Curriculum Sample for 4th Grade Science

Grade Level	4th	**Content Area**	Science
Course Title (grades 9-12 Only)	n/a		
Length of Unit	5 days	**Time of Year**	3rd Quarter
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Students will be expected to know how to ask questions and make predictions that can be tested. Students will be able to make careful observation and measure things with increasing accuracy. Students will know how to keep accurate records and have experiences that allow them to recognize patterns in data and use data to create reasonable explanations of results of an experiment or investigation.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Students will be taught using scaffolding methods as well as with direct instruction. Through lecture-discussions and demonstrations, students will develop their knowledge while practicing problem-based learning & inquiry activities. Students will also work cooperatively with each other.		
Standard Number and Description *List the Number* and full description for the required Standard.*	*Strand 1 - Inquiry Process* *Concept 3 – Analysis and Conclusions (Organize and analyze data; compare to predictions)* *PO #1 - Analyze data obtained in a scientific investigation to identify trends.*		
Summative Assessment *Describe a cumulative and comprehensive activity, clearly separate from instruction and guided or independent practice, which allows each student to individually demonstrate mastery of the required Standard. A copy of the summative assessment must be attached to the curriculum sample.*	Students will complete a "Magnet Investigation Assessment." This assessment will test whether Students can organize data, analyze data, and compare to predictions. Furthermore, it assesses whether Students will be able to analyze data obtained in a scientific investigations to identify trends.		
Scoring Scale and Mastery Level *Explain how the assessment is scored, to include points per question, how points are awarded, total points possible, criteria necessary to demonstrate mastery, and grading scale. A copy of the answer key and scoring rubric (whichever applicable) must be attached to the curriculum sample.*	Students will complete an assessment worth a total of 25 points; 20 points for mastery. Question 1 = 5 points; Question 2 = 1 point; Question 3 = 1 point; Question 4 = 1 point; Question 5 = 1 point; Question 6 = 10 points; Question 7 = 2 points; Question 8 = 2 points; Question 9 = 1 point; and Question 10 = 1 point.		
Materials/Resources Needed	Teacher's Edition Science Fusion; Student books; Different types of rocks, e.g. Halite, pumice, talc, limestone, marble, galena, basalt, mica, granite, quartz, obsidian, and sandstone; the book, *Everybody Needs a Rock*; reference books; beach remnants (organisms, sand, litter, etc.); plastic containers; Venn diagrams; the books, *Out of the Ocean* or *Ribbons of Sand;* magnets; paper clips		

Lesson (add as needed)	**Instruction**	**Student Activities**
1	Teacher states that today Students will observe, identify, and classify rocks and minerals. Teacher reads the book, *Everybody Needs a Rock*, and discusses it with Students, and tells them that they are going to go on a field trip to find a special rock...but first they must write their own rules for selecting a special rock. Teacher has some Student volunteers read their rules. Now, Teacher and Students go on a rock collecting field trip. Each Student should return with one special rock that closely fits his/her rules. Teacher requests Students share and discuss their finds. Teacher asks Students how they would change their rules if they were to go on another rock hunt. Teacher instructs Students, "In this next investigation, you will work in groups of 2 or 3 and will be given mystery rocks or minerals to observe and identify using written or computer identification references." (The size of the student groups may be determined by the number of complete rock and mineral specimen sets you have available. For example, more specimen sets and references equal more and smaller-sized student groups. Fewer specimen sets and references equal larger-sized student groups.) Teacher provides several possible specimens to choose from. For example: Halite (mineral), pumice (igneous rock), talc (mineral), limestone (sedimentary rock), marble (metamorphic rock), galena (mineral), basalt (igneous rock), mica (mineral), granite (igneous rock), quartz (mineral), obsidian (igneous rock), and sandstone (sedimentary rock). The number of specimens can be reduced or increased to make the lesson easier or more challenging.	Students listen to the story, *Everybody Needs a Rock*. Students write down rules for selecting a special rock. Student volunteers read their rules out loud to the class. Students go on a rock collecting field trip. Students pick out one special rock. Students get into groups of 2 to 3. Students observe rocks carefully, recording their observations.

