UNIT 2

LIFE: STRUCTURE & FUNCTION

CHAPTER 5:

CELL STRUCTURE AND FUNCTION

LESSON 1 VOCABULARY

- CARBOHYDRATE - ONE OR MORE SUGAR MOLECULES
- CELL THEORY - LIVING THINGS ARE MADE OF ONE OR MORE CELLS; THE CELL IS THE SMALLEST UNIT OF LIFE; NEW CELLS COME FROM PREEXISTING CELLS

LESSON 1 VOCABULARY

- LIPID - LARGE MACROMOLECULE THAT DOES NOT DISSOLVE IN WATER
- MACROMOLECULE - SUBSTANCE THAT FORMS BY JOINING MANY SMALL MOLECULES

LESSON 1 VOCABULARY

- NUCLEIC ACID - MACROMOLECULE THAT FORMS WHEN A LONG CHAIN OF NUCLEOTIDES JOIN TOGETHER
- PROTEIN - LONG CHAIN OF AMINO ACID MOLECULES

LESSON 1 VOCABULARY

- THEORY - EXPLANATION BASED ON SCIENTIFIC KNOWLEDGE RESULTING FROM SEVERAL OBSERVATIONS AND EXPERIMENTS

LESSON 2 VOCABULARY

- CELL MEMBRANE - PROTECTS THE INSIDE OF A CELL FROM THE ENVIRONMENT
- CELL WALL - STIFF STRUCTURE OUTSIDE THE CELL MEMBRANE

LESSON 2 VOCABULARY

- CHLOROPLAST - MEMBRANE-BOUND ORGANELLE THAT USES LIGHT ENERGY AND MAKES FOOD
- CYTOPLASM - FLUID INSIDE A CELL THAT CONTAINS SALTS AND OTHER MOLECULES

LESSON 2 VOCABULARY

- CYTOSKELETON - NETWORK OF THREADLIKE PROTEINS INSIDE A CELL
- ENVELOPE - OUTER COVERING

LESSON 2 VOCABULARY

- FUNCTION - PURPOSE FOR WHICH SOMETHING IS USED
- NUCLEUS - DIRECTS ALL CELL ACTIVITIES AND CONTAINS DNA

LESSON 2 VOCABULARY

- ORGANELLE - MEMBRANE-BOUND CELL STRUCTURE WITH A SPECIALIZED FUNCTION

LESSON 3 VOCABULARY

- ACTIVE TRANSPORT - MOVEMENT OF SUBSTANCES THROUGH A CELL MEMBRANE USING THE CELL'S ENERGY
- DIFFUSION - MOVEMENT FROM AN AREA OF HIGHER CONCENTRATION TO AN AREA OF LOWER CONCENTRATION

LESSON 3 VOCABULARY

- ENDOCYTOSIS - PROCESS DURING WHICH A CELL TAKES IN A SUBSTANCE BY SURROUNDING IT WITH THE CELL MEMBRANE
- EXOCYTOSIS - PROCESS DURING WHICH A CELL'S VESICLES RELEASE THEIR CONTENTS OUTSIDE THE CELL

LESSON 3 VOCABULARY

- FACILITATED DIFFUSION - WHEN MOLECULES PASS THROUGH A CELL MEMBRANE USING TRANSPORT PROTEINS
- OSMOSIS - DIFFUSION OF WATER MOLECULES ONLY THROUGH A MEMBRANE

LESSON 3 VOCABULARY

- PASSIVE TRANSPORT - MOVEMENT OF SUBSTANCES THROUGH A CELL MEMBRANE WITHOUT USING ENERGY

LESSON 4 VOCABULARY

- CELLULAR RESPIRATION - SERIES OF CHEMICAL REACTIONS THAT CONVERT ENERGY IN FOOD MOLECULES INTO ATP
- FERMENTATION - REACTION USED TO OBTAIN ENERGY FROM FOOD WHEN OXYGEN LEVELS ARE LOW

LESSON 4 VOCABULARY

- GLYCOLYSIS - PROCESS BY WHICH GLUCOSE IS BROKEN DOWN
- PHOTOSYNTHESIS - SERIES OF REACTIONS THAT CONVERT LIGHT ENERGY, WATER, AND CO2 INTO GLUCOSE AND GIVE OFF OXYGEN

LESSON 1:

CELLS AND LIFE

STANDARDS

- 7.LS1.3
  - EVALUATE EVIDENCE THAT CELLS HAVE STRUCTURAL SIMILARITIES AND DIFFERENCES ACROSS KINGDOMS.

I CAN…

- DESCRIBE THE KEY SUBSTANCES THAT MAKE UP A CELL.
- DESCRIBE HOW SCIENTISTS' UNDERSTANDING OF CELLS DEVELOPED.

ESSENTIAL QUESTIONS

- HOW DID SCIENTISTS' UNDERSTANDING OF CELLS DEVELOP?
- WHAT BASIC SUBSTANCES MAKE UP A CELL?

