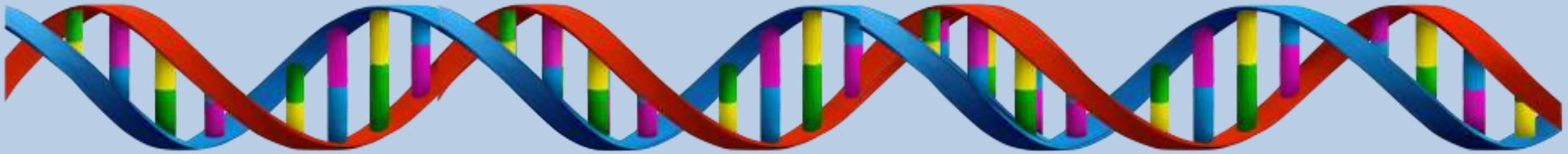
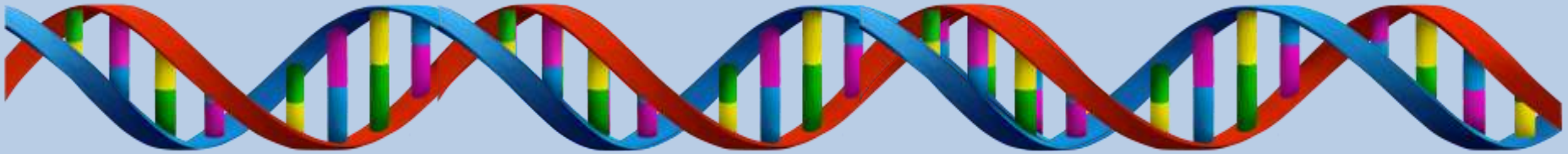
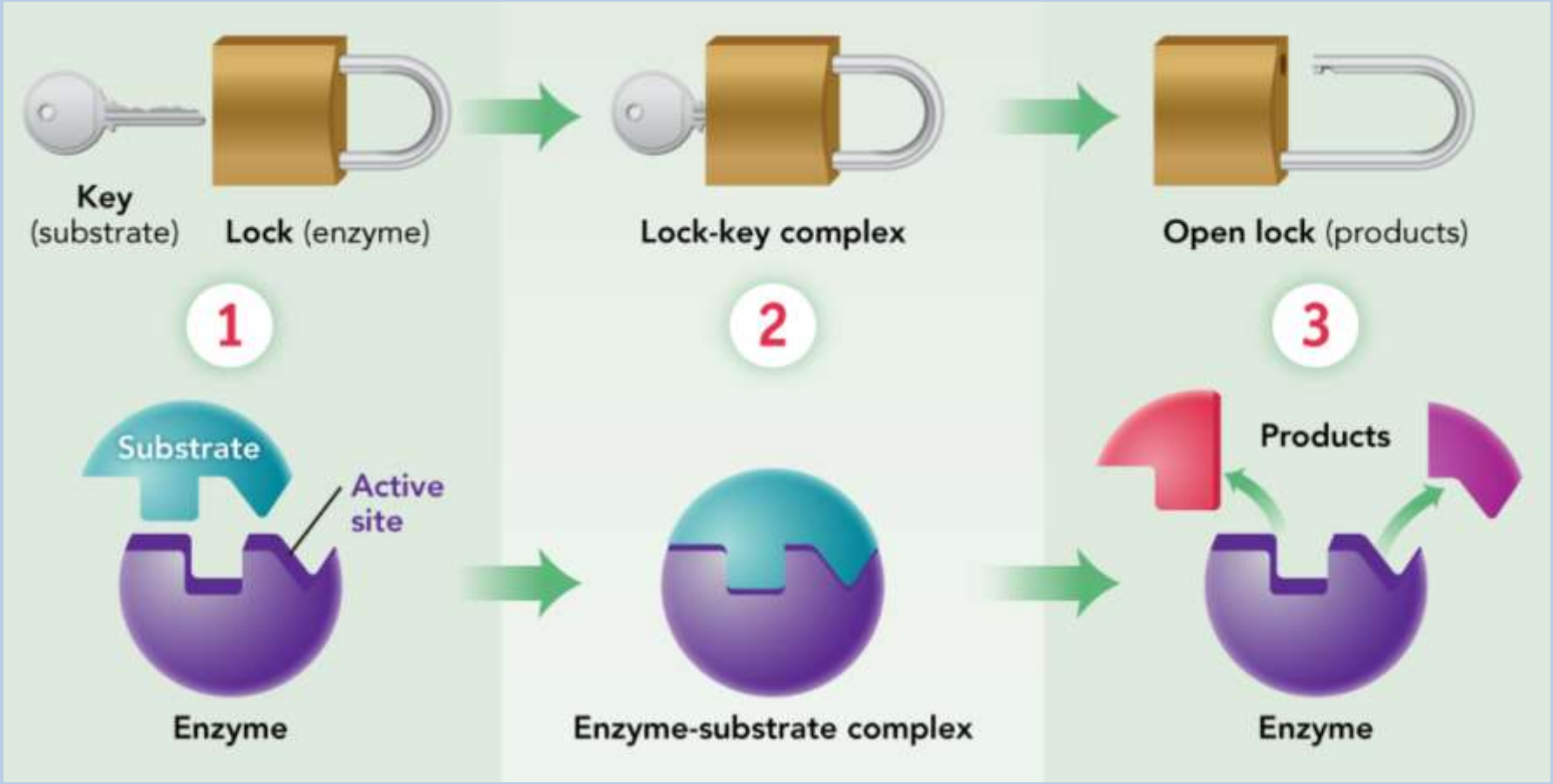


1. What properties of water make it important for life?
2. Why are macromolecules important for life?
3. Why are enzymes important for life?
4. What temperature is the optimal temperature for your enzymes?



Enzymes


Key
(substrate)
Lock (enzyme)
Lock-key complex
Open lock (products)
1
2
3
Substrate
Active site
Products
Enzyme
Enzyme-substrate complex
Enzyme

Logistics

- **Unit 1 Assessment is THURSDAY, OCTOBER 3rd**
  - **Covers chapters 1-2**

Unit 1: The Nature of Life Review

- Science in Context
- Characteristics of Life
- Properties of Water
- Carbon Compounds
- Enzymes

Unit 1 Review

1. Describe the goals of science
2. Explain the procedures that make up the scientific method
3. Define the term scientific theory (and understand how it is different from a hypothesis)

Unit 1 Review

1. Describe the goals of science:

The goal of science is use data to find patterns and make predictions/solve problems

2. Explain the procedures that make up the scientific method:

- Observation -> Curiosity -> Questions
- Form Hypotheses
- Conduct Controlled Experiments
- Collect and Analyze Data
- Draw Conclusions

3. Define the term scientific theory (and understand how it is different from a hypothesis)

A scientific theory is a well-tested explanation of how/why something happens, IT IS SIGNIFICANT BECAUSE IT IS SUPPORTED BY A GREAT DEAL OF EVIDENCE

Theory

- **A highly tested, reliable, significant explanation of events in the natural world**
  - **supported by copious data**
  - **unifies repeated observations and hypotheses**
  - **leads to accurate predictions**
- ***EXPLAINS THE HOW/WHY***

