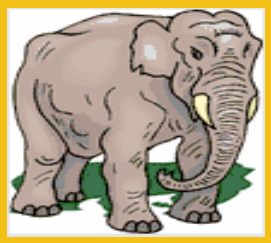
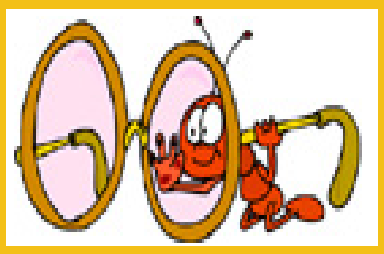
2nd Grade





Teacher Resource Book

Activities for the New 2010 Science Core

SECOND GRADE

STANDARD 2

Earth and Space Science

OBJECTIVE 1

Describe the characteristics of different rocks

Activity 1

Rocks, Rock Everywhere

Activity 2

All Sorts of Rocks

Activity 3

Mystery Rocks

Activity 4

I Spy

Activity 5

Rock Star Centers

Activity 6

Mineral Munch

Activity 7

Rock Hounds

Acclivity 8

How to Make a Rock

LESSON: Rocks, Rocks Everywhere

INSTRUCTOR: Jodi Rees

E-MAIL ADDRESS: jlrees@dsdmail.net

DISTRICT: Davis

GRADE LEVEL: 2

CORE CURRICULUM

Science Standard 2: Earth and Space Science

Objective 1: Describe the characteristics of different rocks.

Intended Learning Outcomes:

(P) When science investigation is done the way it was done before, we expect to get a very similar result.
(N) Sometimes people aren't sure what will happen because they don't know everything that might be having an effect.
(C) In doing science, it is often helpful to work with a team and to share findings with others. All team members should reach their own individual conclusions, however, about what the findings mean.

Lesson Objective: The students will be able to sort rocks based upon color, hardness, texture, layering and practical size.

INTRODUCTION

Research Basis:

Woods, Robin, (1994). A close-up look at how children learn science. Educational Leadership. Feb. 1994, 33-35.
Building on her desire to understand how children learn science, the author designed a science lesson that uses the "Conceptual Change" idea. It was that the students will revise their theories of the natural world once they see and learn new evidence based on their investigations.

Kirch, S. (2007). *Re/Production of science process skills and a scientific ethos in an early childhood classroom. Cult, Stud. Sci. Educ. 2, 785-845.* http://www.springerlink.com/content/126t3731207x6517.
Kirch examines early elementary students' learning of and engagement in science process skills and the establishment of a scientific those in the classroom, including questioning, forming, and critiquing hypotheses and identifying evidence, abilities sometimes considered to be beyond the capabilities of young learners. Kirch concludes with an essay on concerns about students' understanding of their engagement in science processes and the significance of the scientific ethos they generate.

LESSON: Rocks, Rocks Everywhere

INSTRUCTOR: Jodi Rees

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INVITATION TO LEARN

Provide the students with either a rock or a picture of a rock, and have them write about what they see. This can either be done in a paragraph or as a list. Once students are finished writing, have them compare their information with their neighbor. This information can then be used as a bulletin board being displayed throughout the unit of study.

Ask students, "What is sand?" Give students the opportunity to look at sand through hand lenses and notice that sand is itty-bitty rocks. Discuss some of the attributes that students know rocks have. Have some rocks on hand for students to look at.

INSTRUCTIONAL PROCEDURES

ROCK COLLECTION

- Give each student a copy of a **KWL chart** (see KWL). Explain how this chart can be used to organize information.
- Have students record things they already know about rocks on the **KWL chart**.
- Ask: "What do you know about rocks? What do they look like? What are some of their characteristics? Where do they come from?"
- Instruct students to write questions about rocks on the **KWL chart**.
- Ask: "What else would you like to know about rocks?"
- Read the book, *Sylvester and the Magic Pebble*.
- As a class, make a list on the board of the various attributes of Sylvester's pebble.
- Explain to students that together you are going to start a classroom rock collection and look at the characteristics of rocks.
- Each student will need an empty egg carton to collect rocks in. These can be collected and brought to school by students prior to collecting rocks.
- Encourage students to bring in at least 10 different rocks. Assign a day when their rock collections need to be completed.
- Have extra rocks on hand for students who don't bring in their rocks on the appointed day.
- General rules of rock collecting:
  1. Rocks should not be purchased from the store.
  2. Each rock should fit into a section of an egg carton.
  3. Ask permission before taking rocks from private property.
  4. Try to get rocks from different locations.

LESSON: Rocks, Rocks Everywhere

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- When students bring in their rocks, allow them to clean them with an old toothbrush and water. They need to write their initials on them with a Sharpie marker and put them in a section of their egg carton.
- On the appointed day, have students get their rock collections and get together with a partner.
- Give each student a magnifying glass and a piece of paper.
- Have students observe and discuss the characteristics of their rock collections.
- Students should make a list of characteristics on their paper.
- After students have had time to observe their own rocks and make their list of characteristic, have students share their information and make a combined class list of characteristics of the class rock collection.

Rock Sorting

- Have students get their individual rock collections and get in groups of 3-4 students.
- Give each student a copy of the *Rocks: Let's Take a Look* page (see *Rocks: Let's Take a Look*).
- Allow students time to sort their individual rock collections according to the information on the **Rocks: Let's Take a Look** paper.
- Have students share their individual rock sort with the other members in their group.
- Now, as a group have students make a collective sort of all of their rocks using the **Sorting Challenge** page (see *Sorting Challenge*).
- Explain to the students how they can test for certain characteristics in their rocks. Show example what these characteristics will look like when students see them.
- Hardness: Students can use their fingernail, a penny and a nail to scratch on their rock. Students then compare the hardness of their rock to the object that left a scratch on their rock. "My rock is harder than a penny but not as hard as a nail."
- Texture: Students can compare the texture of their rocks to the textures of different grits of sandpaper. Gather samples of different grits of sandpaper. Label the sandpaper samples so students can best describe the texture.
- Color: Students can sort according to colors.
- Particle Size: Students can test this by shaking their rocks in a small metal can for a couple of minutes. The small bits of rock left in the can shows the particle size.
- Layering: Students sort rocks according to the visible layers seen on the rocks.
- Give students time to test and sort their group rock collection in any way that their group chooses. They should only sort by one characteristic at a time.
- Each group should then explain how they sorted their rocks to the rest of the class.
- If time allows, let student groups sort their rocks again using a different characteristic.
- Take pictures of the groups; sorts so that students can see other's work and further class

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discussion can be made. These pictures can then be put on a bulletin board or in a PowerPoint to share with parents.