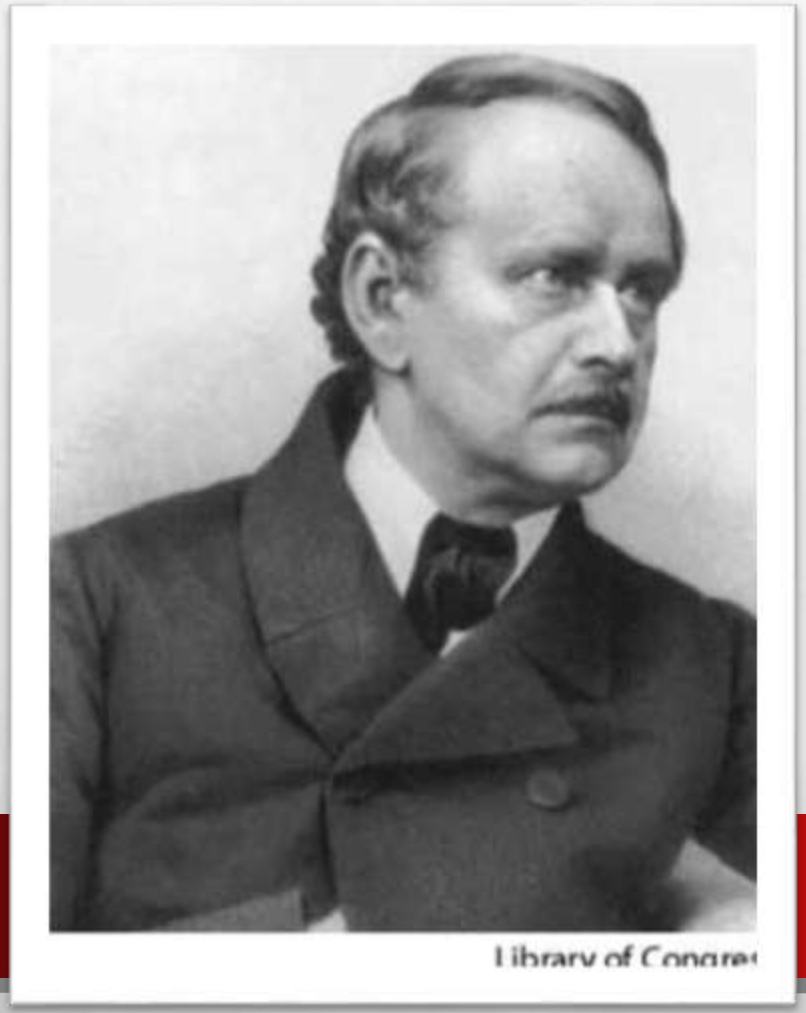
PHENOMENON

- A STUDENT DEVELOPS A MICROSCOPE SLIDE TO OBSERVE AN UNKNOWN SUBSTANCE. THEY NOTICE THAT THERE'S A PATTERN TO HOW IT'S ARRANGED AND WHAT IT'S MADE UP OF.

UNDERSTANDING CELLS

- MICROSCOPES ENABLE US TO SEE THE TINY BASIC UNITS OF ALL LIVING THINGS.
- ROBERT HOOKE SAW THE OPENINGS IN CORK AND CALLED THEM CELLS.

UNDERSTANDING CELLS



- MATTHIAS SCHLEIDEN AND THEODOR SCHWANN REALIZED THAT PLANT AND ANIMAL CELLS HAVE SIMILAR FEATURES.

UNDERSTANDING CELLS

- THE CELL THEORY HAS THREE PARTS:
  - ALL LIVING THINGS ARE MADE OF ONE OR MORE CELLS.
  - THE CELL IS THE SMALLEST UNIT OF LIFE.
  - ALL NEW CELLS COME FROM PREEXISTING CELLS.

