Describe the symbiotic relationship that makes up a lichen. How does each participant contribute?

Algae: Provides sugar/food through photosynthesis

Fungus: Provides structure & shelter...

"What if" questions:

- What if lichens lived in water?
- What if the algae provided the structure?
  - → How would this change the nature of the symbiotic relationship?
- What if the lichen found a different source of food (besides photosynthesis)?
  - → How would this change where we find lichens?

Explain, in general, the relationship between lichens and air quality. Which of the lichens we studied are most sensitive to air pollution? Which are least sensitive?

most sensitive	Lobaria Ramalina m.
middle	Usnea
least sensitive	Ramalina f. Parmelia Hypogymnia Evernia

Lichens in general need good air quality to survive. This is because they absorb nutrients from air and rainwater → they have to absorb stuff through their skin, and they can't be picky about it. SO: lichens end up absorbing any bad chemicals that are in the air.

"What if..."

- Lichens could be picky?
- They were able to productively use the bad chemicals
  - → Would we see different lichens in the city vs. the country?
- The algae was sensitive to air pollution but the fungus wasn't?

How do lichens get water, carbon dioxide, oxygen, and trace minerals? Why is the source of these nutrients critical to our understanding of lichens?

They absorb them through their skin from rain and the air.

THIS IS THEIR BIGGEST WEAKNESS!

"What if..."

- The lichen had to be submerged to absorb these substances?
- Lichens had roots?
- There were only beneficial substances in air?

What are the scientific and common names of the seven lichens we've studied? How can you identify them visually?

See: "Presentation-lichen identification"

You are welcome to use your herbarium on the test!

Don't worry about "what if..."
for this part - you should
be able to think about <u>why</u>
it's important to recognize
different lichen species.

What is a symbiotic relationship? Describe a real or invented example of a symbiotic relationship other than lichens.

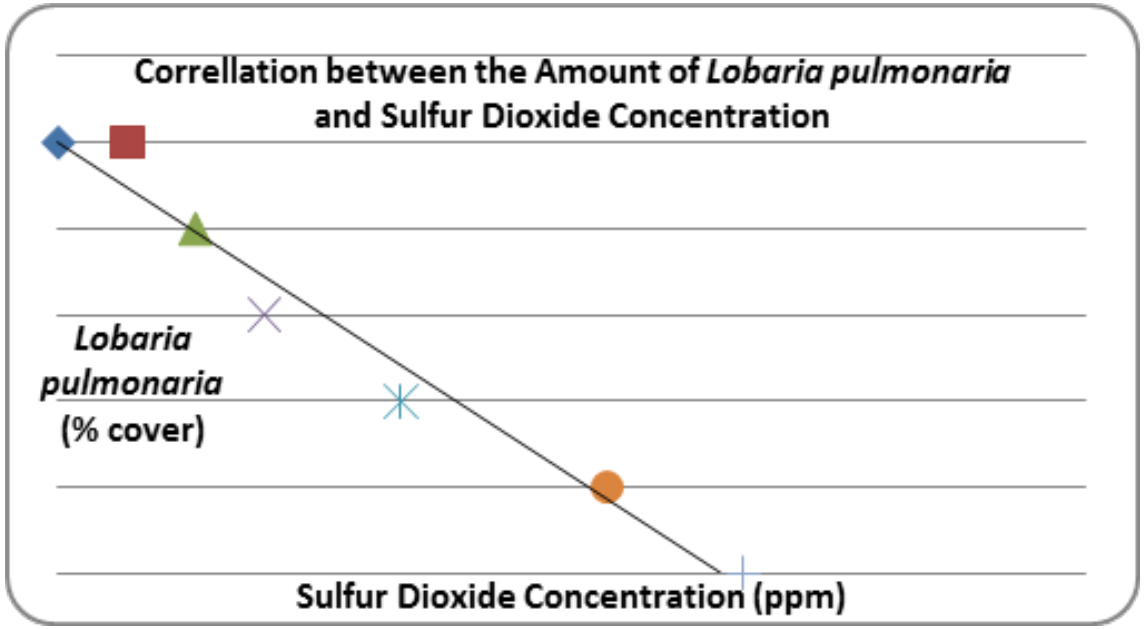
→ An interaction between two organisms that is unique and benefits at least one of the organisms

Ex: bacteria in our guts; they get some of our food and we can absorb the nutrients in their waste

"What if..."

- A different type of organism had a more beneficial symbiotic relationship → ALGAE + DOUG FIR
- Symbiotic relationship went bad — the two organisms started harming each other?

What does the graph below indicate?



As the amount of SO_2 goes up, the amount of Lobaria goes down...

"What if..."

- As the amout of SO_2 went up, the amount of Lobaria increased?
- The lichens benefit from the sulphur but not the dioxide
- There were another organism that absorbed the SO_2

Most lichens can reproduce in two ways - through spores or vegetatively. Describe these two different types of reproduction, and explain why it might be beneficial for a lichen to use one or the other.

- Lichens can produce spores through sexual reproduction (which allows genetic mixing) — the spores need to land in a suitable spot, then they can grow into a lichen
- Or, a piece of the lichen can break off and grow into a clone of the original lichen

"What if..."

- When would it be ideal for a lichen to reproduce vegetatively?
  → When you need a high success rate for your offspring in a favorable environment
- When would it be ideal for a lichen to reproduce through spores?
  → You need genetic diversity in order to thrive in a unfavorable environment

What are some of the types of medical uses, ecological relationships, and other uses that you found for lichens when you did the research for your lichen herbarium?

- Dyes
- Cancer treatment
- Food for deer / other animals
- Diapers!!

"What if..."

- Lichens harmed the organisms they grew on?
- Lichens with different toxicity looked identical?