Close Reading and Text Dependent Questions in Science
Changing Climate Alters Fish Behavior (Ecosystems – Grade 5)

The text selection, *Changing Climate Alters Fish Behavior,* can be found at the following link: http://www.sciencenewsforkids.org/2011/06/changing-climate-alters-fish-behavior/

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Changing climate alters fish behavior

By Stephen Ornes / June 22, 2011

Life can be tough for a small, young clownfish living on a coral reef. Juvenile clownfish grow up to be bright orange with whitish stripes, like the stars of *Finding Nemo*. And to some hungry animals lurking around the reef, these youngsters look like dinner.

"When you're a centimeter long as a fish, anything is a predator," Steve Simpson told *Science News*. A centimeter is less than half the diameter of a dime. Simpson is a fish ecologist at the University of Bristol in England. Ecologists study how organisms sharing a living space behave together, and how they affect their environments. Simpson recently worked on an experiment that looked at how changes to the ocean might affect clownfish.

In response to climate change, the water in the ocean is changing. The way scientists measure the change is to measure the pH of the water. The pH of a chemical reveals if a material is an acid or a base. Just as temperature tells you whether something is hot or cold, the pH can tell you whether something is an acid or a base. The pH of a substance is somewhere between 0 and 14. A neutral substance has a pH of 7. Acids have low pH, less than 7, and bases have high pH, more than 7. When you mix an acid and a base, they react with each other and produce a new substance with a pH somewhere in the middle of the scale.

Currently, the water in the ocean has a pH above 7, which means it's basic. But in the past 200 years, the pH has been

Changing ocean waters may change clownfish behavior in the future. Credit: Dr James

Look in the Student Learning Outcome (SLO) Documents for guidance on when this should be taught. These can be found on the BPS Science Department's website: http://bpsscience.weebly.com/ You will find the Student Learning Outcomes documents organized there by grade level.

Changing Climate Alters Fish Behavior (Ecosystems – Grade 5)
Student Questions

1. Why does the scientist believe that young clownfish have so many predators?

2. How do scientists track and measure climate change through ocean water?

3. What does pH measure?

4. According to this article, how is the ocean water changing?

5. Why do young clownfish stay away from the noisy parts of the coral reef?

6. How did the scientists set up an experiment to find out if clownfish would still avoid noisy areas in water with a lower pH?

7. What is the effect of a lower pH level on clownfish behavior? Why is this worrisome?

8. Why did the clownfish change their behavior in water with a lower pH?

9. According to the author, how are humans contributing to the ocean's changing pH level?

10. Write an answer to the question "Will climate change have an effect on the clownfish population?"

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Sample Answers

1. **Why does the scientist believe that young clownfish have so many predators?**
   The author meant that because clownfish are so small, they look like food to almost anything in the ocean.

2. **How do scientists track and measure climate change through ocean water?**
   Scientists measure the pH levels in the ocean to track climate change.

3. **What does pH measure?**
   The pH of something measures whether the substance is an acid or a base.

4. **According to this article, how is the ocean water changing?**
   The ocean is becoming more acidic.

5. **Why do young clownfish stay away from the noisy parts of the coral reef?**
   They stay away from the reef because noise is a signal that there are predators out hunting. To avoid being eaten, the clownfish do not approach noisy areas.

6. **How did the scientists set up an experiment to find out if clownfish would still avoid noisy areas in water with a lower pH?**
   They set up a fish tank with two speakers, one that played sounds like near a reef, and one that was quiet. They tested some fish in regular seawater and some fish in water with a lower pH to see how the fish would behave.

7. **What did the scientists find regarding the effect of a lower pH level on clownfish behavior? Why is this worrisome?**
   Unfortunately, the clownfish did not avoid noise as they used to when the water was basic. This is a concern because if clownfish no longer attempt to avoid predators by avoiding noise, they will be more likely to get eaten.

8. **Why did the clownfish change their behavior in water with a lower pH?**
   Scientists do not know why the clownfish changed their behavior, but they do know it is not because the bones in the ears of fish were damaged.

9. **According to the author, how are humans contributing to the ocean's changing pH level?**
   Humans began burning coal 200 years ago, which puts carbon dioxide into the air. Some of the carbon dioxide dissolves in the ocean, increasing its acidity.

10. **Write an answer to the question "Will climate change have an effect on the clownfish population?"**
    Scientists predict that climate change will have an effect on the clownfish population. The research, so far, shows that clownfish are less responsive to sound in a marine environment that has a lower pH, making clownfish more vulnerable to predation.