- Have each student make an illustration of one of his/her rocks that shows two different characteristics. Students should put as much detail and color in their pictures as they can. Have the students write a description of the rock they drew. Encourage students to share their illustrations and written descriptions with their partners or with the class if time allows.

LESSON MATERIALS

- Sand
- KWL Chart
- Book: *Sylvester and the Magic Pebble*
- Empty egg carton for each student (students can bring these from home)
- Old Toothbrush for cleaning rocks
- Marker for labeling rocks with students' initials
- Extra rocks
- Magnifying glasses
- Paper
- Rocks: Let's Take a Closer Look paper
- Sorting Challenge paper
- Pennies
- Nails
- Sandpaper
- Small metal cans (soup cans)
- Camera

ASSESSMENT SUGGESTIONS

1. Observation during group work.
2. Student list of attributes for their rock collections.
3. Student work in group sorting activities.
4. Student drawing and written description of their rocks.

POSSIBLE EXTENTIONS/ADAPTATIONS/INTEGRATION

- **Movement:** Take a walk outdoors with children. Have children stop by a large rock.

LESSON: Rocks, Rocks Everywhere

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GRADE LEVEL: 2

Ask children: "If this rock could talk, what do you think it might say? How do you think it would feel about where it lives and how it spends each day? How do you think it would feel about having visitors?" When you return to the classroom, have children write or dictate stories about the magic rock that came to life. Later, have children illustrate their stories and share them with their classmates.

- **Math:** Using the pebbles and stones your child collected in the science lesson, have children make a bar graph of rocks by color, texture (smooth, rough), size, etc. Have them group the rocks in different ways, and look for their input as to how they would graph each one. This can be done in groups so that students have more rocks to use as data. Have each student create his/her own graph.
- **Art:** Have the students bring in a rock that they could decorate. They may even want to bring in several rocks and make a person or object using their rocks. Finished projects can be displayed in the classroom or school library or shared with parents.
- **Writing:** Cut out a red, shiny pebble for the students to glue on their picture. Use red cello phane or scapbook paper. Give them a piece of paper with the following directions: Draw a picture of what you would wish for if you had a magic pebble. Glue your magic pebble onto your picture. Write what you would wish for below the picture.

RESOURCES: Books, Media, Articles, Web Sites, and Organizations

BOOKS

The Nature and Science of Rocks, by Jane Burton and Kim Taylor, ISBN: 0-8368-1945-4
If You Find a Rock, by Peggy Christian, ISBN: 0-15-239339-0
Rock Collecting, by Roma Gans, ISBN: 0-690-04265-5
The Pebble First Guide to Rocks and Minerals, by Zachary Pitts, ISBN: 1-4296-1711-X
Rocks, Rocks, Rocks by Nancy Elizabeth Wallace, ISBN: 978-0-7614-5528-8
Sylvester and the Magic Pebble, by William Steig, ISBN: 0-671-66269-4
Everybody Needs a Rock, by Byrd Baylor, ISBN: 068971058

MEDIA

ARTICLES

LESSON: Rocks, Rocks Everywhere

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GRADE LEVEL: 2

WEBSITES

Retrieved from the World Wide Web on December 2, 2009:
http://ww.neok12.comp/php/devpst.php

ORGANIZATIONS

FAMILY CONNECTIONS

- Rock collecting is a great family activity. There are many places in Utah to collect a variety of rocks.
- Rocks are used for so many things. Have students go on a rock hunt for homework and list the uses of rocks in and around their homes. Add the use of a digital camera and they could make a great poster.

LESSON AND ACTIVITY (TIME SCHEDULE)

- Each lesson is 55 minutes
- Each activity is 30 minutes
- Total lesson and activity time is 85 minutes

ACTIVITY CONNECTED TO LESSON

Rock Hounds

- Give each student or group of students a deck of playing cards. Face cards can be removed.
- Have students sort the cards however their group decides.
- They need to be able to explain how their cards were sorted and share with the class. Point out that there are different ways to sort the cards.
- Read the book Everybody Needs a Rock. Discuss some of the attributes presented in the book.
- Choose a rock from the class collection and study it. Have students describe it. Make a list of their responses on the board.
- Put students into small groups of three or four. Have them select a rock. They need to create a written description of their rock on a piece of paper. You may have each group do two rocks, depending on the number of groups you have. Each rock should have its own description paper.
- When their descriptions are finished, collect all of the descriptions and rocks.

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- Redistribute the rocks and descriptions and see if the groups can find the rock that is described on their paper.

ACTIVITY MATERIALS

- Several decks of playing cards
- Classroom rock collection or other rocks
- Writing paper

Activity #1

Name _____ Date _____

KWL Chart

Before you begin your research, list details in the first two columns. Fill in the last column after completing your research.

Topic _____

What I Know	What I Want to Know	What I Learned

Rocks: Let's Take a Closer Look

Shiny	**Dull**	**Black**
Rough	**Soft**	**Brown**
Hard	**Smooth**	**Red**

Activity #1

Sorting Challenge

Sort your rocks by LAYERS	Sort your rocks by HARDNESS	Sort your rocks by PARTICLE SIZE
Sort your rocks by TEXTURE	Sort your rocks by COLOR	Sort your rocks by Your Choice

All Sorts of Rocks

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective I

Describe the characteristics of different rocks.