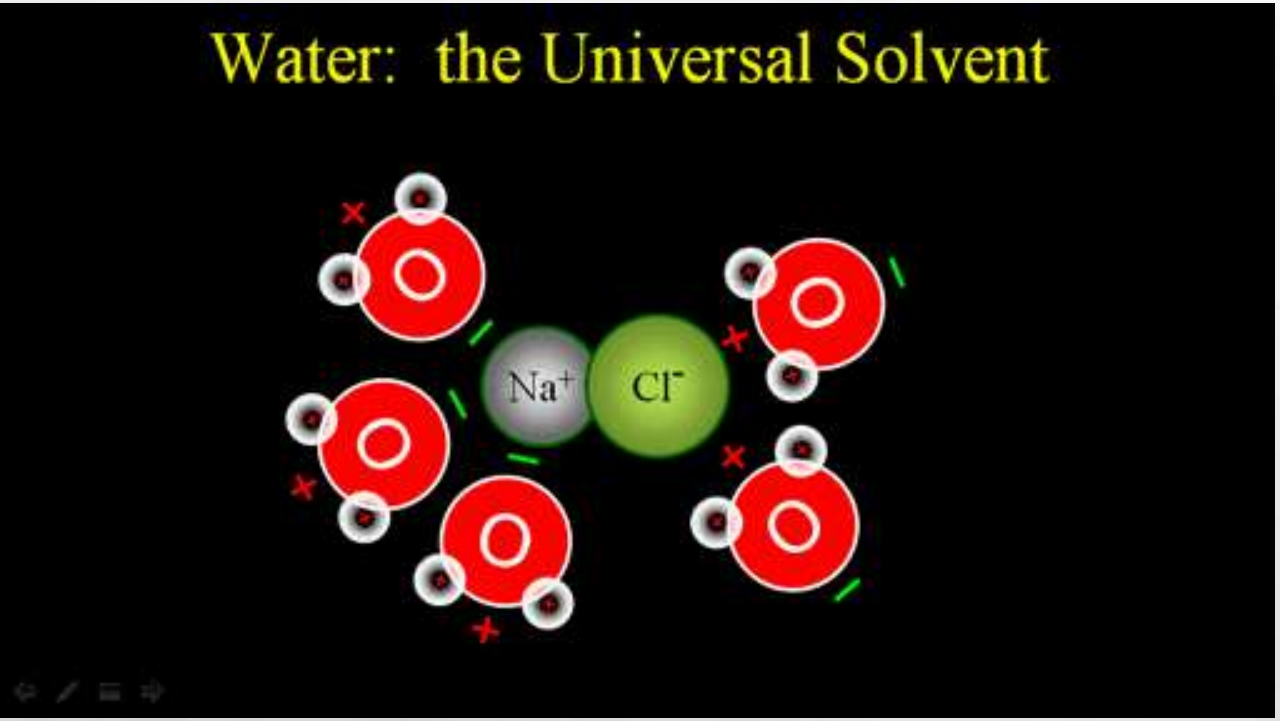
THE WACKY HISTORY OF CELL THEORY

BASIC CELL SUBSTANCES

- MACROMOLECULES FORM WHEN MANY SMALL MOLECULES JOIN.
- THE MAIN INGREDIENT OF ANY CELL IS WATER.

