

Metamorphic Rocks.

By John Jeffrey McCall

Subject: Science
Grade Level: 4

11/05/2008
Time Frame: 50 min.

State Goal 12:

Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.

Learning Standard E:

Know and apply concepts that describe the features and processes of the Earth and its resources.

Benchmark 12.E.2a

Identify and explain natural cycles of the Earth's land, water and atmospheric systems (e.g., rock cycle, water cycle, weather patterns).

Objective: Students will be able to:

1. Sing a song that describes the three types of rocks.
2. Describe the way metamorphic rocks are made on a worksheet.

Materials: Copy of the Rock Cycle Song for each student, Document Camera and projector, videotape on metamorphic rocks, clay model of metamorphic rock, pieces of soft clay, worksheets for each student.

Procedures:

Introduction:

Have the children sing the Rock Cycle Song that was learned previously. Remind them that we have talked about igneous and sedimentary rocks. Briefly review what they learned thus far about the rock cycle. Tell them we are going to talk about the last type of rock called metamorphic rock. Ask what morph means, as in butterflies or Power Rangers.

1. Ask the students to make their hands into fists then shoot them in the air to mime volcanic eruption. Ask them to identify this as an igneous rock being created. Next ask them to hold their hand face out in front of themselves and waggle their fingers above their head. Let their fingers sink to their outstretched palm and press their palms together to signify sedimentary rock formation. Lastly ask the students to press their palms together in front of themselves. Now have them rub their palms together while pressing hard. Point out that the heat and pressure are like the way metamorphic rock is formed.
2. Show the brief film clip and discuss the basic elements of metamorphic rocks and how they fit in the rock cycle. Use the example of pancake batter with chocolate chips. Talk about how the pancakes will be changed by the heat.

3. Show the students the clay pieces. Talk about folding it over and over and how metamorphic rock often has stripes.. Let them fold some pieces of the clay then combine all the pieces together and slice the big piece open to show the layers. Explain how heat added to the pressure will change the rocks further. Show the students the hardened model that was prepared in advance.

Closing:

4. Pass out the worksheet and ask the students to complete it.

Accommodations:

Hearing impaired students will be supported with microphone worn by the teacher.

Text of the song will be enlarged for vision-impaired student.

Concepts are presented in tactile and kinetic fashion to assist language challenged students.

A simplified worksheet will be available for students who will find the on-level worksheet too difficult.

The nature of the activity supports , auditory, visual and kinesthetic learners.

Assessments:

1. Student will be observed to see if they can sing the song.
2. The worksheets will be assessed to see if students understand the main concepts of metamorphic rocks.

Rock Cycle Song

By J. Jeffrey McCall (To the tune of O Christmas Tree)

O Igneous, O Igneous
I hope your flames
My house will miss
I see you shooting in the sky
Your ashes fall and sting my eyes
O igneous, O igneous
I hope your flames
My house will miss

Old lava on the mountainside
The rain and snow
Will make you slide
Into the stream
Where you will be
The rock called Sed-i-mentary

