Ocean vent exploration

Big question: Is the Sun the only source of energy for ecosystems?

First class

Scientists and engineers used the *ALVIN* deep-ocean research submersible to study deep-ocean hydrothermal vents. You will break into groups to investigate a particular part of the research surrounding hydrothermal vents. You will use the website the Woods Hole Oceanographic Institute created to inform the public about its research. In your groups, use the websites below to answer the questions and take notes on anything else that is interesting.

Second class

Present your findings to the class. Ask questions of the other groups. What more do you want to know?

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| Research topics | Questions |  |
| Group 1: Physical conditions | Where are deep-ocean vents located?  Describe the process that formed these vents.  How deep are the vents? What is the range of depths?    Describe the physical conditions at deep-ocean thermal vents:   * range of temperature * pressure * pH * boiling point     What chemicals are found in dissolved in the water?    Is there light?    Fun facts? | [*www.divediscover.whoi.edu/vents/index.html*](http://www.divediscover.whoi.edu/vents/index.html)  [*www.divediscover.whoi.edu/vents/basics.html*](http://www.divediscover.whoi.edu/vents/basics.html)  [*www.divediscover.whoi.edu/vents/boiling.html*](http://www.divediscover.whoi.edu/vents/boiling.html)  [*www.divediscover.whoi.edu/vents/chemistry.html*](http://www.divediscover.whoi.edu/vents/chemistry.html)  [*www.divediscover.whoi.edu/vents/world.html*](http://www.divediscover.whoi.edu/vents/world.html) |
| Group 2: Life | What types of microorganisms live in areas with deep-ocean vents?  What other animals live there?  Do plants live there?  Is there light?  How do living things obtain energy?  Give an example of a food chain from this ecosystem. What eats what?  Fun facts? | [*www.divediscover.whoi.edu/vents/index.html*](http://www.divediscover.whoi.edu/vents/index.html)  [*www.divediscover.whoi.edu/vents/biology.html*](http://www.divediscover.whoi.edu/vents/biology.html)  [*www.divediscover.whoi.edu/vents/anatomy.html*](http://www.divediscover.whoi.edu/vents/anatomy.html)  [*www.divediscover.whoi.edu/vents/light.html*](http://www.divediscover.whoi.edu/vents/light.html) |
| Group 3: Ships and submersibles | Describe the ship *Atlantis* and how it is outfitted to be a research ship.  Describe the different types of submersibles. How deep can they go?  What are the conditions like for these vehicles working on the ocean floor?  Fun facts? | [*www.divediscover.whoi.edu/vents/index.html*](http://www.divediscover.whoi.edu/vents/index.html)  [*www.divediscover.whoi.edu/tools/atlantis.html*](http://www.divediscover.whoi.edu/tools/atlantis.html)  [*www.divediscover.whoi.edu/robotics/pressure.html*](http://www.divediscover.whoi.edu/robotics/pressure.html) |
| Group 4: Expedition 15: Dark life at deep-sea vents | Describe what the crew researched and how they researched it.  Describe the schedule and all the roles of the scientists and crew.  Fun facts? | [www.divediscover.whoi.edu/vents/index.html](http://www.divediscover.whoi.edu/vents/index.html)  [www.divediscover.whoi.edu/expedition15/index.html](http://www.divediscover.whoi.edu/expedition15/index.html)  See the panel on the left side of the webpage to click through multiple pages about this mission. |

1. What do you think were some of the first questions scientists asked about the hydrothermal vent ecosystem?
2. What questions do you think scientists have now?
3. How could scientists answer these questions?
4. If scientists want to study the microbes found near hydrothermal vents, what problems do they need to overcome? Brainstorm ideas with your group.
5. What experts could the scientists turn to in order to develop the technology to solve the scientists’ problems of collecting data/samples from the deep-ocean floor?