

# Ant and Yellow Jacket

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## **Summary**

Students learn about different types of rocks and the geology of the northwestern United States, and about a culturally significant rock formation.

## **Grade level**

Third

## **Time required**

Five 60-minute class periods

## **Materials**

[The Nez Perce story “Ant and Yellow Jacket”](#)

[Pictures of the Ant and Yellow Jacket rock formation](#)

Map of the Pacific Northwest

[Satellite image of the Nez Perce Reservation](#) – see Resources

Photos and maps of the Columbia River Basalt Flows – see Resources

Items made from rock – include cultural items and items familiar to students

Several specimens of the three types of rocks – igneous, metamorphic and sedimentary

Tools for examining rocks – magnifying glasses, probes, hardness plates, etc.

Science journals

[Rock candy recipe](#)

Sugar

Baby food jars

Hot plate

Large saucepan

Measuring cup

Cotton string

## **Goals**

By completing this lesson, the student will

- 1) explore the properties of the three main types of rock,
- 2) explore the geologic history of the region encompassing the Nez Perce reservation,
- 3) become aware of the Ant and Yellow Jacket cultural story and site and
- 4) develop science inquiry process skills.

## **Science standards addressed**

### *National Science Standards*

- Abilities necessary to do scientific inquiry
- Properties of Earth materials
- Changes in Earth and sky

### *American Indian Science Standards*

- Properties of earth, air, fire, and water and how they served as a basis for traditional American Indian production of clothing, housing, tools, and food.

## **Teacher tips**

Provide text resources on rocks and geology relevant to the lesson for students to read.

Students can perform a variety of tests on the rock samples to discover the rocks' properties, such as a hardness test, color test, vinegar test, as well as measure and make observations about the rocks' physical appearance, such as color, luster, size, weight, shape and composition. Provide adequate equipment such as a streak plate, various items to test hardness (nail, penny, etc.), magnifying glasses, and balance.

Students make rock candy as part of this lesson as an analogy for the formation of igneous rock. Be sure to practice making the candy prior to beginning the lesson.

Be very familiar with the story, "Ant and Yellow Jacket", so that you will be able to tell the story rather than read it, in accordance with oral tradition. Visit the Nez Perce National Historic Park web site for information, pictures and maps of the formation (see Resources section for address).

## **Background information**

Igneous rocks are one of the three main kinds of rocks. They are formed when molten rock lying under Earth's crust is pushed up into layers of the crust or onto Earth's surface where it then cools and solidifies. There are two types of igneous rocks formed. Igneous rocks that are formed when magma is solidified inside Earth's crust are called intrusive igneous rocks. Igneous rocks that are formed when magma flows out onto Earth's surface through the crust, as with a volcanic eruption, are called extrusive.

Basalt is an extrusive igneous rock commonly occurring in sheet-like lava flows. The Lapwai area on the Nez Perce Reservation consists of mainly basaltic rock with some granite. The layers of basalt in this area are believed to be a part of a larger area covered by a series of magma floods that occurred in the Pacific Northwest during a period from 17.5 to 15 million years ago. The exact nature of the cause of the magma flows is unknown. Some scientists believe that they began due to the impact of an asteroid or comet with Earth in the Pacific Northwest region, that created a huge crater and outflowing of molten rock from beneath the crust. Others think it was a more gradual occurrence due to the slower rise of magma through a series of dikes that subsequently spread across the region.

The Ant and Yellow Jacket basalt rock formation is a culturally significant site to the Nez

Perce, believed by geologists to have been formed by an ancient magma flow. It is the subject of the story told during this lesson. The book by Alt and Hyndman cited in the Resources section is an excellent reference for more information about these geologic events. Valuable web sites that contain maps, pictures and information on the Columbia River Basalt Flows are also listed in the Resources section.

## **Procedure**

### *Engagement*

- 1) Place a rock in a paper bag, and ask students to predict what is in the bag. Provide clues or allow the students to touch the rock with eyes closed if necessary.
- 2) Show students different types of rocks. Ask them to name common items in our lives that are made of rock. Show them some examples such as jewelry, brick, concrete, a marble dish, salt, soil, pencils, etc. Include cultural items such as a mortar, pestle, scraper, net sinker, or spear point.

