Wilmette Public Schools, District 39
Science Curriculum, Grade 4

Unit: Land and Water Interactions

Essential Question: Are changes predictable?

Time Frame (in weeks): 12 weeks

VOCABULARY: force (constructive/destructive), weathering, erosion, sedimentation, flow, force, igneous, metamorphic, sedimentary, water cycle, evaporation, condensation, precipitation, energy, system, runoff, deposits, ground water, delta, basin, tributary, oxbow lakes, levee, slope, claim, evidence

National Standards or Core Standards

Earth is a complex and dynamic 4.6-billion year-old system of rock, air, water, and life.
Earth's surface continually changes from the cycling of water and rock driven by sunlight and gravity.
Human activities are constrained by, and in turn, affect all other processes at Earth's surface.

	Guiding Questions	Big Ideas of Science	Assessments of Knowledge and Skills	Teaching Resources & Technology
Core Ideas	How do forces change Earth's features over time? How do Earth materials cycle over time? How do the properties and movements of water affect Earth's systems? How can we gather evidence of changes in river systems? How do human beings interact with rivers?	Earth is made up of rock, metal, air, water, and living organisms in the form of the geosphere, atmosphere, hydrosphere, and biosphere. Water, erosion, wind, and weathering change Earth's features over time. The process of weathering breaks down rocks into sand and mud. The process of erosion removes rock and sediment from one location and moves it to another. Erosion is caused by water, ice and wind,and by gravity, which pulls everything downhill. Rocks cycle over time (igneous, sedimentary, and metamorphic). Earth's surface materials are continually moved around and changed from one form to another by the action of water and ice. Water is one of the few substances that can be solid, liquid, or gas under everyday conditions at Earth's surface. Rain, rivers, and oceans are connected through the water cycle. Solar energy and gravity drive the water cycle. Scientists find evidence of constructive and destructive by comparing and contrasting changing land formations. The interactions of human beings with river systems can have positive and negative effects.	**Summative Assessment** Can a force be both constructive and destructive? Support your claim with evidence. **Formative Assessment** Describe forces that change Earth's features. Explain how Earth's features change over time. Compare weathering and erosion. Conduct investigations to determine what factors change Earth's features. Describe how Earth materials recycle over time. **Summative Assessment** Describe the movement of a drop of water through the water cycle, using expository or narrative style. **Formative Assessment** Diagram the water cycle to explain changes that occur in the atmosphere. **Summative Assessment** Support with evidence how humans impact river systems in both positive and negative ways. **Formative Assessment** Conduct investigations to determine what factors change Earth's features. Complete graphic organizers--positive and negative ways humans interact with river systems.	CORE MATERIALS STC Land and Water Unit Kit STC BOOK: Land and Water, (2 additional packs of 8) STC Planner: Land and Water Literacy Enhancement: Earth National Geographic: *Shaping Earth's Surface* Theme Set *Rocks and Minerals* 6-Pack

	Guiding Questions	Big Ideas of Science	CONNECTED/ 21st Century Learning
Scientific and Engineering Practices	What is the nature of scientific inquiry? How to scientists go about their work? How can we analyze design systems considering inputs outputs and the relationship to feedback loops? What is the design process and how can we use it to solve problems? How do theories become accepted or refuted? What is the relationship of scientific claims to evidence?	Scientific inquiry is a dynamic process that is not limited to one scientific method. Inquiry engages learners in asking scientifically oriented questions, gathering and prioritizing evidence, formulating explanations, making connections to scientific knowledge and communicating and justifying explanations. Inquiry leads to new questions. Design systems have interacting parts that can be analyzed by investigating the complexity of inputs and outputs and their relationship to the feedback loop. Technological design is a dynamic problem-solving process that engages designers in proposing solutions, testing, analyzing and modifying designs. Science is an imaginative endeavor that is subject to modification as new information challenges current theories. It involves the collection of data, the use of logical reasoning, argumentation and the devising of hypotheses and explanations informed by evidence. Scientists keep honest/unbiased, clear and accurate records, value hypotheses and understand that more than one explanation can be given for the same evidence. Scientists use a variety of tools to inform their observations. Scientists organize information using tables, graphs, diagrams and symbols. Scientists question claims based on vague attributions and are skeptical of arguments based on small data samples. Scientists embrace unexpected results.	Opening minds to a **global perspective** -group research on human impact on river systems Nurturing the **characteristics of successful learners** -self evaluation and assessment, problem based learning Nourishing a sense of **social responsibility** -environmental awareness Empowering **communication** skills -presentation of findings, presentation of homesites, science notebook writing Cultivating **collaboration** -group work, sharing data and observations among groups in lessons across unit Transforming **technology** -using technology to compile data and share ideas with group members Evolving our **teaching styles** -hands-on, inquiry-based learning