Law

- **Accepted as a universally accurate explanation about a phenomena**
- ***EXPLAINS THE WHAT***

Theories and Laws

- *ARE MEANINGFUL IN SCIENCE*
- *Theories are NOT less important than laws*
- **An idea is not elevated to a theory or law until there is a plethora of statistically significant data to support it**
- **They can change with new evidence**

Unit 1 Review

4. Describe how attitudes and experiences generate new ideas

5. Explain why peer review is important

Unit 1 Review

4. Describe how attitudes and experiences generate new ideas: Curiosity! And a desire to change the world/ solve problems

5. Explain why peer review is important: To remove bias

Unit 1 Review

6. Explain the relationship between science and society:
7. List practices common to both science and engineering:

Unit 1 Review

6. Explain the relationship between science and society: science solves problems within the limitations/logistics of society

7. List practices common to both science and engineering:

- Developing and using models
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence

Unit 1 Review

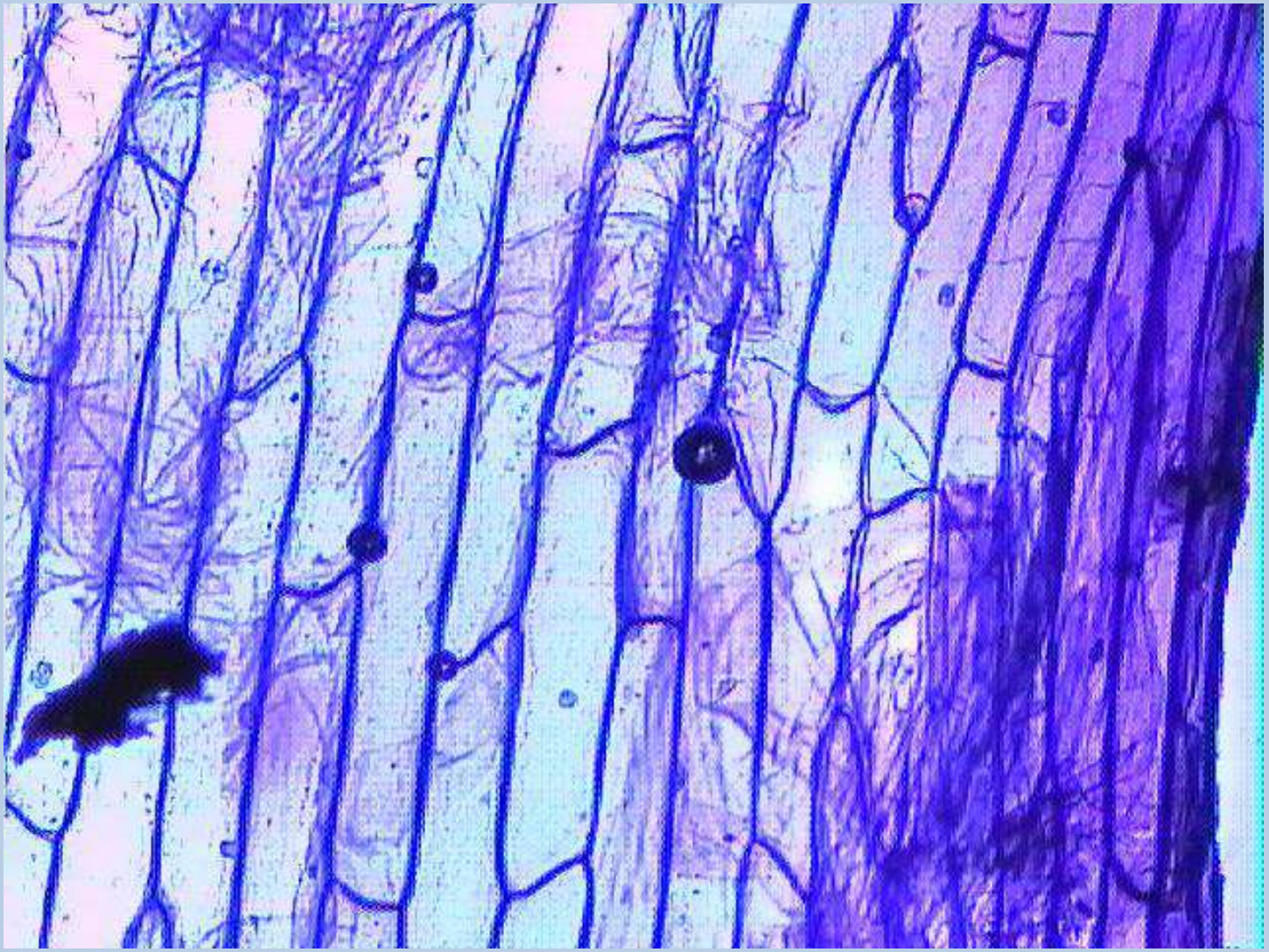
8. Identify characteristics of all living things:

Unit 1 Review

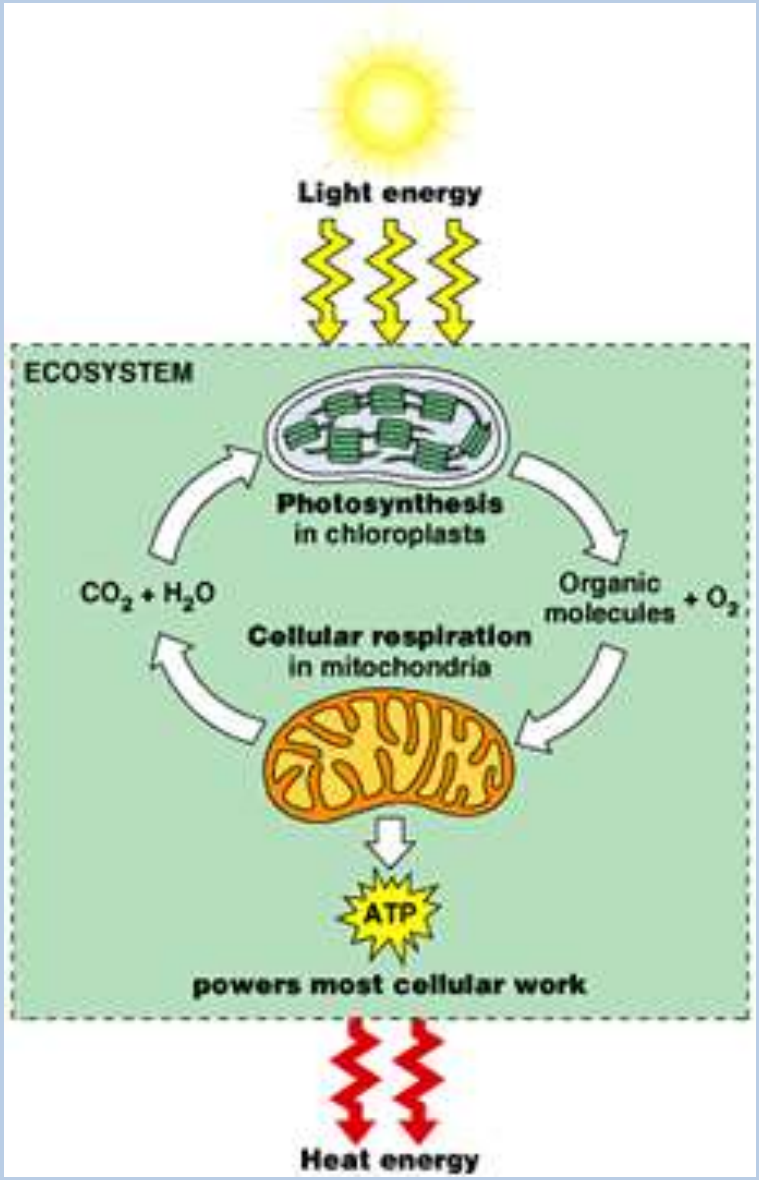
8. Identify characteristics of all living things:

