Earth Time/Our Time

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Overview

This activity allows students to see concretely how large a million is by counting Cheerios in one box, and imagining how many Cheerios (or boxes of Cheerios) would represent one million in the classroom. This is then related to the Earth's age of 4.6 billion years and the short time humans have been present. Students see that changes made by humans to the earth's resources can happen quickly relative to the time it took for life supporting systems to evolve.

Objectives

Students will:

- be able to understand the age of the earth relative to our lifetime and geological and historical time.
- develop an understanding that humans have been present for a very small fraction of total geologic time. But humans have had a great impact on the Earth's environment and sometimes the impact has not been good for our welfare or the welfare of other species.

Grade Levels: 4-6
Time Needed: 30-45 min
Subjects to Integrate: Math, Science, and History
Topics: earth history, impact of humans on environments, meaning of time
Skills: math, motor, evaluation, social, communication
Wild Wonderful Wyoming Goals and Concepts
Goal A, Concepts 3, 9 (refer to this section)

Materials:

Box of cheerios
Thin string that will fit through Cheerio holes

Background

Geologists have determined that the recent Ice Age began two million years ago and that Earth may be 4.6 billion years old. How do they know this? Scientists can measure the age of old earth rocks, meteorites, and moon rocks, which formed at the same time as Earth. Few people understand historical time relative to geological time. Children, and adults too, need concrete experiences that allow them to bridge the meaning of human-perceived time as it relates to events in geologic time. It is important to realize that modern human society with its technology has the potential to suddenly change the earth and earth systems that have been thousands and even billions of years in development. We need to understand that changes we influence, such as climate change or loss of species, may damage our lives and the potential for other species to exist.

Procedure

Students can develop a sense of the meaning of a million by counting Cheerios. Divide up one box of Cheerios among the students and have them count their portion. Knot one end of the string, and have students add their Cheerios onto the string, tallying them on the board as they do. Add the portions together to get a total for one regular sized box of Cheerios. The students then divide one million by the number of Cheerios, and they will know the number of boxes of Cheerios they would need to see a string of one million Cheerios. They can measure their string of Cheerios. Then they should step back and answer the question: How many boxes would it take to show how old the earth is? Hint: there are supposedly about 4800 Cheerios in a 15 oz box. So it would take about a little over 208 boxes of Cheerios to make a million. Imagine a stack of 208 boxes of Cheerios. It would then take 4600 of these stacks to

show the Earth's age in Cheerios! If they measured their string of Cheerios for one box, how many strings of Cheerios would they need to show the Earth's age? How much string would they need?

The students can then count Cheerios as years, back to the signing of the Declaration of Independence or back to the building of the Pyramids in Egypt. What did North America or Wyoming look like only twenty thousand years ago? Would the number of Cheerios in a box represent the amount of time going back to the Age of Dinosaurs, to the time of the extinction of the dinosaurs? Ask your students to investigate the loss of species since humans have been in North and South America. How long have humans been on those continents? Use colored markers (colored pieces of yarn or paperclips with labels) to indicate different events on the Cheerio string.

Extend the Activity

Plan a field trip with a local geologist to a fossil bed. Wyoming is lucky to have a fossil outcrop near most communities. Talk to a local geologist and ask him or her to accompany you. Be sure you find out the age of the fossils that you pick up. Perhaps they represent marine animals that once swam in seas that covered Wyoming. Find out the rate at which a group of animals or plants, like birds, is becoming extinct and compare it with extinction rates of the past millions of years. Read a survival success story like that of the Whooping Crane, the Florida Alligator, the Bald Eagle or the Peregrine Falcon. Students may want to make a poster, or presentation the causes and the prevention of extinction.

Were humans on earth when there were dinosaurs or Ice Age animals that are no longer alive on earth? The kids are probably familiar with the animated movie series "Ice Age". Ask them to think about the animals in the movies. The Tate Museum in Casper, WY now has Dee the Mammoth, an 11,600 year old Columbian Mammoth who lived in the American West during the Pleistocene, or Ice Age. Look up their website to see a picture, or visit the museum as a class. Figure out in Cheerio years when Dee would have been alive.

Suggested Assessment

Ask teams of students or individual students to locate the time of an event along a string of Cheerios. Examples for younger children might be to count back to the date when they were born, a relative was born, or a pet was born. Older children may mark Cheerios that represent the loss of the Irish Elk or the end of the Ice Age. Keep an anecdotal record concerning the individual performance of children as they respond to the total activity. Ask younger children such questions as: "Find out using the Cheerios how much older George Washington would be today than your grandfather." "Did your great, great, great grandfather see the Ice Age?"

Additional Resources

Darwin and Evolution for Kids: His Life and Ideas with 21 Activities. 2003. Kristan Lawson. ISBN-10: 1556525028; ISBN-13: 978-1556525025 (for ages 9-12); Chicago Review Press. 160 pp.

Life on Earth: The Story of Evolution. 2002. Steve Jenkins. Houghton Mifflin Books for Children. ISBN-10: 0618164766; ISBN-13: 978-0618164769. 40pp.

The Evolution Book. 1986. Sara Stein. ISBN 089480927X (0-89480-927-X). Workman Pub Co. 360pp.

How Much Is a Million? 2004. David M. Schwartz. ISBN-10: 0688099335; ISBN-13: 978-0688099336. HarperCollins.40pp. (for ages 4-8)

Upper elementary children would enjoy the essay, "The Earth as a One Year Movie," an essay by James Rettie; see Wild Wonderful Wyoming secondary activities.

Tate Museum, Casper College, WY – Columbian mammoth articulated skeleton
http://www.caspercollege.edu/tate/

Cool Cosmos – how old is the earth, by measuring rocks:
http://coolcosmos.ipac.caltech.edu/cosmic_kids/AskKids/earthage.shtml

For older elementary students, use a clock to represent the time line of Earth's age.
http://www.pitara.com/discover/earth/online.asp?story=110