Rock Groups

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VITAL INFORMATION

Site:
Challenger Learning Center of Lucas County (OH)

Mission Scenario:
Moon and Mars

Application to Mission Preparation:
This lesson extends the students work with classifying rock samples by helping them concentrate on similarities as well as differences.

Whole Group/Small Group/Individual:

Individual first; then team.

Team (if applicable):
Remote

Summary:
Students will use a Venn diagram to classify rocks by markings and size. The activity allows the students to find similarities and differences in the physical properties of the rocks.

LESSON AT A GLANCE

Subject(s):
Elementary, Reading, Science

Grade/Level:
4-6

Objective:
By the end of this lesson, students will be able to:

- Divide a group of rocks into 2 or 3 different groups using a common characteristic.
- Use a different characteristic to divide the same group of rocks demonstrating the rocks may be classified several ways.

Standards:

OH- Ohio Academic Content Standards

- Subject: Science
- Standard: Physical Sciences

Students demonstrate an understanding of the composition of physical systems and the concepts and principles that describe and predict physical interactions and events in the natural world. This includes demonstrating an understanding of the structure and properties of matter, the properties of materials and objects, chemical reactions and the conservation of matter. In addition, it includes understanding the nature, transfer and conservation of energy, as well as motion and the forces affecting motion, the nature of waves and interactions of matter and energy. Students also demonstrate an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with the physical sciences.

- Grade: Grade Four
- Area: Nature of Matter

Grade Level Indicator: 3: Describe objects by the properties of the materials from which they are made and that these properties can be used to separate or sort a group of objects (e.g., paper, glass, plastic, metal).

- Standard: Scientific Inquiry

Students develop scientific habits of mind as they use the processes of scientific inquiry to ask valid questions and to gather and analyze information. They understand how to develop hypotheses and make predictions. They are able to reflect on scientific practices as they develop plans of action to create and evaluate a variety of conclusions. Students are also able to demonstrate the ability to communicate their findings to others.

- Grade: Grade Five
- Area: Doing Scientific Inquiry

Grade Level Indicator: 3: Use evidence and observations to explain and communicate the results of investigations.

- Grade: Grade Six
- Area: Doing Scientific Inquiry

Grade Level Indicator: 3: Distinguish between observation and inference.

- Standard: Scientific Ways of Knowing

Students realize that the current body of scientific knowledge must be based on evidence, be predictive, logical, subject to modification, and limited to the natural world. This includes demonstrating an understanding that scientific knowledge grows and advances as new evidence is discovered to support or modify existing theories, as well as to encourage the development of new theories. Students are able to reflect on ethical scientific practices and demonstrate an understanding of how the current body of scientific knowledge reflects the historical and cultural contributions of women and men who provide us with a more reliable and comprehensive understanding of the natural world.

- Grade Range: By the end of the 3-5 program:

Benchmark: C. Explain the importance of keeping records of observations and investigations that are accurate and understandable.

• Grade Range: By the end of the 6-8 program:

Benchmark: A. Use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation).

USA- National Science Education Standards

- Chapter 6: Science Content Standards
- Grade Level: 5-8
- Content Standard D: Earth and Space Science: As a result of their activities in grades 5-8, all students should develop an understanding of
- Ability/Concept: Structure of the earth system

Detail: Some changes in the solid earth can be described as the "rock cycle." Old rocks at the earth's surface weather, forming sediments that are buried, then compacted, heated, and often recrystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues.

- Chapter 6: Science Content Standards
- Grade Level: 5-8
- Content Standard A: Science as Inquiry: As a result of their activities in grades 5-8, all students should develop
- Ability/Concept: Abilities necessary to do scientific inquiry

Detail: USE APPROPRIATE TOOLS AND TECHNIQUES TO GATHER, ANALZYE, AND INTERPRET DATA. The use of tools and techniques, including mathematics, will be guided by the question asked and the investigations students design.