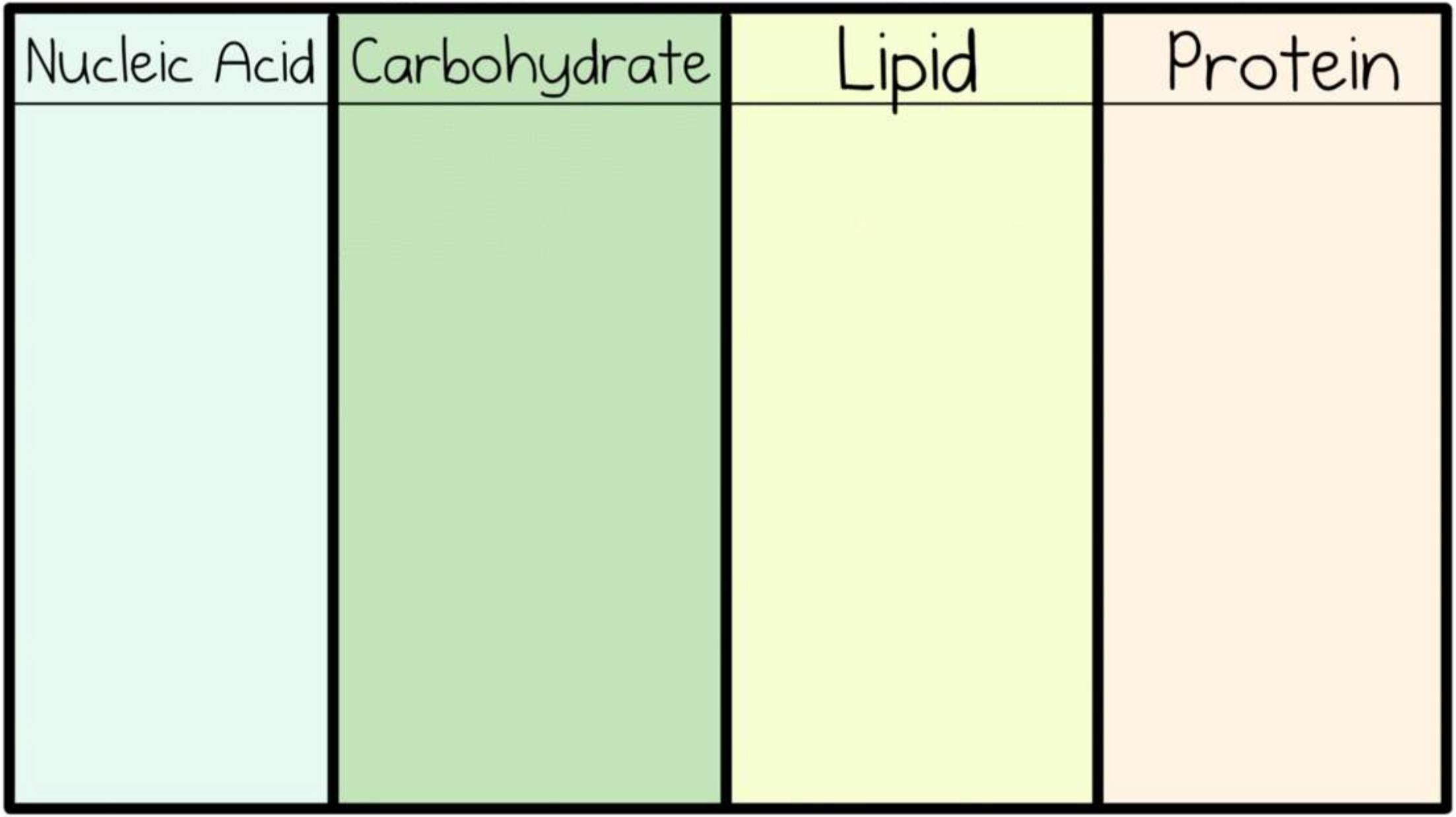

Macromolecules

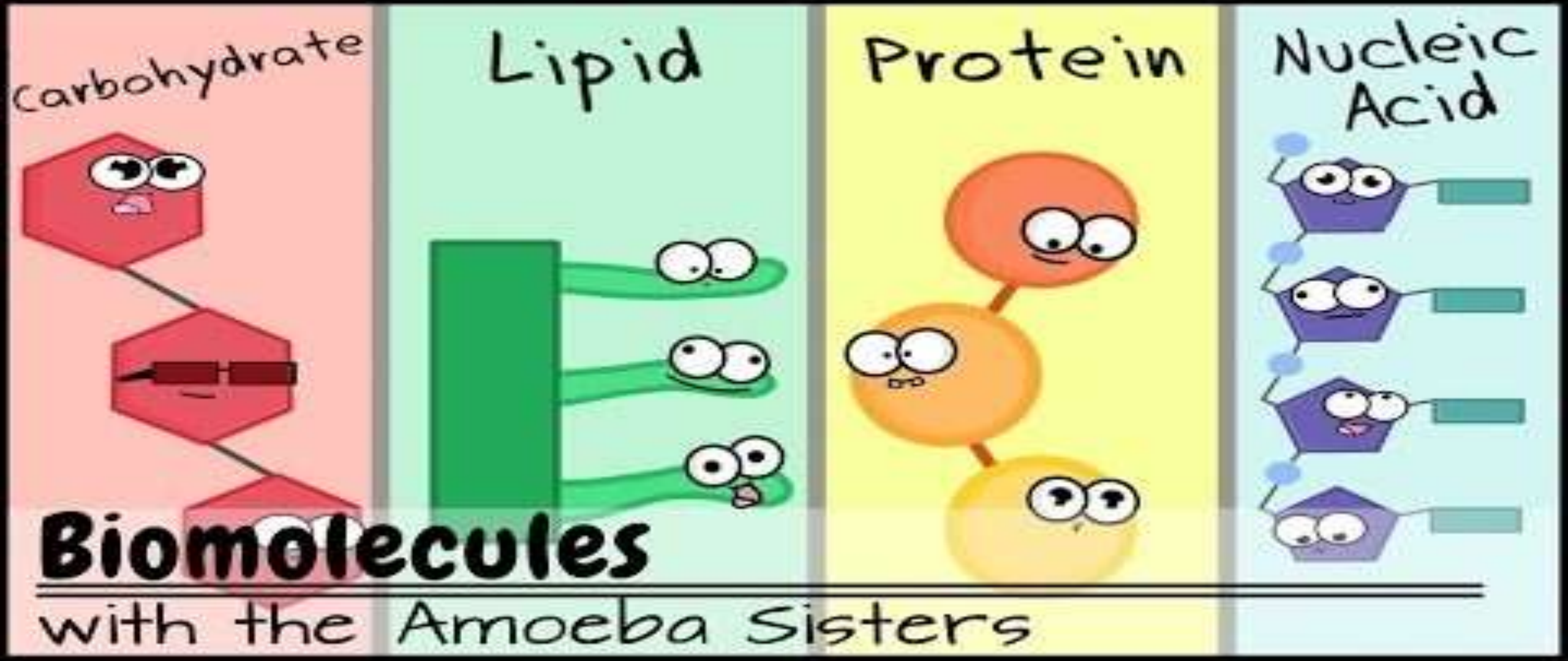
BASIC CELL SUBSTANCES



- THE STRUCTURE OF A WATER MOLECULE MAKES IT IDEAL FOR DISSOLVING MANY OTHER SUBSTANCES.

