TEACHER
ACTIVITY OUTLINE

wyland ocean challenge

AQUATIC ECOSYSTEMS

Activity No. SIXTEEN

Title: HUMAN IMPACTS

OBJECTIVES:
{students will be able to}

- Identify human impacts on a type of aquatic habitat.
- Describe possible affects of human impacts on a type of aquatic habitat and potential solutions.
- Create a piece of art with a purpose of creating a specific reaction

SUMMARY:

Students will understand how humans impact a particular aquatic habitat through brainstorm, investigation, and reading situation cards. Groups will research deforestation and clear-cutting, building and development, and thermal pollution. They will convey their findings by creating an ad to educate others of these impacts and encourage them to take action.

TIME NEEDED:

2-3 sessions

MATERIALS:

SCIENCE MATERIALS:
- Students' Field Notebooks
- Student activity sheets
- Eco-guide: Above/below Wyland painting, How humans affect, 5 ways you can help
- Butcher paper or board to write on
- Human Impact Situation cards

ART MATERIALS
- Poster board for each student
- Variety of washable tempera paint:
- Paint brushes
- Containers for the paint: plates, egg cartons, ice cube trays, small cups, etc…
- Containers for water for rinsing brushes: plastic water bottles are great
- Paper towels
- White glue or corn starch for thickening paint if desired
- Sponges or other painting tools if desired
- Assortment of markers

PREPARATION:

- Read Background: Watersheds, Types of water pollution
- Read How to use art in your classroom: Tempera paints

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a ACTIVITY INTRODUCTION:

1. Pass out copies of the above/below illustration of the aquatic habitat of focus.
2. Ask students how they impact this environment. Ask students to brainstorm how they may interact with or affect this environment. If you have completed other lessons in this unit, remind students of their previous studies.
3. Chart these ideas on the board under the heading "Human Impacts".
4. Have students read the How humans affect section of their Eco-guide.
5. Ask students if they knew these were ways that humans impact this habitat? Ask students to share the human impacts that they just learned about that were not on their list already. Write these impacts under the others in a different color pen. (examples are: building dams, draining wetlands, coastal developement, cutting down trees, changing waterways so that we can use them for transportation, over-fishing, etc.)

e EXPLORATION:

1. Draw attention back to the list of human impacts and have students come up with things that can be done to improve or prevent this human impact. Write these ideas under "Prevention". Have students read 5 ways you can help section of their Eco-Guide.
2. Put students in small groups and assign each group a Human Impact Situation card. Multiple groups can have the same situation, or you can create your own. Tell students that they will read and complete the situation cards. They will be organizing their results and presenting their topic to the class. They should think about the pros and cons for the situation at hand. They will be designing an ad campaign to educate people about their impacts on the ecosystem.3. Introduce students to the concept of composition as an art technique. Explain the rule of thirds as a way to attract a viewer's gaze to their artwork. Pass out student activity sheet.
4. Have students read and complete their situation cards.
5. Posters should have the following components:
   a. The human part of the problem.
   b. The impact on the organisms in the habitat.
   c. Present your findings and try to educate representatives and the public about their effects and what they can do to help or alleviate problems, or prevent them in the first place.
   d. Use the "rule of thirds" art technique.

c COMMUNICATION:
{and assessment}

1. Ask each group to explain how they used each of the required components in their ad campaign.
2. Have students present their posters to the class or arrange for them to present to students in another classroom. When they present their posters ask the other class what they think the images on their posters mean and how they make them feel.

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COMMUNICATION:
{and assessment}

3. Students should answer the following questions in their field notebooks:
   a) List 3 things humans are doing that impact the aquatic habitat we have been studying.
   b) How do human actions impact the animals in that habitat?
   c) How does your poster "catch" the viewer's attention? (For example, is it your color choice, composition, word choice, subject matter?). What might you change about your poster based on the feedback you received from other students?
   d) Explain the rule of thirds and how you used it to make a more interesting poster.

ART CHALLENGE: In your field notebook, describe your life as a conservation superhero. What powers would you have? What would you do? What or who would you protect? Make a sketch of your superhero outfit.

ADITIONAL ACTIVITIES:

Have students write a letter to their local congressman or mayor, informing them of the human impacts at their local aquatic habitat. Tell students to ask them what is being done to help these impacts.

ADAPTATIONS:

For younger students:
Keep the concepts simple and let each student create their own poster using construction paper
and crayons.

For older students:
Have older students do some research about effective campaigns. Have them consider commercials and ads that they've found to be memorable. What was the target audience? Were there any that made them change a behavior? They can look through magazines and check out websites of environmental organizations for ideas. Have them submit an analysis of an ad they found that they didn't like and one that they thought was effective. They could also create a TV ad themselves with a video.

