

THE BARRINGER METEORITE CRATER

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Teacher Lesson 2: Where on Earth Are the Impacts? - A Scavenger Hunt!

Overview

When you look at the Moon, Mars, or Mercury, it's easy to see the craters on their surfaces. The Earth was also bombarded, yet the evidence for impact events is not easy to see. Processes such as plate tectonics, erosion, and metamorphism have altered the surface of Earth throughout its history. The Earth has impact craters scattered across its surface. Some are exposed and easily identifiable (like Barringer Meteorite Crater). Others have become eroded or hidden by vegetation, water, or metamorphism. Where on Earth are they?

PURPOSE

Using an online sites, students will gather data to identify impact craters on six continents.

COMPLETION TIME

1 class period/hour

LEARNING OUTCOMES

Students will collect and organize data using an online tool.

Students will find and identify impact craters on Earth.

Students will plot the locations of the craters on a world map using Latitude/Longitude coordinates.

TOOLS/MATERIALS

Computer Access

Student Data Sheet "Where On Earth Are the Impacts?"

Teacher Key

Image of the Moon

Globe, map or image of the Earth

Procedure

BEFORE THE ACTIVITY

Copy the student data sheet

Print the teacher key

Download and copy the printable world map from

http://www.eduplace.com/ss/maps/pdf/world_cont.pdf. You will need to plot the locations of the craters to use as a key, either on a hard copy or with the image projected on a white/SMART Board.

ON THE DAY OF THE ACTIVITY

1. Review Knowledge about Craters on the Moon (5 minutes)

- Show the class the image of the Moon.
http://nssdc.gsfc.nasa.gov/imgcat/hires/a16_m_3021.gif
- Focus their attention on the number of exposed (seen) craters. Lead a discussion into why there are so many (heavy bombardment through time with no water, plate tectonics, erosion to weather the surface)

2. Activate Prior Knowledge of Craters on Earth

- Show image of Earth
- Ask: “What impact craters have you heard of?” Discuss any answers. If no one has ever heard of any, ask them what they know about the leading theory for dinosaur extinction (Chicxulub Crater).

3. Describe Crater Scavenger Hunt (10 minutes)

- Tell the students that they’re going on an impact crater scavenger hunt all over the world!
- Put students in 6 groups for 6 continents: Africa, Asia & Russia, Australia, Europe, North America, South America
- Hand out the student data sheets “Where on Earth Are the Impacts?”
- Tell them that their job is to gather data about the impact craters found on the continent their group is assigned.

4. Lecture: New Information on the Target Rock type, latitude and longitude, Age in million years. (10 minutes)

- Explain the different types of information that they need to look for: Name, location, diameter, age, latitude/longitude, target rock type.

- Define “target rock” and give target rock descriptions and abbreviations on EarthImpactDatabase website:

“** Abbreviations: C - Crystalline Target; C-Ms - Metasedimentary Target; M - Mixed Target (i.e. sedimentary strata overlying crystalline basement); S - sedimentary target (i.e. no crystalline rocks affected by the impact event)”
(<http://www.passc.net/EarthImpactDatabase/Australia.html>)

- (If needed) Define latitude and longitude. Practice with the following interactive map:

http://earthguide.ucsd.edu/earthguide/diagrams/latitude_longitude/

- Review million years abbreviations and decimals (give a few examples and test class comprehension)

700my = 700 million years ago

.001my = 1,000 million years ago

1.2 ± .8 = from 1.2 million year ago to 800,000 years ago

- Show EarthImpactDatabase and how to access specific data on their continent:

<http://www.passc.net/EarthImpactDatabase/Worldmap.html>

- It would be best if you demonstrated how to use the EarthImpactDatabase with random example.

- For another on-line tool see: Meteorite Impact Viewer:

<http://impact.scaredycatfilms.com/>

5. Students Apply Data-gathering Skills to find and assess impact craters. (20 minutes)

Question: Which Continent will have the oldest crater, the youngest crater, the biggest crater?

6. Post-Activity Discussion (15 minutes)

- Groups present their findings

- After sharing their observations, instruct the students to plot the location of the impact craters on the world map that their group found and also the youngest, oldest, and biggest craters found by the class.
- Ask for other discoveries that surprised them.
- Ask for questions they now have about impact craters and discuss ways to find answers.

ASSESSMENT CRITERIA

Did the student accurately collect, organize and record the data?

Did the student correctly identify the craters?

Did the student accurately plot the locations on the world map?

Did the student demonstrate/share new knowledge about the craters?

Did the student raise questions that moved toward further inquiry?

Links

- Printable world map from http://www.eduplace.com/ss/maps/pdf/world_cont.pdf.
- image of the Moon. http://nssdc.gsfc.nasa.gov/imgcat/hires/a16_m_3021.gif
- Example of EarthImpactDatabase: Australia's data on a impact craters:(<http://www.passc.net/EarthImpactDatabase/Australia.html>)
- latitude and longitude. Practice with the following interactive map: http://earthguide.ucsd.edu/earthguide/diagrams/latitude_longitude/
- EarthImpactDatabase: <http://www.passc.net/EarthImpactDatabase/Worldmap.html>
- Meteorite Impact Viewer at <http://impact.scaredycatfilms.com/>

Activity design by Lollie Garay in collaboration with Dr. Carolyn Ernst.

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