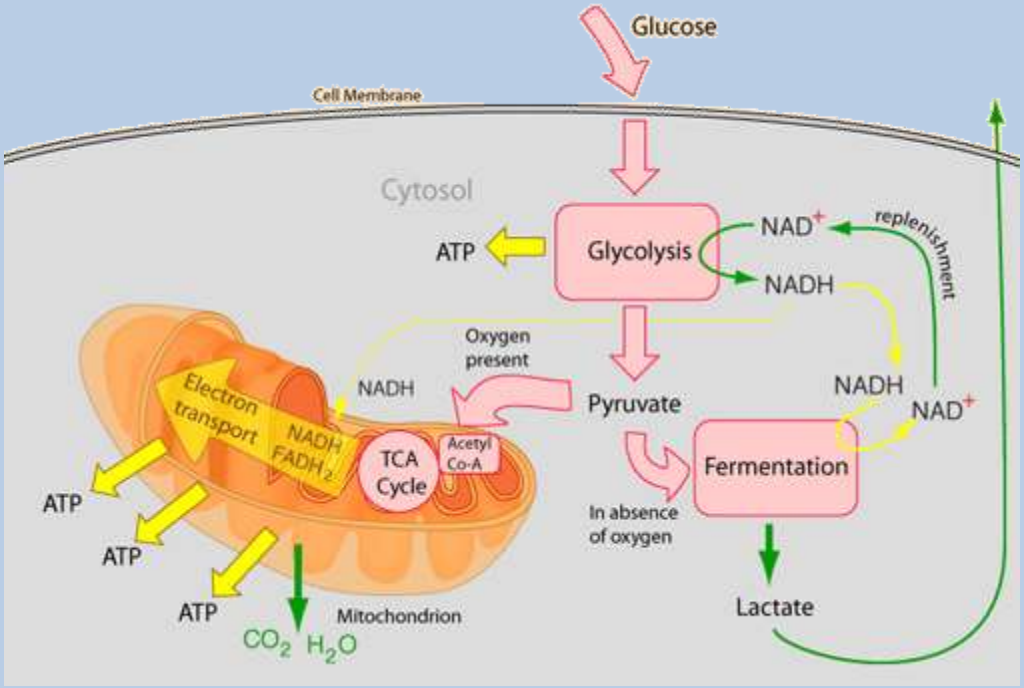
- Cells
- Genetic Material
- Metabolism
- Reproduce
- Homeostasis
- Respond to Stimuli
- Change over Time
- Evolution

