CONSERVATION BIOLOGY

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Subject(s): High School Biology

Topic or Unit of Study (Title): Biological Conservation

Grade Level: 10th – 11th Grade

Materials: water, an aquarium, cups, food coloring, clear containers, measuring cup

Summary (and Rationale): Students will learn the importance of conservation and how they (as a member of a biome) are responsible for keeping our ecosystem healthy.

I. Focus and Review (Establish Prior Knowledge): [10 minutes]

-I will open the class by asking the students to recall the different nutrient cycles, with an emphasis on the water cycle.

II. Statement of Instructional Objective(s) and Assessments:

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Assessments</th>
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<tbody>
<tr>
<td>Objective 1: When given two different worksheets (one in class and one for independent practice), students will show 100% completion. For the in class practice students will show 90% accuracy.</td>
<td>Students will complete a worksheet after the World of Water demonstration. Students are expected to do calculations to determine the different percentages of water on the Earth. They should show 90% accuracy, while all of the worksheet should be completed. I will give students an H2O diary to complete as take-home work. Students will be expected to complete the worksheet in its entirety. Since every student will have different answers, there is no “wrong” answer.</td>
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State the objective: [no time]
Assessment: [no time]
III. Teacher Input (Present tasks, information and guidance):  [60 minutes]

-Concept Development:
  
  -Begin the lesson by asking students to tell me what they think when I say “conservation.”
  
  -Write these responses on the board and group them together based on similar attributes.
  
  -Name the groups and explain how some, if not most of the terms are related (everything in biology is related and/or dependent on the other. This is the main standard we are studying in this Unit.)
  
  -Have students define these terms in their own words and explain why conservation is important to ecological stability.
  
  -Students will then create a graphic organizer from the lists of terms we have created that are associated with conservation.

-World of Water Demonstration:

  -This demonstration will teach students about the availability of water on the planet and what percentages of water are located in a specific system (glaciers, the ocean, freshwater streams, etc.)

  -Step 1:
    
    Put 3 gallons of water in an aquarium. Explain that this water represents all the water on earth.
    
    In their science journals, students complete a 3-minute quick-write estimating what percent of this water is:
    
    Ocean
    Groundwater
    Rivers
    Ice caps/glaciers
    Freshwater lakes
    Inland seas/ salt lakes
    Atmosphere
    
    Share predictions.
-Step 2:
Using a measuring cup, the teacher removes 20 ounces of water from the aquarium. Using food coloring, color the remaining water in the aquarium. The dyed water represents the world's oceans. The water in the measuring cup represents all the water in the world that is NOT ocean water.

Pour 15 ounces of water from the measuring cup into clear container. This water represents ice caps and glaciers. Because it is in the form of ice, it is not readily available for use so it has to be separated from the world's supply of fresh water.

The remaining 5 ounces of water in the measuring cup represent the world's available fresh water. Of this water, only a small percent of an ounce composes the world's freshwater lakes and rivers. Use an eyedropper to collect this water and place it into a student's hand.

The water remaining in the measuring cup, after removing ice caps and glacier water and freshwater lakes and rivers (about 4.5 ounces), is groundwater. Pour this water into a cup of sand and explain that this water is what is referred to as groundwater and that it is held in pore spaces of soil and cracks in bedrock.

-Step 3:
Students complete the World of Water activity worksheet.

The answers to the drinking water percentages are: 0.419% total and 2.799% grand total.

Students review their estimates from the beginning of class and discuss their reactions to learning that there is such a small percentage of fresh drinking water in the world.

-Step 4:
Conclusion
Students respond to the following questions in the science journal:

Why isn't all fresh water usable? It's not often easy to get to; it can be frozen or trapped in the soil; it is too polluted for use

Why do we need to take care of the surface and ground water? Water is important for humans, plants, and animals; the more we use and waste, the less water there is available to use. Discuss responses as a class.

IV. Guided Practice (Elicit performance): [10 minutes]

-The guided practice will be Step 4 of the demonstration of Teacher Input. As students work together in groups to answer their questions about water conservation, I will assist them should they have any questions.
V. Closure (Plan for maintenance): [10 minutes]

- To wrap up the class I will ask students to brainstorm other resources or materials that are in need of conservation. As students give me ideas we will discuss them as a class and determine the importance of conservation as a means of ecosystem stability.

VI. Independent Practice: [10-20 minutes]

- For independent practice, students will take home an H2O Diary in which they will determine which activities that they do each day use the most water and what efforts can be used to conserve water in their home.

STANDARDS:

NC High School Essential Standards for Biology

Bio.2.2.2 Explain how the use, protection and conservation of natural resources by humans impact the environment from one generation to the next.

NC High School Technology Standards

HS.SI.1.3: Evaluate content for relevance to the assigned task.

Plans for Individual Differences: Students will work in groups and collaborate throughout the lesson.

References:


Accompanying Resources:

World of Water Activity Sheet: http://www.thirteen.org/h2o/print/p_educators_lesson4_h1.html

H2O Diary: http://www.thirteen.org/h2o/print/p_educators_lesson4_h2.html