### *Exploration*

- 1) Allow students to examine samples of the three types of rock using magnifying glasses, probes, hardness plates, etc. Have them develop a chart in their journals in which they will record their observations of each rock type.
- 2) Facilitate a discussion in which students compare their observations about the three types of rocks. Record student observations in a large chart. Ask students to hypothesize how each type of rock was formed.

### *Explanation*

- 1) Make rock candy. Ask students to make observations in their journals about the candy as it cooks and hardens.
- 2) Facilitate a discussion in which the rock candy formation is likened to igneous rock formation.
- 3) Have students write a paragraph explaining the process of igneous rock formation.

### *Elaboration*

- 1) Tell the story “Ant and Yellow Jacket”. Show pictures of the formation and locate it on a map and image. Discuss the formation of the basalt rock from magma flows.
- 2) Use regional maps, photos and images to discuss the history of the Columbia River basalt flows that are believed to have occurred 17.5 to 15 million years ago.
- 3) Take students on a field trip to view local basalt formations, such as Ant and Yellow Jacket or the basalt flow layers that are visible in Lewiston, Idaho. Have them draw their observations in their science journals.

### *Evaluation*

- 1) Evaluate students’ ability to use the process skills by observing them during the exploration and by reviewing the observations and explanations that they recorded in their journals. Use a checklist to record your observations about each student.
- 2) Evaluate students’ understanding of content by reviewing their journal paragraphs on the formation of igneous rock, and based on their responses in the discussions.

## **Vocabulary**

igneous          metamorphic          sedimentary          basalt          magma

## **Follow up activities**

- 1) Explore sedimentary and metamorphic rock in more detail. Allow students to try tests on rocks in order to categorize them (hardness tests, acid test, color test, etc.)
- 2) Discuss the layers of Earth. Use a Snickers candy bar to show the layers of the earth. Break the candy bar in half and slide the sides vertically and horizontally to one another to show the motion around faults.
- 3) Make volcano cookies to give parents at parent-teacher conferences or open house.

## **Resources**

### **Books**

Hale, J. A. (1992). Thematic unit on rocks and soil. Huntington Beach: Teacher Created Materials.

Alt, D. & Hyndman D. (1995). Northwest exposures – A geologic story of the Northwest. Missoula, MT: Mountain Press Publishing.

### **Web sites**

National Park Service Nez Perce National Historic Park – Pictures, map of, and info about Ant and Yellow Jacket  
[www.nps.gov/nepe/sites.html](http://www.nps.gov/nepe/sites.html)

U.S. Forest Service Region 6 – Information, maps and images of the geology of the Columbia River and the northwestern United States  
[www.fs.fed.us/r6/columbia/geology\\_index.htm](http://www.fs.fed.us/r6/columbia/geology_index.htm)

US Geologic Service Geologic Provinces of the United States – Excellent maps of and information about the Pacific Northwest showing lava flows, etc.  
[wrgis.wr.usgs.gov/docs/usgsnps/province/columplat.html](http://wrgis.wr.usgs.gov/docs/usgsnps/province/columplat.html)

University of North Dakota's Volcano World - Excellent photos of the basalt flows in Idaho, Oregon and Washington states  
[volcano.und.nodak.edu/vwdocs/volc\\_images/north\\_america/crb3.html](http://volcano.und.nodak.edu/vwdocs/volc_images/north_america/crb3.html)

USGS Cascades Volcano Observatory – Maps, images and information about the Columbia River Basalt Flows  
[http://vulcan.wr.usgs.gov/Volcanoes/PacificNW/AGU-T106/columbia\\_river\\_basalt\\_group.html](http://vulcan.wr.usgs.gov/Volcanoes/PacificNW/AGU-T106/columbia_river_basalt_group.html)

Satellite image of the Nez Perce Reservation  
[http://yoda.cec.umt.edu/sid/bin/show\\_newjava.plx?image=nezperce.sid&client=Native\\_Lands&section=Nez%20Perce%20Reservation&title=Native%20Lands](http://yoda.cec.umt.edu/sid/bin/show_newjava.plx?image=nezperce.sid&client=Native_Lands&section=Nez%20Perce%20Reservation&title=Native%20Lands)