



## Next Generation Science Standards

**Lesson:** [Dead Zones](#)

**Activity:** [Sizing up the Lake Erie Dead Zone](#)

### Prior Knowledge Should Include:

- Things people do can affect their environment, but they can make choices to reduce their impacts.
- The food of almost any animal can be traced back to plants.
- When the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment and some die.

### Performance Expectations:

- MS-ESS3-4 Earth and Human Activity. Construct an argument supported by evidence for how increases in human populations and per-capita consumption of natural resources impact Earth's systems.
- MS-LS2-1 Ecosystems: Interactions, Energy and Dynamics. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- MS-LS2-4 Ecosystems: Interactions, Energy and Dynamics. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

### Disciplinary Core Ideas:

- **ESS3.C Human Impacts on Earth Systems:** Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.
- **LS2.A Interdependent Relationships in Ecosystems:** Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving factors. In any ecosystem, organisms and populations with similar requirements for food, water, oxygen or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.
- **LS2.C: Ecosystem Dynamics, Functioning and Resilience:** Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

### Practices:

- **Analyzing and Interpreting Data (4)** – Progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.



- **Engaging in Argument from Evidence (7)** – Progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

**Crosscutting Concepts:**

- **Stability and Change:** For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.
- **Cause and Effect:** Mechanisms and explanation. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given context and used to predict and explain events in new contexts.

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