Intended Learning Outcomes

Knowing in Science: Understanding the nature of science.

Content Connections: Language Arts

Background Information

Children are excited to learn about rocks, especially when the learning is hands-on! Take this opportunity to have students collect and bring in rocks. The lessons will be more engaging if the students have been responsible for collecting the rocks.

In this lesson, students access their prior knowledge of sorting with a card sort and a book before being asked to apply their understanding of sorting to rocks. This will help the students prepare to think critically and remind them that there are many different ways to for the same set of objects.

To be successful, the students will need to understand the concepts of hardness, texture, layering, and particle size as they relate to rocks. The literature shared in this lesson, and the rock adjective game will both help to facilitate this understanding.

Research Basis

Hanze, M., & Berger, R. (2007) Cooperative learning, motivatinal effects, and studnet characteristics: An experimental study comparing cooperative learning and direct instruction in 12th grade physiucs classes. *Learning and Instruction*. 17(1), 29-41.

Researchers compared student achievement in classrooms with cooperative learning instruction and traditional direct instruction. The method of instruction was found to interact with student's self-concept; students with low academic self-concept profited more from cooperative learning instruction than from direct instruction because they experienced a feeling of greater competency.

Mintz. E. & Calhoun, J. (2004). Project Notebook: Science notebooks emerge. *Science and Children*. 42(3), 30-34.

Teachers from South Carolina, attempting to meet the needs of their diverse student population, create a program implementing science notebooks. They believed that science could be used as a vehicle for increasing student achievement across the curriculum. Science notebooks, used in conjunction with an injury-based science curriculum, emerged as the natural vehicle for helping to create an effective science program.

Invitation to Learn

The teacher gives each student or team of students a deck of cards. Students are invited to sort their cards. Once finished they are asked to share with the class how they have sorted their cards. The teacher emphasizes that there are many different ways to sort the cards correctly.

Materials

- ☐ Deck of cards
- ☐ *Dave's Down to Earth Rock Shop*
- ☐ A box of rocks
- ☐ Hand lenses
- ☐ *Time Capsule Form*
- ☐ *Rock Sorting Challenge*
- ☐ Time Capsule
- ☐ *Rock Bingo*
- ☐ Bingo Game pieces

Instructional Procedures

1. Ask students to share what they know about time capsules. Discuss how time capsules are usually buried and left alone for many, many years to show how much things have changed over time, but that with your special time capsule you can see how much things have changed over minutes instead of years. On their time capsule form have each student list as many ways as they can think of to sort rocks. Have the students place their lists in the time capsule.

2. Read *Dave's Down-to-Earth Rock Shop* to the class.

3. Encourage students to make text-to-text, text-to-self, and text-to-world connections.

4. Give each group of students a box of rocks and some hand lenses. Ask the students to examine the rocks closely and work together as a group to compile a list of adjectives, that describe their rocks.

5. Discuss the students fill in the *Bingo* blackline master with the adjectives on the board.

6. Have the students fill in the *Bingo* blackline master with the adjectives on the board.

7. Play *Bingo* with their cards and the terms in your class list. As each adjective is called out ask the students to review the

rocks on their desk and hold up any that are described by the adjective.

8. As a class, discuss the different ways that rocks were sorted in the book *Dave's Down-to-Earth Rock Shop*. Invite the students to work in groups to find different ways to sort the rocks on their table.

9. Calculate among the groups to informally assess their understanding.

10. Hand out a Rock Sorting Challenge to each group and ask them to discuss how they will sort their rocks and what materials they will need to organize their sort. Meet with each group to scaffold and facilitate their plans.

11. Have each group read their *Rock Sorting Challenge* to the class and show their rock collection.

12. Display their collections in the classroom.

13. Have each student create a new list of all the ways they can think of to sort rocks on the *Time Capsule form*.

14. Open your time capsule and have the students compare their old and new lists to see how many new ways of sorting they have come up with.

Assessment Suggestions

- Informally assess their responses to the Bingo Game and their ability to match adjectives with their rocks.
- Assess the rock collections created by the class groups and their verbal explanations to the class.
- Review student responses on their final *Time Capsule form*.
- Invite Students to create and sort a rock collection at home and present it to the class.

Curriculum Extensions/Adaptations/Integration

- Invite students to select a rock. Ask them to measure and record as much information about their rock as they can. Have them imagine that a rich man has offered to give them $1000 if they can find their exact rock in a field of rocks using the information that they record.

- Take two samples of granite and tap both with a hammer to demonstrate how strong they are. Take one sample and repeatedly bake and plunge in ice water. This speeds up the erosion process that naturally occurs during the winter and summer seasons. After ten cycles of freezing and thawing tap the sample again with the hammer. The sample will crumble into its three component pieces. Invite students to sort the particles by color.

- Advanced learners can be introduced to Moh's Scale of Hardness and given the appropriate tools for determining rock hardness more accurately.

- Rock Field Guides may be introduced to advanced learners.

- Review academic language using pictures and other appropriate graphic organizers for ESL students.

Family Connections

- Invite the students to collect appropriately sized rocks at home to use for the sort. This needs to be done up to a week before beginning the lesson.

- Encourage families to go rock hunting and sort their rocks by color, hardness texture, layering or particle size. Invite them to share and display their collections in your classroom.

Additional Resources

Books

Dave's Down-to-Earth Rock Shop, by Stuart J. Murphy; ISBN 0064467295

Let's Go Rock Collecting, by Roma Gans; ISBN 0064451704

Rocks and Minerals, by DK Publishing; ISBN 0789497604

Smithsonian Handbooks: Rocks & Minerals, by Chris Pellant; ISBN 0789491060

Web sites

http://kids.si.edu/collecting/

http://rocksforkids.com/

http://www.fi.edu/tfi/units/rocks/rocks.html

Name _____

Time Capsule

Activity #2

Date _____ Time _____

List all of the ways that you can think of to sort rocks.

