How Healthy is Your Lake? *Teacher's Guide*

Students practice for the FCAT while learning about water quality indicators in different lakes.

GRADE LEVEL: Upper Elementary

SUBJECT AREA/COURSE: Reading, Writing (Language Arts) and Math

SUNSHINE STATE STANDARDS:
- The student selects from a variety of simple strategies, including the use of phonics, word structure, context clues, self-questioning, confirming simple predictions, retelling, and using visual clues to identify words and construct meaning from various texts, illustrations, graphics, and charts. (LA.A.1.2.2)
- The student reads text and determines the main idea or essential message, identifies relevant supporting details and facts, and arranges events in chronological order. (LA.A.2.2.1)
- The student reads and organizes information for a variety of purposes, including making a report, conducting interviews, taking a test, and performing an authentic task. (LA.B.2.2.5)
- The student recognizes the difference between fact and opinion presented in a text. (LA.B.2.2.6)
- The student selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fraction, and division of whole numbers. (MA.A.3.2.2)
- The student adds, subtracts, and multiplies whole numbers, decimals, and fractions, including mixed numbers, and divides whole numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator. (MA.A.3.2.3)
- The student determines range, mean, median, and mode from sets of data. (MA.E.1.2.2)

ACADEMIC OUTCOMES/LESSON OBJECTIVES:
- Students will read a selection adapted from the Seminole Watershed Atlas, written in FCAT practice form.
- Students will respond to FCAT-type questions or prompts in Reading, Writing, and Math.

BACKGROUND INFORMATION: Scientists measure the level of plant nutrients in lake water as one way to determine lake health. The score for the level of nutrients is the lake's Trophic State Index, or TSI. The different trophic states are <u>Oligo</u>trophic, lacking nutrients, <u>Meso</u>trophic, medium amount of nutrients, <u>Eu</u>trophic, rich in nutrients, and <u>Hypereu</u>trophic, or extremely rich in nutrients.

Many factors are important to the status of the lake including dissolved oxygen (DO) and biological factors, such as plants and animals found in the test sites.

TEACHER WEBSITE RESOURCES:

- Sunshine State Standards can be found at http://firn.edu/doe/menu/sss.htm
- Information about FCAT can be found at http://www.firn.edu/doe/sas/fcat/pdf/fcatfact.pdf
- Rubric for grading FCAT writing prompts http://www.firn.edu/doe/sas/fw/fwaprubr.htm
- Rubric for grading FCAT reading questions http://www.firn.edu/doe/sas/fcat/pdf/rubrcrdn.pdf
- Rubric for grading FCAT math questions http://www.firn.edu/doe/sas/fcat/pdf/rubrcmat.pdf
- More FCAT-Friendly Activities, visit http://pelotes.jea.com

Seminole County Watershed Atlas Curriculum for Teachers
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MATERIALS NEEDED: Internet access with www.Seminole.WaterAtlas.org bookmarked, student pages for "How Healthy Is Your Lake?"

SAFETY: N/A

VOCABULARY: trophic level, nutrient, phosphorus, oligotrophic, mesotrophic, eutrophic, hypereutrophic

KEY:

Reading:

1. Use the rubric for Short Response Reading Questions – 2 points
   LA.A.2.2.1, Bloom's Taxonomy Level One

Example of a Top-Score Response:
The TSI measures the amount of nutrients in lake water. Since nutrients cause plants to grow, this can affect the health of the lake. If too may plants grow, they can choke the waterways so that boaters cannot pass. A few plant species can take over the lake pushing out the others. This decreases the health of the lake.

2. c) LA.A.1.2.2, Bloom's Taxonomy Level One

3. d) LA.A.1.2.2, Bloom's Taxonomy Level One

4. Use the rubric for Short Response Reading Questions – 2 points
   LA.A.2.2.1, Bloom's Taxonomy Level Two

Example of a Top-Score Response:
The author should remove the first column, titled "Scientific Name for Lake Health." It adds scientific names that readers can learn later. The other three columns all give information the reader needs immediately to understand the meaning of the TSI, including the TSI numbers, the rating that goes with those numbers, and the explanations of what the ratings mean.

Writing:
For All – Use the rubric for Florida Writes! – 6 points

1. LA.B.2.2.6

2. LA.B.2.2.5

3. LA.B.2.2.6

4. LA.B.2.2.5

Math:

1. d) MA.A.3.2.2, MA.A.3.2.3

2. c) MA.E.1.2.2

3. d) MA.A.3.2.2, MA.A.3.2.3

4. Use the rubric for Short Response Math Questions – 2 points
   MA.E.1.2.2

Example of a Top-Score Response
56.9. Add together all five lake TSI values to get 284.33. Divide by 5 to get 56.866, then round to the nearest tenth to get 56.9.

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PROCEDURE:

1. Preview this FCAT-Friendly activity. Print copies for your students.

2. Preview the Seminole Water Atlas.

   a. Go to www.Seminole.WaterAtlas.org > The Atlas > Lake Name and scroll down to a lake that is near your school. Look over the General Info page and read the information on Trophic Levels.

   b. Then click on Water Quality > Overall Trophic State Index. Check out the two-year graph and glance over the page for more information.

   c. Click on the Ecology Tab > Plant list to find what plants have been reported for your lake.

   d. If your lake has real-time data, go to that screen to find the current data on that lake.

3. After students have completed the FCAT Friendly activities, select other lakes with which your students are familiar. Visit them on the WaterAtlas website.

4. Using the information learned in the FCAT practice and the Water Atlas, discuss the general health of the nearby lake. How healthy is your lake?