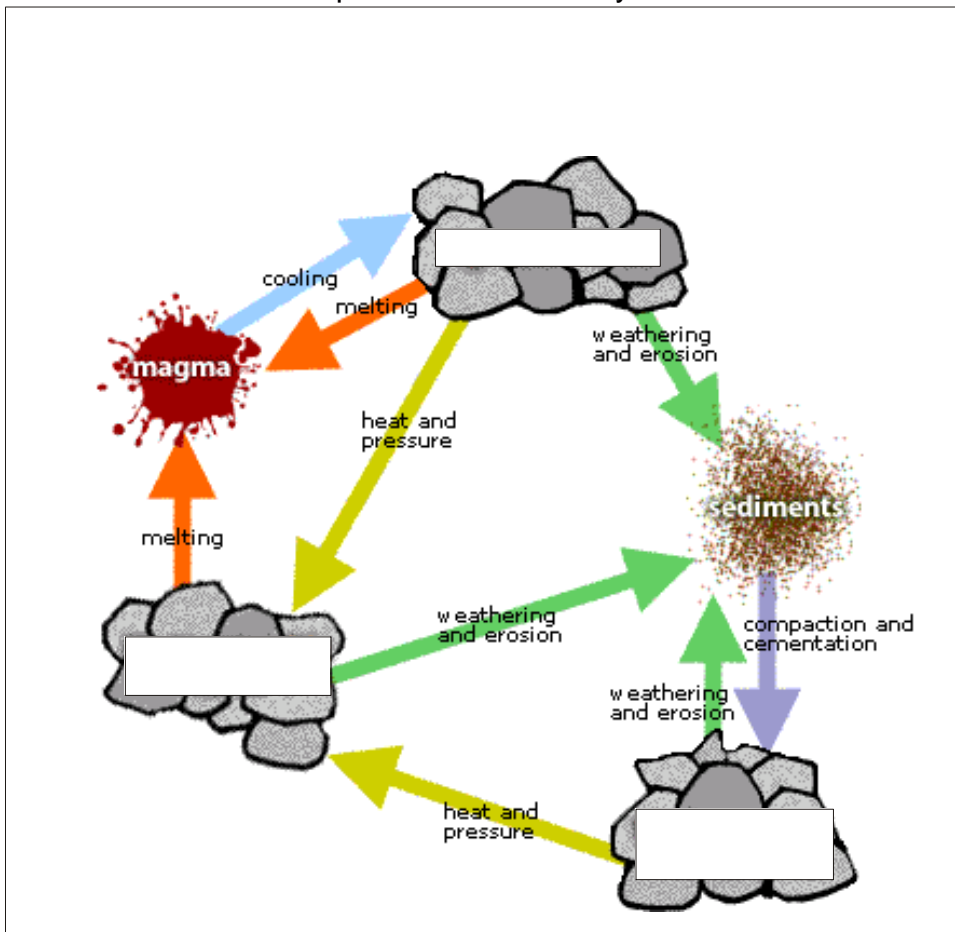
O Metamorphic underground
You're getting squished
With grinding sounds
If you get hot
You will be shot
Volcanoes in the parking lot

NAME _____ Number ____ Date _____

1. Name two forces that produce metamorphic rock. _____ and _____.
2. Limestone is a sedimentary rock that is changed by pressure and heat into the metamorphic rock _____.
3. Draw a line from the definition to the correct type of rock.

Born in volcanoes	Sedimentary
Sedimentary rock made from sea shells	Igneous
Rock formed by erosion of igneous rock and pressure	Limestone
Rock made from Igneous, Metamorphic or Sedimentary Rock That has been changed	Metamorphic

4. Fill in the blanks in the picture of the rock cycle.

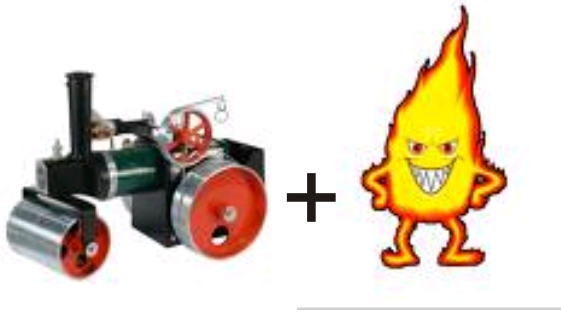


Taken from <http://www.troy.k12.ny.us/faculty/dibarij/earth%20science/earth%20science%20images/rockcycle.gif>

