



Next Generation Science Standards

Lesson: [Dangerous Currents: Don't Get Swept Away](#)

Activity: [What Does Drowning Look Like / Who is Drowning in the Great Lakes?](#)

Prior Knowledge Should Include:

- Forces that act at a distance involve fields that can be mapped by their relative strength and effect on an object.
- The effect of unbalanced forces on an object results in a change of motion. Patterns of motion can be used to predict future motion.
- A variety of hazards result from natural processes; humans cannot eliminate hazards but can reduce their impact.
- Waves are regular patterns of motion, which can be made in water by disturbing the surface. Waves of the same type can differ in amplitude and wavelength. Waves can make objects move.

Performance Expectations:

- HS-PS4.1 Waves and Their Applications in Technologies for Information Transfer: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength and speed of waves traveling in various media.
- HS-ESS3.1 Earth and Human Activity: Construct an explanation based on evidence for how availability of natural resources, occurrence of natural hazards and changes in climate have influenced human activity.
- MS-ESS2-2 Earth's Systems: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- MS-ESS3-2 Earth and Human Activity: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

Disciplinary Core Ideas:

- **PS4.A Wave Properties:** The wavelength and frequency of a wave are related to one another by the speed of the wave, which depends on the type of wave and the medium through which it is passing.
- **ESS3.B Natural Hazards:** Natural hazards and other geologic events have shaped the course of human history; they have significantly altered the size of human populations and have driven human migrations.
- **ESS2.A Earth's Materials and Systems:** The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.



- **ESS2.C Roles of Water in Earth’s Surface Processes:** Water’s movements — both on the land and underground — cause weathering and erosion, which change the land’s surface features and create underground formations.

Practices:

- **Analyzing and Interpreting Data (4)** – Progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques.
- **Using Mathematics and Computational Thinking (5)** – Progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms and computational tools for statistical analysis to analyze, represent and model data.
- **Constructing Explanations and Designing Solutions (6)** – Progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principle and theories.

Crosscutting Concepts:

- **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.
- **Stability and Change:** For natural and build systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.
- **Scale, Proportion and Quantity:** In considering phenomena, it is critical to recognize what is relevant at different measures of size, time and energy and to recognize how changes in scale, proportion and quantity affect a system’s structure or performance.
- **Patterns:** Observed patterns of forms and events guide organization and classification and they prompt questions about relationships and the factors that influence them.

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