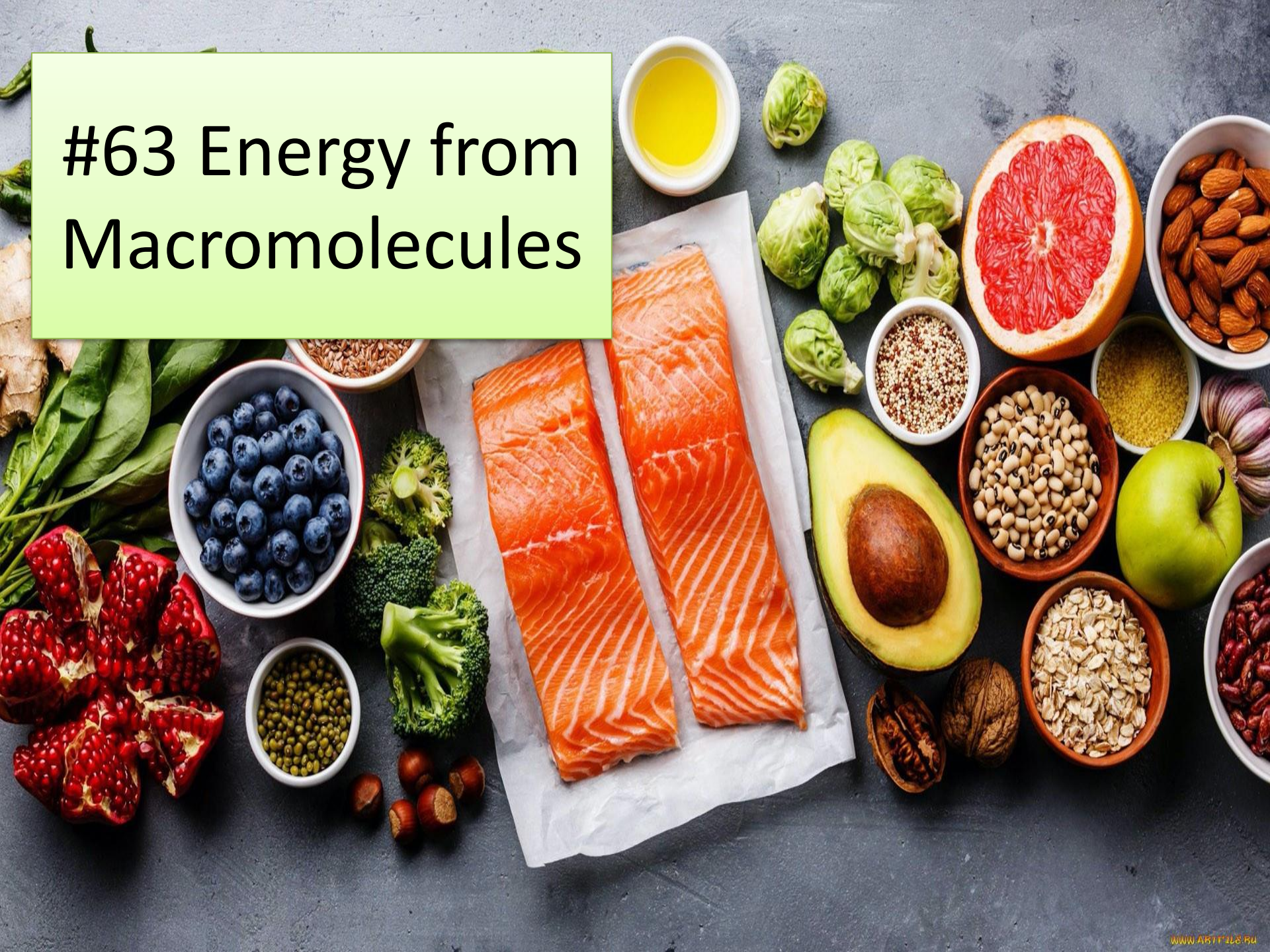


#63 Energy from Macromolecules



Warm-up

1. Read page E54 and explain why you breathe so hard after a long run and your muscle begin to ache (tingle).
2. What is the equation for cellular respiration?

