Dive and Discover Expedition 15: “Dark Life at Deep-sea Vents”

Go to the site, [www.divediscover.whoi.edu](http://www.divediscover.whoi.edu). Read the information on the home page, and then click on “Learn about our mission.” We will watch some of the video interviews together, and then you will answer the following questions.

1) Hydrothermal vents are like undersea ________________ that form near volcanic hotspots on the ocean floor.

2) How hot can hydrothermal fluids get? (include units) __________________________

3) Name three organisms that can live near vents. _____________________________
   _____________________________, _____________________________.

3) Where is this expedition taking place (give study site and country nearby):
   ____________________________________________________________.

4) Define “mid-ocean ridge”: _____________________________________________
   ____________________________________________________________

5) What two types of organisms will scientists be examining? ________________
   and ________________.

6) Microbes are at the base or top of the food chain (as plants are on land). (circle one)

7) Since there is no __________________________ in the deep sea, there can be no photosynthesis. Instead, organisms in the deep sea rely on a process called __________________________. Producers like bacteria use __________________________, instead of sunlight, as an energy source.

8) What is the name of the ROV researchers will be using? __________________________
9) What are two questions scientists are trying to answer during this cruise? (Choose from the four given at the end of that paragraph; number each)

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DEEP SCIENCE
Studying microbes from more than a mile below the surface can be a ___________________________. Why?

_____________________________________________________________________________________________________

The intense______________________________at the seafloor here is also a problem for scientists. It can reach almost 3,600 pounds (1,600 kilograms) per square inch—the same pressure you’d feel if a ____________________________was standing on your big toe. Since the microbes evolved to live in this high-pressure environment, bringing them up to the ship will affect their ____________________________, and could even _______________them.

The water itself would also be affected by the change in pressure. In the deep ocean, gases that the microbes need to survive are ____________________________in the seawater, where the organisms can use them to create ____________________________. Under much less pressure at the surface, those gases would bubble out of the water and escape.

To get around these problems, the scientists will use ____________________________samplers (IGTs). Isobaric means “same pressure.”

OBJECTIVES
How many hours a day will Jason be working? ___________ Using special underwater ____________________________, it will send the IGTs and samples back to the ____________________________. While Jason continues to collect ____________________________, scientists on the ship will start ____________________________on the samples already brought up.

Once the IGTs are on board, the scientists will try to grow the ____________________________ (or bacteria and archaea) inside them. For the_________________________time ever, they’ll be able to conduct experiments on living microbes in an environment that's similar to their natural ____________________________.

What type of “rate” of the microbes will scientists be testing? ____________________________
Define “biomass” ________________________________

______________________________________________

EXTRA CHALLENGE: Why will researchers be looking at DNA, RNA, and proteins of the microbes? ________________________________

______________________________________________