_____

_____

_____

_____

_____

_____

_____

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_____

_____

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_____

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_____

_____

Rock Sorting Challenge

Sort your rocks by

COLOR

Sort your rocks by

HARDNESS

Sort your rocks by

TEXTURE

Sort your rocks by

PARTICLE SIZE

Sort your rocks by

LAYERING

Rock Bingo

Mystery Rocks

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective I

Describe the characteristics of different rocks.

Intended Learning Outcomes

Communicating Science: Communicating effectively using science language and reasoning.

Content Connections: Language Arts

Background Information

This lesson is designed to get students thinking ab out the uses of rocks in the world around them. Special focus needs to be placed on 'why' the rock would be suitable for use. It is important that students learn the soft rocks would be unsuitable for buildings or arrowheads, and that hard rocks would be a poor choice for a chalk substitute or for creating a petroglyph.

There are some obvious opportunities to teach more about the culture of the Native Americans at the end of this lesson. There are also opportunities to discuss how we can respect rock art and other ancient artifacts in our state.

The term 'petroglyph' will need to be introduced to most students. It describes art that is carved, scratched, or pecked into rock. It is not interchangeable with the term 'pictograph,' which describes art that is painted onto rock.

The plaster of Paris used in this lesson can be easily and inexpensively obtained from a hardware store in the paint and spackle area. It is a rock product that is similar in composition to limestone. The plaster of Paris powder is mixed with water and sets up within an hour. The plaster can be poured into paper plates, Styrofoam meat trays, or a shallow cookie sheet. If the plaster of paris pieces are painted a dark earth tone, the picture the students etch will be more visible.

Research Basis

Hanze, M., & Berger, R. (2007) Cooperative learning, motivational effects, and student characteristics: An experimental study comparing cooperative learning and direct instruction in 12th grade physics classes. *Learning and Instruction*. 17(1), 29-41.

Researchers compared student achievement in classrooms with cooperative learning instruction and traditional direct instruction. The method of instruction was found to interact with student's self-concept; students with low academic self-concept profited more from cooperative learning instruction than from direct instruction because they experienced a feeling of greater competency.

Mintz. E. & Calhoun, J. (2004). Project Notebook: Science notebooks emerge. *Science and Children*. 42(3), 30-34.

Teachers from South Carolina, attempting to meet the needs of their diverse student population, create a program implementing science notebooks. They believed that science could be used as a vehicle for increasing student achievement across the curriculum. Science notebooks, used in conjunction with an inquiry-based science curriculum, emerged as the natural vehicle for helping to create an effective science program.

Invitation to Learn

Show pictures or examples of rocks, one at a time, and encourage student responses about how the rock could be used. Show pictures or examples of how the rock was used. Discuss why that rock was a good choice for that use (for example: granite is a good choice for countertops because it polishes smooth and is very hard.)

Materials

- ☐ Pictures of rocks
- ☐ Five Mystery Rock Boxes
- ☐ Ancient rock art
- ☐ Pieces of plaster of paris
- ☐ Nails
- ☐ *Mystery Rock*
- ☐ *Rock Opportunities*
- ☐ Writing Paper

Instructional Procedures

1. Invite the class to view the contents of one of the Mystery Rock boxes (not the plaster of Paris piece). Ask them to write at least a paragraph on their half piece of paper describing how they thin it is used, and why it would be used that way. Encourage them to use their creativity and write so well that the other students will be convinced that they are right.

2. Ask the students to share their writings and discuss the possibilities.

3. Share with them the true identity of the rock and its uses.

4. Collect the students' writing and staple it inside the halves of the *Mystery Rock* blackline master to make a book.

5. Display the four other *Mystery Rock* boxes, and half pages of writing paper in a center. Encourage the students to examine the other mystery rocks and write what they believe each rock is used for.

6. Compile the students work to make books for each mystery box.

7. As a class, review the student guesses and their reasoning. Uncover the real uses of each rock and discuss why the characteristics of that rock make it good for its use.

8. Unveil the plaster of Paris pieces last and discuss how similar rock was used for thousands of years to record history and tell stories.

9. Show pictures of ancient rock art and discuss what can be learned from the pictures (e.g. how they hunted, what they wore, what animals they lived with, etc).

10. Distribute plaster of Paris pieces and nails so that students can create their own petroglyph. Encourage students to tell a story or capture a memory with their picture and to think ahead since it is difficult to fix mistakes.

Assessment Suggestions

- Asses the student responses to the Mystery Rock boxes. They should be able to explain what characteristics of each rock make it suitable for their suggested use.

- Their artwork should show that they understand that rock art was used to preserve stories or memories.

Curriculum Extensions/Adaptations/Integration

- A field trip to collect rocks, fossils, or to view rock art would be useful to reinforce the lesson.

- An unpainted piece of plaster or Paris can be placed in a shallow bowl of vinegar. Bubbles will form, and over time, it will completely disintegrate. This is a good example of what happens to limestone buildings that are subjected to acid rain for a very long time. Daily observations should be made and can be recorded in a science journal.

- Dissolve as much rock salt as possible in very hot water. Hang a string into the center of the salt water. Leave, and allow salt

crystals to develop. You can experiment to determine what conditions (light/dark, hot/cold) encourage the best crystal growth. Student observations can be recorded daily in a science journal.

- Review academic language using pictures and other appropriate graphic organizers for ESL students.

Family Connections

- Send home Mystery Boxes and encourage families to discuss what they think each rock could be used for.
- Using the *Rock Opportunities* blackline master, create a list of nearby areas to collect rocks, find fossils, view rock art, etc. Send it home with the students and encourage their families to take a field trip together!

