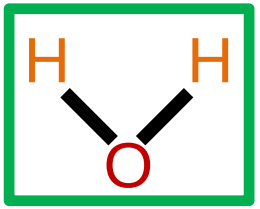
Power and Limitations of Science

Science can explain many things that we see around us. Yet there are things that science can not explain

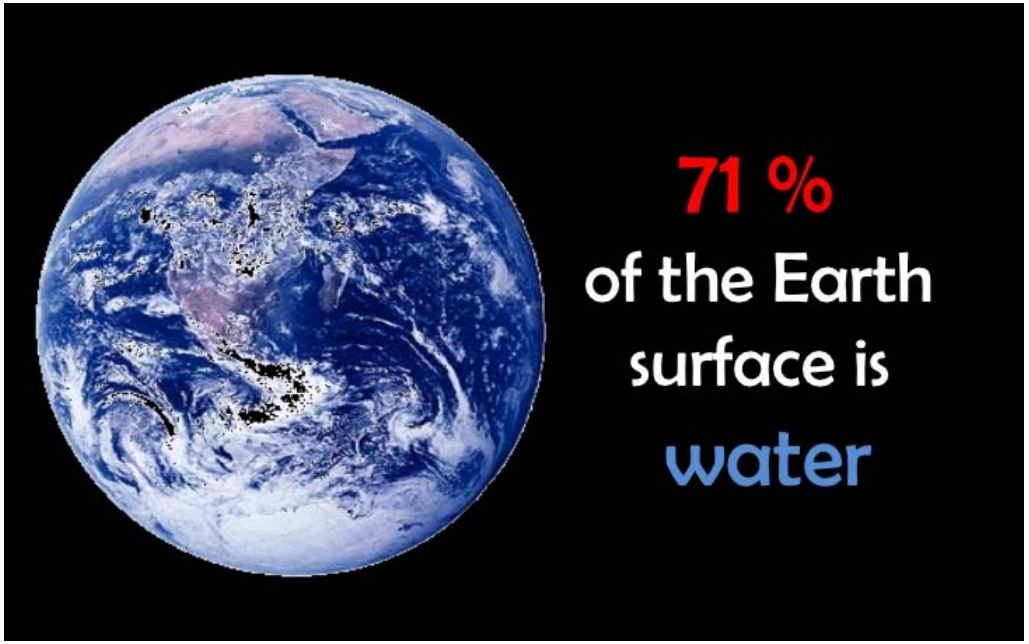
Keeping an open mind is the most important aspect of modern Science

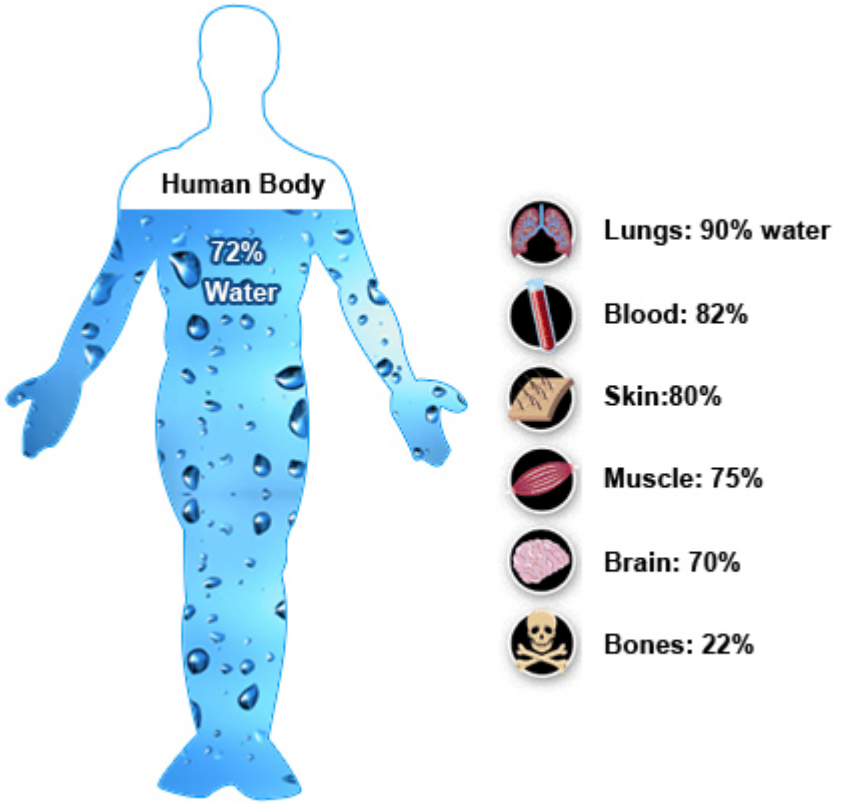
Consider some daily life encounters with science

Water (H_2O)



Our planet Earth & our body primarily consists of water

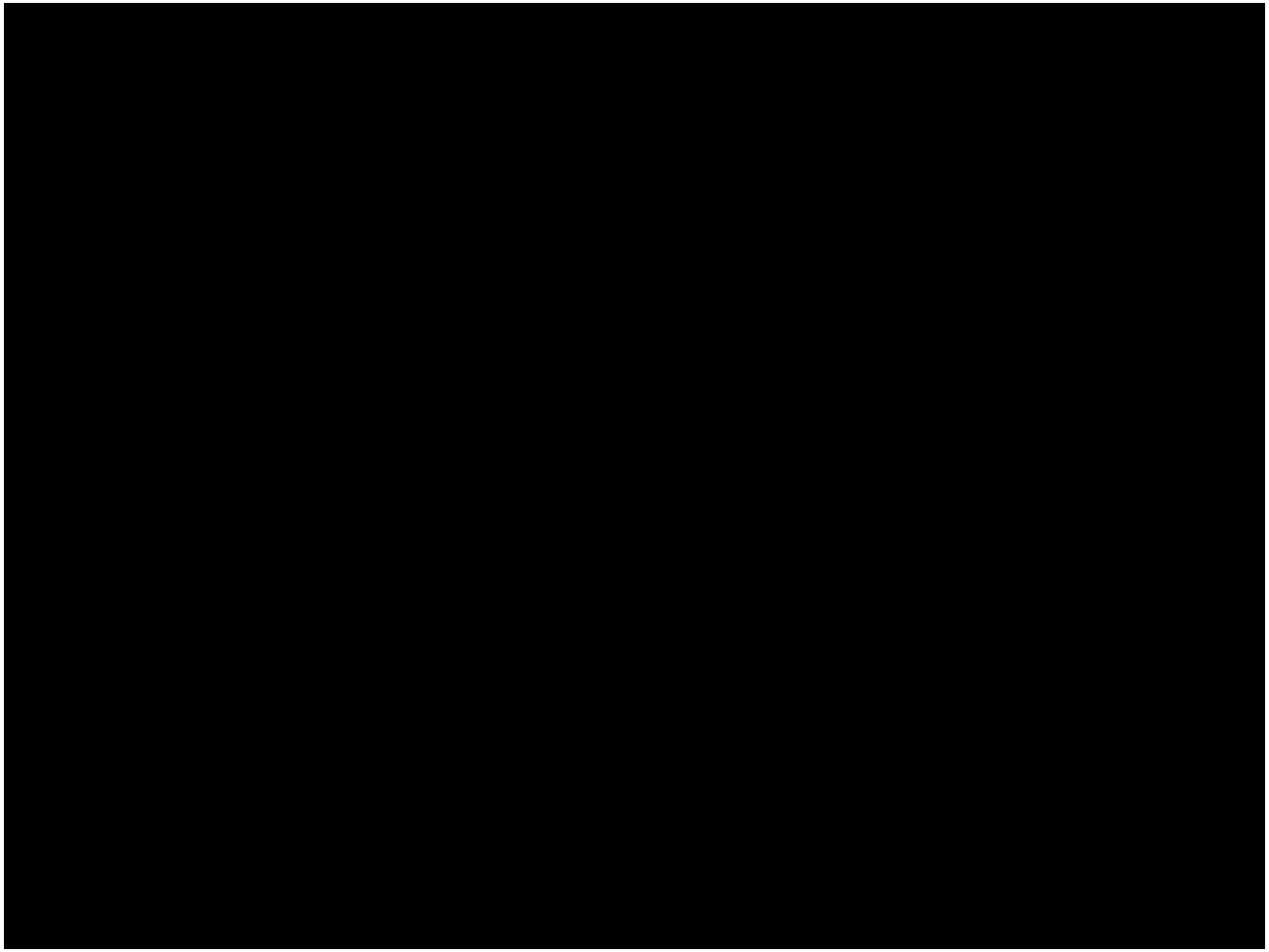




Water commonly exists in the following inter-convertible forms:

