

KELP FOREST VIRTUAL FIELD TRIP

Oregon Science Content Standards:

4.1 Structure and Function: Living and non-living things can be classified by their characteristics and properties.

4.2L.1 Describe the interactions of organisms and the environment where they live.

4.3 Scientific Inquiry: Scientific inquiry is a process of investigation through questioning, collecting, describing, and examining evidence to explain natural phenomena and artifacts.

4.3S.1 Based on observations identify testable questions, design a scientific investigation, and collect and record data consistent with a planned scientific investigation.

4.3S.2 Summarize the results from a scientific investigation and use the results to respond to the question being tested.

4.3S.3 Explain that scientific claims about the natural world use evidence that can be confirmed and support a logical argument.

Ocean Literacy Principles:

5. The ocean supports a great diversity of life and ecosystems

Goals:

- Learn to make predictions and interpret results
- Record scientific observations to come up with a conclusion
- Visually experience the kelp forest ecosystem

Concepts:

- The kelp forest has a high amount of diversity.
- The scientific method is a process of inquiry that helps scientists learn about the natural world.

Materials:

- Kelp forest video (video of a dive in the kelp forest near the Cape Arago Lighthouse is available from OIMB; many other options can be found via the internet such as <http://www.bbc.co.uk/nature/life/Macrocytis> and various kelp forest videos through YouTube.)
- assortment of experiment worksheets, examples below (one worksheet per student or pair of students)

Prep:

1. Before the lesson, determine which kelp video you will use. Look for one that allows for observations to address a specific question, such as “Are urchins found in groups or individually?”

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2. Alter the worksheets to match the chosen video.

Lesson Plan:

1. The virtual field trip should take place toward the end of the kelp forest unit so that the student will have a fairly good understanding of the behavior of kelp forest animals.
2. Begin by telling students that since the class cannot take a scuba diving field trip to the kelp forest, they are going to go on a virtual field trip by watching scuba diving videos. They will be making observations on this field trip, and they have a choice of different “experiments” (sample worksheets attached: sea urchins, sea stars, fish, predators). Students can work in pairs or individually. Explain that if they were really diving, they could lay out transects (tape measures) to determine areas to be sampled. On our dive, we will go where the camera goes, observing and collecting data along the way.
3. Review the scientific method: question, hypothesis, experiment/observations, data collection, results, and conclusion. Discuss how in practice, this is an iterative process.
4. Go over the questions that each group of experimenters will answer. Make sure to do this before the students start filling in their worksheet or watching the video.
 - The students’ first step is to come up with a hypothesis by circling their best guess in the hypothesis section of the worksheet. Emphasize that their hypothesis is based on what they already know, and that it is OK for a hypothesis to be wrong.
 - Once they have all made their hypotheses, watch the video. Tell the class that scuba divers cannot talk with respirators in their mouths, so they should not be talking. The students need to pay very close attention to the video to answer their questions.
 - The students answer their questions by observing and collecting data on the organisms seen in the video.
 - Help the students by pointing out relevant parts of the video such as a predator, or different kinds of sea urchins or sea stars. Having the teacher talk through the video in this way helps the students stay on track with their data collection, instead of getting sidetracked by the cool sights of the video. If time allows, have the students watch the video twice—once to get an overall feel for it, and once to collect data.
5. After the video is over, students should finish the results section by writing down or circling what they observed.
6. The point of the conclusion is to answer the question “Why?” Have each student or pair write their conclusion based on what they know about the animals and what they learned by recording their observations. For example, if there were more purple urchins than red ones, why do they think this is so?
7. Explain that an important part of scientific discovery is sharing one’s results. It is important for the students to listen and learn from each other. After students finish writing, have several students explain what their question was, what they hypothesized, what the results were, and why they think it occurs that way. This reinforces the process and allows the students who did different experiments to learn about the other experiments the class conducted on this virtual field trip.

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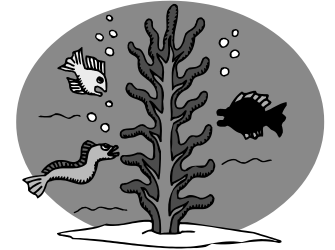
Assessment: The worksheets and student explanations. For this lesson, it is not critical that the conclusions are correct; it is more important that the students give good reasons for their conclusions based on what they observed and know and about the kelp forest. In their presentations, do they articulate the different steps of the scientific method?

GK12 Fellows: Josh Lord and Laurel Hiebert

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KELP FOREST Virtual Field Trip



EXPERIMENT #2—Sea Stars

Questions:

1. Do sea stars live in clumps or spread out?
2. How many different kinds of sea stars are in a kelp forest?

Hypothesis: (circle one)

- | | | | | | | | |
|------------------------------|------------------|-------------------|----------|----------|----------|----------|--|
| 1. Sea stars live: | In Clumps | Spread Out | | | | | |
| 2. How many types are there? | 1 | 2 | 3 | 4 | 5 | 6 | |

Results:

How many sea stars did you see? _____

(circle one)

- | | | | | | | | |
|--------------------------------|------------------|-------------------|----------|----------|----------|----------|--|
| 1. Sea stars live: | In Clumps | Spread Out | | | | | |
| 2. How many types did you see? | 1 | 2 | 3 | 4 | 5 | 6 | |

Conclusions:

1. Why do you think they live clumped or spread out?

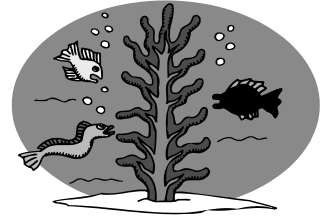
2. Do you think the different types all eat the same thing?



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EXPERIMENT #3—Fish

Questions:

1. Do fish live in clumps or spread out in the kelp forest?
2. Do kelp forest fish have large pectoral fins?

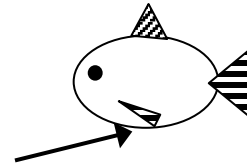
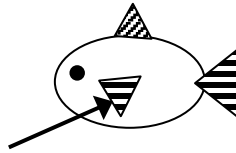
Hypothesis: (circle one)

1. Fish live:

In Clumps

Spread Out

2. Pectoral fin size:



Results:

How many fish did you see? _____

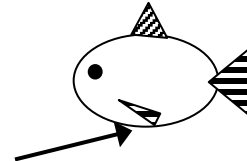
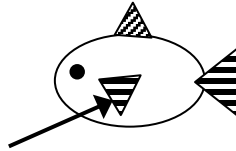
(circle one)

1. Fish live:

In Clumps

Spread Out

2. Pectoral fin size:



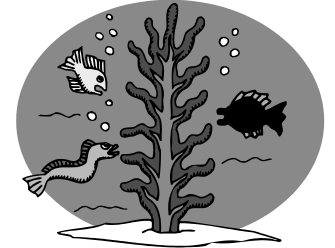
Conclusions:

1. Why do you think they live clumped or spread out?
2. Why do they have a big or small pectoral fin?

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EXPERIMENT #4—Predators

Questions:

1. What are the most common predators in the kelp forest?
2. How do these predators move?

Hypothesis: (circle one)

1. There are the most: Sea stars Otters Crabs Fish Seals/Sea Lions
2. How do most predators move? **SWIM** **CRAWL**

Results:

List or draw all predators:

1. There are the most (circle one):

Sea Stars Sea Otters Crabs Fish Seals/Sea Lions

2. How do most predators move? **SWIM** **CRAWL**

Conclusions:

1. Why do you think there are so many predators in the kelp forest?