



## Dead Zones - Lesson 4: Standards and Assessment

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

#### Discipline 1: Science processes

Inquiry, analysis and communications (IA)

- S.IA.05-07.11 - Analyze information from graphs to answer scientific questions
- S.IA.05-07.13 - Communicate and defend findings of investigations using evidence

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 factors in an ecosystem that influence changes in population size

L.EC.M.4 Environmental impact of organisms

- L.EC.06.41 - Describe how human beings are part of the ecosystem of the Earth and that human activity can purposefully, or accidentally, alter the balance in ecosystems

#### Discipline 4: Earth science

Earth systems (ES)

E.ES.M.4 Human consequences

- E.ES.07.41 - Explain how human activities change the surface of the Earth and affect the survival of organisms
- E.ES.07.42 - Describe the origins of pollution and how pollution impacts, habitats, climactic change, threatens or endangers species

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)

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

### Science as inquiry (A):

- Develop descriptions, explanations, predictions and models using evidence
- Think critically and logically to make the relationships between evidence and explanations

### Life science (C):

- All organisms must be able to obtain and use resources, grow, reproduce and maintain stable internal conditions while living in a constantly changing external environment
- 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 composition

### Science in personal and social perspectives (F):

- Human activities also can induce hazards through resource acquisition, urban growth, land-use decisions and water disposal

## **Great Lakes Literacy Principles – K-12**

- 5e – The Great Lakes ecosystem provides habitat for terrestrial and aquatic species. The Great Lakes are three-dimensional, offering vast living space and diverse habitats from the shoreline and surface down through the water column to the lake floor.
- 5f – Great Lakes habitats are defined by environmental factors. As a result of interactions involving abiotic factors, such as temperature, clarity, depth, oxygen, pH, light, nutrients, pressure, substrate type and circulation, life in the Great Lakes is not evenly distributed temporally or spatially. Abiotic factors within the Great Lakes can change daily, seasonally or annually because of natural and human influences.

## **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).

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## 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
Identify the factors in an ecosystem that influence changes in population size	Explain how dead zones may affect aquatic organisms (Medium)
Explain how human activities change the surface of the Earth and affect the survival of organisms	Describe how human activities may contribute to the creation of dead zones (Medium)
Analyze information from graphs to answer scientific questions	Use graphs to investigate the size and location of the dead zone in Lake Erie (High)
Communicate and defend findings of investigations using evidence	Communicate conclusions about the size and location of the dead zone using evidence (High)