Pollution is a negative human impact

STUDENT
ACTIVITY SHEET

Activity No. 16

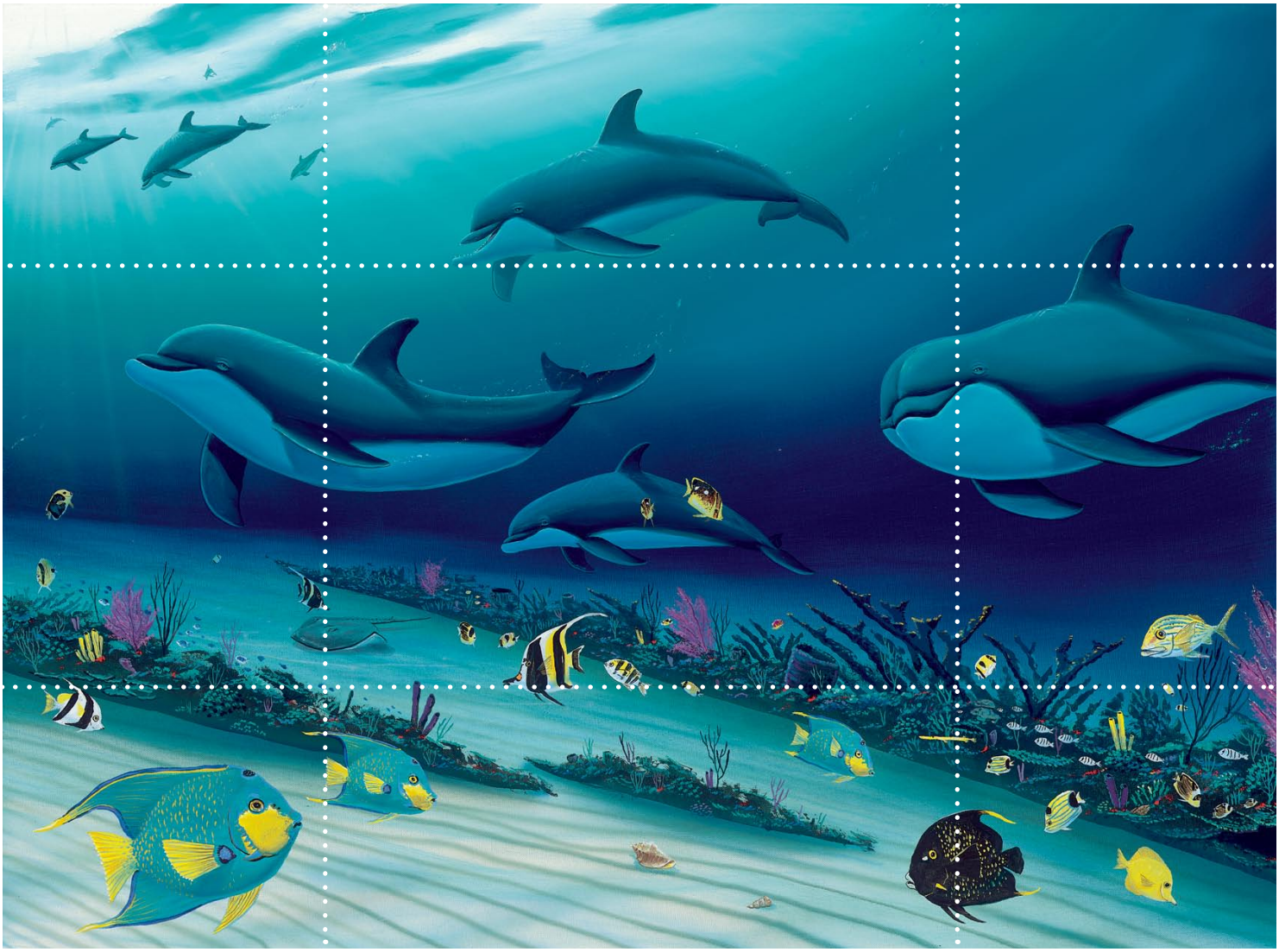
RULE OF THIRDS

Name:

Date:

THE RULE OF THIRDS:

The rule of thirds involves dividing an image into three horizontal and three vertical sections and placing main subjects where the lines cross. Artwork appears more dramatic and interesting when the rule of thirds is used to compose the image. Notice how this Wyland painting has added visual interest because the subject is placed off-center.



STUDENT
ACTIVITY SHEET

Activity No. 16

RULE OF THIRDS

Name:

Date:

THE RULE OF THIRDS:

Now, in the space below, use the "Rule of Thirds" to sketch a draft of the composition of your poster. Be sure it includes:

a) The human part of the problem
b) The impact on the organisms in the habitat
c) Asking people to stop the activity or take an alternative action.

HUMAN IMPACT
Situation cards

BUILDING and Development

Building and development includes any man-made change to land for the purposes of building. It ranges from construction of building complexes to the clearing and establishment of roads. Building and development can also include the creation of new beaches and the clearing of land for commercial reasons.

