



## Dead Zones - Lesson 2, Activity A: Standards and Assessment

### State of Michigan - Grade Level Content Expectations (5th-7th grade)

#### Discipline 1: Science processes

Inquiry process (IP)

- S.IP.05-07.15 - Construct charts and graphs from data and observation

Reflection and social implications (RS)

- S.RS.05-07.15 - Demonstrate scientific concepts through various models and activities

#### Discipline 2: Physical science

Properties of matter (PM)

P.PM.M.2 Elements and compounds

- P.PM.07.24 - List examples of physical and chemical properties of elements and compounds

#### Discipline 3: Life science

Ecosystems (EC)

L.EC.M.3 Biotic and abiotic factors

- L.EC.06.32 - Identify the factors in an ecosystem that influence changes in population size

### National Science Education Standards (NSES) - Middle School

Science As Inquiry (A):

- Think critically and logically to make the relationship between evidence and explanations

Physical Science (B):

- A substance has characteristic properties, such as density, a boiling point and solubility, all of which are independent of the amount of the sample
- Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature

Educators are encouraged to use this free material. Please include source information:

Great Lakes Lessons, Teaching with Great Lakes Data, Michigan Sea Grant, [www.greatlakeslessons.com](http://www.greatlakeslessons.com)

### Life Science (C):

- The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures and soil compositions...Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystems

## Great Lakes Literacy Principles – K-12

1h – The Great Lakes stratify in the summer and in winter under ice cover, forming distinct layers based on water temperature differences. Turnover occurs in the spring and fall when cooler weather minimizes temperature differences and the layers mix. Turnover is the main way that oxygen and nutrient-poor water in the deeper areas of the lakes can be mixed with oxygen and nutrient-rich surface water.

### Standards Sources

- State of Michigan = Michigan department of education - Grade level content expectations (GLCEs)
- NSES = National science education standards
- Great Lakes Literacy Principles, COSEE Great Lakes, 2010. Great Lakes Literacy: Essential principles and fundamental concepts for Great Lakes learning [brochure]. Columbus, OH: Ohio Sea Grant OHSU-B-090. Available from [www.coseegreatlakes.net](http://www.coseegreatlakes.net).

### Assessment

This assessment chart was designed for teachers to create their own assessment. In creating assessments, the value should depend on the learning level of the task. Levels are coded as Low (knowledge, comprehension), Medium (application, analysis), High (synthesis, evaluation).

Learning Objective	Student Performance
List examples of physical and chemical properties of elements and compounds	Describe how water temperature affects water density (Medium)
	Explain how changes in water temperatures and density cause stratification of lake waters (Medium)
Construct charts and graphs from data and observations	Graph water temperatures versus depth (Medium)

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