

## SYNTHESIZE THE UNIT



In your Evidence Notebook, make a concept map, graphic organizer, or outline using the Study Guides you made for each lesson in this unit. Be sure to use evidence to support your claims.

When synthesizing individual information, remember to follow these general steps:

- Find the central idea of each piece of information.
- Think about the relationships between the central ideas.
- Combine the ideas to come up with a new understanding.

## DRIVING QUESTIONS

Look back to the Driving Questions from the opening section of this unit. In your Evidence Notebook, review and revise your previous answers to those questions. Use the evidence you gathered and other observations you made throughout the unit to support your claims.

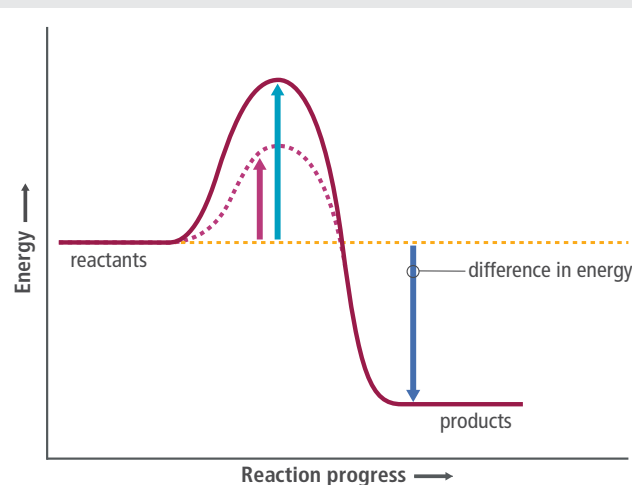
## PRACTICE AND REVIEW

Use the information in from Figure 4 to answer question 1.

1. In the graph shown in Figure 4, the solid red line represents the energy of a chemical reaction. The dotted red line represents the energy of the same reaction, in the presence of a catalyst. Which statement best describes the role played by the catalyst?
  - a. The catalyst is used up in the reaction.
  - b. The catalyst makes the reaction more endothermic.
  - c. The catalyst increases the concentration of reactants.
  - d. The catalyst lowers the activation energy of the reaction.

## Activation Energy with a Catalyst

FIGURE 4: The Effect of a Catalyst on a Chemical Reaction

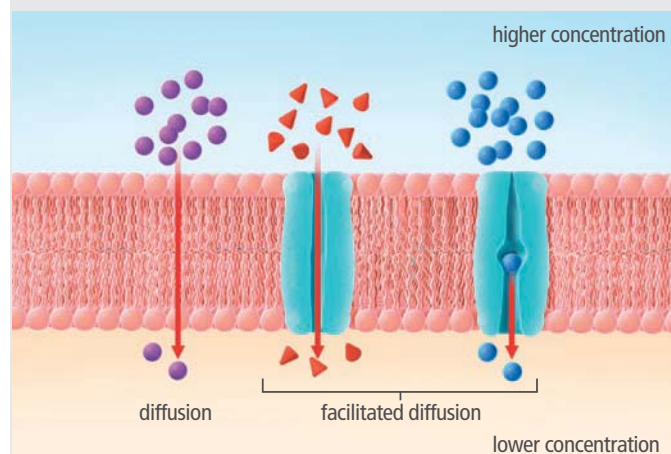


2. Hydrogen bonding is an important factor contributing to many properties of water, including boiling point, specific heat, and adhesion. Which of the following would be true if hydrogen bonds between water molecules did not form? Select all correct answers.
  - a. Water would have less mass per volume.
  - b. Plants would be less efficient in transporting water from roots to leaves.
  - c. Heat produced by biochemical processes would be more difficult to regulate.
  - d. Less water would exist in liquid form on the surface of Earth.
3. In large hydrocarbon molecules such as fatty acids, the component atoms are held together by covalent bonds. Can similar stable molecules be formed with hydrogen bonds? Explain your reasoning.
4. In our bodies, the enzyme amylase is present in saliva and breaks down starch molecules into maltose. In our intestines, the enzyme maltase breaks down maltose into two glucose molecules. In your Evidence Notebook, develop a model demonstrating what effect an amylase enzyme deficiency would have on a person.
5. You learn that two sugar compounds are isomers, meaning they have the same chemical formula but differ in the placement of atoms and/or bonds. Would you expect the two sugars to have the same physical and chemical properties? Explain why or why not.

6. A phospholipid bilayer is the central component of cell membranes, which water molecules cannot freely pass through. What characteristics of the phospholipid bilayer prevent water from crossing freely?
- The exterior and interior regions of the membrane are hydrophobic, keeping water outside.
  - The exterior and interior regions of the membrane are hydrophilic, trapping water inside the membrane.
  - The exterior of the membrane is hydrophobic, keeping water away, though the interior is hydrophilic.
  - The exterior of the membrane is hydrophilic, but the interior is hydrophobic, keeping water from passing.
7. Is it more difficult for your body to break down simple carbohydrates or complex carbohydrates?
- Simple carbohydrates are easier to break down because they consist of only one or two sugar molecules.
  - Complex carbohydrates are easier to break down because they consist of many sugars chained together.
  - Simple carbohydrates are easier to break down because they consist of many sugars chained together.
  - Complex carbohydrates are easier to break down because they consist of only one or two sugar molecules.
8. What would be likely to happen if the hydrogen bonds in DNA were broken?
- The loss of bonds would cause a DNA mutation.
  - The hydrogen bonds would be replaced with covalent bonds.
  - The loss of bonds would tear the DNA strands apart.
  - The loss of bonds could cause the DNA strands to fuse.
9. Insulin is a protein made up of two polypeptide chains. If a mutation caused a change in one of the amino acids in the primary structure of one of the insulin subunits, could that change affect the secondary, tertiary, or quaternary structure of the protein as well? In your Evidence Notebook, create a model to show how each level of protein structure might be affected by a primary structural change.

Use the information from Figure 5 to answer question 10.

**FIGURE 5:** Modes of passive transport include diffusion and facilitated diffusion.



10. In the image in Figure 5, molecules are entering a cell via forms of passive transport. If the molecules reach a higher concentration inside the cell than outside, which of these forms, if any, can still be used to transport molecules into the cell? Are other methods of transport more suitable in this scenario? Explain your reasoning.

## UNIT PROJECT

Return to your unit project. Prepare your research and materials into a presentation to share with the class. In your final presentation, evaluate the strength of your hypothesis, data, analysis, and conclusions.

Remember these tips while evaluating:

- Consider the chemical properties of the stains, and how those properties affect the effectiveness of the soaps.
- Do your predictions match closely with your observations in the experiments? Why or why not?
- Think of ways you could apply your findings to predict properties of other substances.