BROOKLYN BRIDGE PARK CONSERVANCY

PRE-TRIP LESSON

READING ROCKS

LESSON OVERVIEW

OBJECTIVE

Students will learn the difference between rocks and minerals and be introduced to the three types of rocks and where they are formed.

RECOMMENDED GRADE LEVELS

2–4

DURATION

45 minutes

MATERIALS

- Rock & Mineral flash cards (provided)
- Student worksheet (provided)
- White board or poster board
- Tape
- Projector (optional)

TOPIC BACKGROUND

The earth is made up of many rocks and minerals. A **mineral** is a naturally occurring, homogenous solid. It may be composed of one or many elements, but it is the same throughout. **Rocks** are made up of 2 or more different minerals. Rocks are constantly being transformed and transported to different sections of the earth; this is known as the **rock cycle.**

The earth has 3 main layers: **crust, mantle and core.** The center of the earth (the core) is extremely hot and under immense pressure. As rocks get pushed deeper into the earth, the heat and pressure causes the rocks to become folded, stretched and squeezed. Rocks that undergo such a change are called **metamorphic rocks**. Sometimes magma inside the earth or lava that erupts from a volcano cools and solidifies into rocks known as **igneous rocks.** Other rocks form when different sediments accumulate or are compacted together at earth's surface. These rocks are called **sedimentary rocks.**

GETTING READY

1. Print out the provided rocks and mineral flash cards. (If putting students into 10 groups, only print one set. Print multiple sets if children will work in pairs or individually.)
2. Fold flash cards on the dotted lines. Optional: Laminate to withstand wear and tear.
3. Make copies of the student worksheet, layers of the earth.
4. Print and laminate the 3 types of rocks visuals (provided).
5. Prep white board or poster board for Rocks vs Minerals T chart.
6. Set up projector or smartboard if choosing to show a video

PROCEDURE

ACTIVITY 1: INTRODUCTION TO ROCKS

1. Begin by creating a T chart, anchor chart, or word cloud with students to explore the definition of rocks, as well as other related terms such as minerals, gemstones, crystals and geodes.
2. If you choose to have students help create the chart, use the following prompting questions:
    - What do rocks look, feel, smell like?
    - Where have I seen rocks before?
    - I think rocks are made of.....
    - People use rocks to.....
    - Are rocks a part of nature? Are they living?
    - How is a mineral different from a rock?
3. Before moving to the next activity, make sure students understand that while rocks and minerals are similar in some ways, a rock is actually made up of many minerals. A mineral has the same genetic makeup throughout.

ACTIVITY 2: EXPLORING ROCKS AND MINERALS

1. Pass out one pair of Rock & Mineral flash cards to each student (Or divide students into small groups) Give students time to read their cards to determine which card shows a rock and which card shows a mineral found inside their rock.
2. Regroup as a class for students to share with each other their identifications. Create another large T chart on the board or white paper and have students tape their cards in the appropriate column (rock or mineral)

ACTIVITY 3: UNDERSTANDING WHERE ROCKS FORM

1. The earth contains many different rocks. Some that we can see at the surface, others are found deep underground. Just like there are different names given to rocks and minerals, the different sections of earth have different names.
2. Have students complete the "Inside Earth" worksheet to learn the terms crust, mantle and core.
3. Show students the images of sedimentary rock, metamorphic rock and igneous rock. Explaining that rocks are often classified in groups based on where or how they are formed.