Additional Resources

Books

*Easy Field Guide to Rock Art Symbols of the Southwest***,** by Rick Harris; ISBN 0935810587

How We Use Rock, by Chris Oxlade; ISBN 1410909964

Looking at Rocks, by Jennifer Dussling; ISBN 0448425165

Native American Rock Art: Messages from the Past, by Yvette Lapierre; ISBN 1565660641

Rock Art of Utah, by Polly Schaafsma; ISBN 0874804353

Web sites

http://www.rocksandminerals.com/uses/htm

http://www.usgs.gov/

http://www.moab-utah.com/anasazi/rockart.html

http://www.cldphoto.com/rock.html

Organizations

Utah Rock Art Research Association, P.O. Box 511324, Salt Lake City, UT 84151-1324, www.utahrockart.com

Mystery Rock

Mystery Box #1

The mystery rock in this box could be used for...

This mystery rock is really SALT!

Geologists call it Halite.
It is used to season our food.
This rock dissolves in water.
This rock melts ice.

Mystery Rock

Mystery Box #2

The mystery rock in this box could be used for...

This mystery rock is really SAND!

Sand is melted to make glass.
It is used as an ingredient in
concrete and stucco.
When it is glued to paper it makes
sandpaper.

Mystery Rock

Mystery Box #3

The mystery rock in this box could be used for...

This mystery rock is really GRANITE!

It is a very hard rock.
It is polished and used for countertops.
It can also be used in buildings,
statues, and headstones.

Mystery Rock

Mystery Box #4

The mystery rock in this box could be used for...

This mystery rock is really PUMICE!

This rock can float.
It is an ingredient in pink rubber erasers. It is ground up and used to make nail files and household cleaners.

Mystery Rock

Mystery Box #4

The mystery rock in this box could be used for...

This mystery rock is really PUMICE!

**This rock can float.
It is an ingredient in pink rubber erasers. It is ground up and used to make nail files and household cleaners.**

Rock Opportunities

Second graders are naturally curious about the world around them. And here in Utah, we are surrounded by opportunities to learn more about rocks, fossils, and ancient rock art. Consider visiting some of these areas with your students to learn more.

I Spy

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective I

Describe the characteristics of different rocks.

Intended Learning Outcomes

Knowing in Science: Understanding the nature of science

Content Connections: Language Arts

Background Information

All material on Earth an be sorted into three categories -- animals, plant, or mineral. Some materials are easily identified, such as dogs, carrots, or rocks. Other materials may be less obvious, such as rubber, glass, and aluminum. These categories can be more specifically defined as living, once living, and non living. The availability, and properties of these resources will determine how humans use these materials.

Invitation to Learn

Play a game of *I Spy*. Start by saying, "I spy something that was made from a rock." Let students ask yes/no questions to discover the answer.

Instructional Procedures

1. Pass out magazine pictures to table groups. Have students sort the pictures according to living and nonliving objects. Allow each table to explain why they sorted their objects the way they did.
2. Go on an *I Spy* search on the playground. Students are searching for objects made from rock material -- items that are nonliving. When an object is found, students should do the following in their *Rock Journals* (p. 7-5):
3. When the I Spy search is over, take students back into the classroom and compare some of their findings. Be sure to call on any student who found items that may not have been easily identified as rock material (e.g., a metal link from a swing).

Connections

Materials

- ☐ Magazine pictures of living and nonlivng objects
- ☐ Hand lens for each student
- ☐ Pencil
- ☐ Crayons
- ☐ Clipboard
- ☐ Map of the school playground (can be hand-drawn or aerial satelite photos can be acquired for a small fee at landvoyage.com and intelius.com)
- ☐ *Rock Journal*

Possible Extensions/Adaptations/Integration

- Have students make maps of the classroom or of the school and complete the same activity. Be sure to have them describe the object and label it on their maps.

- Have students make an I Spy book by cutting out magazine pictures of living or non living items and gluing them into a collage. Using the writing process, students can write the text and put it into a class book.

- If you have access to several technology sources, students could get into groups and create mini collections of objects made from rock material (e.g., keys, paper clips, rocks, coins, thumb tacks, staples, chalk, etc). Take a digital picture, which could also be used to create a class book in the computer lab. (A regular camera could also be used.)

Assessment Suggestions

Use the first Rock Journal as a pre-assessment tool. At the end of the unit, go on another hunt and have the students compare their journals. Were the items they found just simple rocks, or were they were more complicated, less obvious items? Students who can identify material made of metal or glass probably have a solid understanding of this concept.

Additional Resources

Web sites

http://www.landvoyage.com (aerial satellite photos)

http://www.intelius.com (aerial satellite photos)

Family Connections

- Students could create an I Spy box, bottle, or photograph at home and bring it to class to share.

- Students could make a map of their bedroom and use a symbol to identify items made from rock material.

- With their families, students could go on an I Spy hunt around their house. Ask students to bring in or share unusual items found at their homes that were made from rock materials.

