Fourth Grade

Interdependent Relationships in Ecosystems

Core Concepts

1. Construct an argument with evidence that in a habitat, some organisms can survive well, some survive less well, and some cannot survive at all.
2. Construct an argument that some animals form groups to survive.
3. Investigate a sample of organisms from an ecosystem.
4. Evaluate the effects that changes in the Chesapeake Bay have had on living and nonliving things in the ecosystem.

Essential Vocabulary

Adaptation	Biodiversity	Consumer	Ecosystem	Environment
Group Behavior	Habitat	Herbivore	Omnivore	Keystone Species
Migration	Organisms	Predator	Prey	Producer
Species	Survive			

STEM Fair Ideas

1. What is the effect of different pollutants on the growth of a plant?
2. Why do people huddle together for warmth?
3. How does the increase in manpower affect the time it takes to complete a task?
4. Does the number of people searching affect how quickly an object is found?
5. Does it take the same amount of force for two people to pull an object as it takes for one person to do it?
6. Does the number of people on the lookout affect the response time of the group?
7. How do common items from trash affect clean water?
8. How does polluted water affect underwater plants?
9. How does air pollution affect an animal's health? Choose an aerobic activity and note your resting heart rate and breathing rate. Perform your activity and note your heart rate and breathing rate again. Wait until your body gets back to a resting rate. Repeat with different layers of mask over your face. How did the different masks affect your heart rate, breathing rate, how fast you did the exercise, and how long it took your body to recover?

Fourth Grade

Energy

Core Concepts

1. Construct an explanation of speed.
2. Explain how energy can be transferred from place to place by sound, light, heat, and electric currents.
3. Build an electrical circuit using understanding of insulators and conductors.
4. Describe that energy and fuels are derived from natural resources and their uses affect the environment in multiple ways.
5. Identify and describe renewable resources and how they impact the environment.

Essential Vocabulary

Circuit	Collide	Conductor	Energy	Insulator
Kinetic Energy	Motion	Potential Energy	Speed	Transfer
Natural Resource				

STEM Fair Ideas

1. What materials transfer heat the fastest? What materials do not transfer heat?
2. What type of cup (metal, glass, plastic, styrofoam, ceramic) changes temperature when filled with a hot or cold liquid?
3. What type of cup (metal, glass, plastic, styrofoam, ceramic) keeps a liquid hot or cold for the longest period of time?
4. How can the heat of a candle flame make a fan move?
5. How does a water wheel work? How does a dam work?
6. Create a simple circuit using a battery, a flashlight bulb, and two pieces of insulated wire. Use different objects around the house to complete the circuit and find out what materials are electric insulators and what materials are electric conductors.
7. How does sound create motion?
8. Create a long ramp for a small ball. How long does it take for the ball to get to the end of the track? Raise the starting point of the ramp to different heights. How does this affect how fast the ball makes it to the end of the ramp?
9. Create a solar oven using a box and aluminum foil. How is light energy used to produce heat to melt chocolate in the oven?

Fourth Grade

Waves

Core Concepts

1. Explain how waves transfer energy.
2. Identify parts of a wave and communicate how force impacts physical waves and sound waves.
3. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

Essential Vocabulary

Amplitude	Crest	Energy	Pattern	Trough
Wave	Wavelength	Information Transfer		

STEM Fair Ideas

1. What is a tsunami and how is it created?
2. Use a rope to create a wave. Tie the rope to a chair or table leg and see what happens when the wave hits something heavier than it. Tie a small object to the end of the rope and place it on the floor. Use the wave motion of the rope to make the object move.
3. Use a bottle or jar filled with colored water and oil to show how waves form when you tilt the bottle/jar.
4. Use a cake pan or pyrex dish to show how ripples form on ponds. Secure a ruler to the side of the pan or use masking tape with permanent marker to create your own ruler. Fill the pan partially with colored water and let the water become still. Drop small rocks into the center of the water to create a ripple. Do heavier rocks create a larger ripple? Does dropping a rock from a higher location change how high the ripple rises?
5. How does sound create motion? Cover the top of a mixing bowl with plastic wrap and secure it tightly with a rubber band or tape. Place small objects on the surface of the plastic wrap and then make sounds next to the bowl. What happens to the objects? Try using a handheld speaker or placing the bowl on a table in front of a loud television. What happens?