

## Eighth Grade “Chemistry of Food and Respiration” Assessment

- 1a. The energy for all the life on Earth can be traced back to the \_\_\_\_\_.
- a. Sun
  - b. moon
- 1b. Where does all the energy for life on Earth ultimately come from?  
\_\_\_\_\_
- 1c. Explain why we say that all life on Earth ultimately receives its energy from the Sun.  
\_\_\_\_\_  
\_\_\_\_\_
- 2a. The Earth’s energy cycle starts with sunlight, then goes into plants, which get eaten by \_\_\_\_\_, which then die and their energy goes back to the plants.
- a. other plants
  - b. animals
- 2b. Fill in the missing steps of the Earth’s energy cycle: Sun → \_\_\_\_\_ → \_\_\_\_\_ → back to plants.
- 2c. Give the four main steps of the Earth’s energy cycle in order.
- 1. \_\_\_\_\_
  - 2. \_\_\_\_\_
  - 3. \_\_\_\_\_
  - 4. \_\_\_\_\_
- 3a. Living cells use \_\_\_\_\_ and water in the form of carbohydrates to get energy.
- a. sulfur
  - b. carbon
- 3b. \_\_\_\_\_ in the form of simple sugars, are used by most living cells for energy.
- a. proteins
  - b. carbohydrates
  - c. gasses
  - d. water
- 3c. How do most living cells use carbohydrates for energy?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 4a. Cells get most of their energy from \_\_\_\_\_ reactions.
- a. nuclear
  - b. chemical

- 4b. Living things get most of their energy directly from \_\_\_\_\_.
- a. rocks
  - b. chemical reactions
  - c. nuclear reactions
  - d. each other

4c. Give an example of how living things use chemical reactions to get energy:

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- 5a. Living things use \_\_\_\_\_ as building blocks, which can be very complex molecules.
- a. proteins
  - b. diatomic elements

- 5b. The main building block of cells is \_\_\_\_\_, which can be a very large and complex molecule.
- a. protein
  - b. polyatomic ions
  - c. clay
  - d. lipids

5c. Define protein:

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- 6a. Chemical reactions take place \_\_\_\_\_ or outside cells.
- a. nowhere in
  - b. inside

- 6b. Chemical reactions can take place in several places in living things. Name two general places:
- 1. \_\_\_\_\_
  - 2. \_\_\_\_\_

6c. Give one example of a chemical reaction taking place in a living thing. Tell the reaction and where it takes place.

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- 7a. A substance called an \_\_\_\_\_ is the catalyst that helps chemical reactions in living things take place.
- a. enzyme
  - b. elongation

7b. A(n) \_\_\_\_\_ is a biological catalyst that allows many chemical reactions to take place at low temperatures.

7c. What is an “enzyme” and what does it do?

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8a. Some cells make and store \_\_\_\_\_, which are used for energy.

- a. fats
- b. sulfurs

8b. Many cells make and store fat, which can be broken down by the cell to get \_\_\_\_\_.

- a. carbohydrates
- b. sugars
- c. minerals
- d. energy

8c. Why do cells make and store fats?

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9a. Most plants do not need to \_\_\_\_\_, because they get their energy from photosynthesis.

- a. drink
- b. eat

9b. Most plants do not need to eat other living things because they get most of their energy from the chemical reaction called \_\_\_\_\_, which involves sunlight, CO<sub>2</sub> and H<sub>2</sub>O.

9c. Explain photosynthesis:

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10a. Plants need several specific elements, called nutrients, to live. These include nitrogen, phosphorous, potassium, calcium, carbon, \_\_\_\_\_ and hydrogen.

- a. radium
- b. oxygen

- 10b. Choose the group of elements that plants can best use as nutrients.
- aluminum, vanadium, oxygen and carbon
  - nitrogen, oxygen, phosphorous and carbon
  - lead, thorium, flourine and carbon
  - sodium, neon, copper and carbon
- 10c. Name three elements that are used by plants as essential nutrients.
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
- 11a. The process of \_\_\_\_\_ changes carbon dioxide, water and sunlight into more plant cells and oxygen
- glycolysis
  - photosynthesis
- 11b. A chemical reaction called \_\_\_\_\_ helps plants take CO<sub>2</sub> and H<sub>2</sub>O and turn them into glucose for energy and O<sub>2</sub>.
- 11c. Tell the two main reactants and two main products of photosynthesis.
- Reactants: \_\_\_\_\_
- Products: \_\_\_\_\_
- 12a. The pigment chlorophyll is responsible for the \_\_\_\_\_ color in plants.
- green
  - pink
- 12b. Which pigment is responsible for the green color of plants and essential to the process of photosynthesis?
- chlorophyll
  - keratin
  - anthocyanin
  - carotinoids
- 12c. The pigment chlorophyll is responsible for two things in plants. What are they?
- \_\_\_\_\_
  - \_\_\_\_\_
- 13a. Unlike plants, animals mainly get their energy from a process called \_\_\_\_\_.
- respiration
  - oxygenation
- 13b. Plants use photosynthesis to get energy, but animals use \_\_\_\_\_.
- respiration
  - phosphorylation
  - glycolysis
  - oxidation

13c. Explain what happens during respiration with animal cells:

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14a. Animals take in oxygen and give off \_\_\_\_\_.