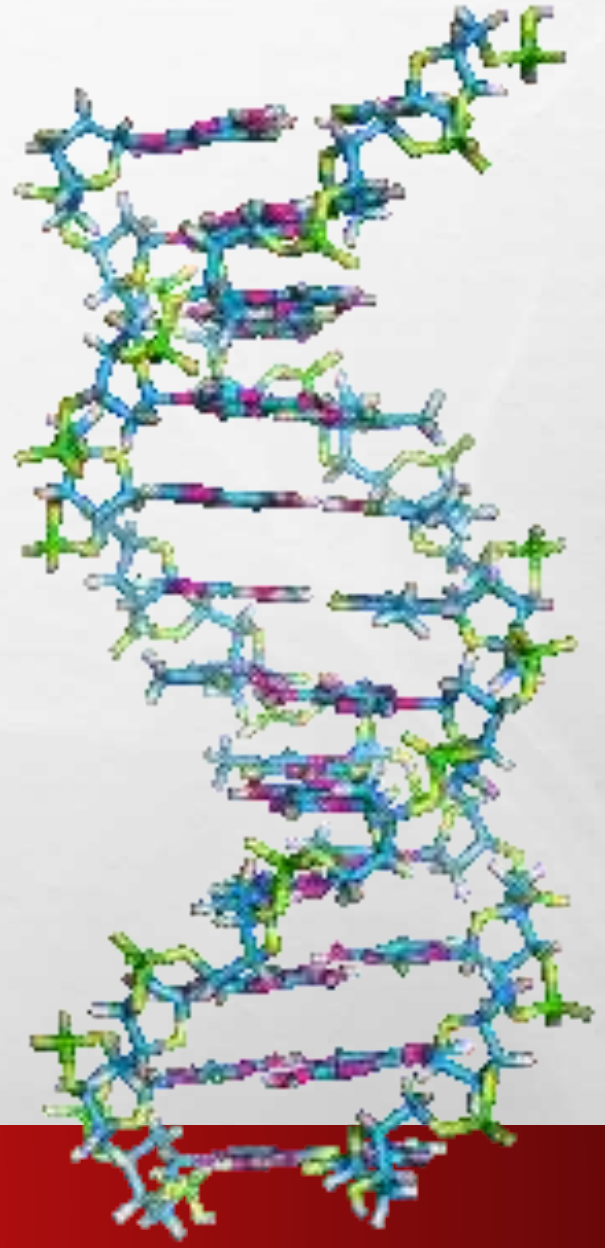
Monomers of Biomolecules



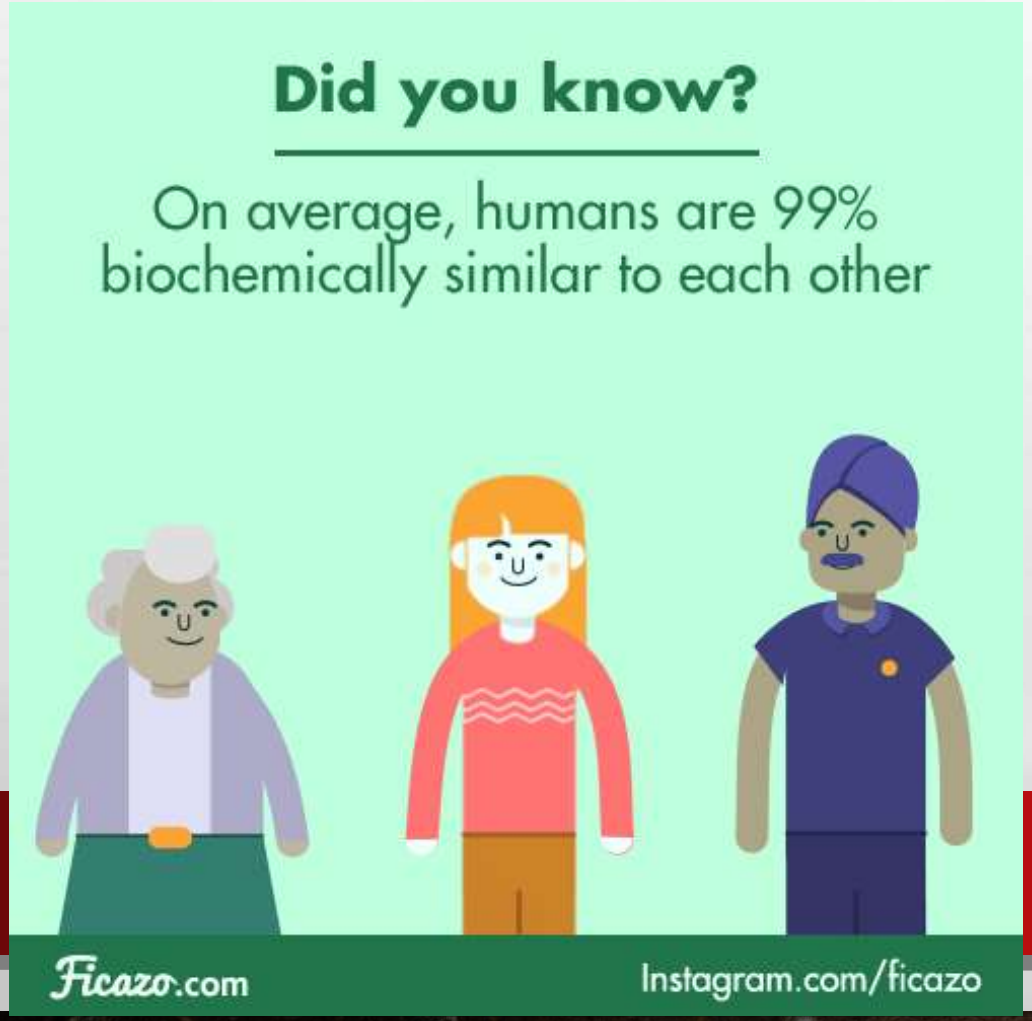

Carbohydrate
Lipid
Protein
Nucleic Acid
Biomolecules
with the Amoeba Sisters

BASIC CELL SUBSTANCES

- NUCLEIC ACIDS FORM WHEN LONG CHAINS OF MOLECULES CALLED NUCLEOTIDES JOIN.