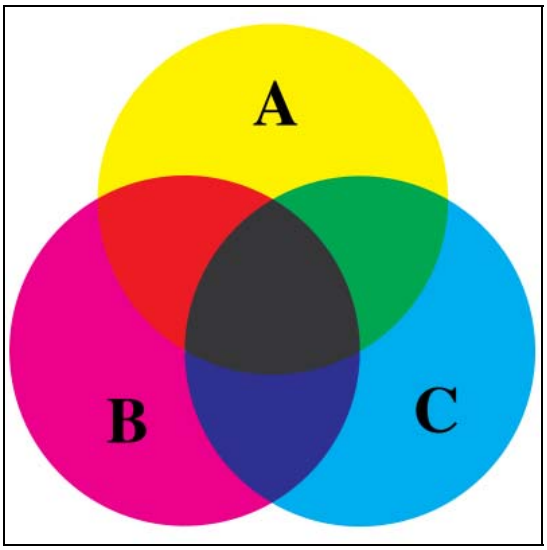
Time Required:
45 minutes

Essential Question:
How can we classify rocks using various physical characteristics demonstrating that there are both similarities and differences within each classification?

Lesson Overview:
Students will use a Venn diagram to sort rocks by characteristics identifying what the rocks have in common and also how the same rocks differ.

TEACHER PREPARATION

Subject Matter Overview:
Rocks have various physical properties by which they may be sorted. There are many ways to sort rocks by different properties.



Materials:

- Venn diagram model
- Four 24" loops of yarn per group - 3 blue and one red
- Collection of 8 rocks per group
- Data collection sheet (1 per student)

Preparation:

- Prepare the teacher model of a Venn diagram.
- Prepare the yarn loops for each group.
- Copy the data collection sheet for each student.
- Collect set of 8 rocks per group.

Differentiated Instruction:
Students may use either 3 or 4 loops for their Venn diagram. Characteristics used for sorting may vary: sedimentary, etc., color, magnetism, striped, spotted, texture

TEACHING THE LESSON

Lesson Management:
Begin by having individual students use a Venn diagram to sort an object such as Teddy Grahams. Then share the classroom model using the same object. Next extend the use of the Venn diagram to small groups to classify rocks.

Teaching Tips:

Adjust and modify the activity as you make note of the students' abilities to use the Venn diagram. You may decide to use more than one period.

Make a poster sample of the Venn diagram so that you will be able to use it for different activities. Draw the 2-circle format on one side and the 3-circle format on the other;

laminate the poster and use a dry erase marker for the labels. Select groups of rocks so that there are ample differences and similarities.

Instructions:
1. You will first walk the students through the classification process using a Venn diagram. Label the first blue circle "spotted" and the second "not spotted." Label the red circle "large."

2. Direct the students to place their yarn loops on the work surface as you set up your model and have them sort their rocks by placing them in the appropriate circle.

3. Point out to the students that the spaces where the red loop overlaps the blue loops are called intersections.

4. Rocks that are spotted as well as large should be placed in the intersecting section.

5. Do the same thing with the "not spotted" circle.

Student Worksheets:
Rock Groups

1. Draw each rock in a square below.
2. Cut out the squares in which you have drawn the rocks.
3. Glue the rocks in the appropriate circle of the Venn Diagram.

Draw the Venn Diagram circles below.
Label the circles: spotted, large, not spotted

Create another Venn Diagram using different characteristics.

Resources:
The Big Fearon Book of Doing Science
Technology resources:
PowerPoint
URL: Venn Diagram

ASSESSMENT AND EXTENSIONS

Assessment/Rubrics:
Scoring of Data Collection Sheet

1. Student chose 3 characteristics to use in classifying. 5 pts

or Student chose 4 characteristics to use in classifying. 8 pts

2. Student correctly placed rocks into the two blue loops. 5 pts

or Students correctly placed rocks into intersecting loop. 8 pts

3. Student created 1 other way to classify the rocks. 5 pts.

or Student created 2 or more other ways to classify the rocks. 10 pts.

Extension Activities:
Have the students use a 4-circle format for classifying. Use sedimentary, igneous, and metamorphic, as well as the color and texture characteristics to sort the rock samples.