Ocean Observation Puzzles

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Introduction to Ocean - Research/Concepts/Observing

Focus Questions: What do these images explain about:

1. Ocean observing?
2. How biological and physical oceanography are connected?
3. How scientists study the ocean?

Goals: students will:

- Be introduced to concepts connected to ocean observing
- Understand concepts in oceanography through identification and discussion
- Better understand why it is important to study the ocean

Objectives: students will be able to:

- Assemble and analyze 2 or more related puzzles
- Explain how each puzzle is connected to the other and
- Describe what they each represent in relation to oceanography

Materials:

- 4 puzzles (pre-assembled - poster/cut/laminated/puzzles) (18 pieces in each)
- Paper, pencil/pen
- Ocean Observing Puzzle Key

Background Information:

This activity was created with the intent of introducing participants (students, teachers, scientists, etc) to the subjects related to ocean observing. Each of these puzzles were created with images from the Gulf of Maine or represent topics that capture the essence of ocean observing in the Gulf of Maine and beyond. Each of these puzzles represents the four main themes of:

A. Buoy Technology,
B. Bathymetry and Geologic features,
C. Temperature/Chlorophyll Satellite,
D. Plankton

Included in this lesson is a key to what each of the items in each puzzle represent. After students identify as many different items in each puzzle, you can check what they got correct and talk about questions they have.

Learning Procedure: A possible scenario

1. Organize participants in small groups, 4 (or less) is a good number for the activity. Hand out a puzzle to each group and have them assemble the pieces. This can be done in a set amount of time or open ended. Itr should take 5 to 10 minutes.

2. Once each group is completed, you can have each group answer one or two

questions as a group on a piece of paper or on a flip chart for others to view more easily. These questions can include: A. Describe the theme the puzzle is illustrating giving examples that support your reasoning. B. Make a list of items you know and can identify and a list of items you do not know or can't identify.

3. When each group is finished answering their questions, have them share as a group or before doing that have them move as a group to the next table and look at a different puzzle. Ask them to read over the items in the new groups list and ask them to add any new ideas to their list. You can do this two more times if desired and then discuss or stop right there. Then have them return to their original puzzle and share what things they wrote down in their lists, discussing what they did know and clarifying what they didn't know.

Some other options:

4. You can also have students write down concepts that they can think of by looking at the puzzles that relate to oceanography. This will reinforce or generate students knowledge on the subject which will help you know better what foundation your audience is starting with.

5. These puzzles can be used in the beginning or the middle or as a summary tool when teaching about ocean based topics. Depending on which topics you choose to bring out when using this activity, several of the National Education Science Standards can be addressed. This activity can be used to introduce your students to a topic, reinforce concepts after they have already been exposed, or be used to generate research projects, analyze connections and much more.

Additional Notes for Puzzle Activity

General questions

1. Describe the major theme of your puzzle. What is it describing?
2. Make a list of as many concepts you see in your puzzle that are important for students to know.
3. Write down any questions or ideas you have about the puzzle.

Buoy Puzzle

Theme: data buoys

Concepts to Teach:

- What can be monitored; where; how (salinity, properties of water, light perception, chlorophyll up welling)
- Water temp variations – why are they important?
- People still have a lot to learn about the ocean.
- There are a lot of combinations of "professional" fields working together.

Questions about Buoy Puzzle:

- What kind of data represented in mini map insert.

- Exactly where is this buoy?
- Can students access buoy into?
- How long does it take to build, launch, test one buoy?
- What is salinity, temp, ocean color, chlorophyll, light?

Phytoplankton puzzle

Concepts to Teach:

- Productivity and diversity of phytoplankton and zooplankton.
- Important role of phytoplankton in food chain and trophic/energy pyramid
- Relationship of sunlight and nutrients to productivity.

Questions about the puzzle:

- How could we identify all the pictures?
- Does the puzzle provides a good intro to the topic or to how data is collected?
- How can we measure nutrients that might be associated with phytoplankton blooms?