



Creation Lens

Exploring the World, Discovering God

Grade Level: Grade 8

Title:

Metamorphic Rocks & Change in Forming Spiritual Growth

Denomination: Catholic

Lesson ID: ES-G8-04-CA

Contact Info:

Exploring the World, Discovering God (EWDG)
Institute for Theological Encounter with Science & Technology (ITEST)
20 Archbishop May Drive, Suite 3400A
St. Louis, MO 63119

EWDG email: EWDG-Info@creationlens.org

EWDG web site: www.creationlens.org

ITEST web site: www.faithscience.org

Ph: 314.792.7220

Note: Web sites referenced in this lesson were valid at time of publication.

Copyright by Exploring the World, Discovering God (EWDG), a pilot program of Institute for Theological Encounter with Science & Technology (ITEST). All rights reserved. The contents, or parts thereof, i.e., lessons/modules, may be reproduced for classroom educational use only. Any reprinting or reproducing for the purpose of sale is prohibited, and if done, party is subject to all legal sanctions.

© ITEST © EWDG



EARTH SCIENCE MODULE - GRADE 8 - CATHOLIC
LESSON TITLE: Metamorphic Rocks & Change in Forming Spiritual Growth

GENERAL CONCEPT: Causes of change.

SCIENCE LESSON CONCEPT

- Metamorphic rocks are the result of forces that changed them

GOAL OF SCIENCE LESSON

- Students will learn the metamorphic process.

OUTCOME EXPECTED

- Students will be able to describe and demonstrate the metamorphic process.

RELIGION LESSON CONCEPT

- Change is part of spiritual development

GOAL OF RELIGION LESSON

- Students will learn how saints have experienced forces which helped them become holy.

OUTCOME EXPECTED

- Students will be able to relate how grace enables them to participate in spiritual growth.
- Students will learn about significant saints.

MATERIALS NEEDED

- Diagram of the rock cycle (see Science Links section)
- Science Journal page: Metamorphic Rocks
- Science Journal page: Sedimentary Rocks
- Sedimentary rock sample showing layer of sediment
- Bread (1 white and 2 wheat slices per student)
- Yellow cheese (2 slices per student)
- White cheese (2 slices per student)
- Chopped green peppers ($\frac{1}{4}$ teaspoon per student)
- Margarine for the grill
- Heating element to make grilled cheese sandwiches
- Heavy metal object to put on sandwiches while heating
- Definition of metamorphic rock
- Pictures of metamorphic rock strata
- Photos of strata of rock – along highways is a good source or your state highway department
- DVD or video of the formation of the Grand Canyon

MATERIALS NEEDED

- Bible
- Copies of the following list of saints
 - St. Peter the Apostle
 - St. Catherine of Siena
 - St. Augustine of Hippo
 - St. Teresa of Avila
 - St. Cecilia
 - St. Sebastian
 - St. Edith Stein
 - St. Maximilian Kolbe
 - St. Gianna
 - St. Maria Goretti
- Instruction sheet for research project giving length, due date, what to look for, etc. (teacher should modify as needed)
- Computer with internet access
- List of acceptable internet sites for this project
- Lives of the Saints books
- Pen
- Religion Notebook

SCIENCE METHODOLOGY

- **TELL** the students to look at the pictures of the rock strata.
- **ASK:** How did the various layers get there? (wind, water deposit)
- **DEFINE** metamorphic rock. Metamorphic rock is a sedimentary rock changed by heat caused by the pressure of the upper layers of the earth.
- **HAVE** the students write the definition on the Science Journal page: Metamorphic Rocks.
- **HAVE** the students examine, sketch, and record the information they gather from the sedimentary rock samples.
- **SHOW** the Grand Canyon video or DVD – only the part that describes the layering and metamorphic rock.
- **HAVE** the students take notes during the Grand Canyon presentation on their Science Journal page: Sedimentary Rocks
- **ASK:** What happened to the layer of sandstone for the limestone laid down by water as tiny grains of sand or limestone to become solid stone? (pressure from layers added on top caused heat which in turn caused the sand or limestone to solidify)
- **SHOW** the students the grill, heavy metal flat object