Characteristics of Life - Cells



Characteristics of Life - Metabolism

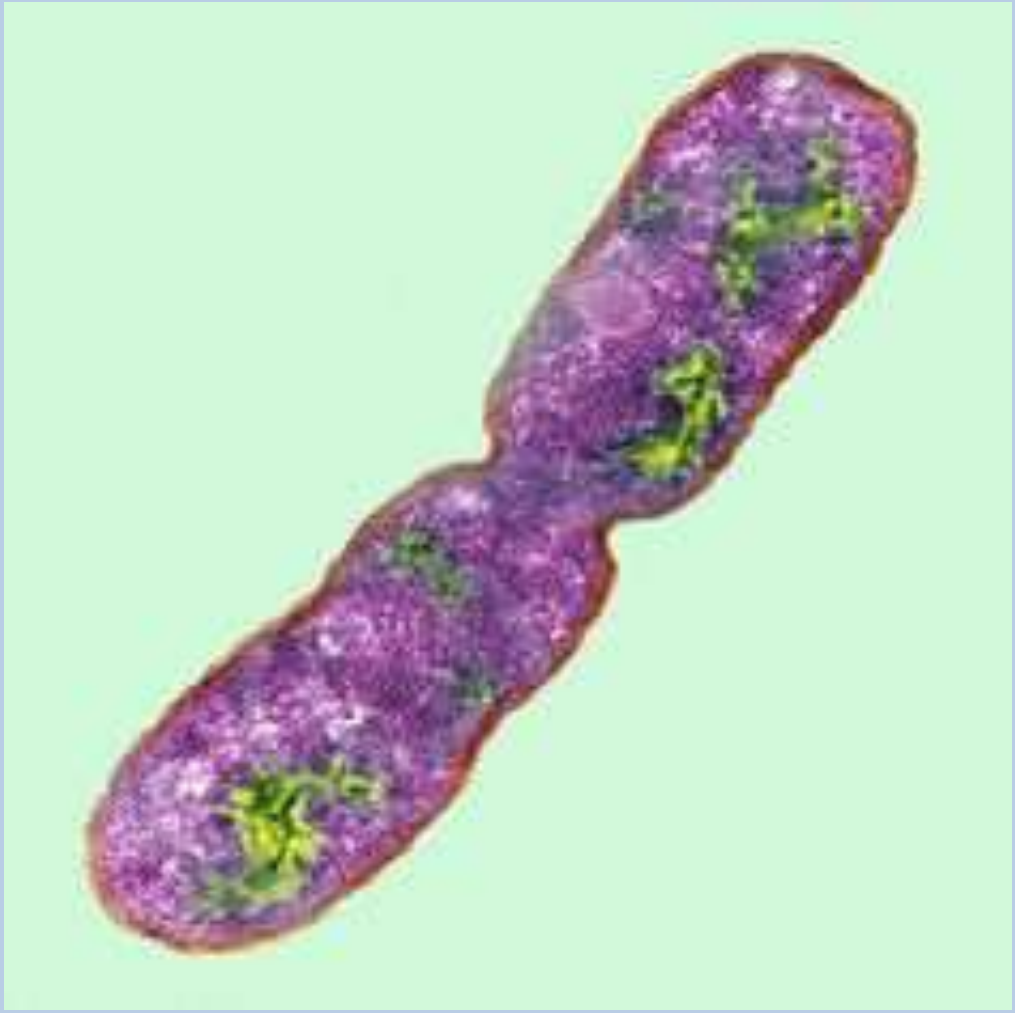




Characteristics of Life – Response to Stimuli

Characteristics of Life – Homeostasis

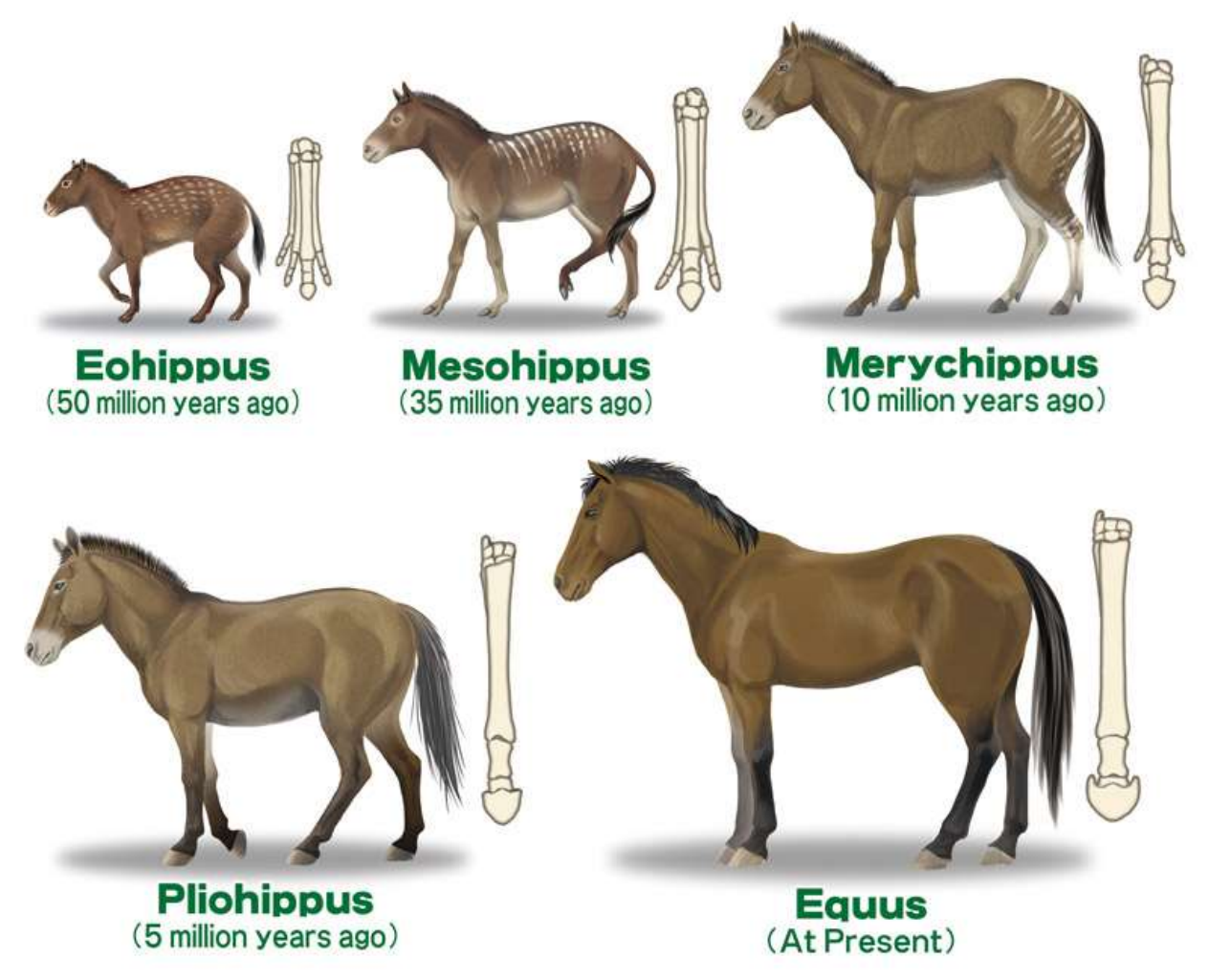
Characteristics of Life – Reproduction



Characteristics of Life – Change Over Time

Characteristics of Life – Genetic Material

Characteristics of Life – Evolution



Life must do all of these things INDEPENDENTLY.

Unit 1 Review

9. Explain the unique properties of water

10. Explain how water's polarity affects the way that water interacts with other substances

Unit 1 Review

9. Explain the unique properties of water: water is polar because oxygen pulls on the electrons

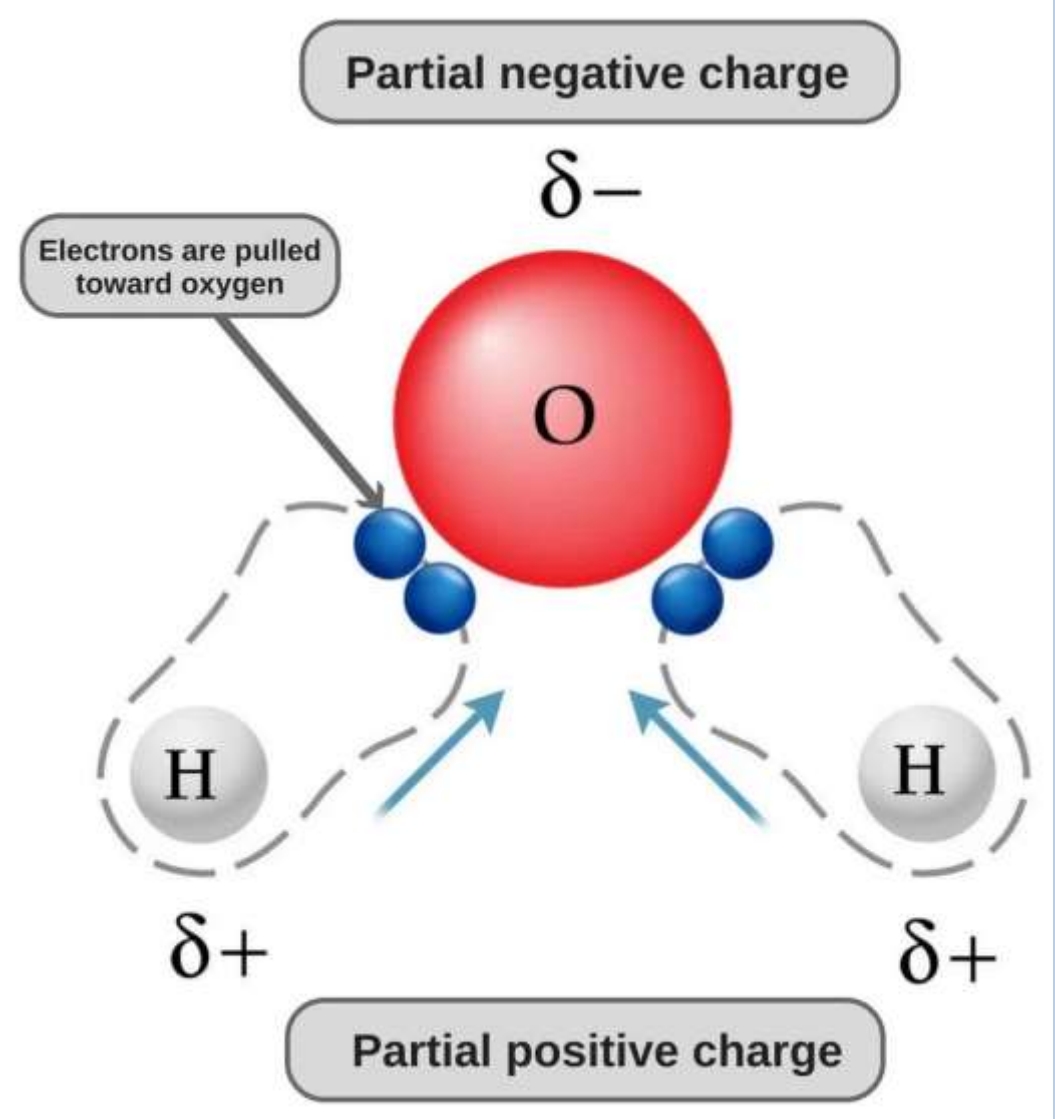
10. Explain how water's polarity affects the way that water interacts with other substances:

Polar → Cohesion → Surface Tension

Polar → Adhesion → Capillary Action

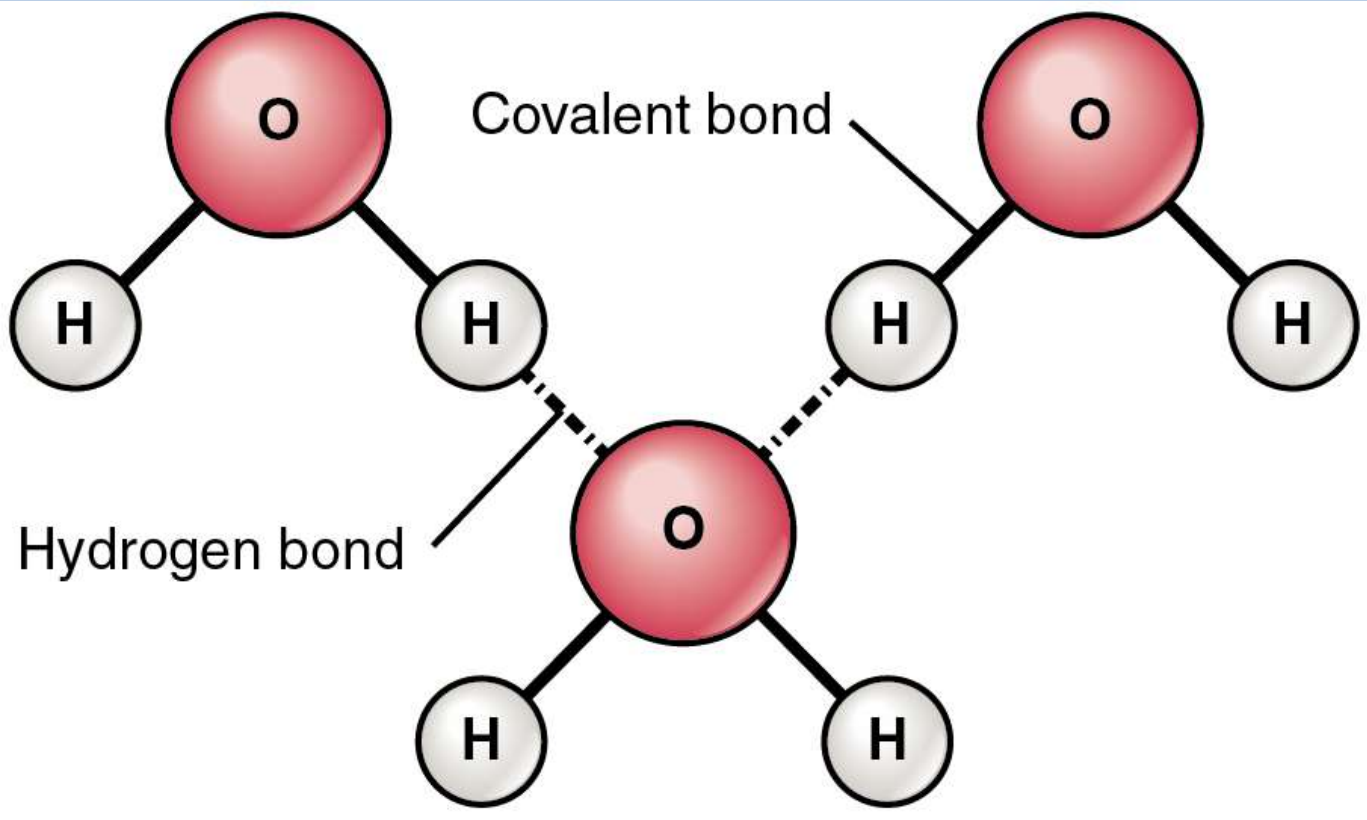
Magic of Water

Polar: Atoms of a molecule have unequal pulls on electrons, creating a positive end and a negative end