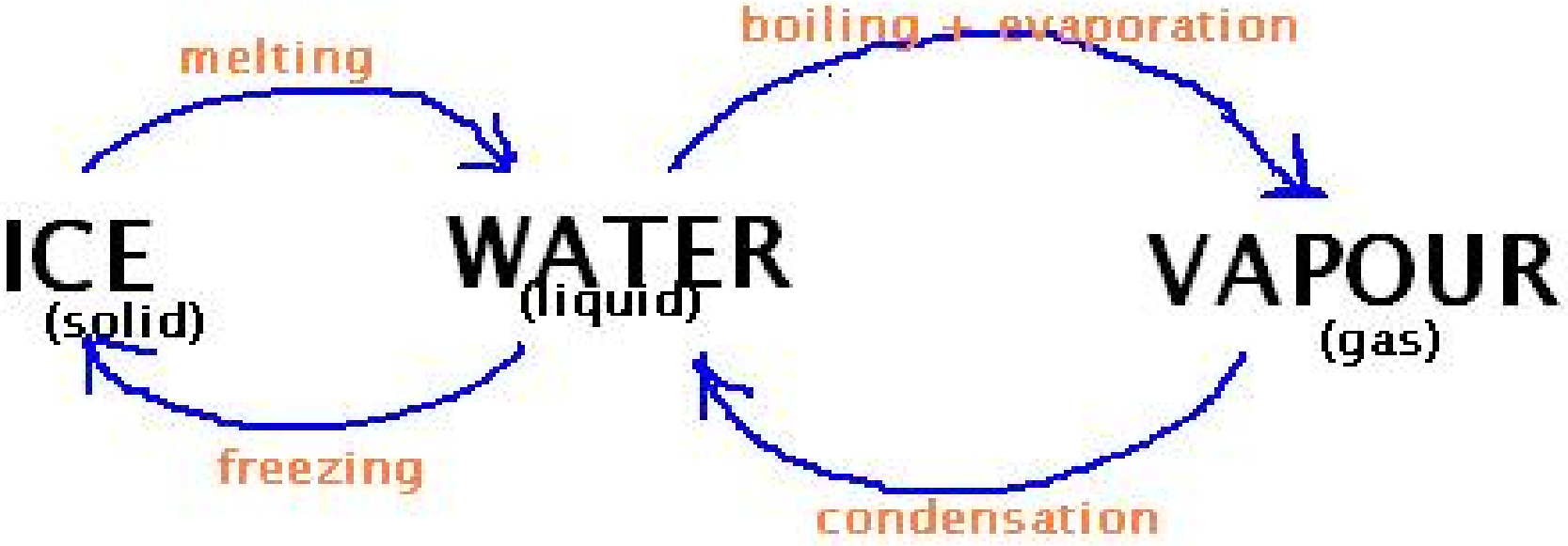
Solid (ice), Liquid (water), gas (steam)

What is this process?