RECOMMENDED BOOKS

- *Rocks: Hard, Soft, Smooth, and Rough* by Natalie M. Rosinsky (Gr. K - 4)
- *National Geographic Kids: Everything Rocks and Minerals* by Steve Tomecek (Gr. 3 - 7)
- *The Magic School Bus Inside the Earth* by Joanna Cole (Gr. 2 - 5)
- *The Rock Factory: The Story About the Rock Cycle* by Jacqui Bailey (Gr. 2 – 6)
- *Smithsonian Handbooks: Rocks & Minerals* by Chris Pellant

RECOMMENDED WEBSITES

Mineralogy4kids
http://www.mineralogy4kids.org/

Rocks and minerals interactive games for kids
http://interactivesites.weebly.com/rocks-and-minerals.html

Scholastic– Rocks, Minerals and Landforms
http://www.scholastic.com/teachers/activity/rocks-minerals-and-landforms-12-studyjams-interactive-science-activities

Geology.com
http://geology.com/teacher/rocks.shtml

RECOMMENDED VIDEOS

Real World Science– What are rocks and minerals?
https://www.youtube.com/watch?v=weWXc5Oydy8

Rocks and Minerals
https://www.youtube.com/watch?v=XEg_XuCMD2s

Billy Nye the Science Guy– Rock Cycle
https://www.youtube.com/watch?v=BsIHV__voMk

The Dr. Binocs Show—Types of Rocks
https://www.youtube.com/watch?v=CeuYx-AbZdo

Rocks and Minerals (For Teachers)
https://www.youtube.com/watch?v=ZkHp_nnU9DY

TEACHER NOTES:

VOCABULARY

Core: The innermost layer of the earth and composed of two parts. The outer core is a thick, liquid layer of iron. The inner core is under so much pressure that it remains solid iron. The core is about 7,000 degrees Fahrenheit.

Crust: The hard and rigid outermost layer of the Earth.

Deposition: The process of eroded material being added or settling someplace.

Erosion: The wearing away of Earth's surface by water, wind, glaciers, waves, etc.

Geologist: A scientist who deals specifically with the history of the Earth and its life especially as recorded in rocks.

Heat: A form of energy associated with the motion of atoms or molecules and capable of being transmitted through solid and fluid media by conduction.

Igneous: A type of rock having solidified from lava or magma.

Mantle: The semisolid and hot layer covering the outer core of the Earth.

Metamorphic: Rock altered by pressure and heat.

Mineral: A solid, inorganic substance of natural occurrence.

Petrologist: A scientist who deals specifically with the origin, history, occurrence, structure, chemical composition, and classification of rocks.

Pressure: The process by which heat or electricity is directly transmitted through a substance.

Properties: Characteristics used to describe something – size, shape, color, etc.

Rock Cycle: A fundamental concept in geology that describes the dynamic transitions through the geologic time among the three main rock types: metamorphic, sedimentary, and igneous.

Sedimentary : A type of rock formed by consolidated sediment deposited in layers.

STANDARDS

COMMON CORE ELA

- Reading Informational Text
- Speaking and Listening
- Literacy in Technical Subjects
- Literacy in Science

COMMON CORE MATH

- Number System
- Expressions and Equations

NYC K-8 SCIENCE & SOCIAL STUDIES SCOPE & SEQUENCE

- Humans in Their Environments
- Earth Materials
- Earth Science
- Geology

NEXT GENERATION SCIENCE STANDARDS

2. Structure and Property of Matter

2. Earth's Systems: Processes that Shape the Earth

3. Forces and Interactions

ROCKS/MINERALS CARD GUIDE

CARD PAIR #	ROCK	MINERAL FOUND IN ROCK
1	Sandstone	Feldspar
2	Granite	Quartz
3	Limestone	Calcite
4	Marble	Calcite
5	Phyllite	Mica
6	Basalt	Olivine
7	Schist	Talc
8	Basalt	Hornblende
9	Granite	Mica
10	Sandstone	Quartz

SANDSTONE

1

ABOUT SANDSTONE:

- Can form in the ocean or on land
- Comes in a variety of colors such as red, yellow, brown, and grey.
- Forms when many different sand-size grains are compacted together.

FELDSPAR

1

ABOUT FELDSPAR:

- Often red or pink in color
- Has cleavage in two planes– which means it can easily break in one of two different directions.
- Feldspar minerals make up nearly 60% of earth's crust!

GRANITE

2

ABOUT GRANITE:

- Forms when magma underground cools and hardens.
- Granite is often used when building bridges, stairs, tombstones, and kitchen countertops.