	Teacher instructs Students to get started and establishes a behavioral model for classroom procedure; one specimen can be selected for observation and identification. For example, Teacher chooses halite. Teacher has Student groups have only halite. Teacher asks Students to observe it carefully, recording their observations. Then Teacher asks Students to infer the identity and discuss their inferences. Now Teacher gives Students a single reference on halite and has them compare what they read to their observations, e.g. transparent, colorless, feels sticky, can stand up on any side, and dissolves easily in water. Teacher then uses the references to find out more about halite: all halite comes from the sea, it is a mineral, it is essential in the diets of animals including humans, and it is used as a seasoning, preservative, road de-icer, and raw material in the chemical industry. In this entire activity it is important for Teacher to have Students observe carefully, accurately describe what they see, and use reference materials effectively to organize and analyze their data.	
2	Teacher states that today the class will be continuing the investigation from yesterday. Teacher gives Student a mystery group of set of rocks and mineral specimens and access to references for identification. For example, each group may have 10 mystery specimens to identify. First, they should observe all specimens carefully, recording and discussing their observations using charts. Then they use references to identify the specimens, differentiate between rocks and minerals, and classify rock types. When all have finished, Teacher selects groups to report their findings on and identification of one specimen. Teacher follows with group discussions.	Students observe a mystery group of set of rocks and mineral specimens. Students write down observations Student groups report their findings to the class.

	To conclude this activity, Teacher differentiates between rocks and minerals. For instance, Teacher states, “Each mineral contains the same kinds of particles. The particles of each mineral always form the same pattern. The crystals of each mineral always have the same definite shape. Rocks are made of minerals. However, in many rock types the minerals can't be recognized because the minerals are not in crystalline form. From the mystery rocks and minerals observed in class, identify the minerals, e.g. talc and mica and the rocks, e.g. basalt and sandstone. You may also want to distinguish among the three basic rock types; igneous, sedimentary, and metamorphic. Igneous rocks form when melted material inside the Earth or on the Earth's surface cools and becomes a solid, e.g. pumice. Sedimentary rocks are formed by deposits of particles carried in air or water. Thick layers form and become buried, e.g. limestone. Metamorphic rocks form when existing rocks are subjected to high temperatures and pressure for long periods of time, e.g. limestone is turned to marble.”	
3	Teacher begins by stating, “Today you will learn how to observe, identify, and infer materials found on beaches, e.g. organisms, sand, and litter.” Teacher begins by having children discuss ocean beaches, what organisms can be found there, and their own beach experiences. Teacher asks Students to predict what material is found most on the beaches. (Teacher has already brought in materials from a beach visit). Teacher puts Students into teams of two. Teacher provides each team of two students with a beachcomber box including the beach sand, organisms, and litter. Teacher asks Students to "comb" carefully and slowly through the sand with their fingers, finding evidence of living things that they can place on their own pieces of paper for further observation	Students discuss open beaches and predict what organisms can be found there based on their own beach experiences. Students get into teams of two. Students use a beachcomber to carefully “comb” through the sand. Students group objects by similarities and select something they found very interesting and describe it to the class.

