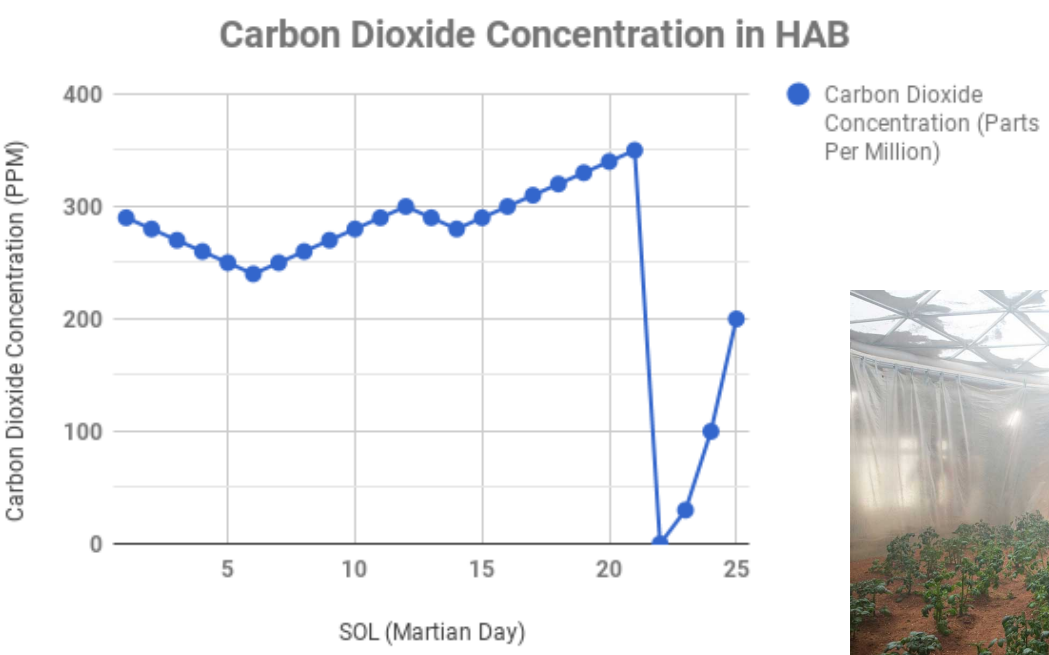
Ecology Final Review KEY

In the book *The Martian,* astronaut Mark Watney has to find a way to survive after he is stranded alone on Mars. In order to do this, he grows potatoes in "the hab" (habitation or house) that will be his food after his normal rations run out. He has to grow them in the hab because the atmosphere on Mars is far too thin to support plant or human life. He devises a system to keep the potatoes warm and watered so they can grow, even if he is away because he has to take several trips to retrieve items in order to survive.



Use the graph and the following options as answers, answer questions 1-8

- **A.** Mark arrives back at the hab
- **B.** Mark Watney is on his way back to the hab after he found Pathfinder (a old lander that he can use to communicate with NASA).
- **C.** Mark Watney stays in the hab for 8 days
- **D.** Mark goes on a 2 day trip to retrieve the RTG (Radioisotope thermoelectric generator) that he will use to keep himself warm
- **E.** The hab gets a hole in it and all of the air escapes
- **F.** Mark fixes the hole
- **G.** The CO2 in the hab is slowly replenished by Mark

1. __B__Choose the most likely thing that is happening **between SOL's 1 and 5**?
2. __A__What happens on **SOL 6**?
3. __D__What happens on **SOL 12**?
4. __A__What happens on **SOL 14**?
5. __C__What happens **between SOL 14 and SOL 21**?
6. __E__What happens **between SOL 21 and SOL 22**?
7. __F__What happens on **SOL 22**?
8. __G__What happens on **SOLs 23-25**?

9. What is the formula for photosynthesis?

$CO_2 + H_2O + \text{sunlight} \rightarrow C_6H_{12}O_6 + O_2$

10. What is the formula for cellular respiration?

$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O + ATP\ (energy)$

11. How would the presence of a human being affect the amount of CO_2 in a closed space (like the hab)?

Humans breath out CO_2, so the amount of CO_2 would increase or go up.

