

Blue Impact: Thermal Expansion

Student Sheet

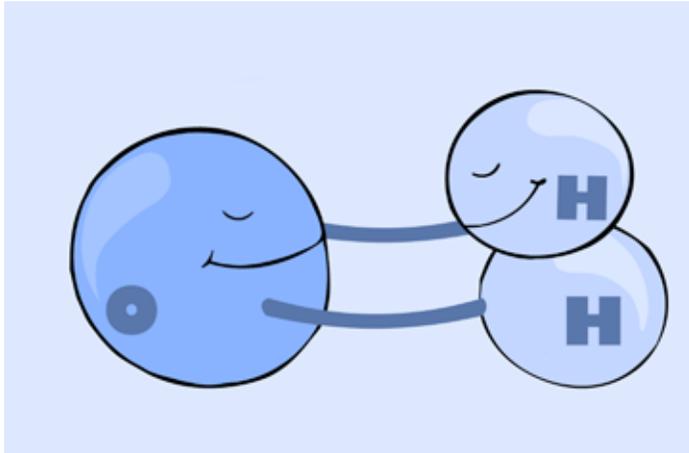
DIRECTIONS

Answer the following questions while watching the New England Aquarium's **Blue Impact Thermal Expansion: Dance of the Rising Oceans** video. It is a good idea to read all the questions before you start the video. You may need to pause or replay sections to help you answer the questions.

QUESTIONS

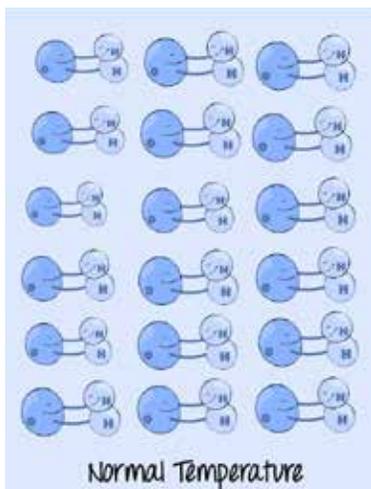
1. Draw a water molecule below.

Drawings should include 2 hydrogen atoms and one oxygen atom.



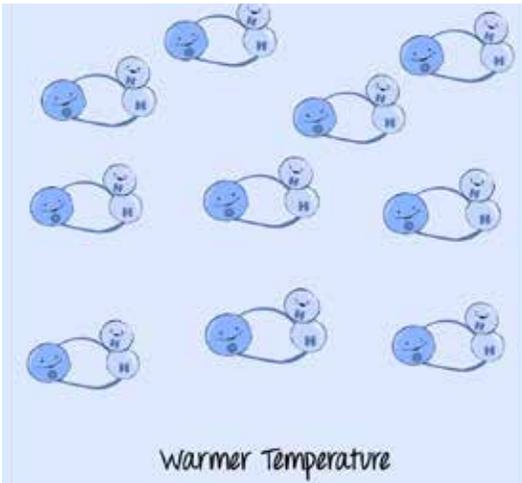
2. Below, draw 10 water molecules below and arrange them as if they were cold.

Drawings should look like the molecules are tightly packed into one area (more dense).



3. In the box below, draw 10 water molecules below and arrange them as if they were warm.

Drawings should look like the molecules are spread out taking up more room (less dense).



4. Which is more dense?

- a. cold water molecules**
- b. warm water molecules
- c. they are the same

5. Which molecules vibrate faster?

- a. cold water molecules
- b. warm water molecules**
- c. they move the same

6. When do water molecules take up more room?

- a. when they are warm**
- b. when they are cold
- c. temperature does not impact the amount of space the molecules take up

7. Explain how warmer waters, thermal expansion and sea-level rise are related.

As water molecules warm up, they begin to vibrate faster and take up more room than cold-water molecules. As the molecules space out further and further, the same amount of water is taking up more room. Thermal expansion is exactly that: the spacing out of faster molecules. And it is the one of the major reasons oceans will rise in the 21st century. As the oceans heat up, the water molecules will move faster and take up more space thereby causing the sea level to rise.