RELIGION METHODOLOGY

- **SAY:** You remember from science class how sedimentary rock is formed – layer by layer deposited. This is like our faith heritage. Ages and ages of people living the Faith create our heritage.
- **ASK:** Can you define metamorphic rock? (sedimentary rock changed by the heat caused by pressure from upper layers)
- **ASK:** Are all pressures bad influences? No, peer pressure can help us do the right thing. The good example of others can be a pressure to help us make good choices.
- **SAY:** You are going to work in small groups (2-3 per group) to look at the life of a particular person who was under some sort of pressure. As a result of that pressure, the person was able to grow more mature, in their spiritual life. They became more like Jesus.
- **ASSIGN** students to groups and give each group a list of the saints they can research.
- **GIVE** each student the instruction sheet on how to do the research project. Be very specific about acceptable internet sites, books, how the groups should present their report, deadlines, etc.
- **ALLOT** time for research and writing the presentation.
- **HAVE** the groups present their reports.

(could be the lid) bread slices, cheeses, green peppers.

- **SAY:** We are going to make a tasty simulation of what happened to the layers of sandstone and limestone using these materials.
- **EITHER THE TEACHER OR GROUPS OF STUDENTS CAN DO THE SIMULATION.**
- **SAY:** Our simulation will attempt to show the process of turning sediment into metamorphic rock.
- **EXPLAIN** the following;
 - ~ The grill represents the heat.
 - ~ The lid or heavy metal object represents the pressure.
 - ~ The bread, cheese, and peppers represent the various layers.
- **TURN** on the grill.
- **HAVE** the students butter one side of each slice of bread and assemble cheese and pepper sandwich.
- **PUT** a bit of margarine on the grill.
- **PLACE** the sandwich on the hot grill and either close the lid or place a heavy flat metal object on top of the sandwich.
- **ALLOW** bread to toast and cheeses to melt.

- **DISCUSS** what pressures (difficulties) each saint faced and how those pressures helped each one become holy – helped each one to change to be more like Jesus.
- **SAY:** We have pressures – both positive and negative – which produce enough heat to make us move. These pressures provide occasions for us to grow more holy or to become more sinful.
- **ASK:** What pressures are facing 8th graders now?
- **RECORD and DISCUSS** student responses.
- **ASK:** How can these pressures help us to grow spiritually?
- **POSIT:** The pressures of our daily lives can help us grow spiritually – to change – to become holy – to become more like Jesus.

- **REMOVE** sandwich from the grill.
- **CUT** the sandwich in half.
- **HAVE** the students observe the sandwich.
- **ASK:** What happened to our individual layers? (melted into each other)
- **SAY:** This is what happens when new layers are added on top of the original layers. The pressure of the upper layers creates heat and force which “melts” the individual layers of sand and lime and fuses them into a solid.
- **HAVE** the students record the experiment/simulation on the Science Journal page: Metamorphic Rocks.
- **EAT** the grilled cheese sandwiches.
- **POSIT:** Metamorphic rock results from sedimentary layers changed by heat caused by the pressure of the upper layers of the earth.

SCIENCE LINKS

www.bobspixels.com/kaibab.org/geology/gc_geol.htm

[The Geology of the Grand Canyon - Bob Ribokas - On-Line](#)

...Rock layers younger than 250 million years have been eroded away and no longer exist in the immediate vicinity of **the Grand Canyon**. The Rocky Mountains begin to **form** 60 ...

http://www.nps.gov/grca/photosmultimedia/rangerm00804_qcdance_mov.htm

Ranger Andy gives a one minute explanation via the Rock Arena Dance of how the Grand Canyon was formed.

RELIGION LINKS

www.catholic-saints.info/index.htm

CATHOLIC SAINTS Visit this **Catholic Saints** site for history, facts and information. List of Names of **Catholic Saints**. The story of the lives and deaths of Roman **Catholic Saints**.

www.catholic.org/saints

[Saints & Angels - Catholic Online](#) Large searchable database of information on **Catholic saints**. Saints, **Catholic Saints**. Thousands of **Catholic Saints** with biographical data, prayers, images, etc. The ...

www.ewtn.com/saintsHoly

[EWTN's Saints and other Holy People Home](#) EWTNKids: **EWTN** Mini Sites: Traditional Mass Resources: **Saints** ... **W**: X: Y: Z ... HOME - EWTNews - FAITH - TELEVISION - RADIO - **LIBRARY** - ...

KEY WORDS

- SEDIMENTARY ROCK
- METAMORPHIC ROCK
- PRESSURE
- HEAT

KEY WORDS

- SAINTS
- SPIRITUAL DEVELOPMENT