QUARTZ

2

ABOUT QUARTZ:

- Made up of 6 sided crystals
- Transparent in color
- Often used in jewelry
- Found in rocks such as quartz and granite

LIMESTONE

3

ABOUT LIMESTONE:

- Composed mostly of calcium carbonate ($CaCO_3$)
- Fossils are commonly found in limestone
- Often forms in warm, shallow marine waters
- People use limestone as a building materials

CALCITE

3

ABOUT CALCITE:

- Calcite contains carbon, calcium, and oxygen.
- Commonly used to make cement.
- Shells are largely made from calcite.
- When in contact with vinegar, a reaction will occur causing the mineral to fizz.

MARBLE

4

ABOUT MARBLE:

- Primarily white, but can come in other colors
- Limestone rocks turn into marble through heat and pressure
- Marble is used to construct buildings, statues, and floors.

CALCITE

4

ABOUT CALCITE:

- Calcite contains carbon, calcium, and oxygen.
- Commonly used to make cement.
- Shells are largely made from calcite.
- When in contact with vinegar, a reaction will occur causing the mineral to fizz.

PHYLLITE

5

ABOUT PHYLLITE:

- Very fine-grained.
- Easily splits into thin sheets.
- Often lustrous, meaning light reflects to create a shiny or glossy appearance.
- Primarily composed of quartz, mica, and chlorite.

MICA

5

ABOUT MICA:

- Breaks apart in very thin sheets
- Lightweight and very flexible
- Because mica is heat-resistant and does not conduct electricity, it is often used in electronics.

BASALT

6

ABOUT BASALT:

- Fine grained
- Usually forms from cooled lava
- Very commonly found at the bottom of oceans.
- Basalt is also a very abundant rock on the moon!

OLIVINE

6

ABOUT OLIVINE:

- Named for it's green or olive color
- Has a glassy appearance
- Heat resistant
- Commonly found in igneous rocks as well a meteorites.

SCHIST

7

ABOUT SCHIST:

- Sometimes shiny in appearance because it contains mica.
- Most schist begins as mud and clay which undergoes heat and pressure.
- Much of New York City is on top bedrock called Manhattan schist.

TALC

7

ABOUT TALC:

- Often broken down into a powder used for cosmetics and baby powder.
- Softest mineral on earth
- Resistant to heat
- Pearly and greasy in appearance

BASALT

8

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GRANITE

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MICA

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ABOUT MICA:

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- Lightweight and very flexible
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SANDSTONE

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ABOUT SANDSTONE:

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- Comes in a variety of colors such as red, yellow, brown, and grey.
- Forms when many different sand-size grains are compacted together.

QUARTZ

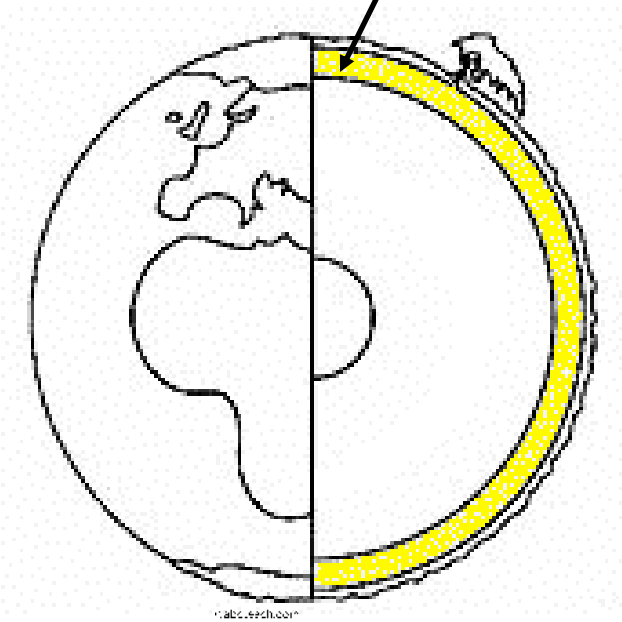
10

ABOUT QUARTZ:

- Made up of 6 sided crystals
- Transparent in color
- Often used in jewelry
- Found in rocks such as quartz and granite

Sedimentary Rocks

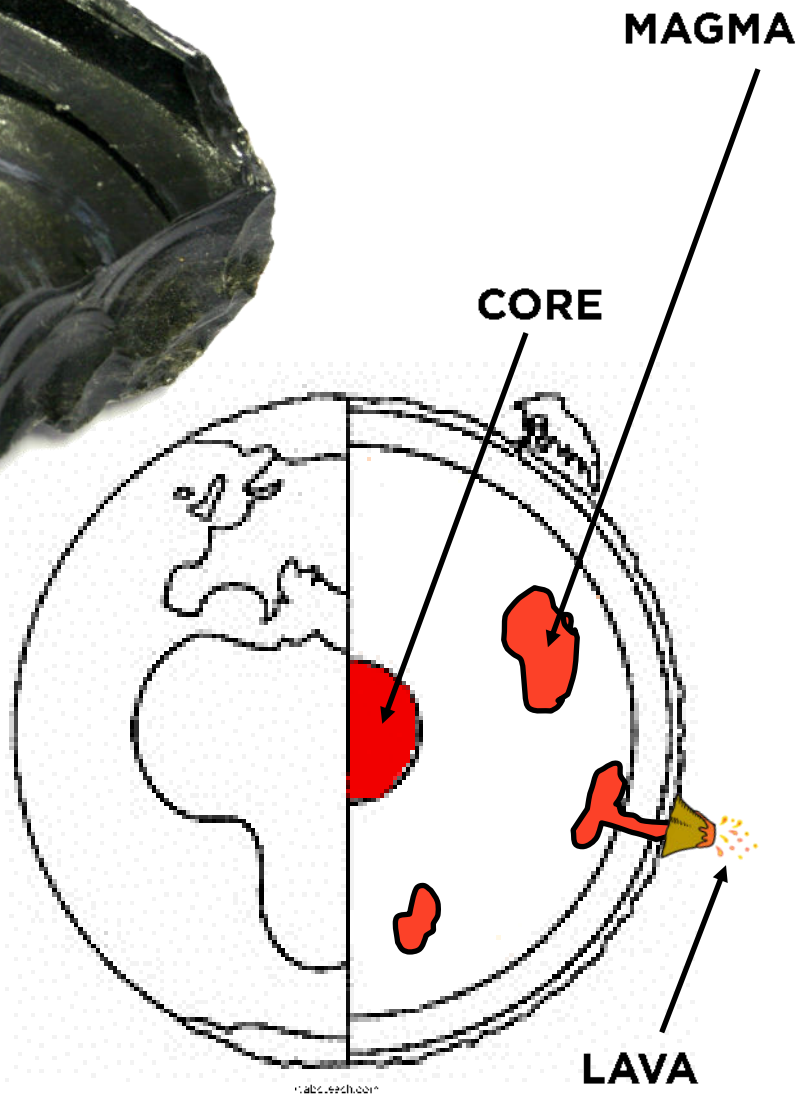
Sedimentary rocks are formed and usually found at Earth's surface, above the crust.



Metamorphic Rocks

Metamorphic rocks develop when heat and pressure in the mantle transforms them.