	with their magnifying lenses and microscopes. Teacher allows time for this exploration period. Teacher asks Students to group the objects by similarities (e.g. crab parts with crab parts), then select something that they found very interesting and describe it to the class. Teacher asks other Students who have found something similar in their beach boxes to hold it up and add to the descriptions. Teacher points out the characteristics, identity, and life histories of selected objects (e.g. the mermaid purses are skate egg cases and quahog clams were used as wampum by native Americans). Teacher has Students use reference books to help identify the objects that are found.	
4	Teacher explains to Students, "Today we will be finishing up our investigation from yesterday." Teacher instructs Students to identify beach litter (e.g. cigarette butts and balloon parts), consider the effects on animals and the environment, and suggest rules, regulations, or laws to control beach litter. Teacher asks Students to put the items into categories. Teacher then instructs Students to count the items in each category. Teacher questions Students, "Were your predictions correct?" Teacher instructs Students to write down their findings. Next, Teacher has Students use the magnifying lenses and microscopes to examine the sand grains, identifying and describing their similarities and differences on a Venn diagram. Teacher explains how sand is formed over a long time period from weathering of rocks by glaciers, wind, and water. Teacher instructs Students to sweep a magnet through the sand to determine if anything sticks to it. If black particles adhere to the	Students identify beach litter. Students discuss the effects on animals and the environment and create rules or laws to control beach litter. Students put the items into categories and count them. Students record their findings. Students use magnifying lenses and microscopes to examine the sand grains, identifying and describing their similarities and differences on a Venn diagram. Student sweep a magnet through the sand to determine if anything sticks to it. Students listen to a book.

	magnet ask the children to infer their identity. Teacher explains that these are small particles of iron (magnetite) often found in sand. Finally, Teacher reads and discusses the book, *Out of the Ocean* or another excellent beach book, *Ribbons of Sand* by Larry Points and Andrea Jauck, (Books about seashells and seashores may also serve as useful references to both Students and Teacher.)	
	Teacher tells students that today they will be using a magnet to predict what objects around them are magnetized. Teacher passes out "Magnet Investigation Assessment" to Students. Teacher tells Students to predict what items will be attracted to a magnet. Teacher passes out magnets to Students. Teacher instructs Students to fill out the assessment. After exploring, Teacher has Students return to their seats, put the magnets down, and record the objects that they tested, noting those that were attracted to the magnet and those that weren't. Teacher explains to Students that any object attracted to the magnet has iron in it. Magnets attract iron. Now Teacher has Students investigate the strength of magnets by predicting how many paper clips can be picked up by their magnets. Teacher instructs Students to record their findings on the assessment. Teacher then instructs Students to finish filling out their assessments by using the data they obtained. Teacher collects assessments.	Students predict what items will be magnetic. Students explore magnetic properties of objects around them. Students fill out "Magnet Investigation Assessment." Students investigate the strength of magnets by predicting how many paper clips can be picked up by their magnets. Students record their findings. Students complete their assessment and turn it in.

Summative Assessment:

Magnet Investigation Assessment

Name _____Date _____

Directions: Please answer all questions below to show that you can analyze data obtained in a scientific investigation.

1. Predict 5 things around you that you think are magnetic.

_____ _____ _____ _____ _____

2. Are your desk legs magnetic? Circle - Yes or No

3. Is your folder magnetic? Circle – Yes or No

4. Is your chair magnetic? Circle – Yes or No

5. Is your book magnetic? Circle – Yes or No

6. List the 5 previous things that you predicted would be magnetic. Write the letter "M" for Magnetic and the letters "NM" for Not Magnetic next to your items.

1.
2.
3.
4.
5.

7. How many of your predictions were correct? Incorrect?

Correct = _____ Incorrect = _____

8. List two properties that the magnetized items possess.

_____

9. Predict how many paperclips your magnet can hold. _____

10. How many paperclips did the magnet actually hold? _____

Answer Key/Scoring Rubric:

Answer Key

Total points = 25 points; 20 points or higher = mastery

1. Wrote down 5 items (5 points)
2. Yes (1 point)
3. No (1 point)
4. No (1 point)
5. No (1 point)
6. Listed 5 items and listed whether or not they are magnetic - "M" = Magnetic and "MN" = Not Magnetic. (10 points)
7. Wrote down how many predictions were correct and incorrect. (2 points)
8. Described at least two properties that the magnetized items possess. (2 points)
9. Wrote down a prediction. (1 point)
10. Wrote down actual amount of paperclips held up. (1 point)

Total = _____/25

Comments:

Points	Percentage
18	72
19	76
20	80 *mastery
21	84 *mastery
22	88 *mastery
23	92 *mastery
24	96 *mastery
25	100 *mastery