

Testing the Level of Oxygen in the Hillsborough River

Essential Question: How can I calculate the oxygen level from the Hillsborough River at Nature's Classroom?

Objective: Students will test the Hillsborough River during the boat trip of Nature's Classroom activities (River Exploration) and then convert the oxygen level to a percentage. This can be done by remembering that percentage is just really fractions with a denominator of 100. An example is that the oxygen can sometimes register 7; therefore it is $7/100$ which would be 7%.

Standard(s):

MAFS.6.RP.1.3c

Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.

Materials:

- Pen or Pencil
- 1 pieces of notebook paper (loose leaf)
- Student page: **Bell Work Sheet** (Optional – may be written on the board)
- **River Exploration Data** (provided by NC)

Setup: Students must know ahead of time that the Oxygen Sampling will be collected.

Lesson Duration: 5-10 minutes

Directions: Students will use the Oxygen level results to complete the Bell Work.

Background:

1. During the boat trip, students will collect a water sample of the Hillsborough River water.
2. The sample will be collected using a glass bottle and vacuole from the Nature's Classroom testing kit.
3. A color comparison will give the oxygen level of the water. This will be read to the group and recorded on the data sheet used during the activity.
4. Once back to Nature's Classroom, all groups will share their data of the oxygen readings that were recorded from all boats to obtain an average for the day.
5. Adequate dissolved oxygen is necessary for good water quality.
6. The natural process of stream purification will process an adequate oxygen level in order to provide for aerobic life forms.
7. Dissolved oxygen is absolutely essential for the survival of all aquatic organisms.
8. Oxygen is perhaps the most well-established indicator of water quality.



Bell Work:

Using the oxygen level data gathered from the River Exploration experience, find the percentage of oxygen levels collected.



Oxygen Levels Collected

BOATS	1	2	3	4	5	6
Oxygen						
% of Oxygen						

Discuss the following:

1. Compare the data collected from each boat that went out. Are the oxygen numbers the same?
2. Are these numbers close to each other?
3. Why would these numbers be close to each other?

“pH” Testing of the Hillsborough Water

Essential Question: What is the median and the interquartile range for the “pH” test sampling of the Hillsborough River during Boating?

Objective: I will use the information collected at the Boating activity to calculate the mean, median and the interquartile range of the “pH” testing during the Boating Activity.

Standard(s):

MAFS.6.SP.2.5c

Giving the quantitative measures of center (median and/or mean) and variability (interquartile range and/ or mean absolute deviation, as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Materials:

- Pen or Pencil
- 1 pieces of notebook paper (loose leaf)
- Bell work Sheet (Optional – may be written on the board)

Setup: Students must know ahead of time that the “pH” data will be collected.

Lesson Duration: 5-10 minutes

Directions: Students will complete Bell Work activity

Background:

- During the boat trip a student will be assigned the task of collecting a water sample of the Hillsborough River water.
- The sample will be collected using a testing kit.
- The water will be tested using a paper strip test sheet that will be dipped into the river.
- The paper strip will be matched to its color/ number range of “pH”.
- The “pH” number will be read to the group and recorded on the data sheet.
- Once back to Nature’s Classroom, all groups will share their data of the “pH” reading that were recorded from all boats.
- The “pH” levels from all boats will be used to find the median and interquartile range of the “pH” from the sampling during the in-class Bell Work.
- Refer to the pH scale attached for background reference



Bell Work:

Using the pH data collected during the River Exploration experience, find the mean, median and interquartile range

Boats	A	B	C	D	E	F
“pH”						

Mean =

Median =

Interquartile Range =

Explanation of results:



+++++

Example:

Data Set of the “pH” from the boating of the Hillsborough River

Boats	A	B	C	D	E	F
“pH”	4	3	5	4	4	4

Method for Solving:

1. Add up all of the numbers then divide by the amount of numbers added up
2. $(4 + 3 + 5 + 4 + 4 + 4) / 6 = 4$
3. Now all “pH” numbers must be solved with absolute value using the mean to subtract by
4. $\begin{matrix} |4-4| & |4-3| & |4-5| & |4-4| & |4-4| & |4-4| \\ 0 & 1 & 1 & 0 & 0 & 0 \end{matrix}$
5. Add all absolute values up and divide by the amount of numbers added up
6. $(0 + 1 + 1 + 0 + 0 + 0) / 6 = .33$
7. The absolute value of the mean is .33
8. There was no striking deviation from the “pH” collected in the boating.

pH scale