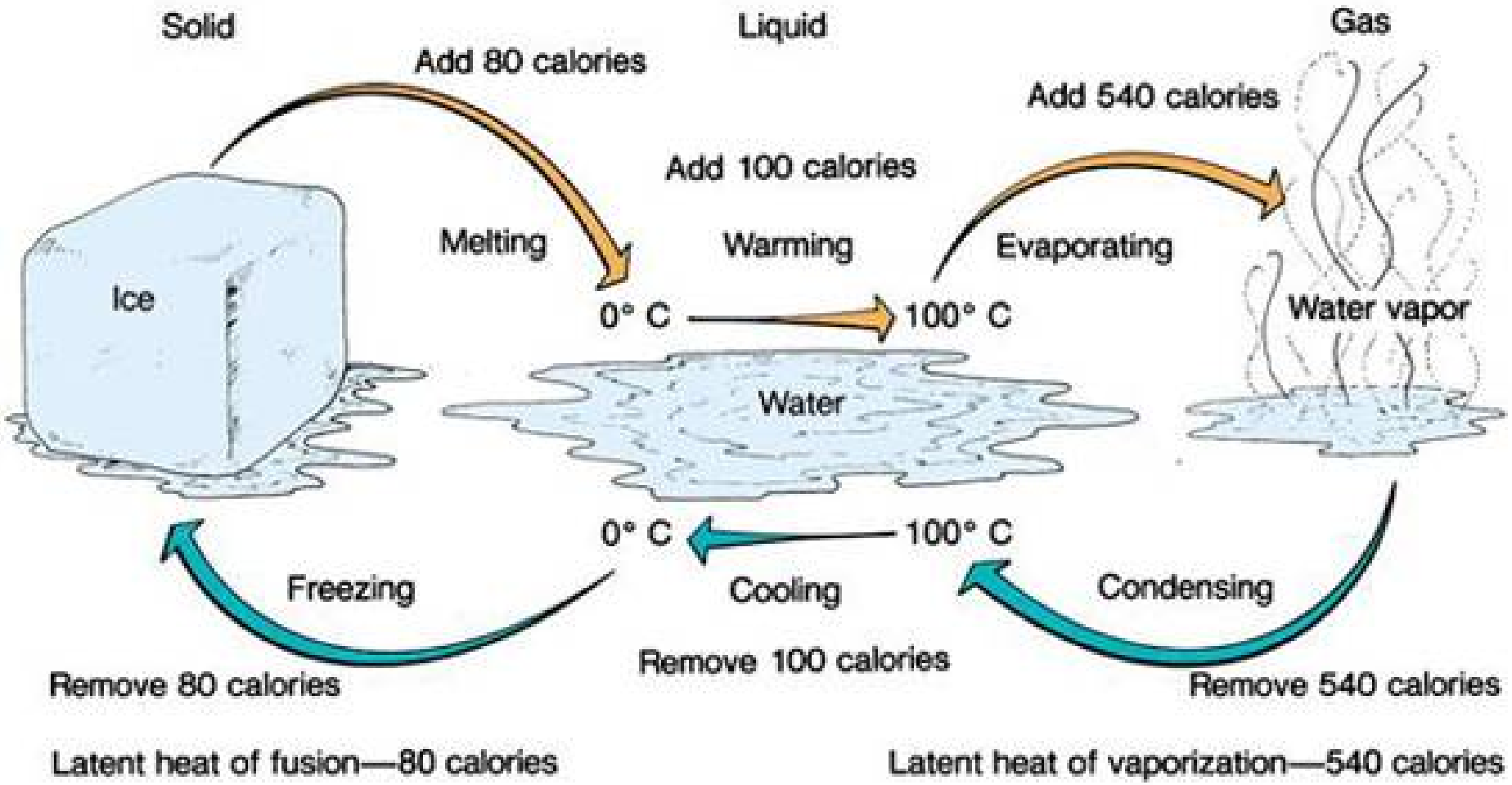
Ice melting into liquid water

Inter-conversion of forms of water



Heating/cooling is required for these inter-conversions

Science behind these inter-conversions



Evaporation

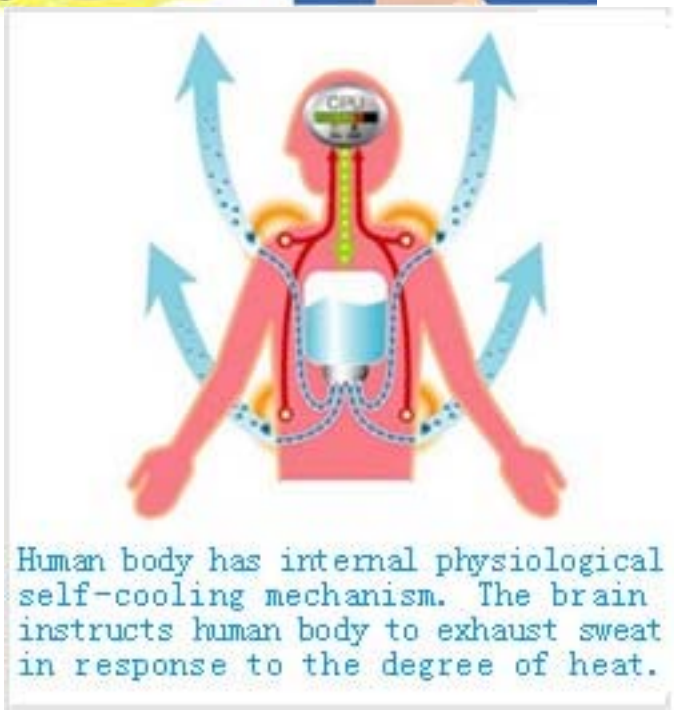
Evaporation in action: Drying Clothes

Drying clothes in winter is faster than in rainy days

Humidity present in the air matters

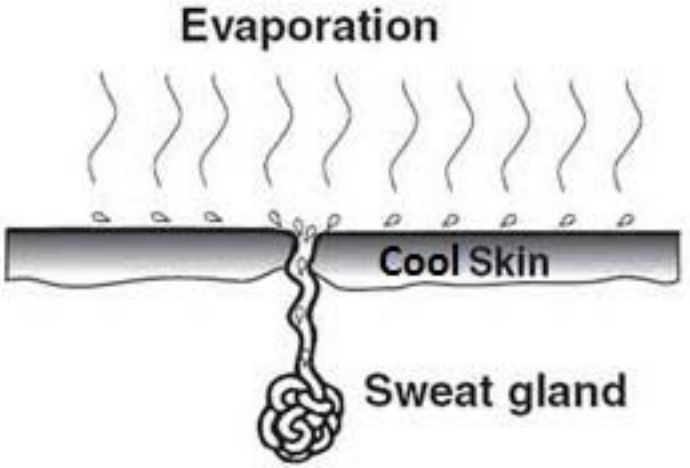
Why Evaporation causes Cooling

Why do we Perspire (sweat)?



Thermoregulation (maintaining body temperature) needs sweating

Evaporative cooling in action



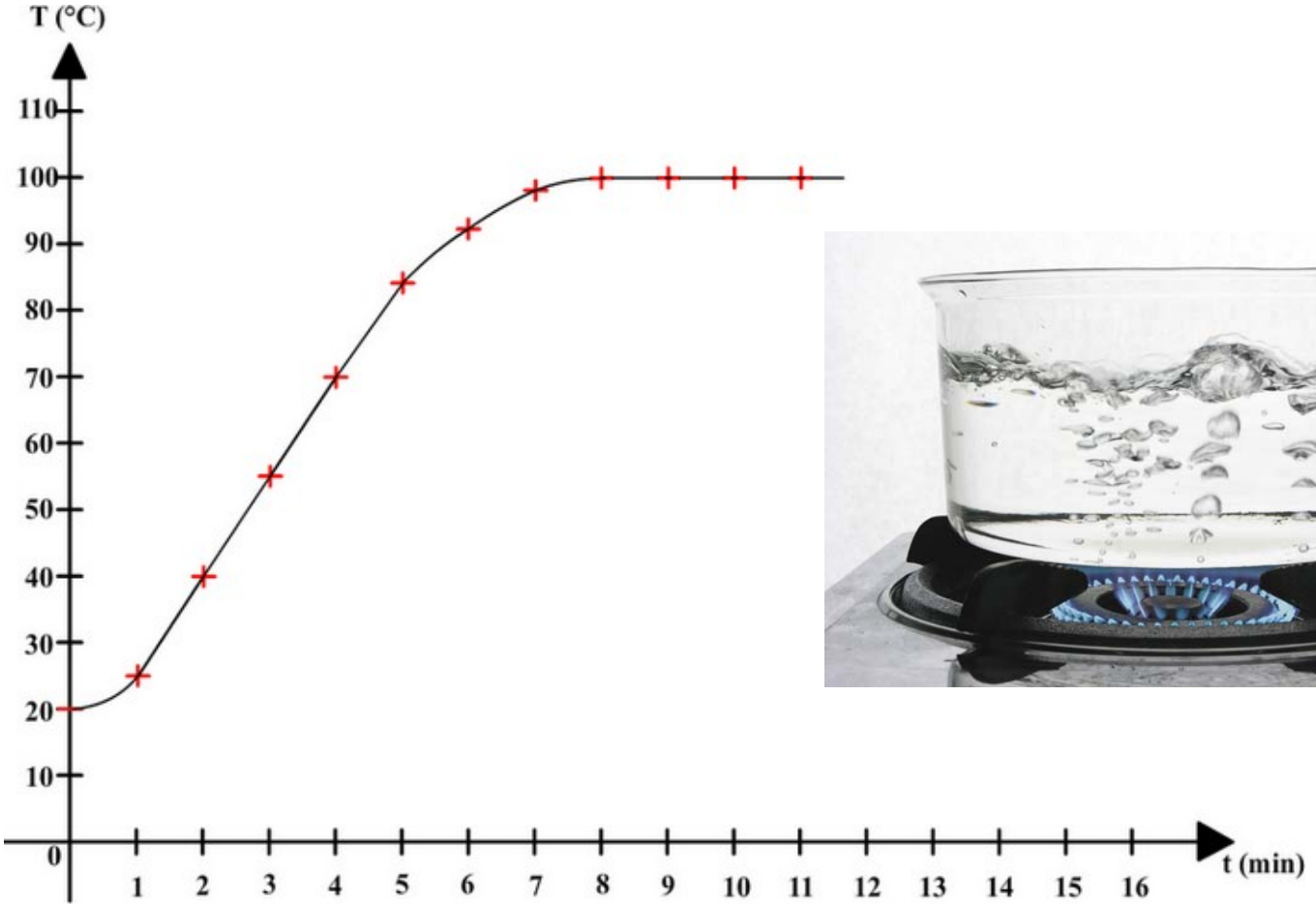
Boiling

Water boils at 100 ºC

Water at 1 atmosphere Pressure boils at 100 ºC

Water at 0.33 atmosphere Pressure (Mount Everest) boils at 71 ºC

Boiling water at 1 Atm.



Boiling temperature & Pressure acting on the liquid are connected

Higher the surrounding pressure, higher is the boiling temperature of the liquid

Pressure cooker

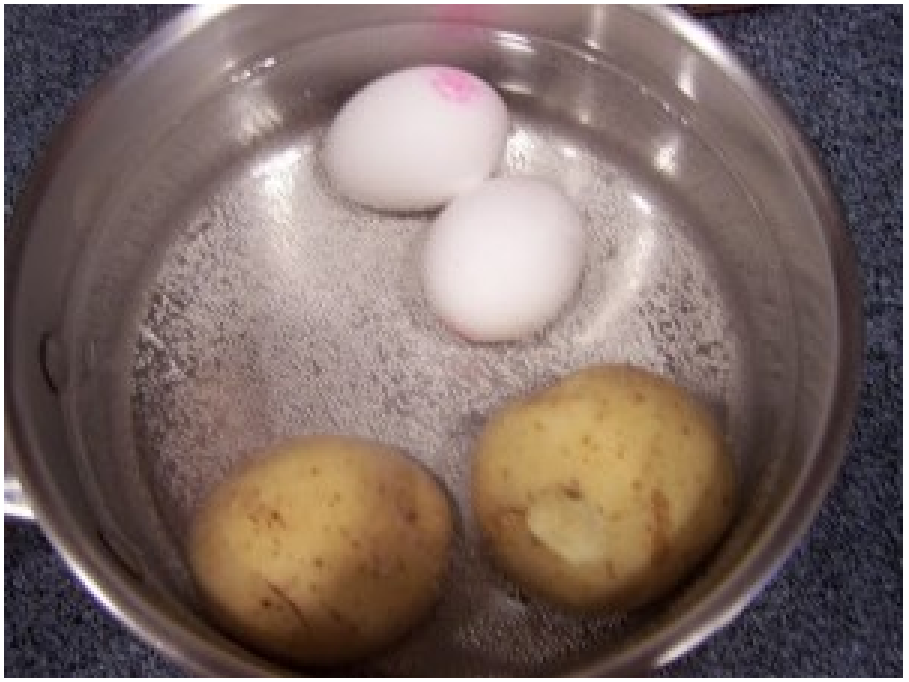
Let’s go inside a kitchen

Common Indian Kitchens

Everyday Cooking involves Science

Tips for Cooking

How do you boil potato/egg in water?



When boiling potato/eggs in Water, add some salt to cook it faster

Elevation of boiling point

Why is Salt Used on Icy Roads?