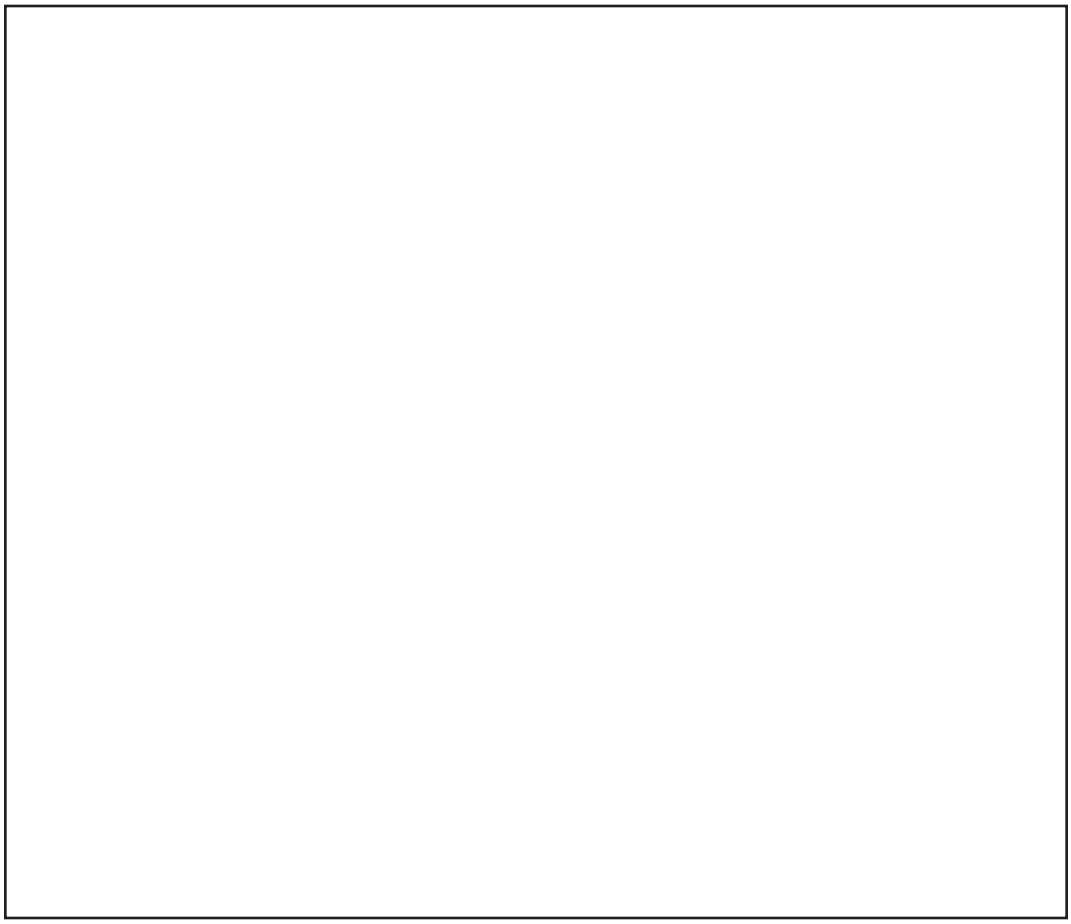
_____ 's

Rock Journal

Date Started _____

_____ School

Use a colored circle to mark each place you found a rock or rock material.



Key:

☐ = Rock 1 ☐ = Rock 2 ☐ = Rock 3 ☐ = Rock 4

(Use a different colored dot for each rock.)

I Spy Rock Material

Number your rock, make a rubbing of your rock, and describe your rock.
Be sure to mark where you found it on the map.

Rock #1

Description of your rock:

Make a rubbing of your rock:

Rock #2

Description of your rock:

Make a rubbing of your rock:

I Spy Rock Material

Number your rock, make a rubbing of your rock, and describe your rock.
Be sure to mark where you found it on the map.

Rock #3

Description of your rock:

Make a rubbing of your rock:

Rock #4

Description of your rock:

Make a rubbing of your rock:

Rock Star Centers

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective I

Describe the characteristics of different rocks.

Intended Learning Outcomes

Generating evidence: Using the processes of scientific investigation (i.e. framng questions, designing investigations, conducting investigations, collecting data, drawing conclusions)

Communicating Science: Communicating effectively using science language and reasoning.

Content Connections: Language Arts

Background Information

All rocks are made of minerals or a combination of minerals. They are used to make many products. Common minerals, such as graphite, are used to make the lead in pencils, while other minerals are more rare, such as gold and silver. These minerals are often used to make jewelry or money. Common minerals can be identified by looking at some of their properties or attributes, such as color, texture, hardness, and luster.

Invitation to Learn

Tell the students they are going to study a rock star. They each get to choose their own rock star, and then they are going to learn everything they can about their "rock" star.

Instructional Procedures

Materials

- ☐ *Rock Star Journal*
- ☐ Ziploc bags
- ☐ Rock for each student
- ☐ Pencil
- ☐ Center materials
- ☐ *Crayons*

1. Have each student select one rock from his/her rock collection. Give each student a *Rock Star Journal* (p. 7-16). Put the rock in a bag that is stapled to the front of his/her journal. It is important that they keep it safe and don't loose it. When they are finished you will want to discuss the results and try to determine a good use for their rock.

2. Students will rotate through the different centers and complete tasks to help determine the different properties of their rock.

   These are the centers:

Center 1 -- Weight

Students will use a balance scale to determine how heavy their rock is. They may add teddy bear counters, marbles, or some other nonstandard unit of measure to determine the weight of their rock.

Materials

- ☐ Balance Scale
- ☐ Nonstandard weights (e.g., teddy bear counters, marbles, etc.)

Center 2 -- Size and Shape

Students will trace their rock onto their paper. They will also use string to determine the circumference of their rock.

Materials

- ☐ Scissors
- ☐ Ball of sturdy string

Center 3 -- Hardness

Students will determine how hard their rock is by scratching it with several objects (e.g., fingernail, penny, nail, etc.). If the object does not make a mark, then the rock is harder than the object.

Materials

- ☐ Penny
- ☐ Nail

Center 4 -- Texture

Students will compare the texture of their rock to varying grits of sandpaper. They will take a small square of the sandpaper that matches their rock's texture and glue it into their journal.

Materials

- ☐ Several pieces of sandpaper with different grits

Center 5 -- Sink or Float (density)

Students will use a balance scale to determine how heavy their rock is. they may add teddy bear counters, marbles, or some other nonstandard unit of measure to determine the weight of their rock.

Materials

- ☐ Container of water
- ☐ Paper towels
- ☐ Sample of pumice

Materials

- ☐ Aluminum foil
- ☐ Glitter or sequins
- ☐ Brown paper sack
- ☐ Wax paper

Center 6 -- Shiny or Dull (luster)

Students will compare their rocks to pieces of aluminum foil, sparkly sequins or glitter, wax paper, or a brown paper sack. They will take a sample of the one that is most like their rock and glue it in their journal.

Center 7 -- Color

Students will draw their rock and how it looks on the outside. They should pay close attention to whether or not the rock has layers or multiple colors.