Igneous Rocks



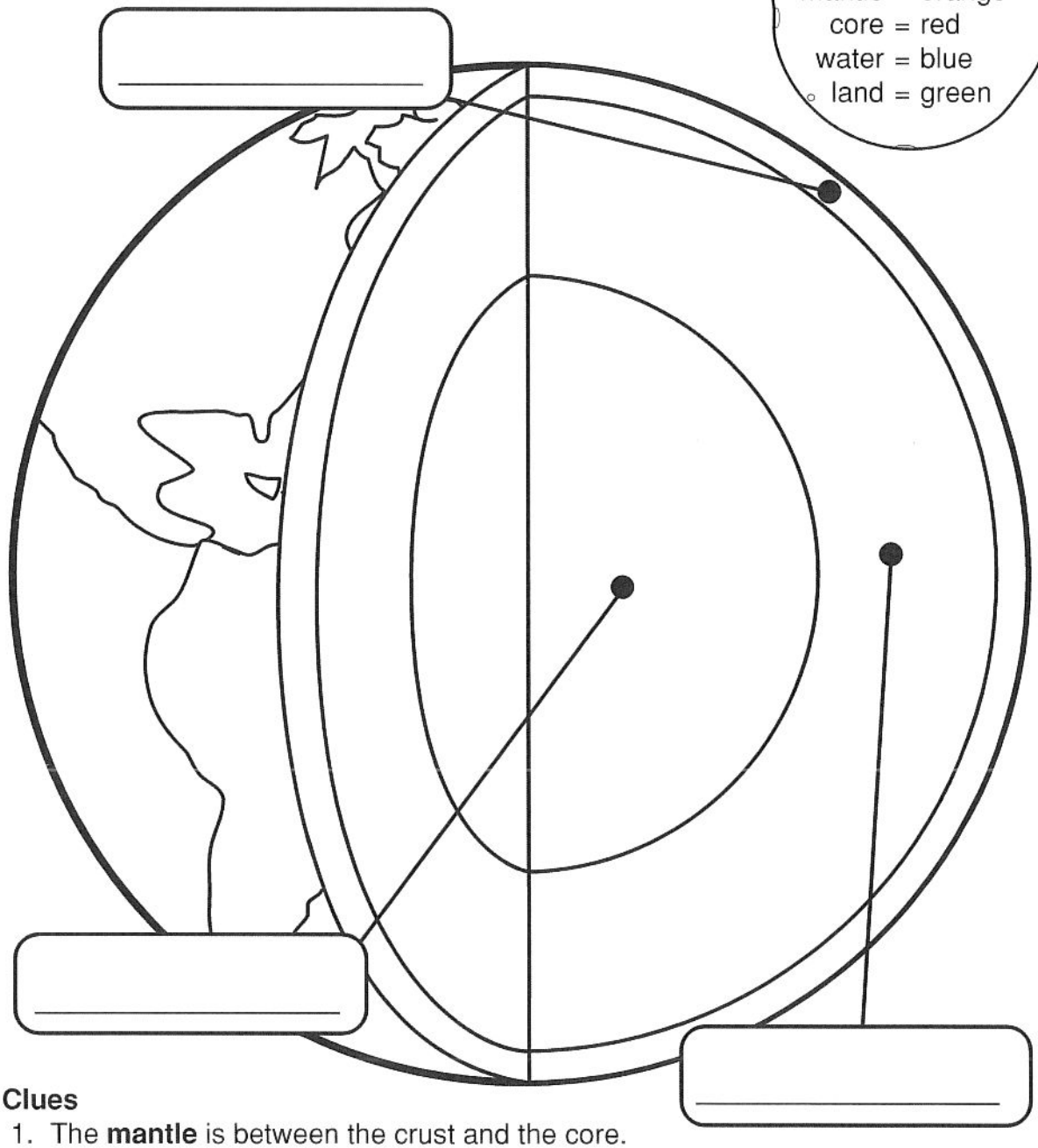
Igneous rocks form when hot, liquid lava erupts from a volcano and cools or when hot, liquid magma cools deep underground. The earth's outer core is also a hot liquid, however not composed of magma and rocks are not formed in the core.

Name _____ *Layers of Earth*

Inside Earth

Use the clues below to help you label Earth.
Use the code on the Moon to color each part of Earth.

Color Code
crust = brown
mantle = orange
core = red
water = blue
land = green



Clues

1. The **mantle** is between the crust and the core.
2. We live on the outer layer called the **crust.**
3. The **core** is found in the center of Earth.