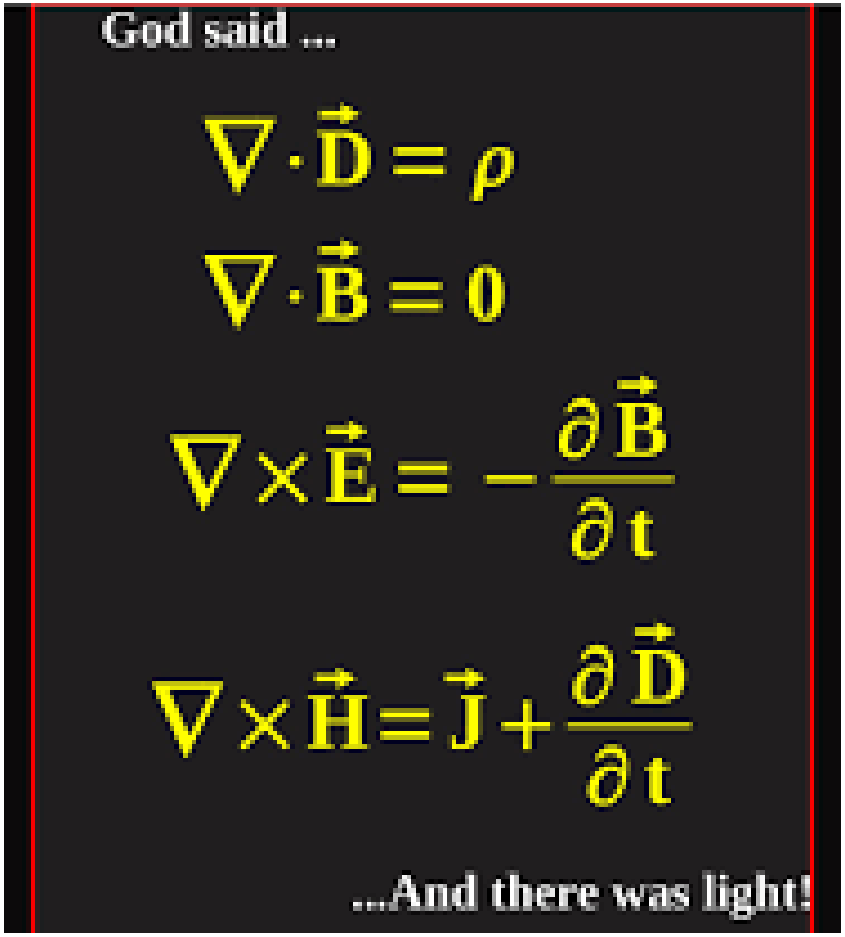
To melt the slippery ice on the road

Working principle: Freezing point Depression

Elevation of Boiling Point

Light: What it does for us

Let's SEE



"Let there be light"

What is a common theme
In these two images?

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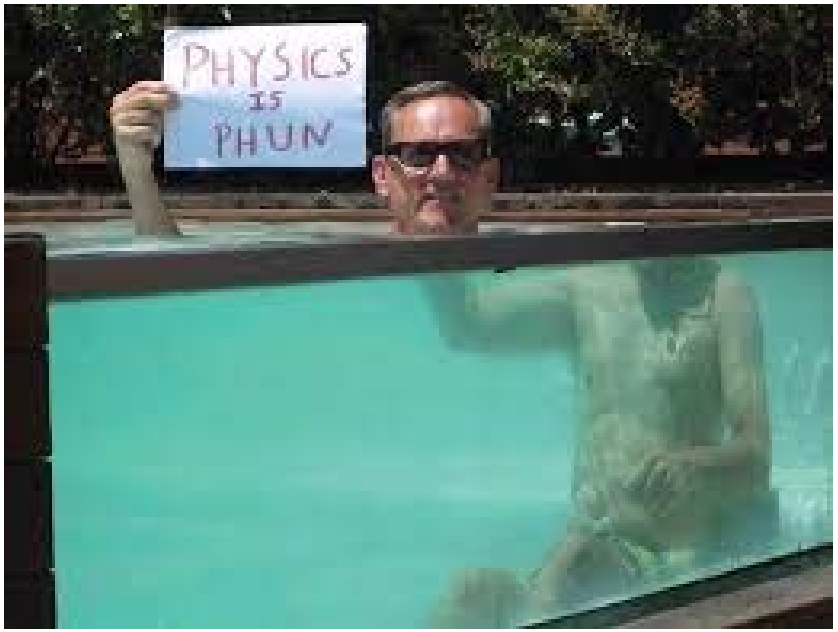
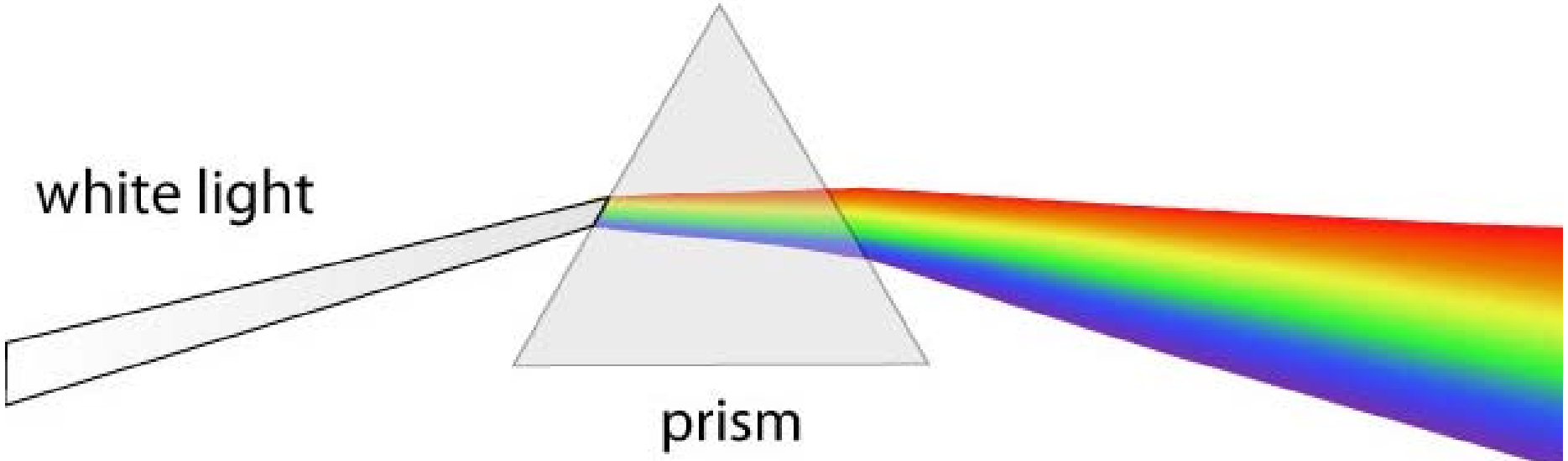


REFRACTION

What is this process called?