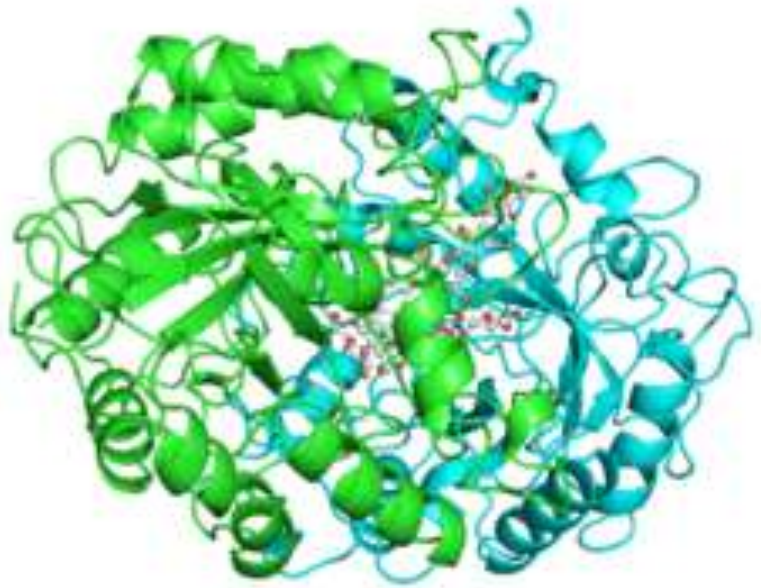


BASIC CELL SUBSTANCES



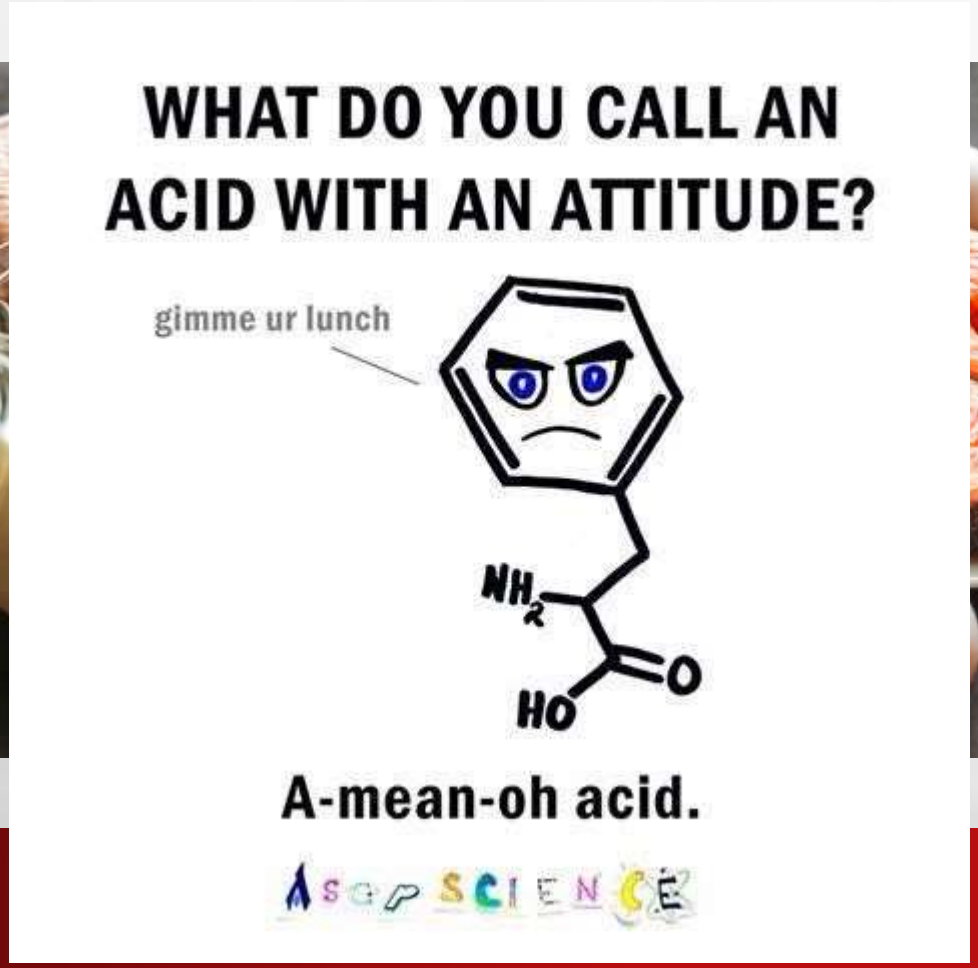
- NUCLEIC ACIDS ARE IMPORTANT IN CELLS BECAUSE THEY CONTAIN GENETIC INFORMATION.

BASIC CELL SUBSTANCES



- THE MACROMOLECULES THAT ARE NECESSARY FOR NEARLY EVERYTHING CELLS DO ARE PROTEINS.