Materials

- ☐ Crayons

3. When each child has had a chance to complete each center, have a short discussion about the findings. Based on these findings, see if they can come up with some ideas for uses of the rock.

Possible Extensions/Adaptations/Integration

- Using the word MINERALS, conduct a "making words" activity. Some possible words and chunks that can be created are: a, an, in, me, ran, man, nail, sail, rail, mine, line, miner, Reams, linear etc.

- Make an interactive writing book about the properties of rocks and their uses. For example, a page may read, "Some rocks are hard. Hard rocks can be used to make tools like hammers and jewelry like diamond rings. Some rocks are soft. Soft rocks can be used to make things to write with like chalk and pencil lead."

- Be sure to include pictures alongside difficult vocabulary words for learners with special needs. You may also want to have students work with partners as they move through the centers.

Assessment Suggestions

- The *Rock Star Journal* is a good indicator as to whether or not the student understood the centers. When the centers are complete, students could also be asked to write a short descriptive paragraph about their rock using information they discovered at the centers.

Additional Resources

Books

Rocks and Minerals, by Dr. R. F. Symes (Eyewitness Books); ISBN 0-394-89621-1

Rocks and Minerals, by Ann O. Squire; ISBN 0-516-22505-9

Gemstones, by Ann O. Squire; ISBN 0-516-22505-7

Investigating Rocks, by Natalie Lunis and Nancy White (Big Book); ISBN 1582730814

Remarkable Rocks, by Ron Cole (Big Book); ISBN 1-56784-221-6

Rocks, Minerals, and Fossils, by Rebecca Hunter; ISBN 0-7398-3250-6

Video

Uses of rocks and Minerals; ISBN 1-58541-088-8

Web site

http://www.mii.org (Mineral Information Institute)

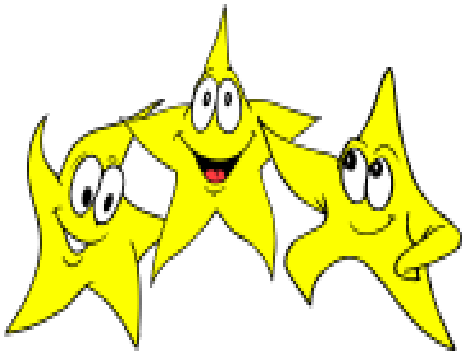
Family Connections

- Teachers could send a short summary of each of the centers home and ask families to test more rocks for hardness, texture, etc.

- Give families the Web site to the Mineral Information Institute. Ask students to look up one of their favorite minerals. Bring in a sample or printed picture.

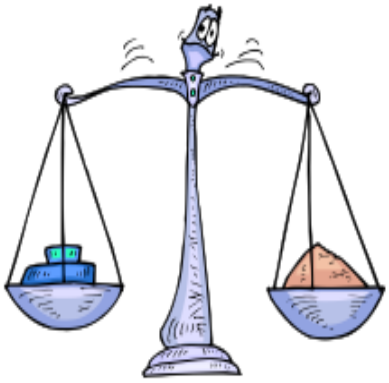
- Issue a challenge for families to find three kid-friendly Web sites about rocks and minerals.

Rock Star Journal



Name _____ Date _____

Center 1 -- Weight



My rock is as heavy as _____ teddy bears.

Center 2 -- Size and Shapes

This string will fit around teh widest part of my rock.
(Tape string here.)

This is what my rock looks like when I trace it.

Center 3 -- Hardness

Check each item that scratches your rock.



Fingernail _____ Penny _____ Nail _____ Nothing _____

Center 4 -- Texture

The surface of my rock feels like this.

Glue sandpaper here.

Center 5 -- Sink or Float

Predict what will happen to your rock when you place it in water.
(Color in the box.)

Sink | Float

What happened to your rock when you placed it in water?
(Color in the box.)

Sink | Float

Center 6 -- Shiny or Dull

The surface of my rock looks like this.

Glue
paper
here.

Center 7 -- Color

The color of my rock looks like this:

Be sure to draw any layers or multi-colored areas.

Mineral Mulch

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective I

Describe the characteristics of different rocks.

Intended Learning Outcomes

Communicating Science: Communicating effectively using science language and reasoning.

Content Connections: Language Arts

Background Information

Connections

Halite, which is also called sodium chloride or salt, is a common mineral found in many products, including food. Salt can be used as a food seasoning and is valuable for preserving meats, especially in hot climates. In the U.S. only about 1% of processed salt is used in food, the rest is used as a deicer for the roads or in the chemical industry. In Roman times salt was used as currency and the English word salary actually comes from the Latin word Sal. You may have heard that a person is "worth their salt" or the "salt of the earth" meaning they are very valuable and highly praised. The recommended daily allowance of sodium is 2, 400 mg.

Invitation to Learn

Explain to students that you would like to invite two students to come to a "mineral munch." The two students who can name the most items in the place setting that are made from rock materials (e.g., plates, silverware, vase, salt and pepper shakers, etc.) Will be invited to dinner. Unveil the table for 5 seconds. Then give the class a minute to write down as many items as they can remember. Determine which two students had the most items made from rock material. Invite these students to come to the front of the class and become diners.

Instructional Procedures

1. Serve each of the "diners" a low sodium cracker. Don't tell them it's low sodium. Ask them to describe the taste. Then serve them the regular cracker. Ask them if they noticed any difference. Compare the two crackers. Did they like one more than the other?

(Students may not be able to tell the difference--even low sodium crackers still have some added salt.) It is okay if the students like the lower sodium cracker better. There is no right answer, just a comparison of taste.

2. Allow all of the students in the class to taste the low sodium cracker and then the regular cracker. Can they tell a difference?

3. Discuss some of the benefits and uses of salt. Also discuss some of the problems that can occur if there is too much salt in your diet.

4. Show an overhead of a cereal nutrition label. Point out the sodium content.

5. Explain that when the sodium content is lower, the nutritional value is generally higher.

6. Break into table groups and fill out the *Sodium Content* handouts (p. 7-23) for various cereal nutrition labels. When students are finished, compare results.

