

The Rock Cycle

Lesson Objective: Upon completion of this activity students will have reviewed the rock cycle, and will also have been introduced to various fossil excavation processes.

Purpose:

The activity serves as an introductory lesson to the caves and karst unit. It reviews key elements of the rock cycle, including the types of rocks and the processes involved.

The fossil excavation activity was intended to be an engagement activity to get the students interested in future caves and karst lessons.

Key Concepts: sedimentary, igneous, metamorphic rocks; rock cycle; fossil excavation.

Duration: 1 55-minute class period

Audience: Middle school and high school students





The Rock Cycle

Teacher Copy,
Answer Key, and
Supplemental
Photographs

THE ROCK CYCLE REVIEW AND FOSSIL EXCAVATION

TEACHER COPY

Lesson Objective:

This activity is meant as an introduction to the caves and karst unit; upon completion of this activity students will have been introduced to fossil excavation processes and will also have reviewed the rock cycle.

Note: The fossil excavation activity is meant as a way to get the students interested in the unit; there are more detailed fossil activities later in the unit. The rock cycle will also be revisited in later activities.

Materials:



- Plaster of Paris
- Sawdust or dirt
- 1 small paper cup per group.
- Mixing container
- “Fossils” = 1 small chicken bone or sea shell per group.
- Small paintbrushes
- Bamboo skewers or craft sticks
- Construction paper
- Printed **Excavation Directions** for each group.
- Printed worksheet for each student.
- Set of activity sheets for each student/group.

Teacher Preparation: To be done a day or two before beginning the lesson.

1. Mix the Plaster of Paris with the dirt or sawdust until the consistency is almost as thick as mashed potatoes.
2. Fill each cup (one per student) 1/3 full with the plaster mixture.
3. Drop a “fossil” onto the mixture and cover with more plaster mixture.
4. Allow to dry for a day or two and then remove the paper cups.

Procedure:

1. Before the students arrive:
 - a. Have the classroom arranged so that the students are working with a partner or in small groups.
 - b. Have the following materials ready each group:
 - i. A previously prepared hidden fossil
 - ii. A small paintbrush
 - iii. A bamboo skewer or craft stick
 - iv. A copy of the Excavation Directions.

TEACHER COPY AND ANSWER KEY

2. Begin class with a brief introduction to the new unit.
3. As a way to get the students interest, start with the fossil excavation activity.
 - a. This is meant as a self- guided exploration activity, so there is no need for a big explanation.
4. Give the students 10 minutes to excavate their fossils.
5. Allocate an appropriate amount of time for clean-up (~ 5 minutes).
6. After the room is cleaned up and the students are back at their seats, introduce the next activity.
 - a. This is a unit centered on caves so briefly discuss how the processes of the rock cycle are the driving forces behind fossil and cave formation. This will tie the fossil excavation activity that they just completed to the rock cycle, and how they both tie into the caves unit.

Example Introduction:

Ask the students how they think fossils tie into their new unit on caves. Then ask them how if they know what kinds of rocks most fossils are found in. (Don't give them the answer...the worksheet will explain it. Just get them thinking.) Tell the students that the different types of rocks influence what types of caves are formed, and the formation of the rock itself determines if fossils can be formed and preserved.

7. Pass out the **Rock Cycle** worksheets, and have the students spend the remaining class time reading and completing the worksheets.

Suggested Answers to Questions

- 1.) ***THEY ARE FORMED FROM CONSOLIDATED ROCK FRAGMENTS***
- 2.) ***MAGMA IS MOLTEN ROCK.***
- 3.) ***ERODED MATERIAL IS CARRIED AWAY BY RIVERS, WIND OR GLACIERS.***
- 4.) ***THE GEOLOGIC EVENTS THAT FORMED DEVILS TOWER ARE:***
 - Stage 1: ***DEPOSITION OF THE SEDIMENTARY ROCKS***
 - Stage 2: ***UPLIFT OF THE BLACK HILLS***
 - Stage 3: ***INTRUSION OF MAGMA***
 - Stage 4: ***REGIONAL UPLIFT AND EROSION***
- 5.) The Rock Cycle:
 1. ***IGNEOUS ROCK***
 2. ***SEDIMENTARY ROCK***
 3. ***METAMORPHIC ROCK***
 4. ***MAGMA***
 5. ***SEDIMENTS***