BASIC CELL SUBSTANCES

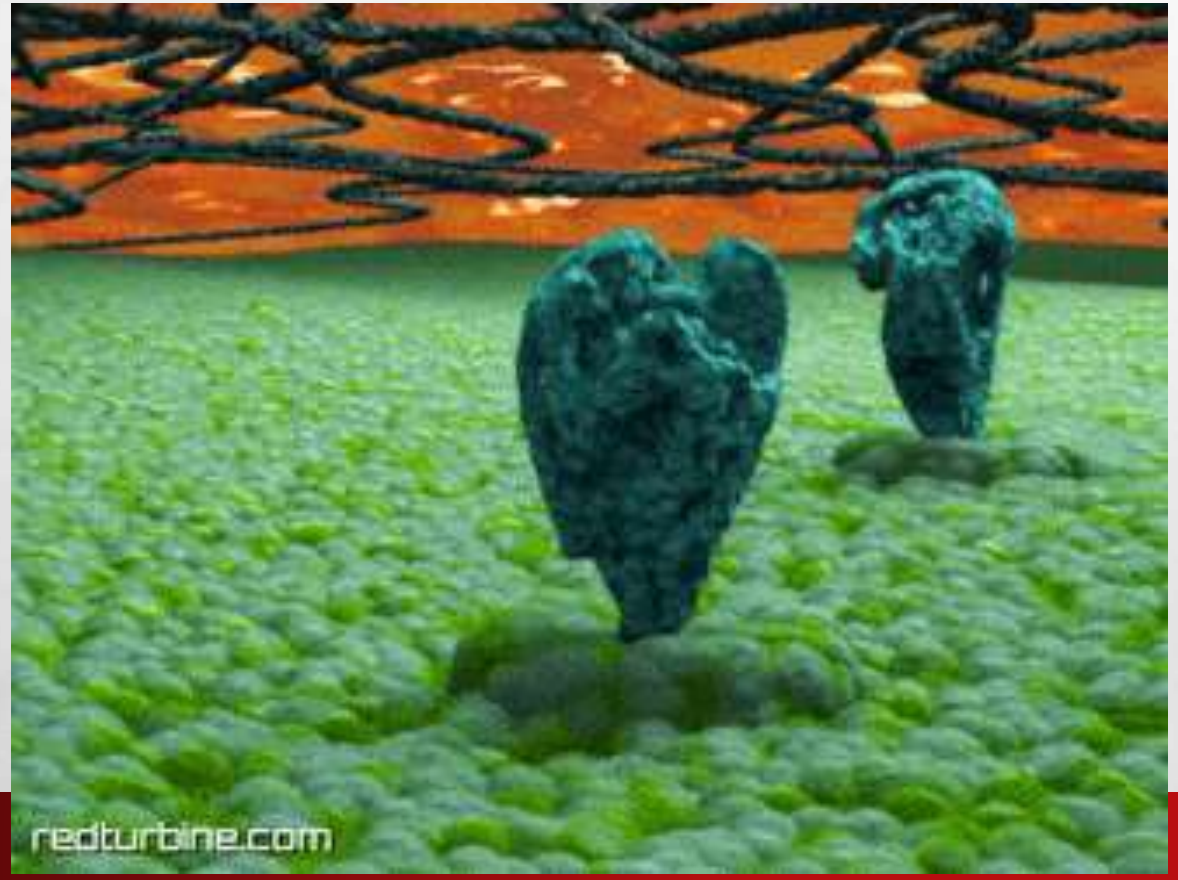


- PROTEINS ARE LONG CHAINS OF AMINO ACID MOLECULES. SOME PROTEINS HELP BREAK DOWN NUTRIENTS IN FOOD.

BASIC CELL SUBSTANCES

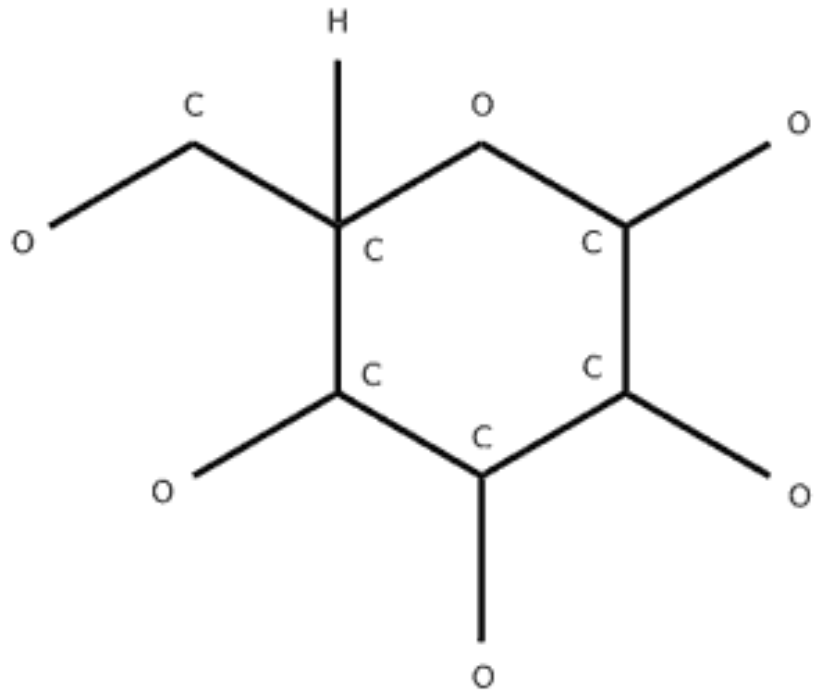
- A(N) LIPID IS A LARGE MACROMOLECULE THAT DOES NOT DISSOLVE IN WATER.

