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Clean Clear Water

Grade Level: First Grade

Instructional Time: 60 minutes.

Standards:

- Students will develop an understanding of their environment.
- Students will develop language for the purpose of effectively communicating through listening, speaking, viewing, and presenting.

Objectives:

- Students will understand that dirty water can be cleaned.
- The Students will develop an understanding that water is a habitat for animal life and need to be kept clean.
- Students will understand the importance of wetlands and how the wetlands clean the water.
- Students will investigate and report conditions that affect plant growth.
- Students will investigate the effects that polluted water has on plants and animals.

Abstract:

This lesson will help the students to understand that the waterways in our community are habitat for many birds, fish and bugs. Water often becomes polluted; nature has special ways to clean up water.

Background Information:

The waterways in our community are habitat for birds, fish and bugs. It is important that we make sure that we do not pollute these waterways. Nature has provided a natural filtration system to help keep the water clean. The wetlands are low marshy areas that are wet for at least part of the year. The wetlands help clean the water by slowing it down and allowing sediment to settle. The plants and bacteria help to purify the water by eating the pollution and making it less harmful.

Terminology:

- Wetland- an area of land characterized by swamps, marshes, etc. that is preserved for wild life.
- Pollution- Unclean, contaminated.
- Purify - to rid of impurities or pollution.

- Habitat - the region where a plant or animal naturally grows or lives, native environment.

Prior Knowledge Assessment:

- KWL – have children list what they know or would like to know about how nature purifies water and why that is important.

Materials:

Pictures of wetland, and animals that inhabit them, a two-liter bottle with the bottom cut off, a wide mouth jar, cotton balls, gravel, sand, pebbles, pencil shavings, dirt, and a glass of water.

Procedures:

- Start with KWL chart to assess prior knowledge students may have on how nature purifies water.
- Show the children pictures of wetlands and the animals that live in them.
- Discuss water pollution and where it comes from. Remind the children of the experiment they observed showing the effects of pollution on the aquatic plants.
- Go over terminology that will be new to the students.
- Explain that the wetlands help by filtering out pollution in the water. (Magic School Bus has a video [Get Swamped](#) that shows this process well.)
- Make the water filter.
- Place the two-liter bottle upside down in the jar with the neck facing down.
- Push cotton balls down into the neck of the bottle.
- Put gravel on top of the cotton.
- Put the pebbles on the top of the gravel.
- Put the sand on the gravel.
- Pollute the glass of water by adding pencil shavings and dirt to the water. Explain to the students that pencil shavings and dirt represent things that pollute our water.
- Ask the children if they think that fish and plants could live in this water.
- Have the children predict what will happen when you pour the water over the filter.
- Pour the polluted water through the filter.
- Ask the children what happened to the dirty water.
- Ask the children if fish and plants could live in the water after it has been filtered.
- Have the children draw a picture of what happened in the demonstration.
- Invite several of the children to explain their drawing to assess their understanding.
- Return to KWL chart and have children list what they have learned.

Assessment:

Use the KWL chart and the children's drawing and explanations to assess their understanding.

References: www.atozteacherstuff.com, www.scholastic.com

Part II: Pesticides and Water Plants

Abstract: In this lesson, students will have the opportunity to see how too much pesticides affect the life cycle of water plants. The students will record their observations and data through drawings and writing.

Grade Level: 2nd

In Class Instructional Time: 30 minutes for initial lesson, 5 minutes per day for 5 days, 30 minutes for closing lesson.

Integration: Science, Creative Arts and Language Arts

Terminology:

Pesticides – a chemical agent used to destroy pests and weeds.

Chemicals - a substance obtained by a chemical process or used for producing a chemical effect.

Utah Core Standards:

Standard 3 – Students will develop an understanding of their environment.

Objective 1 – Investigate the relationship between plants and animals and how living things change during their lives.

- Describe the life cycle of local plants and animals using diagrams and pictures.

Intended Learning Outcomes:

- Students will be able to describe the effects of too much pesticide on water plants.
- Students will be able to record their findings through drawings and writing.

Background:

Agricultural chemicals designed to kill or limit the growth of life forms are a common form of pollution. This pollution results from attempts to limit the negative effects of undesirable species on agricultural crop production. Irrigation, groundwater flow, and natural runoff bring these toxic substances to rivers, streams, lakes, and oceans. The purpose of this lesson is to have the students investigate the effects of pesticides on water plants.

Materials:

- 12 mason jars

- 12 aquatic plants commonly found at your local fish store.
- One quart of pesticide
- Teaspoon
- Water
- Magnifying glass for each student
- Lab notebooks, paper, pencils

Advanced Preparation/Introduction:

Talk about pesticides and what they are used for. Use the word frequently to have the students become accustomed to its meaning. Have a discussion on what they think too much pesticide would do to plant life.

