Student Worksheet: Fueling All Life on Earth

Name: _____ Date: _____ Class: _____

Introduction

The majority of life on Earth is based on a food web which revolves around the Sun, as plants use sunlight to make food in a process called photosynthesis. Ecosystems depend upon the ability of primary producers to convert inorganic carbon into organic molecules such as glucose and consumers that eat and break down those organic molecules to fuel their cellular processes. In this lesson, you will learn what process takes place when the sun's energy is not available in the deep sea and how this process contributes to fueling life on Earth.

Briefly discuss the following questions with your group and share your answers with the class.

- What happens in environments where there is no sunlight and thus no plants?
- What is this process called?
- What do organisms rely on for primary production?

Learning Procedure

Follow the directions given by your teacher for how to model the process of photosynthesis and the process of chemosynthesis. Your bag/container of materials should include colored cubes (C=7, H=20, O=22, S=4), a color key to tell you what color represents each element, and cut pieces to complete two equations.

Photosynthesis

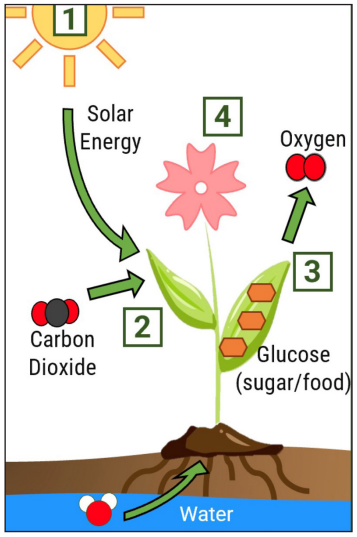
1. Write down what color represents each element.

   Carbon (C) = _____

   Oxygen (O) = _____

   Hydrogen (H) = _____

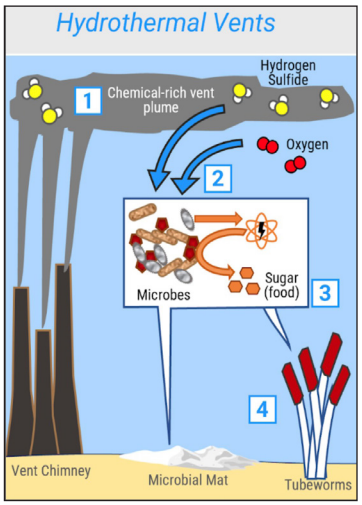
2. Write the equation plus names of the molecules/compounds for photosynthesis in the box.



3. What is the energy that fuels this process? _____

4. Where does the energy come from? _____

Chemosynthesis



5. Write down what color represents each element.

Carbon (C) = _____

Oxygen (O) = _____

Hydrogen (H) = _____

Sulfur (S) = _____

6. Write the equation plus names of the molecules/compounds for chemosynthesis in the box. *Since you may not be as familiar with chemosynthesis, use the questions below to guide you.*

7. What is coming out of the vent? _____

_____

8. If there is no plant or algae life, what is at the base of the food web? _____

_____

9. What is the energy that fuels this process? _____

10. Where does this energy come from? _____

Data Table: Using the diagrams and the information you gathered, fill in the table below identifying the similarities and differences between the two processes?

Photosynthesis	Common to both processes	Chemosynthesis
Write the equation.		***Write the equation.***

Data Table cont.

Photosynthesis cont.	**Common to both processes** cont.	**Chemosynthesis** cont.

Putting the Pieces Together

Discussion Questions

11. In words, describe the reactions that you have modeled. _____

    Photosynthesis _____

    _____

    Chemosynthesis _____

    _____

12. What did you learn by modeling your equations? How do these processes affect your life and the life of deep sea organisms? _____

    _____

    _____

13. Why is chemosynthesis important to both autotrophic and heterotrophic organisms in the deep sea?

    _____

    _____