Photosynthesis exit ticket rubric

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| **Concept** | **Description** | **Level 2 example** | **Level 1 example** |
| Plants use glucose for food. | BioBot Bob uses glucose for fuel or energy to break down walls. Glucose gives him energy. | “When Bob ran low on energy, I had to make molecules to create methanol (fuel), tear gas, and glucose (sugar).” | “I made substances so Bob has energy.” |
| Sunlight provides energy. | BioBot Bob has to find sunlight to get energy. Sunlight provides him with energy. | “You had to go next to a light source and make energy by aligning molecules.” | No mention of sunlight providing energy or a mention of sunlight providing glucose but not energy. |
| Sunlight is needed to make glucose. | Sunlight provides the energy to make glucose and break apart water and carbon dioxide. | “To make them [glucose molecules], you will need a light source and make the stuff you need,” after mentioning the “stuff you need” is glucose. | No mention of sunlight making glucose, or a mention of sunlight making energy without using the word *glucose*, or mentioning the breaking apart of molecules. |
| Rearranging molecules makes glucose. | You have to separate and build molecules using carbon dioxide and water. You have to break apart molecules and put them back together to make glucose. | “To make the substances you need to blast the molecules and put them back together in a certain way.” | “I had to combine carbon, oxygen, and hydrogen to make the substances.” |
| Glucose is made by connecting atoms to form a molecule. | To give BioBot Bob energy, you have to make molecules of glucose by combining atoms of carbon, hydrogen, and oxygen. You put together molecules that were taken from the things we broke apart to make glucose. You combine elements to make a molecule of energy. | * “To make the substance that Bob needed, we needed to make a pattern with the atoms to make energy.” * “Make energy by aligning molecules.” * “You made the substances [for energy] by moving molecules.” * “We had to make him move with water (H2O) and carbon dioxide (CO2).” | * “You had to get glucose, methanol, and tear gas.” * “I had to connect the shapes.” |
| Goal of game | BioBot Bob is trying to rescue his friends from the maze. They are also looking for stolen treasures and gold. | “The goal was to save the friends who got captured and to get the treasure.” | “To get power-ups.” |

Rubric for evaluating photosynthesis postassessment responses

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| Question 1 | Level 1 | Level 2 | Level 3 | Level 4 |
| Description | Plants need sunlight. | Sunlight allows the plant to make glucose, which is the plant’s food. | Sunlight is needed to create glucose from carbon dioxide and water. | Energy from sunlight allows plants to break up molecules of carbon dioxide and water into atoms that then make glucose and oxygen.  OR  Glucose is what allows the plant to make plant matter and grow. |
| Example | “Sun energy is what makes plants grow.” | “It is more healthy because when the other trees are cut down, more sunlight is exposed to the tree. It helps because then the tree can make more glucose to feed itself.” | “… a crucial part of photosynthesis is the sunlight. To make glucose, the plant’s food, the plant needs sunlight, carbon dioxide, and water.” | “The plant is healthier because the Sun’s energy is needed to zap apart the carbon dioxide and water into atoms. Then the atoms make glucose for the plant.” |
| Question 2 | Level 1 | Level 2 | Level 3 | Level 4 |
| Description | Gives an example from the game, but makes no connection to photosynthesis | Gives one example that connects the game to photosynthesis | Gives two examples, one that connects the game to photosynthesis and one that does not | Gives two examples that connect the game to what happens during photosynthesis |
| Example | “You move a robot around to collect treasure in the cave.” | “Glucose gave the robot and gives plants energy.” | “In the game, you shoot sunlight to break up molecules. You also need to save your friends.” | “BioBot Bob needs sunlight, just like plants do. Also, you need to make glucose from atoms to give Bob energy, like plants make glucose for energy.” |