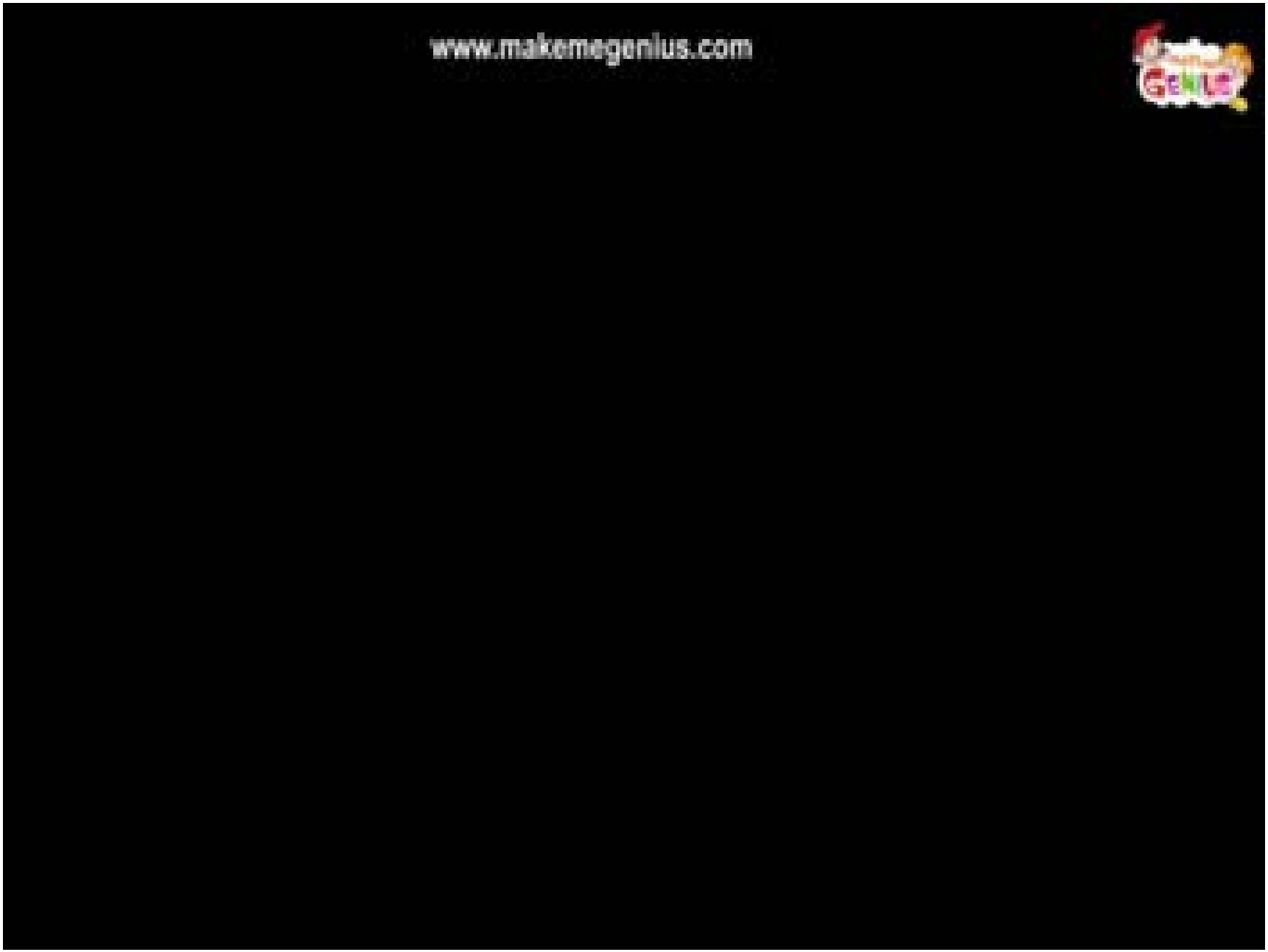


Refraction in Action

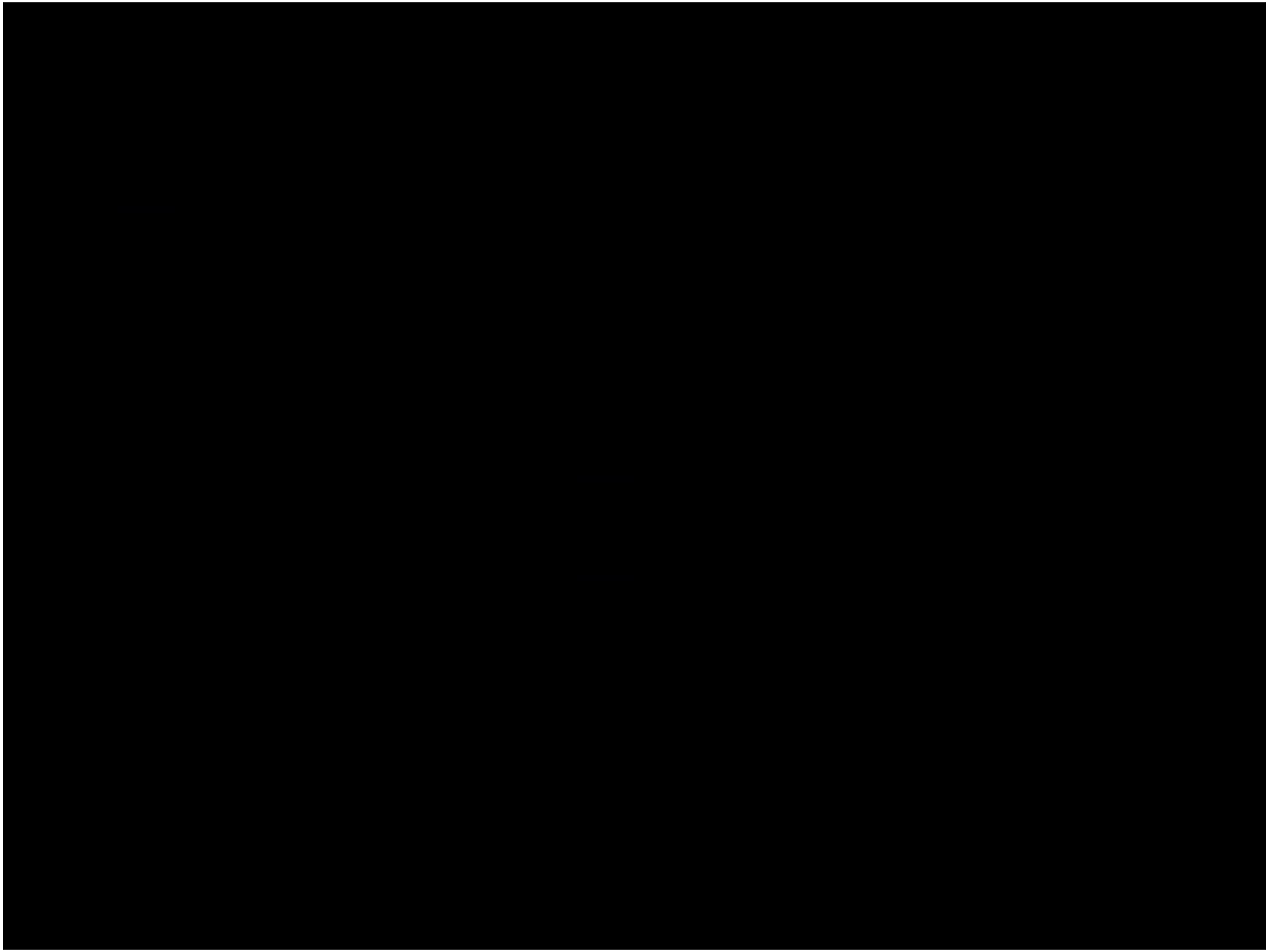
Common encounters with Refraction:

- Occurrence of mirage effect in deserts in summer
- Pencil partially dipped in glass filled with water seems to be bent at point of immersion
- Twinkling of star- light reaching to us has gone several refraction because of mediums
- A clear pool of water always appears to be shallower than it actually is
- Formation of a RAINBOW

