Life at 2,286 meters (7,500 feet) below the ocean surface is harsh. To survive, some organisms living near the hydrothermal vents have formed close associations. These kinds of relationships between organisms occur in many ecosystems not just near hydrothermal vents. Sulfur-oxidizing bacteria and tubeworms living at the hydrothermal vents share a symbiotic association. The microbes make their home in special cells inside the worm. Quite a few microbes live here: an estimated 285 billion bacteria per ounce of tissue. In exchange for a safe and cozy place to live, they give the worm all the nourishment it needs. They do this by absorbing three ingredients-oxygen, carbon dioxide and hydrogen sulfide—and then changing those ingredients to make food for the worm.

Questions from Volcanoes of the Deep:

1. On a separate sheet of lined paper, describe the relationship between the two organisms.

\*Which organism(s) benefits from the relationship? How?

\*Is either organism harmed by the relationship? How?

\* Could both organisms survive without this relationship? Explain

 2. Consider the relationship between the tubeworms and the microbes that live inside them. How is this relationship similar to or different from the relationship between your organisms?

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