

Physical Monitoring

3-5

Activity: Go with the Flow

Standard	Organizer	Benchmark and Grade Level Indicator
Life Sciences (L)	Diversity and Interdependence of Life	B-C 5.6 Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental (e.g., beaver ponds, earthworm burrows, grasshoppers eating plants, people planting and cutting trees and people introducing a new species).

Activity: Turbidity or Not Turbidity: That is the Question!

Standard	Organizer	Benchmark and Grade Level Indicator
Life Sciences (L)	Diversity and Interdependence of Life	<p>B-C 3.6 Describe how changes in an organism's habitat are sometimes beneficial and sometimes harmful.</p> <p>B-C 5.4 Summarize that organisms can survive only in ecosystems in which their needs can be met (e.g., food, water, shelter, air, carrying capacity and waste disposal). The world has different ecosystems and distinct ecosystems support the lives of different types of organisms.</p> <p>B-C 5.5 Support how an organism's patterns of behavior are related to the nature of that organism's ecosystem, including the kinds and numbers of other organisms present, the availability of food and resources, and the changing physical characteristics of the of the ecosystem.</p> <p>B-C 5.6 Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental (e.g., beaver ponds, earthworm burrows, grasshoppers eating plants, people planting and cutting trees and people introducing a new species).</p>

Activity: Field Procedure: Flow

Standard	Organizer	Benchmark and Grade Level Indicator
Physical Sciences (P)	Forces and Motion	B-D 9.21 Demonstrate that motion is a measurable quantity that depends on the observer's frame of reference and describe the object's motion in terms of position, velocity, acceleration and time.
	Nature of Energy	B-E 9.12 Explain how an object's kinetic energy depends on its mass and its speed ($KE = \frac{1}{2}mv^2$). B-E 9.13 Demonstrate that near Earth's surface an object's gravitational potential energy depends upon its weight (mg where m is the object's mass and g is the acceleration due to gravity) and height (h) above a reference surface ($PE = mgh$).

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Earth and Space Sciences (ES)	Earth Systems	B-D 10.5 Explain how the acquisition and use of resources, urban growth and waste disposal can accelerate natural change and impact the quality of life.
Life Sciences (L)	Diversity and Interdependence of Life	B-G 10.18 Describe ways that human activities can deliberately or inadvertently alter the equilibrium in ecosystems Explain how changes in technology/biotechnology can cause significant changes, either positive or negative, in environmental quality and carrying capacity. B-G 10.19 Illustrate how uses of resources at local, state, regional, national, and global levels have affected the quality of life (e.g., energy production and sustainable vs nonsustainable agriculture).

Activity: Field Procedure: Flow

Standard	Organizer	Benchmark and Grade Level Indicator
Earth and Space Sciences (ES)	Earth Systems	B-B 11.6 Explain how interactions among Earth's lithosphere, hydrosphere, atmosphere and biosphere have resulted in the ongoing changes of Earth's system.
		B-B 11.8 Describe the normal adjustments of Earth, which may be hazardous for humans. Recognize that humans live at the interface between the atmosphere driven by solar energy and the upper mantle where convection creates changes in Earth's solid crust. Realize that as societies have grown, become stable and come to value aspects of the environment, vulnerability to natural processes of change has increased.
Life Sciences (L)	Characteristics and Structure of Life	B-B 11.5 Investigate the impact on the structure and stability of ecosystems due to changes in their biotic and abiotic components as a result of human activity.
	Diversity and Interdependence of Life	B-F 11.11 Investigate issues of environmental quality at local, regional, national and global levels such as population growth, resource use, population distribution, over-consumption, the capacity of technology to solve problems, poverty, the role of economics, politics and different ways humans view the earth. B-F 11.9 Give examples of how human activity can accelerate rates of natural change and can have unforeseen consequences. B-E 12.8 Based on the structure and stability of ecosystems and their nonliving components, predict the biotic and abiotic changes in such systems when disturbed (e.g. introduction of non-native species, climatic change, etc.).
Science and technology (ST)	Understanding Technology	B-A 11.6 Research sources of energy beyond traditional fuels and the advantages, disadvantages and trade-offs society must consider when using alternative sources (e.g., biomass, solar, hybrid engines, wind and fuel cells). B-A 12.3 Research how scientific inquiry is driven by the desire to understand the natural world and how technological design is driven by the need to meet human needs and solve human problems.

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Earth and Space Sciences (ES)	Earth Systems	B-C 11.11 Analyze how materials from human societies (e.g., radioactive waste and air pollution) affect both physical and chemical cycles of Earth.
		B-C 11.12 Explain ways in which humans have had a major effect on other species (e.g., the influence of humans on other organisms occurs through land use, which decreases space available to other species and pollution, which changes the chemical composition of air, soil and water).
		B-C 11.13 Explain how human behavior affects the basic processes of natural ecosystems and the quality of the atmosphere, hydrosphere and lithosphere.
Life Sciences (L)	Characteristics and Structure of Life	B-B 11.6 Explain how interactions among Earth's lithosphere, hydrosphere, atmosphere and biosphere have resulted in the ongoing changes of Earth's system. B-B 11.3 Relate how birth rates, fertility rates and death rates are affected by various environmental factors. B-B 11.5 Investigate the impact on the structure and stability of ecosystems due to changes in their biotic and abiotic components as a result of human activity.
	Diversity and Interdependence of Life	B-F 11.9 Give examples of how human activity can accelerate rates of natural change and can have unforeseen consequences.

Physical Sciences (P)	Nature of Matter	<p>B-E 12.8 Based on the structure and stability of ecosystems and their nonliving components, predict the biotic and abiotic changes in such systems when disturbed (e.g introduction of non-native species, climatic change, etc.).</p> <p>B-A 12.2 Describe how a physical, chemical or ecological system in equilibrium may return to the same state of equilibrium if the disturbances it experiences are small Large disturbances may cause it to escape that equilibrium and eventually settle into some other state of equilibrium.</p>
Science and technology (ST)	Understanding Technology	<p>B-A 11.2 Predict how decisions regarding the implementation of technologies involve the weighing of trade-offs between predicted positive and negative effects on the environment and/or humans.</p> <p>B-A 12.1 Explain how science often advances with the introduction of new technologies and how solving technological problems often results in new scientific knowledge.</p> <p>B-A 12.3 Research how scientific inquiry is driven by the desire to understand the natural world and how technological design is driven by the need to meet human needs and solve human problems.</p>