★AN ADDITIONAL ROCK CYCLE PICTURE AND PHOTOGRAPH OF DEVILS TOWER ARE INCLUDED FOR TEACHERS TO USE AT THEIR OWN DISCRETION. ★

THE ROCK CYCLE

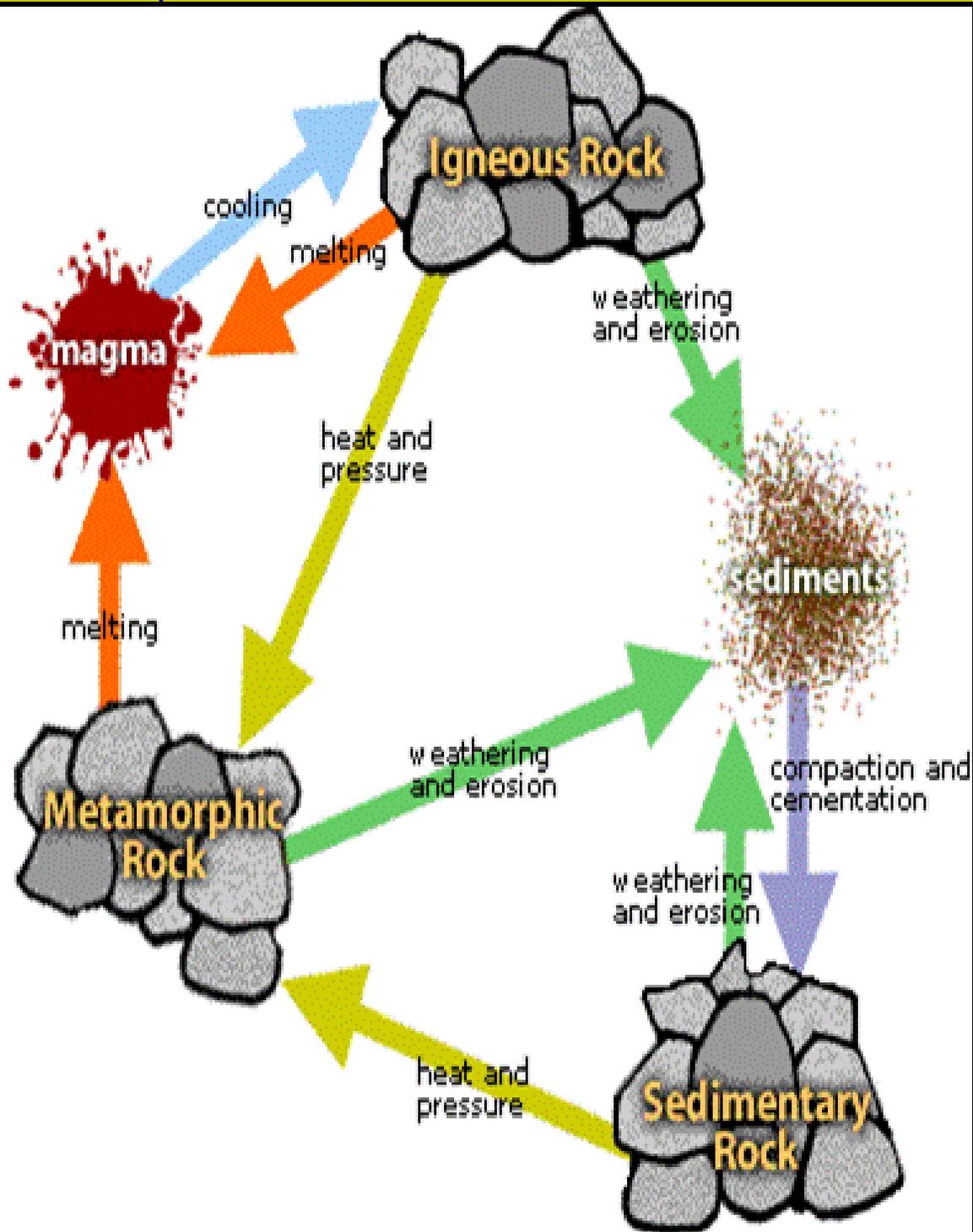
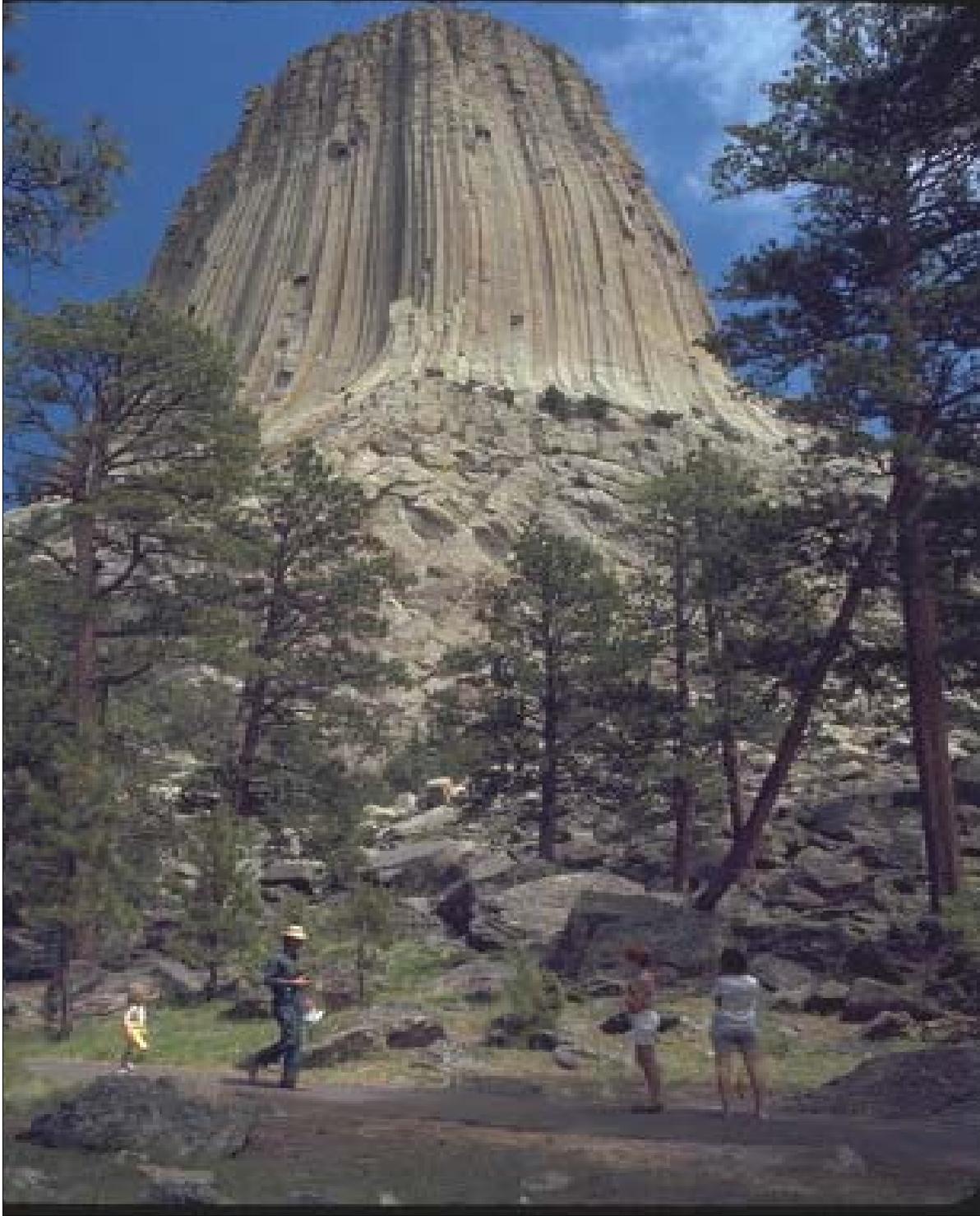


Illustration Source: <http://www.teacher-lab.org/ps101/bglasgold/rocks/lessoon3rocksysle.htm>

Devils Tower National Monument



NPS Photo: Courtesy of National Park Service Digital Image Archives

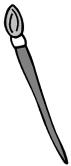
EXCAVATION DIRECTIONS

Step 1: Use the **bamboo skewer** or craft stick to pick away at the substance surrounding your fossil.



Work slowly and be careful not to damage the fossil inside!

Step 2: Once you find your fossil, use the **paintbrush** to remove any remaining small particles of the substance surrounding the fossil.



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