Refraction



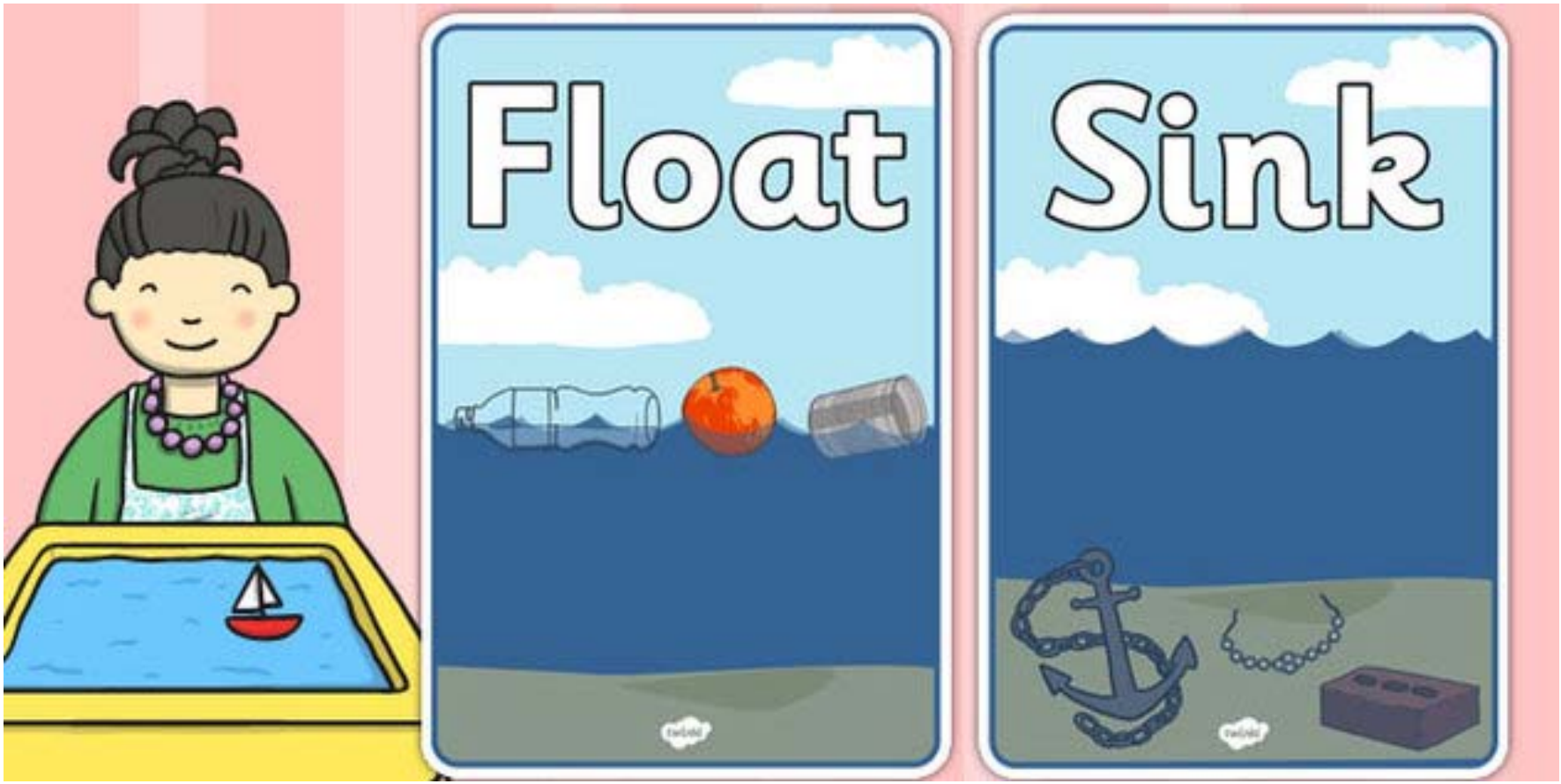
Refraction and it’s extension



Rainbow

Mirages

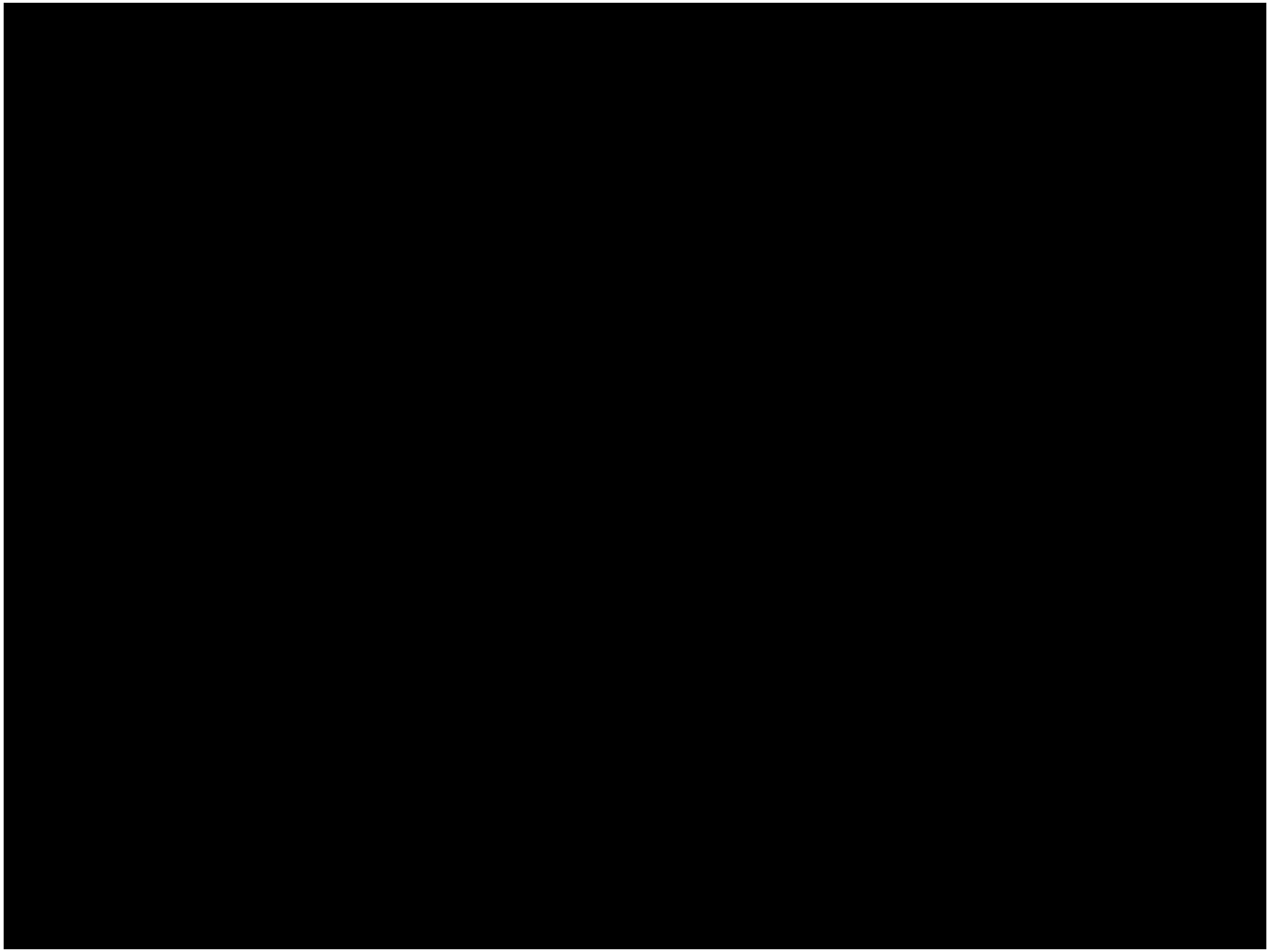
Float or Sink?



Density and Buoyancy are important

Will an Orange Sink in water?

Answer: Depends on the nature of the orange



Why does it not hurt to cut your nails/hair?