Prior Knowledge Assessment:

Have a class discussion and ask the students if they have ever seen an adult put chemicals or something on your lawn to kill the weeds or help it grow. Ask them what they think would happen if too much of it were to be spilled on the lawn or plants. Ask them what they think might happen if plants or animals drank water that had the chemicals in it. Have them write what they know about pesticides in their lab notebook.

Procedure, Day 1:

- Follow the steps above in the advanced preparation and prior knowledge assessment sections.
- After the assessment, decide if the students need further review on the effects of chemicals on living things before proceeding to the next step.
- Have the students write predictions in their science log on what they think adding a lot of pesticides will do to the plants. Have them also write what they think adding some pesticides will do.
- Break the students up into three separate groups. Give each group 4 mason jars and 4 plants. Have the student's fill each jar full of lukewarm tap water and place one plant in each jar.
- Instruct the students to use a permanent marker to label two jars "0", one jar "1" and one jar "2".
- Go around to each group and carefully assist them in adding 1 teaspoon of pesticides in the jar marked "1" and two teaspoons in the jar marked "2".
- Place the jars in an unreachable place.

Procedure, Days 2-5:

- Carefully help the students add the pesticides to the plants each day.
- Students should be writing daily changes that they observe in their science log.

Procedure, Day 6:

- Have the students get into their assigned science groups.
- Take out each plant and place them on a paper towel for the students to observe.
- Give each student a large, blank, white piece of paper and have him or her fold it into 4 equal squares.
- Provide each student will a magnifying glass.
- Instruct the students to look very closely at the plants with the magnifying glass.
- Instruct the students to draw the plants marked “0” in the top boxes of the paper and to draw the plants marked “1” and “2” in the bottom boxes.
- When the students are done drawing the plants, instruct them to collaborate and see each other’s results. Ask them to come up with their results as a group and what they think happened.
- Have the students write their final results in their lab notebook.

Closure:

- Have each group take a turn standing and explaining what they saw happen with their plants. Have them explain why they think this occurred.

Assessment:

- Check the student’s journals to check and see if they were able to make predictions and if they were able to make conclusions. (Predictions do not need to be correct.)
- Check for understanding during the conclusion of the lesson. See if the students are able to draw conclusions from the result of the experiment.
- Look at the drawings of the plants for how well the students observed changes.
- Within small groups, have the students compare responses and come up with theories of why the experiment turned out the way it did.
- Ask the students individually what happened in their experiment and why they think it might have happened.

Part III: What Effect Does Pollution Have On Aquatic Life?

Abstract: This lesson will assess what students have learned about the effects of pollution to aquatic life.

Grade Level: 1

Utah Elementary Core Curriculum Standards :

Standard 3: Students will develop an understanding of their environment.

Objectives: Students will investigate plants and plant growth.

Students will investigate and report conditions that affect plant growth.

In Class Instruction Time : 40 minutes

Terminology:

Pollution: The act of polluting something, especially the natural.

Pollute: To cause harm to an area of the natural environment, for example, the air, soil, or water, usually by introducing damaging substances such as chemicals or waste products.

Aquatic Life: Plants and animals that live or grow in water.

Introduce new words by going over each definition while giving examples and using pictures.

Intended Learning Outcomes:

- Students will know what things will pollute water.
- Students will create a mobile that will show different pollutants.

Background for Teacher Use: This lesson is designed for assessment purposes. The desired outcome for this unit is for students to understand the importance of not polluting the waters around them and to do what they can to stop pollution in our lakes and streams. Water plays an essential part in our everyday lives. When pollutants go into bodies of water, the quality of water goes down and has detrimental effects on aquatic life. Pollution has many different forms. Human garbage is too often carelessly thrown into water bodies, cleaning products, chemical fertilizers and pesticides can often be left to run through outside drains that lead into different water bodies, affecting aquatic life. Polluted water becomes hazardous for drinking, recreation, agriculture and aquatic life. By learning about pollution and how to help stop it, the problem can be minimized and the dangers can be stopped.

Materials:

Possible Polluters booklet

Crayons

Scissors

Glue

String

Activity:

1. Have a group discussion about what the students have learned from

the unit.

2. Ask students why it is important to keep our waters pollution free.
3. Talk about the dangers of pollution to people, plants and aquatic life.
4. Talk about what possible water polluters are.
5. Students will look through their booklet and circle the pictures of the things that can pollute water.
6. Students will pick out 5 pictures of things that pollute water and color them.
7. They will then cut out the pictures and the picture of the lake.
8. Students will create a mobile of things that pollute water.

Closure : Students will show their mobiles to the other students and explain what pictures they have used. Mobiles will be displayed around the room.

Assessment : The teacher will look over each student's mobile and determine whether they have chosen correct pictures or not. Have a group discussion with the students again about why keeping water clean is so important.