



Fish Experiment

STEM Sims

Lesson 3: Does Algae Affect the Respiration Rate of a Fish?

Have you ever seen a pond covered with green scum? That scum is algae. Algae are small plants that live in water. Sometimes, if too much algae grows, the fish in the pond can be affected. Can you take a splash into this study and see how algae affects Goldie, the goldfish?

Here are some definitions to help you in your investigation.

| | |
|------------------------|--|
| Breath - | taking in oxygen; one breath is one in and out movement of a fish's gill |
| Respiration - | the action of breathing in oxygen and exhaling carbon dioxide |
| Respiration rate - | how fast breathing happens |
| Variable - | something that can change |
| Direct relationship - | as one variable increases, the other variable also increases |
| Inverse relationship - | as one variable increases, the other variable decreases |

Doing the Science

1. Open the Fish Experiment Simulation by clicking on the "Simulation" tab.
2. Move the "Temperature" lever on the bottom of the fishbowl to the far-left position.
3. Note and record in Table 1 the temperature and dissolved oxygen concentration.
4. Count and record the number of times the gills on the goldfish move in and out for one minute. This is the goldfish's respiration rate.
5. Click the "Add Algae" button. Repeat steps 4 and 5, making sure to record your data in Table 1.
6. Click the "Reset" button.
7. Slide the "Temperature" lever to the right to about the middle position.

8. Repeat steps 3 - 6.
9. Slide the "Temperature" lever to the far-right position.
10. Repeat steps 3 - 6.

Table 1.

| Trial | Before Algae Added | | | After Algae Added | | |
|-------|--------------------|----------|--------------------------------|-------------------|----------|--------------------------------|
| | Temp. (°C) | DO (ppm) | Respiration Rate (breaths/min) | Temp. (°C) | DO (ppm) | Respiration Rate (breaths/min) |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |

Do You Understand?

1. How did adding algae affect the water temperature?
2. How did adding algae affect the dissolved oxygen concentration?
3. How did adding algae affect the goldfish's respiration rate?
4. Is the relationship between increases in algae and the fish's respiration rate a direct or inverse relationship? Please explain your response.