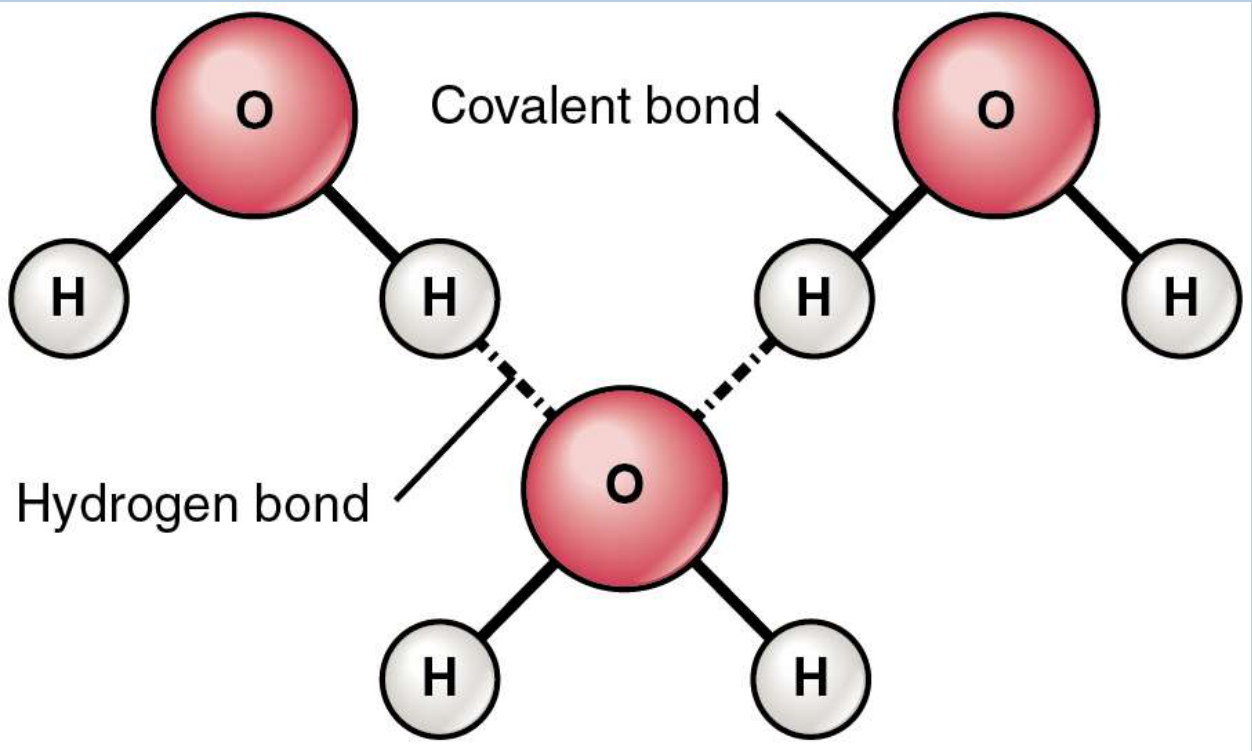
Magic of Water

Covalent bond: forms when atoms share electron pairs



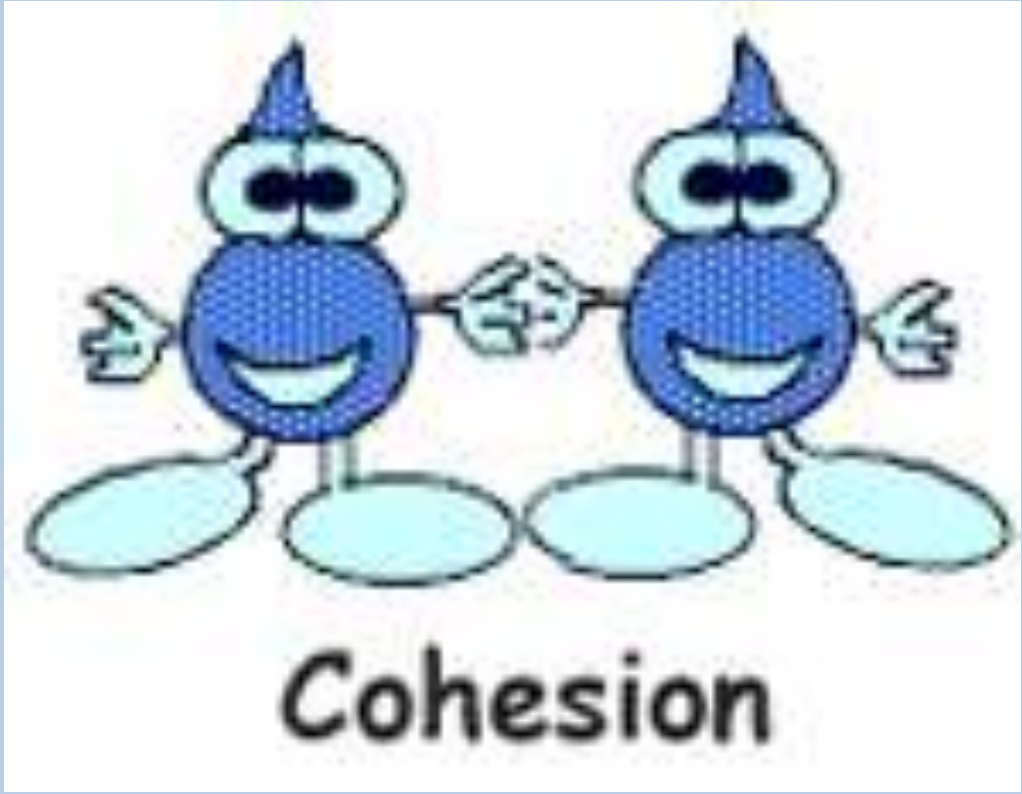
Magic of Water

Hydrogen bond: attraction between a partial positive H and a partial negative atom (form between water molecules)



Magic of Water

Cohesion: Water molecules are attracted to water molecules



Magic of Water

Surface tension: Water molecules at the surface are more attracted to each other than to other molecules (air)

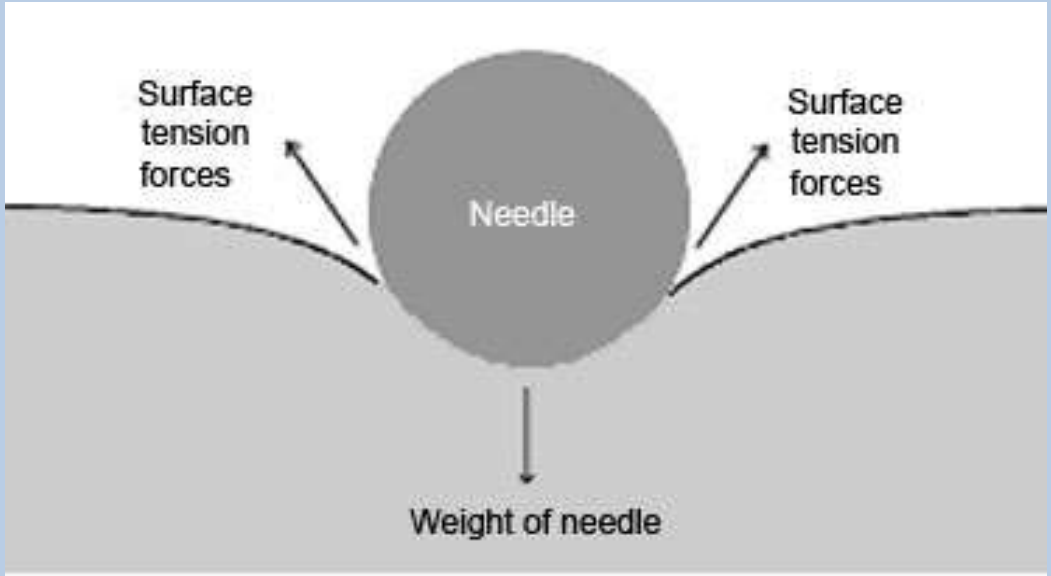


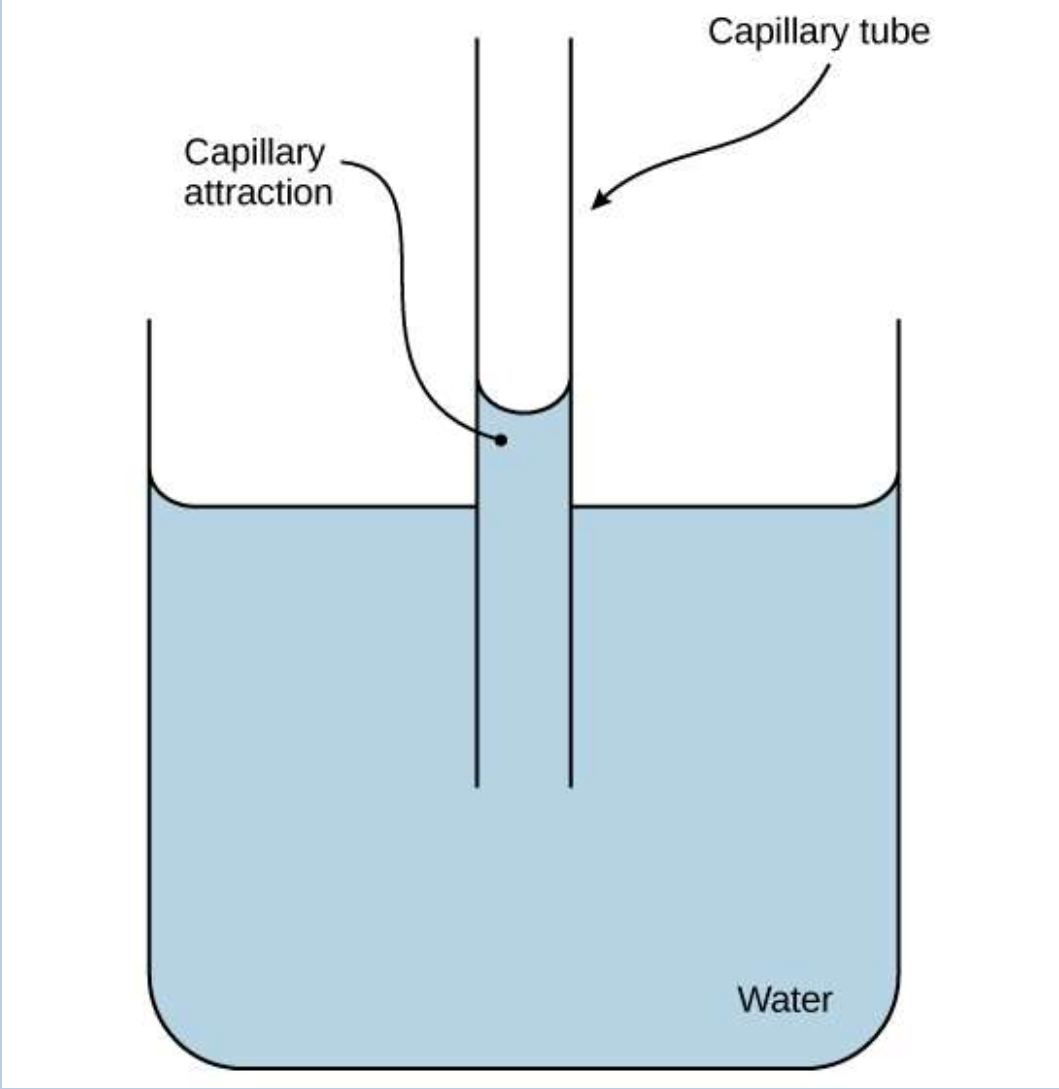
Fig 2. Forces enabling a needle to float on water