- Cells need to absorb and use energy in order to grow and reproduce...but where is this energy coming from?

All cells use chemical energy within the cell to carryout life's function.

*Types of molecules within the cell

Large molecules made up of smaller molecules linked together that are used to keep your body functioning are called macromolecules.

The subunits(types) of macromolecules are carbohydrates, lipids (fats), proteins, and nucleic acids

All macromolecules contain carbon. Carbon is present in all living things.

*Carbohydrates

Examples of carbs are:

- soda
- cereals
- pastas & breads
(starches)
- candy
- chips
- **FRUITS!!!**

<https://www.youtube.com/watch?v=--DCJxequd0>

**PRIMARY SOURCE of
QUICK ENERGY!**

*Proteins

Proteins are used for repair, building, and chemical reactions (digestion).

Proteins can be found everywhere in a cell and proteins are needed in order for your body to make its own usable proteins.



*Proteins

- Examples of proteins:
- **Lean meats**
- chicken (no skin)
- beef jerky
- low-fat milk
- seeds
- tofu
- <https://www.youtube.com/watch?v=k9fLrtI4RK0>

*Nucleic acids

Nucleic Acids is the DNA/RNA within all cells that helps control an organism. DNA are the “instructions” for producing more proteins, which all cells need.

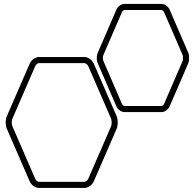
Nucleic Acids holds instructions for **maintenance, growth, and reproduction** (mitosis) of cells

Located in the nucleus



*Nucleic acids

- Examples of nucleic acids are:
- DNA



*Lipids

Fats, oils, and waxes are also known as Lipids.

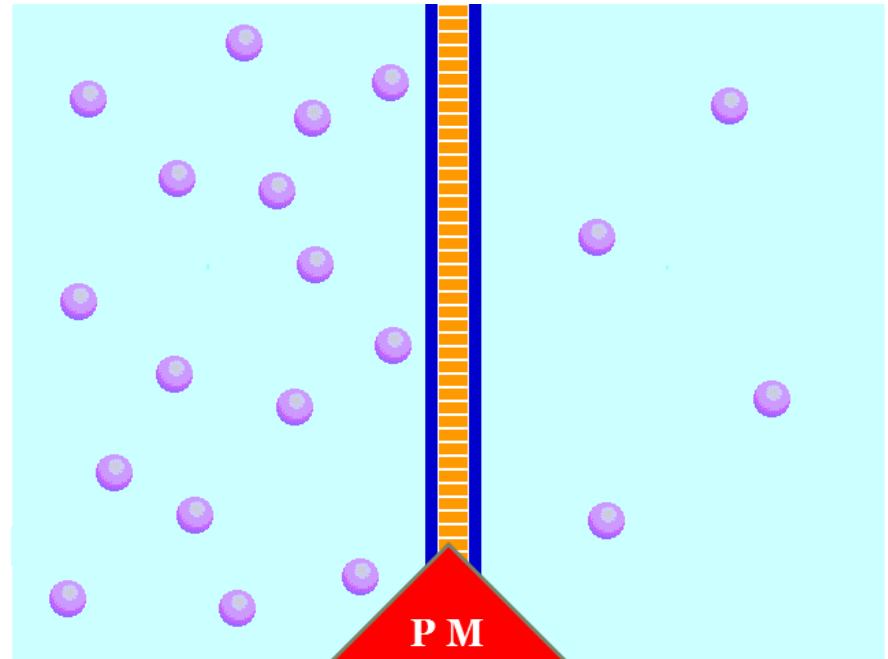
Lipids make up the cell membranes surrounding the cell and organelles and helps with the overall structure of the cell.