- a. carbon dioxide
- b. nitrogen

14b. Which gas do animals take in to use during chemical reactions? \_\_\_\_\_

14c. Explain how carbon dioxide relates to cellular respiration:

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15a. Animals cannot make their own carbohydrates or proteins in their cells, so they must \_\_\_\_\_ them.

- a. eat
- b. become

15b. Basically, animals cannot make their own nutrients, so they must \_\_\_\_\_ other animals and plants to receive the nutrients they need.

15c. How do animals ultimately get most of their nutrients?

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16a. Plants and \_\_\_\_\_ need each other because each of them gives off products that the other needs, like O<sub>2</sub> and CO<sub>2</sub>.

- a. algae
- b. animals

16b. \_\_\_\_\_ and \_\_\_\_\_ need each other because one gives off CO<sub>2</sub> which the other needs, and the other gives off O<sub>2</sub>, which it needs.

16c. How are plants and animals interdependent?

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17a. Humans are omnivores, which means we can eat both \_\_\_\_\_ and animal foods.

- a. junk
- b. plant

- 17b. Because humans are \_\_\_\_\_, we can eat both plant and animal foods.
- a. herbivores
  - b. carnivores
  - c. omnivores
  - d. scavengers

17c. Why are humans considered omnivores?

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- 18a. Humans transport oxygen to all of their cells with their \_\_\_\_\_.
- a. brains
  - b. blood

- 18b. Blood carries \_\_\_\_\_ to cells in humans.
- a. CO<sub>2</sub>
  - b. nitrogen
  - c. chlorine
  - d. oxygen

18c. What is the main job of blood in animals?

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- 19a. Hemoglobin is the molecule in our \_\_\_\_\_ that actually transports oxygen to our cells.
- a. blood
  - b. food

- 19b. Which molecule in our blood is responsible for the red color and whose job is to transport oxygen?
- a. hemoglobin
  - b. DNA
  - c. glucose
  - d. hormones

19c. Explain the job of hemoglobin:

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20a. While many other animals can make their own \_\_\_\_\_, humans must get them from outside sources, like balanced meals and supplements.

- a. calories
- b. vitamins

20b. Most animals can make their own vitamins, but humans must get them from \_\_\_\_\_ and \_\_\_\_\_.

- a. food and supplements
- b. air and water
- c. sunlight and CO<sub>2</sub>
- d. dirt and grass

20c. What do food and supplements provide to humans?

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21a. A balanced \_\_\_\_\_ contains foods from all six food groups.

- a. schedule
- b. diet

21b. A balanced diet contains food from how many food groups?

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21c. What does a balanced diet contain?

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22a. The six \_\_\_\_\_ groups are breads, meats, vegetables, fruits, dairy and fat.

22b. Name three of the six main food groups.

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

22c. Which of the six food groups do we require the largest amount of? \_\_\_\_\_  
Which do we require the least of? \_\_\_\_\_

23a. When your body needs energy for a long period of time when you haven't been eating, it breaks down \_\_\_\_\_ that have been stored.

- a. vitamins
- b. fats

23b. What large, stored molecule, also called lipid, is broken down by your body when you need energy for a long time?

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23c. Explain one of the uses of fats or lipids in the human body.

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24a. The second level of the food pyramid, dairy and meats, supplies \_\_\_\_\_ and vitamins and minerals to our bodies to build strong muscles and keep our bodies functioning properly.

- a. fiber
- b. protein

24b. The second level of the food pyramid contains two groups, both of which provide proteins, vitamins, minerals and trace elements to build strong muscles and to keep our bodies functioning properly. Name one of the food groups in the second level.

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24c. Explain the importance of the foods in the second level of the food pyramid: dairy and proteins. What do our bodies use them for?

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25a. The second largest food groups, the vegetables and fruits, provide fiber and \_\_\_\_\_ and minerals for our bodies.

- a. vitamins
- b. fats

25b. The second largest pair of food groups in the food pyramid includes \_\_\_\_\_ and \_\_\_\_\_, which provide fiber, vitamins and minerals for our bodies.

25c. What do fruits and vegetable provide for in our nutrition, and how much of our diet should be fruits and vegetables?

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26a. Breads, cereals and grains, also called \_\_\_\_\_, supply us with the energy we need to make it through the day.

- a. proteins
- b. fats
- c. vitamins
- d. carbohydrates



- 26b. The part of the food pyramid that can also be called the Carbohydrate group, is made up of what three types of food?
- a. fruit, vegetables and cheese
  - b. bread, cereal and grain
  - c. meats and eggs
  - d. oils, fats and fiber
- 26c. What type of molecule is the main part of the food group made of breads, cereals and grains?
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The following Colorado Model Content Standards are addressed in this assessment by the questions indicated:

Questions 7a, 7b, 7c: Standard 1. Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

All questions: Standard 2. Physical Science: Students know and understand common properties, forms, and changes in matter and energy.

