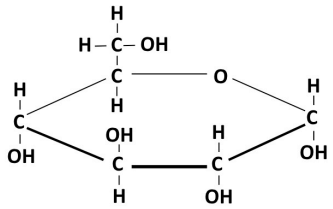
Name _____ Teacher _____ Date _____

2.3: Molecules in Cells Quiz

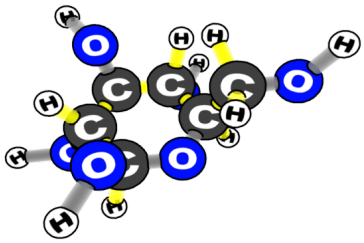
*This tool has "grading" in the title because at this point, students can be held accountable for correct answers. Level 4 (correct) responses to the questions are in **blue bold italics** below. There are also comments about common Level 2 and Level 3 responses to help you with grading and making decisions about what to emphasize in future lessons.*

Red italics suggest ways to grade student responses by giving them points for correct or partially correct answers. There are 22 points total on this quiz.

These questions are about a kind of sugar molecule, glucose. Here are three different ways of showing a glucose molecule.



$C_6H_{12}O_6$



1. What atoms are in the glucose molecule? (Circle one or more than one)

Hydrogen Calcium ***Carbon*** Nitrogen ***Oxygen*** Helium Iron Sodium

1 point for each correct choice: circle or not circle for each atom (8 points total)

b. After this molecule is eaten by an animal, will the atoms still exist inside the animal?
Circle one: ***YES*** NO

1 point for correct response

c. Explain your answer.

Level 4 responses will connect this question to a key fact about atoms in the Three Questions poster: Atoms last forever in living systems.

Level 3 responses may confuse atoms and molecules. It is true that molecules will not exist (these will be digested and taken apart), but the atoms last forever and will not cease to exist.

Level 2 responses may suggest that the atoms disappear because they were eaten by the animal.

1 point for correct response

2. Does the glucose molecule have chemical energy?
Circle one: ***YES*** NO

1 point for correct response

3. How did you decide if the glucose molecule has chemical energy?

Level 3 and 4 responses will suggest that the glucose molecule has chemical energy stored in its C-C and C-H bonds.

Level 2 responses may focus on atoms or bonds in general rather than specifically on C-C and C-H bonds.

1 point for correct response

4. To the right is the nutrition label for peanut butter.
List the three most important kinds of organic molecules in peanut butter:
Level 4 responses will identify fats, carbohydrates, proteins.
Level 3 and 2 responses may identify micronutrients such as cholesterol, water, iron, vitamins, sodium or calcium.
1 point for each correct response (3 points total)

Peanut Butter

Nutrition Facts

Serving Size (100g)
Servings Per Container

Amount Per Serving	
Calories 590	Calories from Fat 450
	% Daily Value*
Total Fat 50g	**77%**
Saturated Fat 8g	**40%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 15mg	**1%**
Total Carbohydrate 22g	**7%**
Dietary Fiber 8g	**32%**
Sugars 9g	
Protein 24g	

Vitamin A 0%	• Vitamin C 0%
Calcium 4%	• Iron 10%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

		Calories:	2,000	2,500
Total Fat	Less than		65g	80g
Saturated Fat	Less than		20g	25g
Cholesterol	Less than		300mg	300mg
Sodium	Less than		2,400mg	2,400mg
Total Carbohydrate			300g	375g
Dietary Fiber			25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

5. Does peanut butter have chemical energy?
Circle one: ***YES*** NO
1 point for correct response

Explain your answer. How do you know?
Level 4 responses will suggest that the fat, carbohydrate, and protein molecules in the peanut butter are organic molecules, so they all contain C-C and C-H bonds, which are high in chemical energy.
Level 3 and 2 responses may fail to mention high-energy bonds or incorrectly identify micronutrients such as calcium, vitamins, iron, sodium, or cholesterol as sources of chemical energy.
1 point for correct response

6. Answer the following true-false questions:
   a. ***TRUE*** FALSE All cells contain water.
   b. ***TRUE*** FALSE All cells contain minerals such as sodium and potassium.
   c. TRUE ***FALSE*** Cells can get energy from water.
   d. TRUE ***FALSE*** Cells can get energy from minerals.

1 point for each correct response (4 points total)

Explain your answer to parts c and d. Can water and minerals be sources of energy for cells? Why or why not?
Level 4 responses will suggest that cells cannot get energy from water or minerals, because water and minerals do not contain C-C and C-H bonds, which are high in chemical energy.
Level 3 and 2 responses may suggest that water and/or minerals can be sources of energy for cells.
1 point for correct response