Lipids provide cushion, structure, and stored energy



*Lipids

- Fatty (lipid) cell membranes regulate/control the flow of nutrients in and out the cell through osmosis or diffusion.
- This creates a balance of how much contents are in and out of the cell



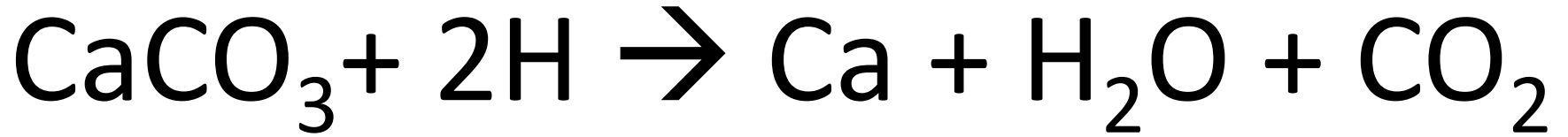
P
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If more water is on the outside of the cell, the membrane will allow more water to pass through

*Lipids

- Examples of lipids are:
- <http://www.cnn.com/2014/01/18/health/fish-oil-recovery/>
- cheese
- **BUTTER**
- **OILS**
- chocolate
- egg yolks
- some nuts
- avocados

Dissolving an Egg Shell



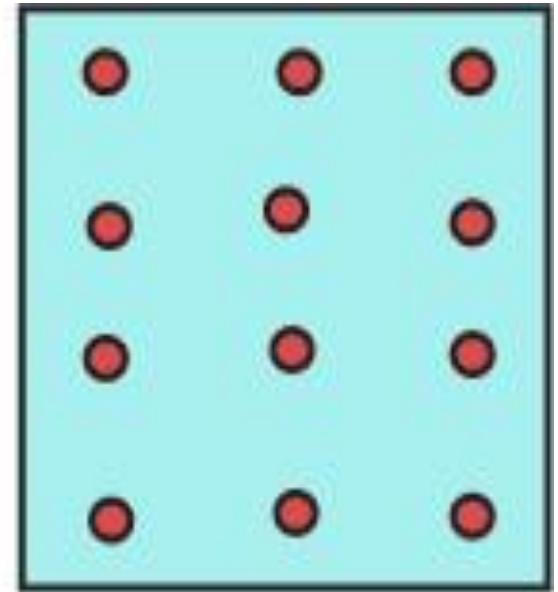
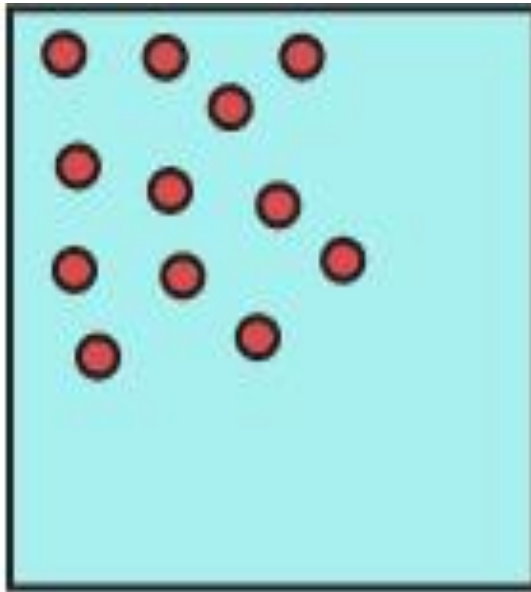
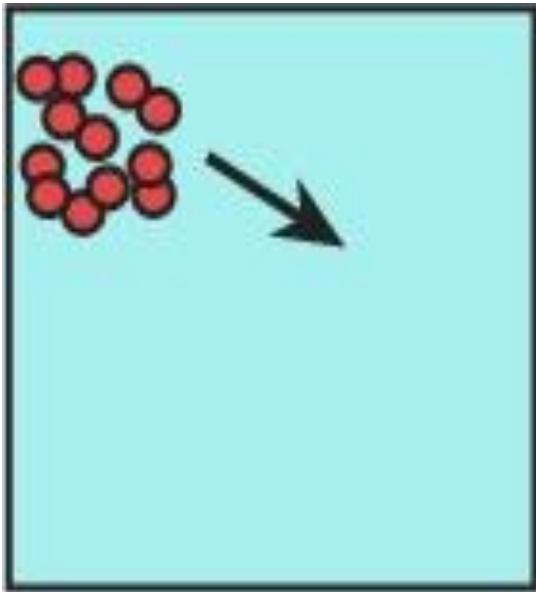






*Diffusion

The spreading of molecules from areas of high concentration to areas of low concentration.

