

# **MOVE TO A HEALTHIER AQUATIC BALANCE**

by

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GRADE 4

Overview: You will examine aquatic organisms and how environmental changes affect them. These factors will be looked at: temperature, Ph, oxygen, nutrients, and pollutants. Habitat quality (erosion) will be explored. You will compile data and create a graph demonstrating how you can improve aquatic life quality.

## **Major Focus**

### **Academic Expectations:**

2.3 Students identify and describe systems, subsystems, and components and their interactions by completing tasks and or creating products.

### **Essential Content:**

- Role of environmental factors on aquatic life
- Impact of erosion on habitat quality

### **Organizer:**

Moving to a healthier aquatic balance

### **Essential Questions:**

- How do environmental changes (temperature, oxygen, nutrients, and pollution) affect aquatic life?
- How does erosion affect the habitat quality for aquatic life?
- How can I help improve aquatic life quality?

## **CULMINATING PROJECT**

Students will create a healthy aquatic environment including living organisms. Use the information obtained through class activities, experiments, and research. You should consider the factors that influence the quality of water such temperature, Ph balance, oxygen levels, nutrients, and pollution. A report should be included indicating beginning water conditions, any steps for correcting water balance, and effects of conditions and changes on organisms. Student work will be displayed through the use of graphs, pictures, reports, and student-built aquatic environment.

### **Enabling Knowledge**

- Steps to water cycle
- Life cycle
- Biotic index
- Standards of a healthy aquatic system
- Testing steps for temperature, Ph, oxygen, nutrients, and pollution
- Aquatic vocabulary
- Role of environmental factors on aquatic life

### **Enabling Skills and Processes**

- Language skills (e.g., use of descriptive and figurative language, word usage, spelling, writing, and reading)
- Communication skills (e.g. public speaking, listening)
- Cooperation skills
- Use of technology
- Mathematics skills (e.g., calculation, graphing)
- Research skills

### **Instructional Plan 1**

Title: Environmental check-up

Number of days: 5

Academic Expectations:

2.3 Students identify and describe systems, subsystems, and components and their interactions by completing tasks and or creating products.

Essential Content:

- Role of environmental factors on aquatic life

**Enabling knowledge:**

- \*Steps to water cycle
- \*Life cycle
- \*Biotic index
- \*Standards of a healthy aquatic system
- \*Testing steps for temperature, Ph, oxygen, nutrients, and pollution
- \*Aquatic vocabulary
- \*Role of environmental factors on aquatic life

**Enabling Skills and Processes:**

- \*Research skills (e.g., use of descriptive and figurative language, word usage, spelling, writing, and reading)
- \*Communication skills (e.g., public speaking, listening)
- \*Cooperation skills
- \*Use of technology
- \*Mathematics skills (e.g., calculation, graphing)
- \*Research skills

**ACTIVITY 1**

**Materials:**

- \*Sample of pond water
- \*Thermometer for testing water temperature
- \*Making Water Quality Connections Guide

Use thermometer to test temperature of pond water sample. Check temperature daily to determine if there is an increase or decrease in water temperature. Research problems associated with increase in water temperature.

**ACTIVITY 2**

**Materials:**

- \*Sample of pond water
- \*Kit for testing oxygen level of water
- \*Making Water Quality Connections Guide

Use kit for testing oxygen to determine the oxygen level in the water. In pairs, research possible associated problems and or causes of oxygen levels. Graph daily levels.

### **ACTIVITY 3**

#### **Materials:**

- \*Sample of pond water
- \*Water kit for testing nutrients in the water sample
- \*Making Water Quality Connections Guide

Use kit for testing levels of different nutrients in the water. Chart or graph the daily amount of nutrients. Use guide to determine causes for nutrients.

### **ACTIVITY 4**

#### **Materials:**

- \*Sample of pond water
- \*Water kit for testing pollutants in the water sample
- \*Making Water Quality Connections guide

Use kit for testing levels of phosphate, nitrate, Ph & alkalinity, and salinity of water. Graph the amounts of each pollutant. In pairs, graph the levels of each. Using the Making Water Quality Connections Guide, research the possible associated problems and or causes of the pollutants.