BASIC CELL SUBSTANCES



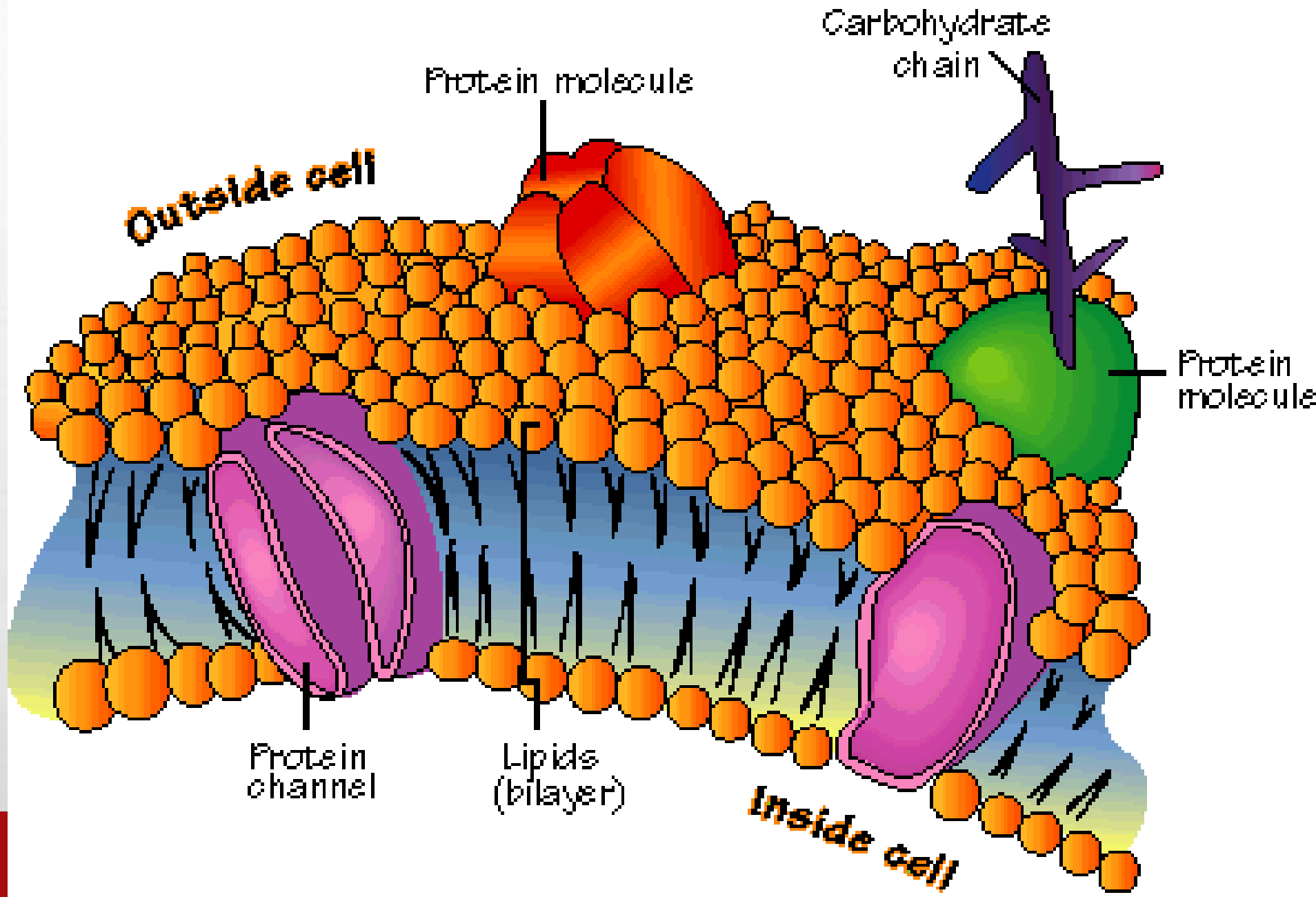
- MACROMOLECULES THAT DO NOT MIX WITH WATER PLAY AN IMPORTANT ROLE AS PROTECTIVE BARRIERS IN CELLS.

BASIC CELL SUBSTANCES



- ONE SUGAR MOLECULE, TWO SUGAR MOLECULES, OR LONG CHAINS OF SUGAR MOLECULES MAKE UP CARBOHYDRATES.

BASIC CELL


Carbohydrate chain
Protein molecule
Outside cell
Protein molecule
Protein channel
Lipids (bilayer)
Inside cell