PROS

- Accommodates for the growing population
- Usually makes things faster and more efficient
- Provides community buildings as well as private houses and residential accommodations
- Provides for more recreational areas for human enjoyment

CONS

- Accommodates for the growing population
- Usually makes things faster and more efficient
- Provides community buildings as well as private houses and residential accommodations
- Provides for more recreational areas for human enjoyment

Situation: Local officials and developers want to build a road through your ecosystem. Research the Pros and Cons for your specific spot, including projected short-term and long-term effects the road might have.

Do the Pros outweigh the Cons?
How can this issue directly impact your local water system?
What are possible solutions?
How will these solutions affect your current way of living?
How can YOU help?

{Other Places}

- United Arab Emirates: Rapid coastal development causes changes not only in local areas, but will have lasting effects on the ocean habitats as well.
- Nigeria: Rapid urbanization of big cities like Lagos (the most populated city in sub-Saharan Africa) has dramatic effects on human life as well as the local ecosystems.
- New Orleans: City built below sea level, in certain situations can have devastating effects on both human life and ecosystems.

RESOURCES

http://www.epa.gov/smartgrowth/water_density.htm
http://coastalmanagement.noaa.gov/issues/welcome.html
http://coastalmanagement.noaa.gov/issues/impacts_cs.html

HUMAN IMPACT
Situation cards

THERMAL Pollution

Thermal pollution is the change of the temperature in a body of water usually resultant of the re-introduction of water of a different temperature. Most thermal pollution is the result of man-induced temperature changes in the water from sources such as power plants and industrial companies using water as a coolant, soil erosion, and deforestation on the coast.

PROS

- Water acts as a highly efficient coolant for power plants and industrial plants
- Water can easily undergo temperature changes
- Water is a readily available source
- Process uses no chemicals, therefore greatly reduces production costs of power and the amounts of chemicals needed
- Process significantly reduces chemical waste

CONS

- Can cause serious detrimental effects on local aquatic life
- Can make animals more susceptible to disease
- Raises the temperature of the water
- Can cause thermal shock
- Lowers the dissolved oxygen levels in the water

Situation: There is a shortage of power in your area, and local officials are considering doubling the amount of power that your local plant produces. In order to do this, the power plant is proposing to draw water from the water source feeding your ecosystem, use it as a coolant, then return it to the same source. The water will not contain any chemicals or other byproducts from the process. Research the Pros and Cons for your specific spot, including projected short-term and long-term effects the process might have.

Do the Pros outweigh the Cons?
How can this issue directly impact your local water system?
What are possible solutions?
How will these solutions affect your current way of living?
What if there are other byproducts discovered later from the process?
How can YOU help?

{Other Places around the world}

- The coast of California has been affected by thermal pollution. In San Onofre, a nuclear power plant uses seawater as a coolant. The area surrounding the discharge site was once a bustling kelp forest. Now the kelp is gone, along with the 1000's of animals that ecosystem supports. The plant has since started working on rebuilding the community, beginning with artificial reefs.

RESOURCES

http://library.thinkquest.org/C0111040/Types/thermal.php
http://outreach.ecology.uga.edu/watershed/thermal.html

HUMAN IMPACT
Situation cards

CLEAR-CUTTING and Deforestation

Deforestation is when areas of forest are removed in order to either utilize the products from trees or to clear an area for other land purposes. Clear-cutting is stripping land (including roots) of all vegetation.

PROS

- Provides a large majority of the world's wood supply (including paper, pulp, building supplies and firewood)
- Provides more land for agricultural grazing and crop building
- Can provide a steady income for countries and local people

CONS

- Causes the loss of habitat to thousands of species
- Can result in widespread erosion
- Can greatly affect the amount of oxygen produced
- Disrupts the natural carbon cycle
- Disrupts the natural water cycle
- Deforestation and clear-cutting are usually committed on a large scale

Situation: Local officials want to develop land near your ecosystem. They are proposing to remove the land cover (trees, shrubs, grass, etc.) in the designated area. Research the Pros and Cons for your specific spot, including projected short-term and long-term effects the process might have on your ecosystem.

Do the Pros outweigh the Cons?
How can this issue directly impact your local water system?
What are possible solutions?
How will these solutions affect your current way of living?
How can YOU help?

{Other Places around the world}

- The Amazon Rainforest is rapidly being cut down for development and to make room for cattle grazing
- In Kenya, local people are cutting down trees to sell and to make room for agricultural progress. This is one of the few trades these people have to support themselves and their families. The result is a growing Sahara desert and drought, called desertification
- In the Great Plains during the early half of the 1900's, farmers pulled out the natural grasses in order to plant crops. In the 1930's, the area was plagued by drought, and there was nothing to hold the topsoil in place. The results were nine years of the Dust Bowl, when all the topsoil was carried away in massive dust storms

RESOURCES

http://earthobservatory.nasa.gov/Library/Deforestation/