### **Instructional Plan 3**

Title: Erosion and aquatic life

Number of days: 5

Academic Expectations:

2.3 Students identify and describe systems, subsystems, and components and their interactions by completing tasks and or creating products.

Essential Content:

- \*Impact of erosion on habitat quality

Essential Question:

How does erosion affect the habitat quality for aquatic life?

Enabling Knowledge:

- \*Steps to water cycle
- \*Life cycle
- \*Standards of a healthy aquatic system

- \*Aquatic vocabulary
- \*Role of environmental factors on aquatic life

**Enabling Skills and Processes:**

- \*Language skills (e.g., use of descriptive and figurative language, word usage, spelling, writing, and reading)
- \*Communication skills (e.g., public speaking, listening)
- \*Cooperation skills
- \*Use of technology
- \*Mathematics skills (e.g., calculation, graphing)
- \*Research skills

**Activity 1**

**Materials:**

- \*Library resources/Internet access
- \*Social Studies book (grade level)

Discuss erosion and the most probable causes. Develop interview questions and interview community and or family members about how erosion can be minimized. Discuss interview finding with classmates.

**Activity 2**

**Materials:**

- \*Art supplies
- \*Library resources/Internet access

Draw an animal in its habitat. Label problems the animal may have as a result of erosion. Develop graph of animals and each problem, and possible solutions to eliminate the erosion.

**Activity 3**

**Materials:**

- \*Writing supplies

Write an article for the local newspaper including facts about erosion, focusing on causes within the community. Include in the article a location and time for the community to meet in order to discuss possible ways to minimize erosion.

**Activity 4**

**Materials:**

- \*Writing supplies

Write an informational article on erosion and ways to prevent it.

### **Instructional Plan 3**

Title: Aquatic life check-up

Number of days: 5

Academic Expectations:

2.3 Students identify and describe systems, subsystems, and components and their interactions by completing tasks and or creating products.

Essential Content:

\*How can I help improve aquatic life quality?

Enabling Knowledge:

- \*Steps to water cycle
- \*Life Cycle
- \*Biotic index
- \*Standards of a healthy aquatic system
- \*Testing steps for temperature, Ph, oxygen, nutrients, and pollution
- \*Aquatic vocabulary
- \*Role of environmental factors on aquatic life

Enabling Skills and Processes:

- \*Language skills (e.g., use of descriptive and figurative language, word usage, spelling, writing, and reading)
- \*Communication skills (e.g., public speaking, listening)
- \*Cooperation skills
- \*Use of technology
- \*Mathematics skills (e.g., calculation, graphing)
- \*Research skills

#### **Activity 1**

**Materials:**

- \*Writing materials
- \*Research materials

Develop a persuasive letter to the Department of Agriculture requesting funding for farmers who are

participating in various ways to eliminate erosion. Present your findings on erosion throughout the letter. Explain the benefits of reducing erosion within the community and the great effects it has on aquatic life.

## Activity 2

### Materials

\*Manpower

\*Garbage bags

Organize a “Clean up the community day.” Working in pairs, students will clean up garbage to help clean the pollution effects throughout the neighborhood.

### Assessment Activity

All products completed throughout the unit development.

## Scoring Guide

### Performance

#### Level

#### Indicators

#### Adult

- \*clearly demonstrates knowledge of environmental factors on aquatic life
- \*clearly demonstrates knowledge of the impact of erosion on habitat quality
- \*clearly demonstrates how to develop a healthier aquatic environment
- \*letters written are distinguished quality according to writing portfolio requirements

#### Adolescent

- \*demonstrates knowledge of environmental factors on aquatic life
- \*demonstrates knowledge of the impact of erosion on habitat quality
- \*demonstrates how to develop a healthier aquatic environment
- \*letters written are proficient quality according to writing portfolio requirements

#### Toddler

- \*presentation demonstrates some knowledge of environmental

factors on aquatic life

\*demonstrates some knowledge of the impact of erosion on habitat quality

\*demonstrates some knowledge on how to develop a healthier aquatic environment

\*letters written are apprentice quality according to writing portfolio requirements

Infant

\*does not demonstrate knowledge of environmental factors on aquatic life

\*does not demonstrate knowledge of the impact of erosion on habitat quality

\*does not demonstrate knowledge on how to develop a healthier aquatic environment

\*letters written are novice quality according to writing portfolio requirements