12. How would the presence of plants in a closed space (like the hab) affect CO_2?

Plants take in CO_2, so the more plants there are, the more the CO_2 would decrease or go down.

13. What is the relationship between photosynthesis and cellular respiration?

Photosynthesis produces the molecules that respiration uses to produce energy. Respiration produces the molecules that photosynthesis uses to make glucose.

14. How has photosynthesis changed the Earth?

It has produced oxygen in the atmosphere

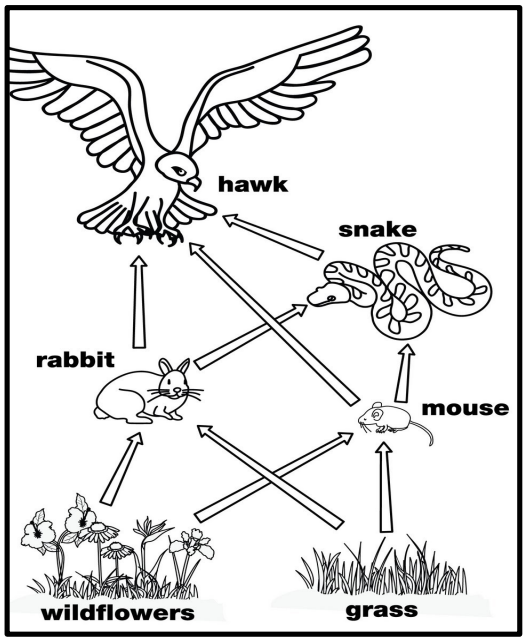
15. What factors affect the rate of photosynthesis on Earth?

The amount of sunlight, the amount of water, and the amount of carbon dioxide

16. How do **<u>all</u>** organisms rely on photosynthesis? Cellular respiration?

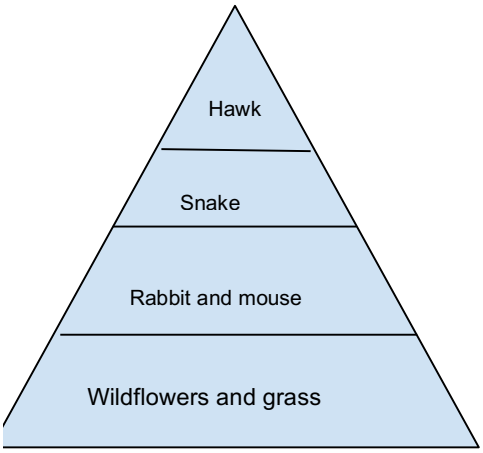
All plants and animals need glucose for energy. They all use respiration to get the energy from glucose. Plants and animals both rely on photosynthesis to get glucose (plants make it themselves and animals eat to get it)

Using the diagram of the food web and energy pyramid to answer questions 17-23



17. What are the **producers** in this food web?

Wildflowers and grass



18. What are the **consumers** in this food web?

Hawk, snake, rabbit, mouse

19. Fill in the energy pyramid with the organisms from the food web.⇦

20. What happens to the amount of energy as you travel from the bottom of the energy pyramid to the top?

The amount of energy decreases

21. Which organism could you take away from the food web that would cause the biggest change? **Why**?

The plants would cause the biggest change because they are the base - they produce food for all animals.

22. Which organism could you take away from the food web that would cause the smallest change? **Why**?

The animals at the top of the food web would have a smaller change because they don't produce food through photosynthesis.

23. What are some things that could happen if a new organism was introduced to this food web?

The new organism could multiply a lot because it might not have a natural predator. It could also cause another animal or plant to go extinct because it preys on that animal or eats a certain plant.

24. Why are ecosystems delicate?

All animals and plants depend on all other animals and plants. A change in one organism can affect the animals it eats as well as the animals that eat it. Those affected animals can then have an effect on other animals.