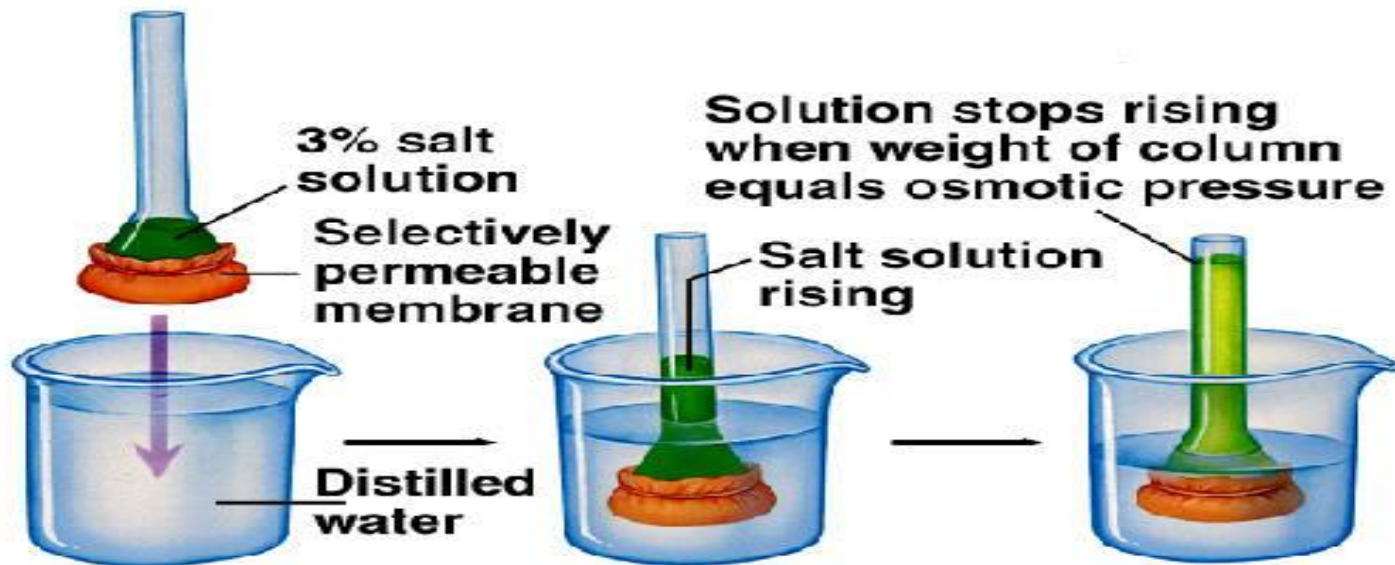


*Osmosis

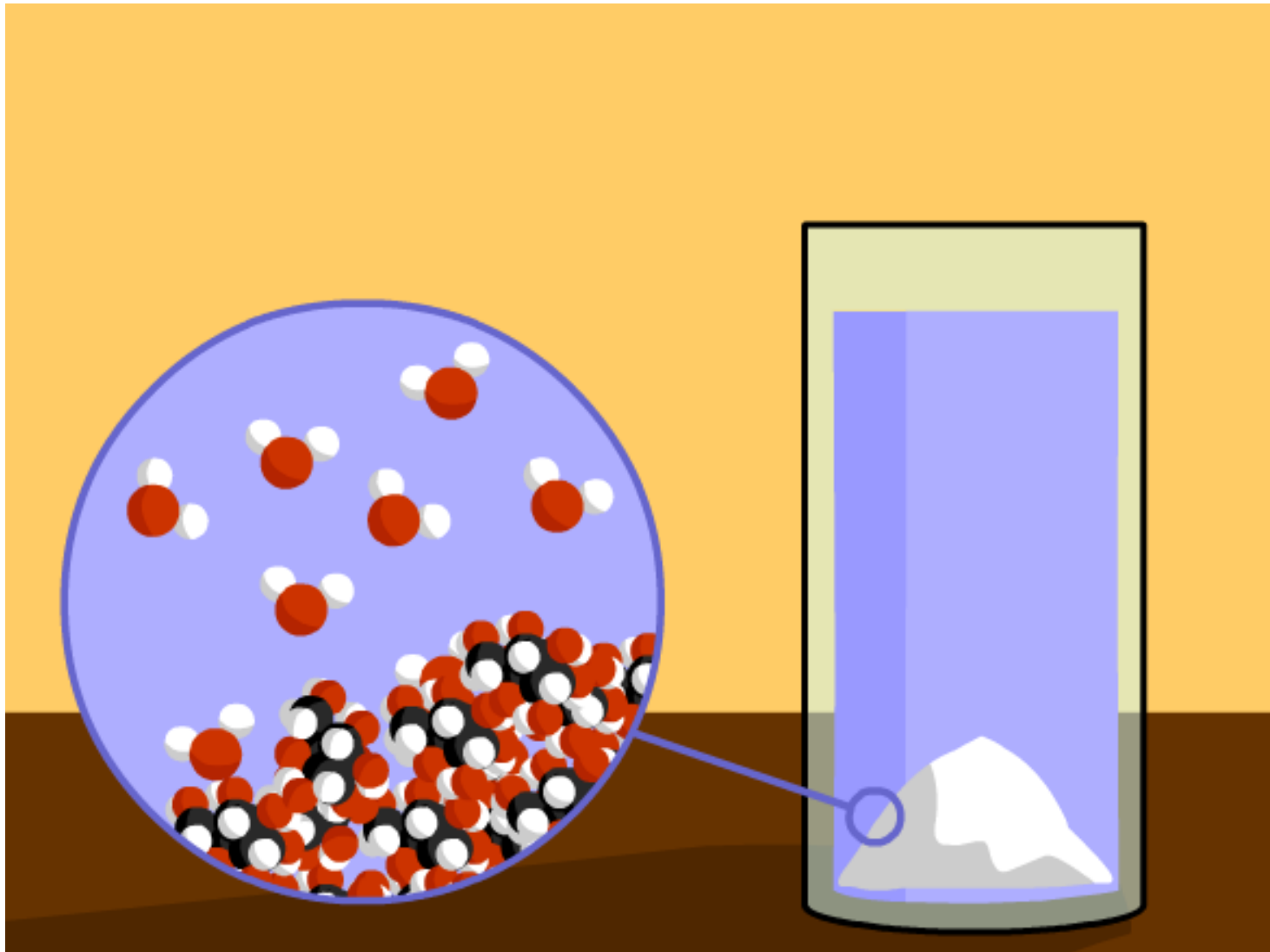
The selective diffusion of water molecules across a membrane.

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Osmosis Demonstration



Brain Pop - Diffusion



end

Extra! Extra! Read all about it..

Cells!

- <https://www.youtube.com/watch?v=gFuEo2ccTPA>
- Starting on page D154 in textbook, assign students carbs, proteins, lipids, nucleic acids
 - Students are to summarize their topic in 3-5 bullet point sentences