Materials

- ☐ Table Setting
- ☐ Low sodium crackers
- ☐ Regular Crackers
- ☐ Overhead of a cereal nutrition label
- ☐ Cereal nutrition label for each student
- ☐ *Sodium Content* handout

Possible Extensions/Adaptations/Integration

- Compare rocks to a cookie with several ingredients (e.g., chocolate chips, nuts, raisins, M&Ms, etc.). Students dissect the cookie and divide them into parts. The comparison can be made that chunks of ingredients are the minerals and the remaining cookie parts hold them together -- just like real rocks and minerals.

- Using cream, you can make two sets of homemade butter. Salt one set and leave the other plain. Ask the class to see if they can taste the difference.

- Using a cereal with a high iron content like Total, crush the cereal. Add warm water to make a watery mush. Using a powerful magnet pull the iron particles from the cereal by stirring it with the magnet. This is a very visual example of how minerals are found in what we eat.

- For learners with special needs you may want to highlight the sodium line on their nutritional label. Labels can be hard to read and this will help them find the information quickly.

Assessment Suggestions

- Ask students to complete the same activity, but this time look at the calorie count or iron content.

Additional Resources

http://www.mii.org (mineral information Institute)

Family Connections

- Go shopping with a family member and help determine a low sodium purchase.
- Look at all the cereal in your cupboard. Which cereal has the best nutritional value when you compare the sodium, iron, and calories?
- Try to go a day without adding any extra salt to your meals. How did the food taste? Report back to the class.

Sodium Content

Fill in the table with your group. Using information from the table, answer the questions.

Name	Cereal Name	Sodium Content
		

The cereal with the least amount of sodium is

_____

The cereal with the greatest amount of sodium is

_____.

Activity --Rock Hounds

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective I

Describe the characteristics of different rocks.

Intended Learning Outcomes

Knowing In Science: Understanding the nature of science

Content Connections: Language Arts

Invitation to Learn

Ask students, "What is sand?"

Instructional Procedures

1. Look at sand with hand lenses. Help students discover that sand is a lot of itty-bitty rocks.
2. Read *Everybody Needs a Rock*. Discuss some of the rock attributes presented (e.g., size, color, shape, and texture).
3. Select a rock and study it. Have students help describe it. Introduce and discuss other rock attributes such as hardness, patterns, crystals, etc. Complete the description of the rock.
4. Put students into small groups of three or four. Have them select a rock, and then describe and classify their rocks. Write down the descriptions and pool all the rocks together again.
5. Have groups move to a new group location. Students should choose a description and try to find the rock it goes with.

Materials

- ☐ *Everybody Needs a Rock* by Bryd Baylor
- ☐ colored sand and glue
- ☐ assorted rocks
- ☐ classifying grid
- ☐ hand lenses

Extension/Adaptations

Keep a list of the attributes listed so students can see h ow the words are spelled. If necessary, buddy up students so they have a resource to help with spelling and reading.

Assessment

Can students describe rocks using appropriate terminology?

Additional Resources

Rocks by Brenda Parkes (Newbridge Discover Links)

Family Connections

Look for rocks at home and practice describing their attributes.

Looking at Rocks

Shiny	Dull	Black
Rough	Smooth	Brown
Hard	Soft	Red

Activity -- How to Make a Rock

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective I

Describe the characteristics of different rocks.

Intended Learning Outcomes

Communicating Science: Communicating effectively using science language and reasoning

Content Connections: Language Arts

Invitation to Learn

Ask students to explain how rocks are made.

Connections

Instructional Procedures

This lesson has three phases: igneous, sedimentary, and metamorphic. It is recommended that 2-3 lesson periods be used. The focus on this activity should be on the three concepts and not the terms.

Igneous: Explain that when a rock gets really hot, it melts. It turns to a liquid called magma which is found deep inside the earth. When it cools, it forms an igneous rock. Melt crayons in saucepan. This will represent molten rock. Pour some of the crayon into the tub of cool water. Note how fast it hardens into a rock. Pour the rest into the pie tin. Let cool. Later, compare the one that rapidly cooled and the one that cooled slowly.

Sedimentary: Talk about sizes of rocks. Some are very small, but can be compressed into a new layer of rock. Tell the students that can sometimes look like a sandwich of rock. Make a peanut butter and jelly sandwich. You may add other things such as M&Ms or marshmallows to represent a layer of gravel. After adding the top layer of bread, put it into a baggie and pile several heavy books, such as dictionaries or encyclopedias, on top. Emphasize to students that mere layers are not enough to make a sedimentary rock. Those layers must be under extreme pressure for a long time.

Metamorphic: Ask students if they have ever helped their mom make cookies. What happened after they baked them? Did they change? Some rocks are like cookies. When an igneous or sedimentary rock is under extreme heat and pressure, they change just like cookies.

Materials

- ☐ small hot plate or stove
- ☐ saucepan
- ☐ old crayons
- ☐ tub of cold water
- ☐ pie tine
- ☐ bread
- ☐ peanut butter
- ☐ jelly
- ☐ baggie
- ☐ saltwater taffy

Hand out 2 or 3 pieces of taffy. Have students press the taffy in their hands, working it much like modeling clay or Playdough. Tell students that the heat and pressure of their hands is changing these 3 taffies into one big piece of taffy.

Extensions/Adaptations

An alternative method of demonstrating igneous rocks:

Materials: magic shell, ice water

Procedures: Give each child a cup of ice water. Squirt a little magic shell into each cup. Wait while chocolate hardens. Students can now eat their "chocolate rock." This will allow students to eat each kind of "rock."

Assessment

Have students make a flip book. On the cover, label a type of rock. Inside, draw a picture and write one or two sentences explaining how each type of rock is made.

Additional Resources

Rock hound Homepage:
http://sln.fi.edu/fellows/payton/rocks/index2.html

Family Connections

Take a walk with family and look for rocks. Try to identify them.