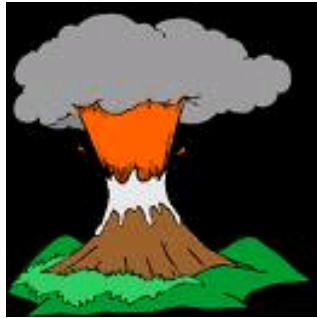
NAME _____ Number _____

Date _____

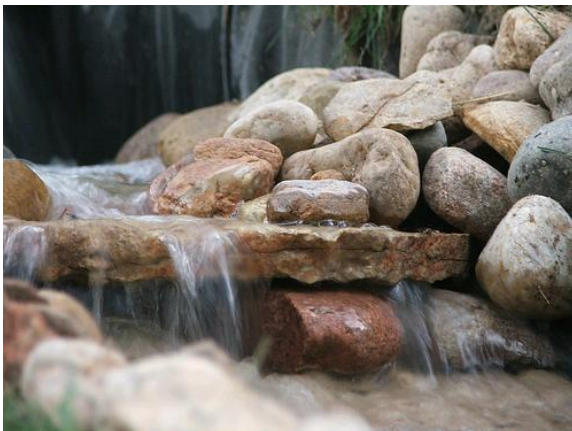
Draw an arrow from the picture to the rock type that goes with the picture.



Sedimentary



Metamorphic



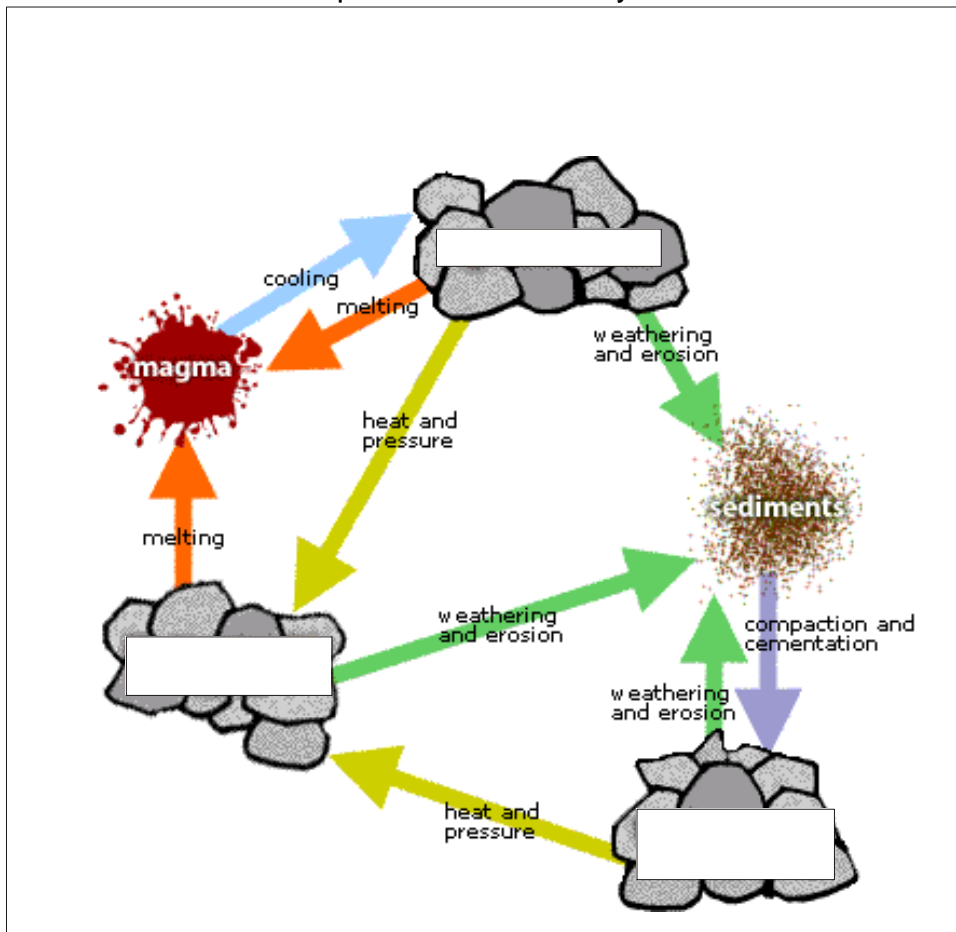
Igneous

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Taken from <http://www.troy.k12.ny.us/faculty/dibarij/earth%20science/earth%20science%20images/rockcycle.gif>

5. Compare and contrast metamorphic and igneous rocks. Consider what forces create these rocks. How are those forces similar and how are they different?

6. Draw a picture of a machine you might invent for creating sedimentary rocks.