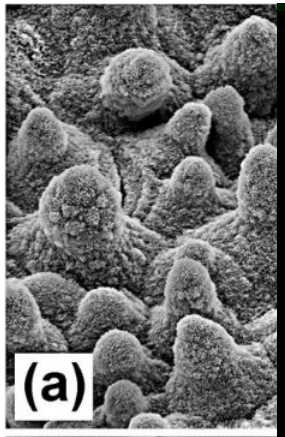
Dead vs. Alive Cells

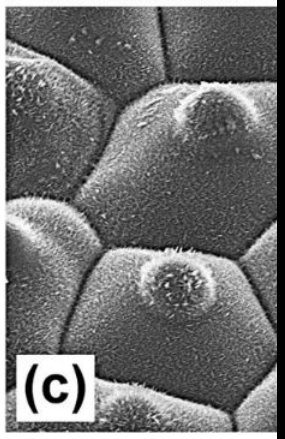
Beauty of a Lotus Leaf

Rolling off of water
from lotus leaves

Self-cleaning surface

Lotus Effect





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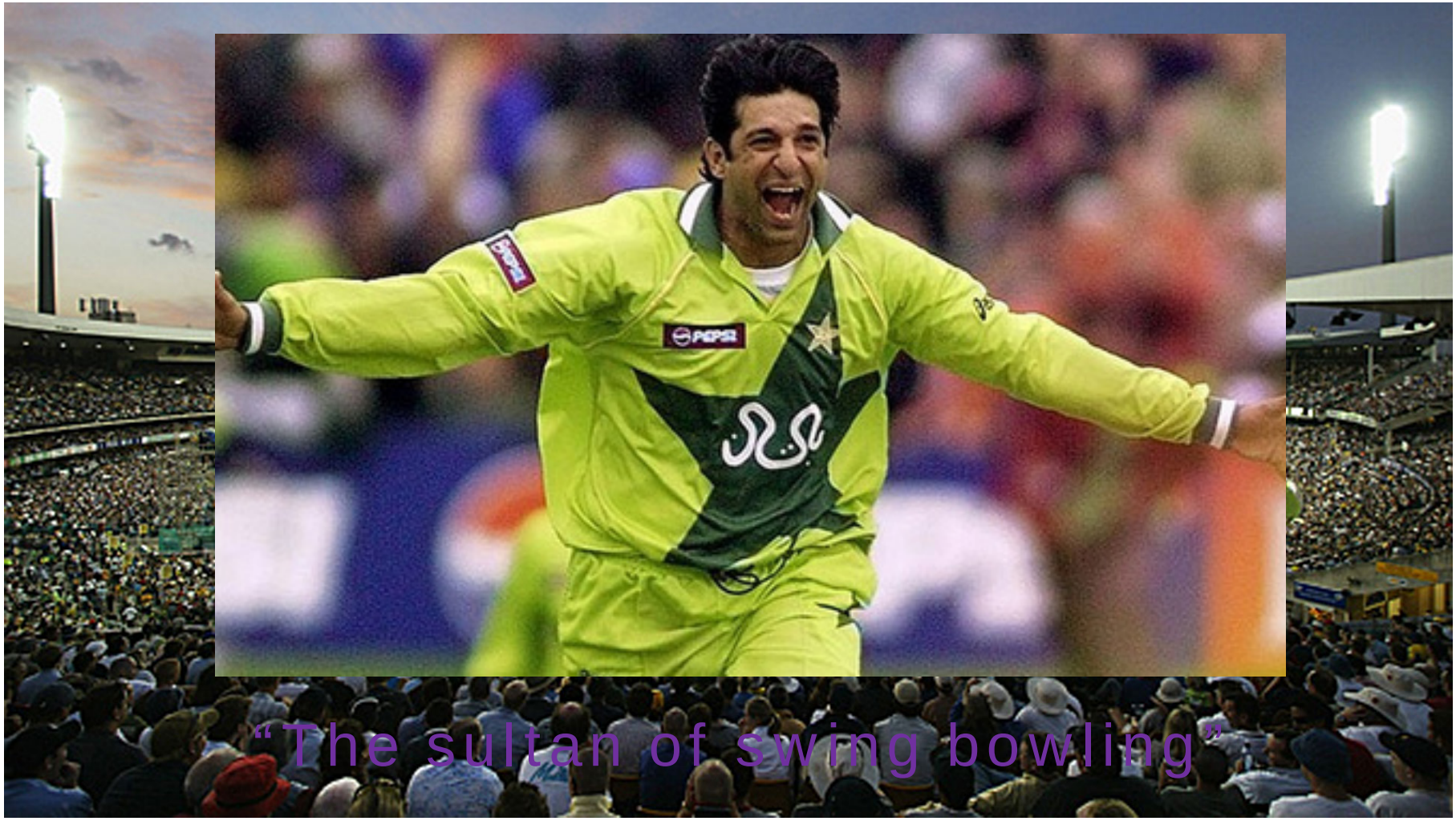
Emulating Lotus Effect in the Lab

