

Name: _____

Date: _____

Period: _____

Locked in a Box, with Plants as a Lifeline

Week # _____

Directions: Read and annotate the passage below. Then answer the questions below.

What do you get when you lock yourself in an airtight box for 48 hours with no source of oxygen other than 150 house plants? A “blinding headache,” according to Iain Stewart, a professor, who survived the ordeal to demonstrate the interdependence of humans and plants. “We wanted a really dramatic way to drive home the message that photosynthesis is essential to life on this planet,” said Dr. Stewart. With every exhalation, he explained, humans release carbon dioxide. Plants absorb the carbon dioxide and use light energy to convert it to food while giving off oxygen as a byproduct. We inhale the oxygen. Life goes on.

This cycle is fundamental to our existence, but one that most people take for granted, according to Dr. Stewart. To make his point, he had himself locked inside a 130-square-foot, clear, plastic chamber from Thursday to Saturday. The chamber was equipped with 150 house plants that were chosen for their quick rate of photosynthesis. The chamber also had a hammock, laptop, portable toilet, and exercise bike. Doctors kept a close watch on his vital signs by conducting various tests on Dr. Stewart to study the effects of low- oxygen environments. The lights stayed on and the temperature and humidity were kept high to provide the optimal environment for the plants, although this made things a bit sticky for the professor.

Oxygen levels in the chamber were initially set at 12.5 percent, resembling very high altitudes, to see if the plants could return the levels to 21 percent, the oxygen content of the atmosphere at sea level. Hence the high-altitude headaches, which Dr. Stewart said were the worst of his physical discomfort. He spent much of the first day watering the plants and speaking with journalists. Two film crews tracked his every move, and a constant stream of visitors walked by offering an encouraging thumb’s-up. But the movement caused him to produce more carbon dioxide than the plants could absorb. With higher carbon dioxide levels, the plants became less efficient at photosynthesizing and produced less oxygen. As oxygen levels declined, the doctors cautioned him to reduce his physical activity, so on the second day he mostly reclined in his hammock. “When I calmed down, the plants responded and we saw the oxygen levels gradually go back up,” he said. The correlation was expected but still startling, and further reinforced the connection he was trying to demonstrate.

1. (RST.9-10.4) Use context clues to define the following terms:
 - a. interdependence: _____
 - b. byproduct: _____
 - c. fundamental: _____
 - d. correlation: _____
2. (RST.9-10.2) How do plants and humans depend on each other? _____

3. (RST.9-10.1) Why did the doctors tell Dr. Stewart to reduce his physical activity? _____

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Directions: Use the passage to identify each part of the experiment that was conducted.

Title: The Effect of Plants on the Survival of a Human

Question: _____

Hypothesis: If _____
then _____ because _____

Background Information: Why did Dr. Stewart believe he could survive living in an airtight box?

Materials: _____

Procedure: 1. _____
2. _____
3. _____
4. _____

Diagram: Draw the experimental set-up.



Adapted from the article, "Locked in a Box, with Plants as a Lifeline" by Jim Witkin for The New York Times, on September 21, 2011.