Magic of Water

Adhesion: Water molecules are attracted to other molecules

Magic of Water

Capillary Action: Movement of water through tubes and porous materials



Unit 1 Review

11. Identify the elements that carbon bonds with to make up the molecules of life

12. Explain the functions of each of the four groups of macromolecules

Unit 1 Review

11. Identify the elements that carbon bonds with to make up the molecules of life:

hydrogen, oxygen
proteins: nitrogen
nucleic acids: nitrogen and phosphorus

12. Explain the functions of each of the four groups of macromolecules:

Carbohydrates: energy and structure

Proteins: structure and function

Lipids: energy

Nucleic Acids: genetic information/instructions

Unit 1 Review

13. Explain what happens to chemical bonds during chemical reactions

14. Investigate how energy changes affect whether a chemical reaction will occur

Unit 1 Review

13. Explain what happens to chemical bonds during chemical reactions: they are broken and reformed in different patterns

14. Investigate how energy changes affect whether a chemical reaction will occur: enzymes lower the activation energy and make the reaction happen faster

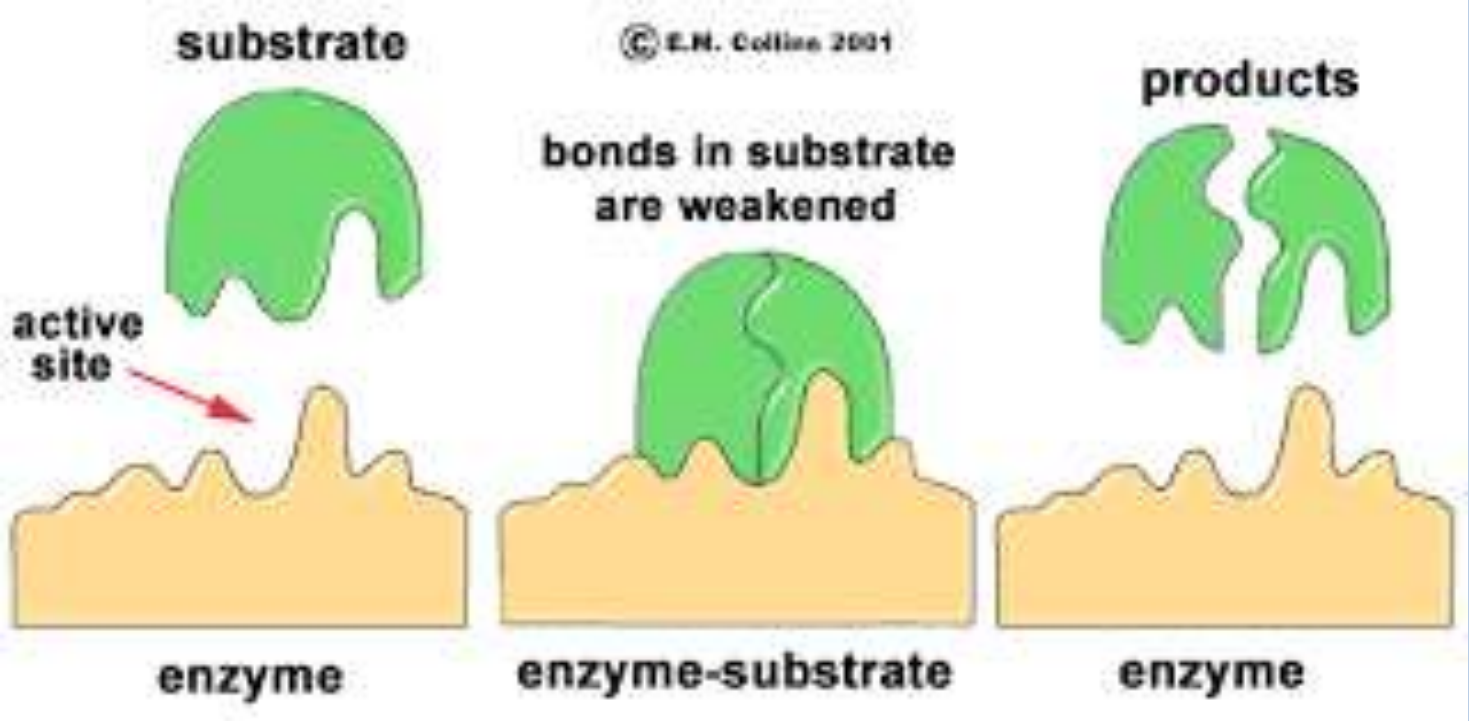
Unit 1 Review

15. Explain the role enzymes play in living things and what affects their function

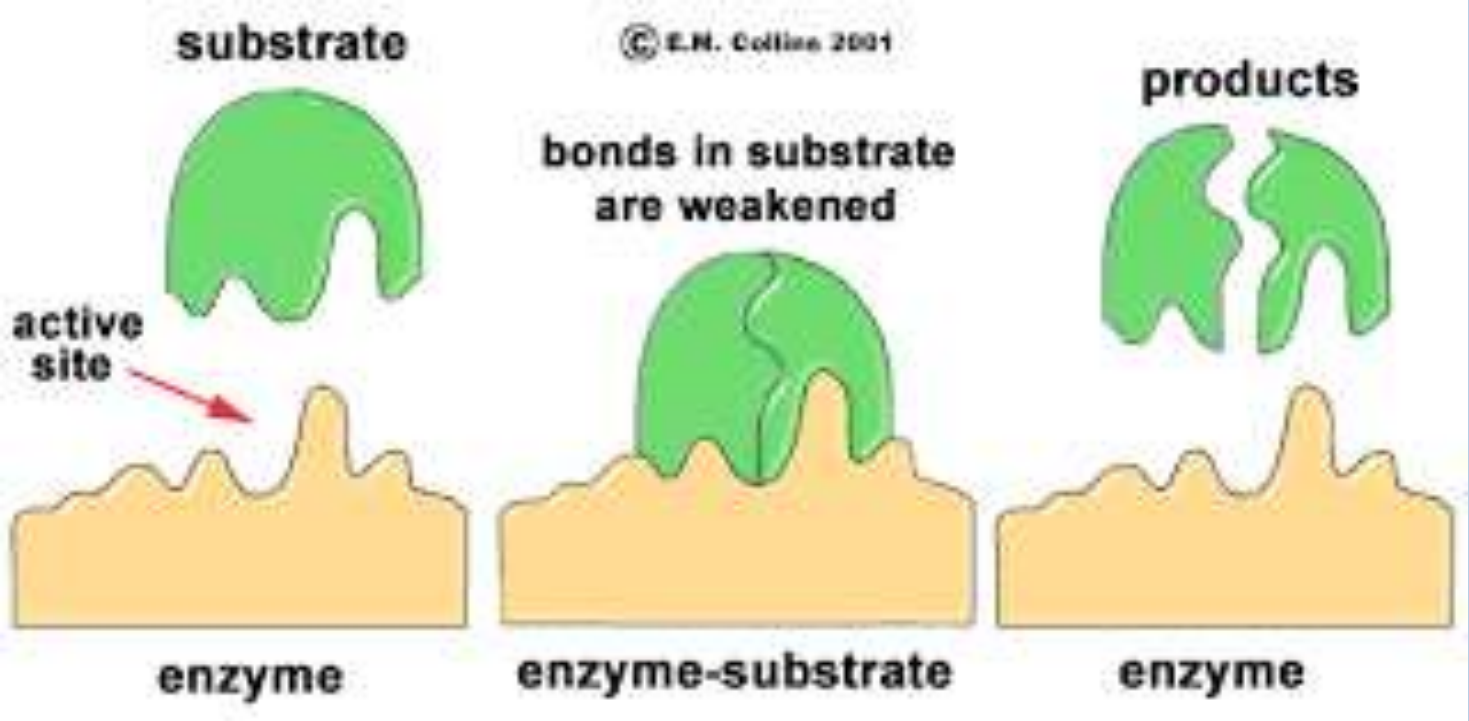
Unit 1 Review

15. Explain the role enzymes play in living things and what affects their function: Enzymes make reactions happen faster in living things, their function is affected by changes in temperature and pH

Enzymes

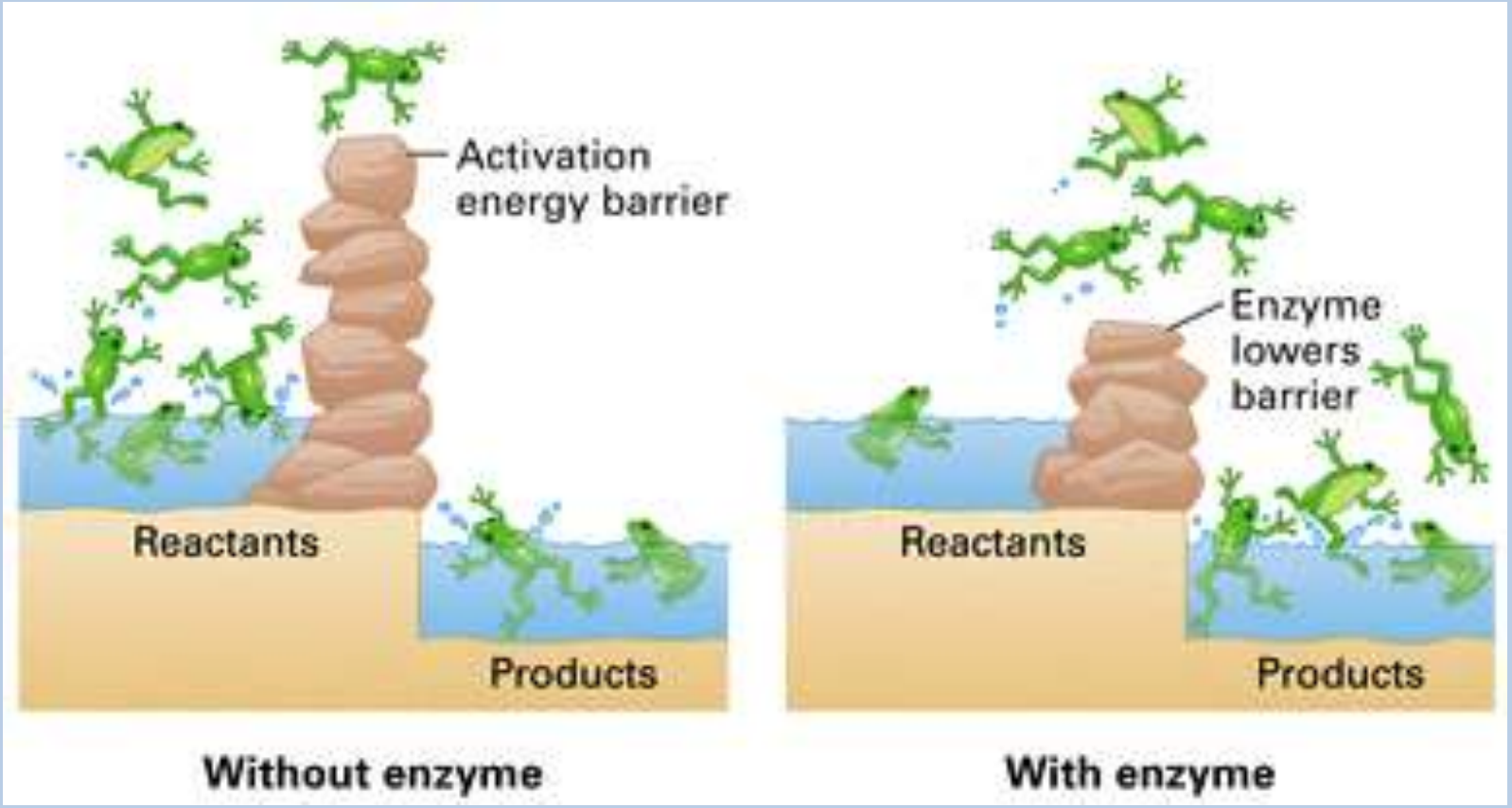

substrate
© E.N. Collins 2001
products
bonds in substrate
are weakened
active
site
enzyme
enzyme-substrate
enzyme

Enzymes


substrate
© E.N. Collins 2001
products
bonds in substrate
are weakened
active
site
enzyme
enzyme-substrate
enzyme

Enzymes

- **Enzymes make reactions happen FASTER by lowering activation energy**



Unit 1 Practice Test

- Use a laptop, or lab computer, to login to Pearson
- You have been assigned various quizzes
- When you finish complete any assignments the computer gives you to fill in gaps in your knowledge

Review

- **MAKE SURE YOU CLICK ON THE ORANGE HEADING ON REALIZE**