Cricket

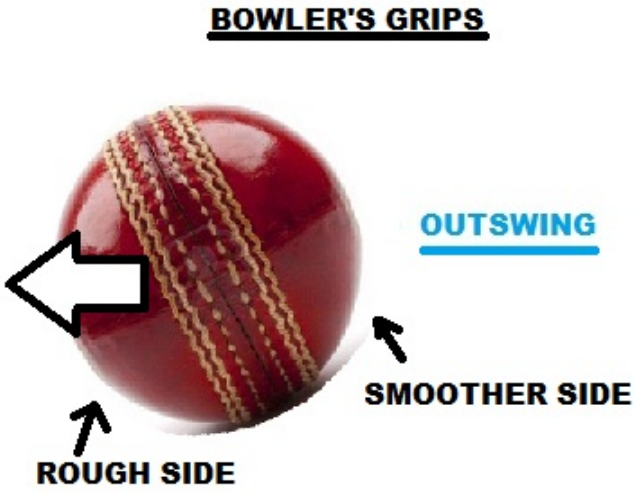


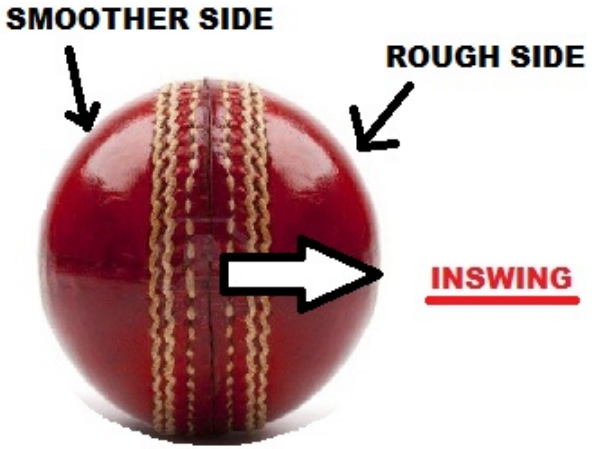
Inswing and outswing balls

Swing Bowling in Action

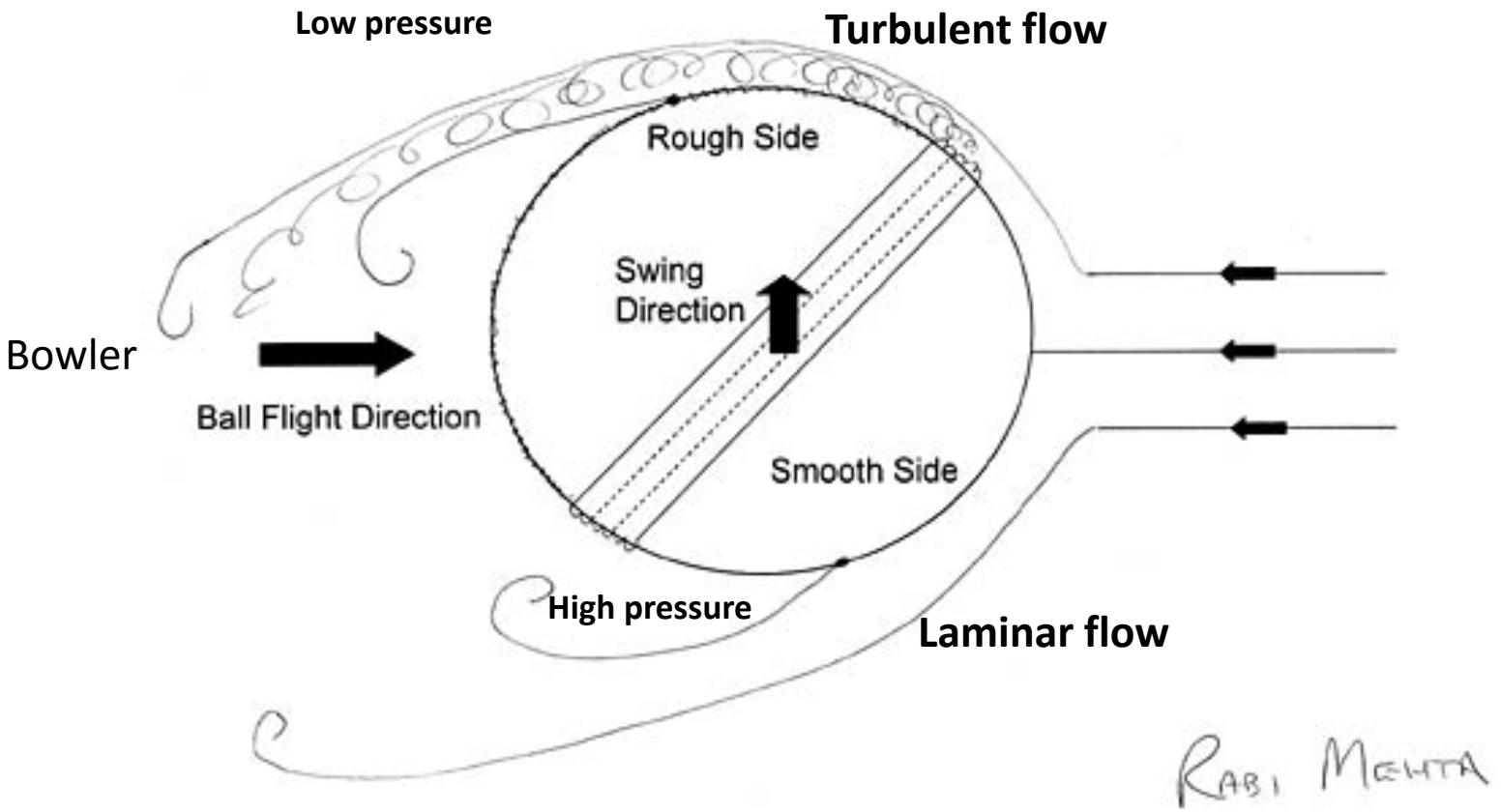
Swing Bowling: Art

Cricket Academy teaches how to swing ball



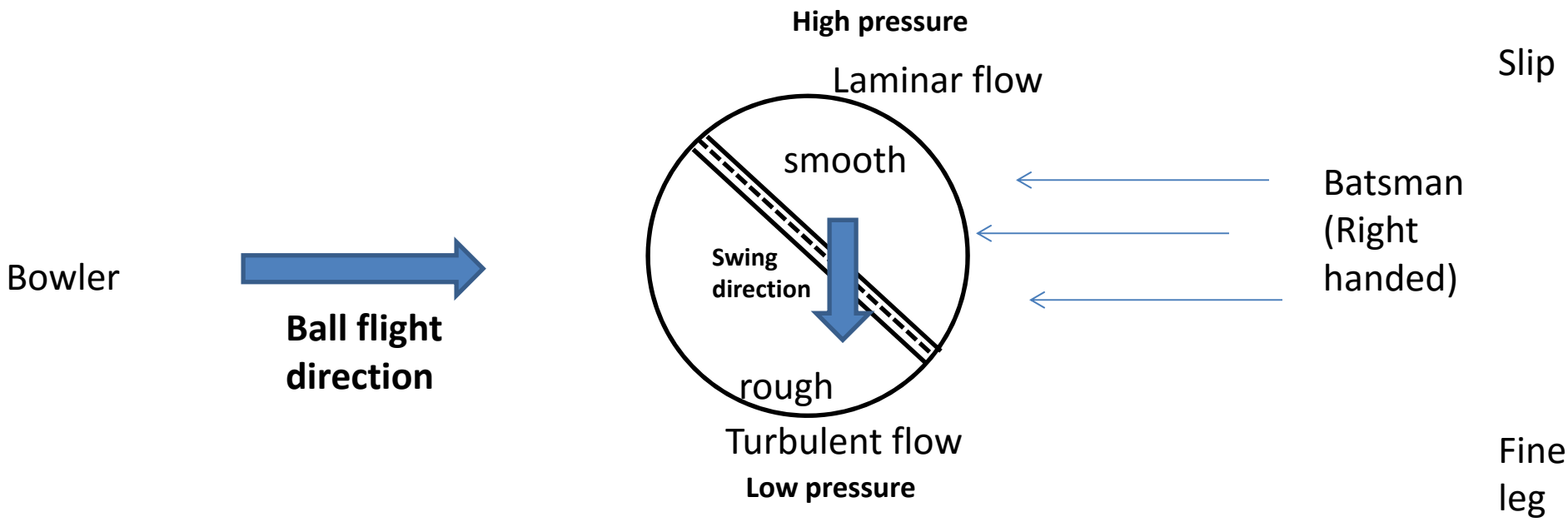


Swing Bowling: Science



Outswinging ball

Inswinging ball



SEASONS

Axis

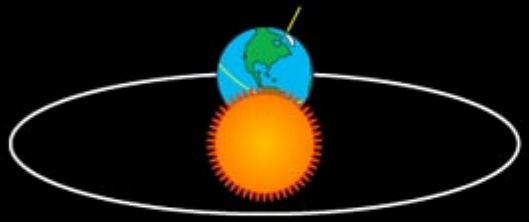
Su

Earth has seasons because its axis is tilted.
Earth rotates on its axis as it orbits the Sun,
but the axis always points
in the same direction.

Southern Hemisphere

Northern Hemisphere

December:
Summer south of the equator,
winter north of the equator.
The Sun shines directly on
the Southern Hemisphere
and indirectly on the Northern
Hemisphere

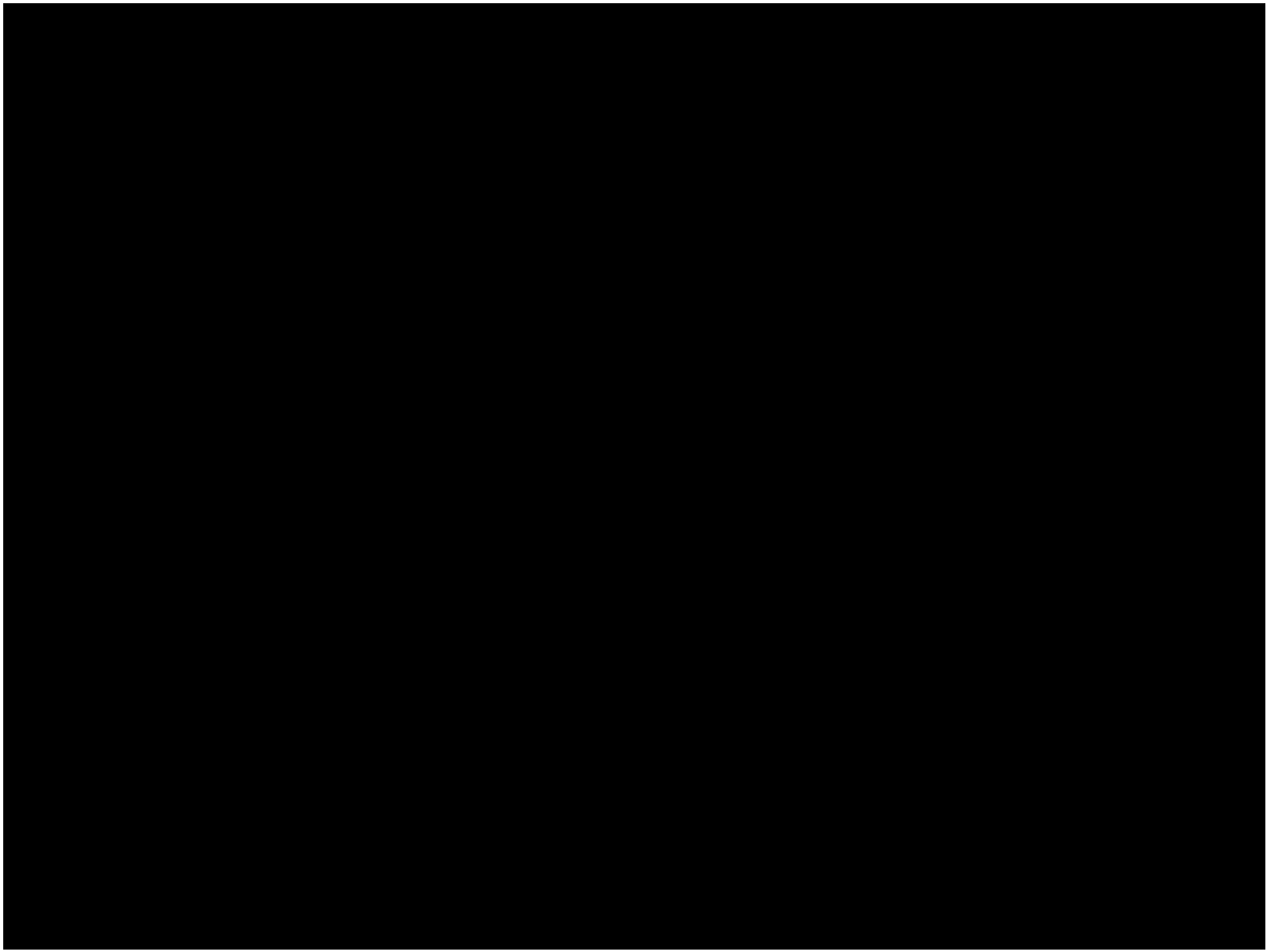


March:
Fall south of the equator,
spring north of the equator.
The Sun shines equally on
the Southern and Northern
Hemispheres

June:
Winter south of the equator,
summer north of the equator.
The Sun shines directly on
the Northern Hemisphere
and indirectly on the Southern
Hemisphere

September:
Spring south of the equator,
fall north of the equator.
The Sun shines equally on
the Southern and Northern
Hemispheres

SEASONS



Instances of Science in Everyday life is countless

You have to keep looking and Think how Science operates

You may see the working of the science and sometimes you may not

Science is powerful but has it's limitation and hence it is evolving

Unsolved Mysteries of Science

1) Why do we need sleep?

Scientists simply don't know for sure. In broad terms, researchers believe it is to enable our bodies and especially our brains to recover

2) How do animals Migrate?

Different animals use different navigational tools, including some who are able to tap into the Earth's magnetic field and use themselves like a compass. However, scientists still don't know how this trait evolved or how untrained animals know exactly where to go season after season.

3) Does intelligent life exist elsewhere?

Why haven't we connected with anyone else yet? This is known as the Fermi Paradox.

There are two (at least) possible explanations: One, there have been no messages from Aliens. Two, the messages are there, but nobody knows how to detect or recognize them.

4) Why and How Gravity works?

While scientists do understand a great deal about how gravity acts, they aren't really sure why it exists. Why are atoms mostly empty space? Why is the force that holds atoms together different from gravity? Is gravity actually a particle (gravitons) or is it a wave (Gravitational waves)?

5) What is the nature of TIME?

What's the nature of duration and the flow of time — is it illusory or "real" in some elusive way?

What about the direction of time — does it always go forward? Why?

Is time travel possible, or can messages at least be sent backward in time?

Terminator series is a classic example where time travel has been implicated

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