All questions: Standard 3. Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.

## Answer Key

- 1a. a. Sun  
1b. the Sun  
1c. Acceptable answers could include:  
-Plants and most algae get their energy from the Sun, then most other organisms consume them.
- 2a. b. animals  
2b. plants, animals  
2c. Acceptable answers could include:  
-the sun gives energy to the plants, which are eaten by the animals, which die and give their energy back to the plants
- 3a. b. carbon  
3b. c. carbohydrates  
3c. Acceptable answers could include:  
-They break them down into carbon dioxide, water and lots of energy.
- 4a. b. chemical  
4b. b. chemical reactions  
4c. Examples will vary depending on class experience. Two of the main chemical reactions that will probably be the most common answers are photosynthesis for plants to store energy from the sun, and cellular respiration to break down sugars and release energy.
- 5a. a. proteins  
5b. a. protein  
5c. Acceptable answers could include:  
-protein is the complex molecule, made of amino acids, which cells use as a building block
- 6a. b. inside  
6b. inside or outside cells (variation acceptable)  
6c. The main and most common answer will be cellular respiration, where sugars are broken down to release energy. The reaction is:  $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$ . The other may be photosynthesis:  $12H_2O + 6CO_2 + \text{light} \rightarrow C_6H_{12}O_6 \text{ (glucose)} + 6O_2 + 6H_2O$ .
- 7a. a. enzyme  
7b. enzyme  
7c. Acceptable answers could include:  
-A biological catalyst that causes most of the chemical reactions in living things happen at low enough temperatures that the organisms can survive them.
- 8a. a. fats

- 8b. d. energy
- 8c. Acceptable answers could include:  
-Fats can be broken down for energy later.
- 9a. b. eat
- 9b. photosynthesis
- 9c. Acceptable answers could include:  
-Most plants do not need to eat other living things because they get most of their energy from the chemical reaction called photosynthesis, which involves sunlight, CO<sub>2</sub> and H<sub>2</sub>O.
- 10a. b. oxygen
- 10b. b. nitrogen, oxygen, phosphorous and carbon
- 10c. Any three of: nitrogen, phosphorous, potassium, calcium, carbon, oxygen, hydrogen, etc.
- 11a. b. photosynthesis
- 11b. photosynthesis
- 11c. Reactants: Carbon dioxide, water  
Products: glucose (sugar), oxygen
- 12a. a. green
- 12b. a. chlorophyll
- 12c. green color, photosynthesis
- 13a. a. respiration
- 13b. a. respiration
- 13c. Acceptable answers could include:  
-the conversion of oxygen by living things into the energy by which they continue life
- 14a. a. carbon dioxide
- 14b. oxygen
- 14c. Acceptable answers could include:  
-carbon dioxide is the gas product that occurs during the chemical reaction of cellular respiration
- 15a. a. eat
- 15b. consume, eat (synonyms)
- 15c. Acceptable answers could include:  
-from consuming other organisms
- 16a. b. animals
- 16b. plants, animals
- 16c. Acceptable answers could include:  
-The waste (product) gases of each are the reactants needed for the other to perform their main chemical reactions. Also, plants feed animals and animals fertilize plants with waste and their remains.

- 17a. b. plant  
 17b. c. omnivores  
 17c. Acceptable answers could include:  
 -humans are considered omnivores since they use both plants and animals for food
- 18a. b. blood  
 18b. d. oxygen  
 18c. Acceptable answers could include:  
 -Blood transports oxygen, nutrients and waste throughout the animal's body and to and from cells.
- 19a. a. blood  
 19b. a. hemoglobin  
 19c. Acceptable answers could include:  
 -hemoglobin is the molecule in our blood is responsible for the red color and whose job is to transport oxygen
- 20a. b. vitamins  
 20b. a. food and supplements  
 20c. Acceptable answers could include:  
 -their food and supplements
- 21a. b. diet  
 21b. all six  
 21c. food from all six food groups
- 22a. food  
 22b. any three of bread (carbohydrates), meat (protein), vegetables, fruit, dairy (milk), fat (sweets & oils)  
 22c. largest: breads (carbohydrates)  
 smallest: fats (sweets & oils)
- 23a. b. fats  
 23b. fat  
 23c. Acceptable answers could include:  
 -Fats that are stored in the body can be broken down by the body as a good source of energy after carbohydrates have been used up.
- 24a. b. protein  
 24b. Either dairy or meat  
 24c. Acceptable answers could include:  
 Our bodies use dairy products and meats to supply proteins to help build strong muscles and for sustained energy, vitamins and minerals to keep the chemical reactions in our bodies in balance.
- 25a. a. vitamins

25b. fruit/ vegetables

25c. Acceptable answers could include:

-Fruits and vegetables provide the fiber that we need to keep our digestive tracts healthy and to decrease cholesterol, sugars for energy and vitamins and minerals essential to various chemical reactions within the body.

26a. d. carbohydrates

26b. b. bread, cereal and grain

26c. Carbohydrate (or starch)