Lipids

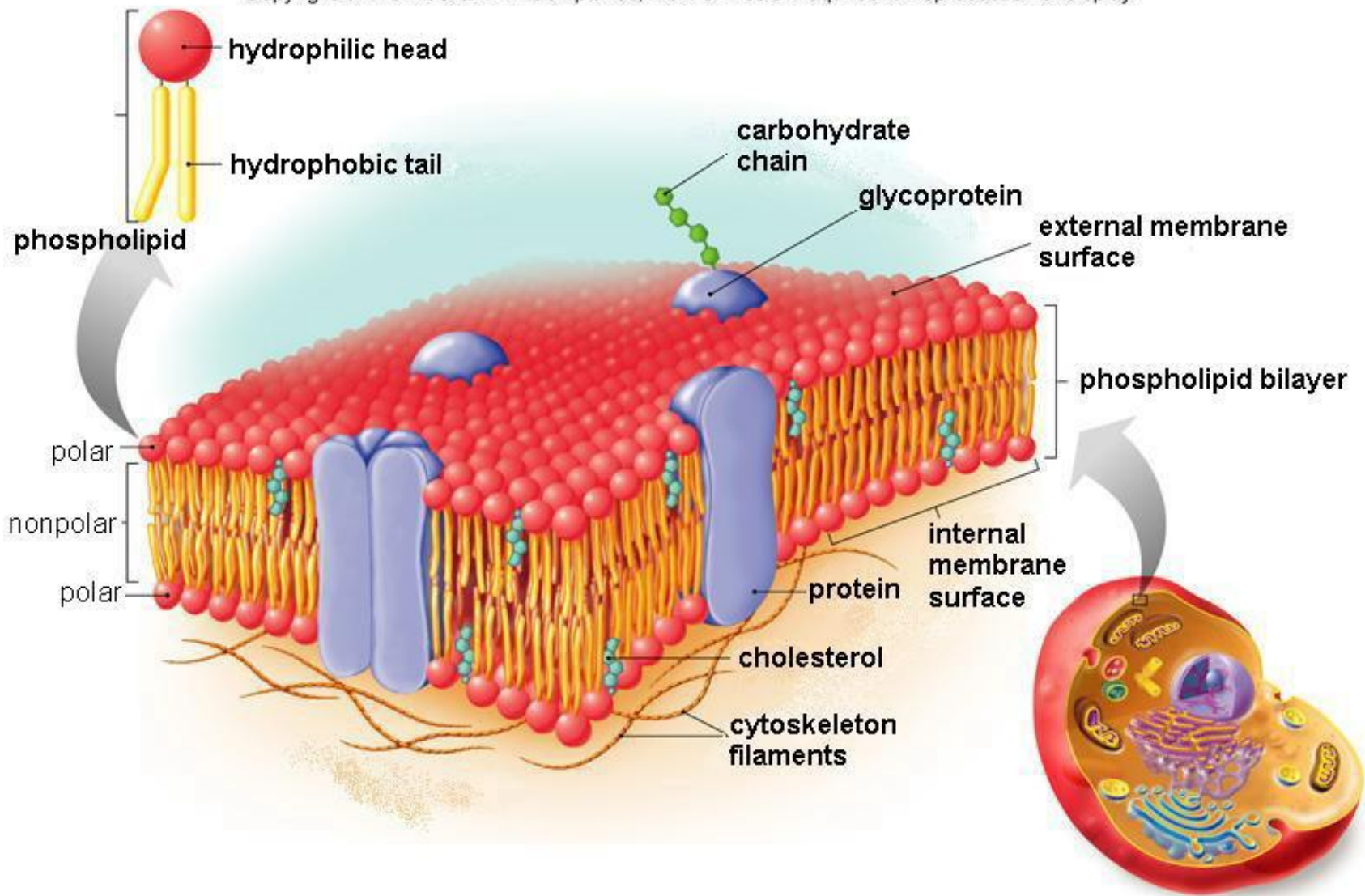
- Lipids are arranged in a special way.
 - Front – water loving
 - Tail – water hating
- Lipids do not dissolve in water
- They separate the inside of the cell from the outside of the cell

Audience participation

Using your computer or textbook answer the questions:

1. Explain polarity and give an example.
2. Why is it important that cell membrane contain lipids?
3. Which part of the lipid is polar and non-polar?

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Random yet useful....

Electrical Conductivity of oil:

- Using controlled conditions an test was assembled together using a digital volt/ohm/ammeter, a sample of engine oil, transmission oil, water and an automotive battery.

The three test liquids were put in paper cups. They were tested for continuity in the three samples with the ohmmeter starting with the lowest setting and progressively switching to the highest most sensitive settings.

Results: water passes current at some of the higher resistance settings while the 2 two respective oil samples did not have any continuity, even when the meter was on its most sensitive setting. This test was conducted multiple times and the expected result was obtained: electricity will flow thru water but the oil samples did not allow any measurable current to flow.

So in conclusion...

oil is in fact an insulator

Lorenzo's oil...

- http://www.youtube.com/watch?v=41v9TuIFu_s
- followed by fish oil for brain traumas!

<http://www.cnn.com/2014/01/18/health/fish-oil-recovery/>

Warm-up

- Explain how photosynthesis and cellular respiration can portray a continuous cycle.
- What is the difference between a cell and an atom?