



Major Earth Events, Part One

Lesson by Lacey Moore

Video Title: *Cambrian Explosion*

Activity Subject: Cambrian Explosion and time scale of Earth's history

Grade Level: 6-8 grades

Introduction

In this lesson, students watch the *Cambrian Explosion* video, construct personal and Earth timelines (vertical to mirror the geologic time scale which will be introduced in future lessons), and begin to explore the scale of time embodied in Earth's history.

Assessments: Worksheet, Informal Discussions

Time: 45 min-60 min

Group Size: Varies

Materials:

- Internet connection, computer and projector to watch *Cambrian Explosion* video (available to download)
- "Major Earth Events, Part One" worksheet per student (three pages)

Preparation:

Make copies of "Earth's Major Events, Part One", one worksheet for every student. Project prompts or write on the board if students use a science notebook.

Procedure:

1. LESSON OBJECTIVE AND ENGAGE PRIOR KNOWLEDGE. (5-10 MIN)

Before class, write (or project) this focus question on the board: *How do scientists figure out and sequence major events in Earth's history?* When students arrive, introduce this question as one they'll be investigating over the next few lessons.

NEXT GENERATION SCIENCE STANDARDS

MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. *[Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of Homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.]*

Connections to Nature of Science

Science Investigations Use a Variety of Methods
Scientific investigations use a variety of methods and tools to make measurements and observations.

LEARNING OBJECTIVES

After this lesson, students will be able to:
Construct timelines for both self and Earth and sequence major events along each of them.

- Describe the Cambrian Explosion as a major event in Earth's history.
- Recognize that the scale between the schoolyard, personal and Earth's timelines are different but some of the same science ideas can be used to understand them all.



Major Earth Events, Part One-Page 2 Procedure - Teacher's Edition

Remind students that they used observations and inferences to figure out and sequence major events in their schoolyard's history. Ask students to think about how their experience compares to what scientists do to figure out Earth's history and think-pair-share.

2. WATCH THE CAMBRIAN EXPLOSION VIDEO. (15 MIN)

Give students an open-ended task while watching. In their science notebook or piece of paper, they can draw a two-column chart with the headers "Things I Observe" and "Questions I Have." Or you can have them use a "3-2-1 Strategy" (on a piece of paper, write down three things they learned, two things they found interesting or would like to learn more about and one question they have). Students can also jot down words they don't understand to help build academic vocabulary.

3. CONSTRUCT A PERSONAL TIMELINE AND EARTH'S TIMELINE. (10 MIN)

Pass out pages one and two of "Major Earth Events, Part One" worksheet and metric rulers. Go over the worksheet with students. Each student will construct two vertical timelines: a personal one that represents a student's age in centimeters and another one that represents Earth's history and is the same height as the personal timeline. (Note: These timelines can also be created on separate sheets of papers. They'll refer to these throughout the next five lessons.) They'll think of three to five events in their personal history (that they don't mind sharing) that they'll label at appropriate measurements (e.g., "moved to another city at age six" labeled at six centimeters from the bottom of the timeline). On Earth's timeline, have them guess what Earth's birthday, or age of formation, is and label it. Remind them that the bottom of each vertical timeline is when time began-so it's age 0 or birth for the personal timeline and formation of the Earth at the bottom of Earth's timeline.

4. WATCH THE VIDEO THE CAMBRIAN EXPLOSION A SECOND TIME. (15 MIN)

Pass out page three of "Major Earth Events, Part One" for students to complete as they watch the video a second time. They'll record any references to time they notice, describe the Cambrian Explosion, why it's considered a major Earth event, evidence of the Cambrian Explosion as well as when it took place. They'll also think about how the scale of Earth's history compares to human's history. (In the video, the Cambrian Explosion was described as happening in a "blink of an eye" geologically. But the period it spans is thought to be 40 million years, from 570 to 530 million years ago.) Then they'll indicate where they think it occurred along the timeline of Earth's history they constructed.

5. DEBRIEF AND INTRODUCE PHENOMENON OF SCALE OF GEOLOGIC TIME. (10 MIN)

Guide a discussion about how scientists figure out and sequence major events as well as the immense scale of Earth's history. Question may include:

- What processes or information did scientists use to discover and sequence the Cambrian Explosion in Earth's history?
- How was that similar or different to what students did in the schoolyard?
- How might the timescale of the Earth compare to their schoolyard or personal timescale (e.g., what is a "blink of an eye" in geologic versus human history)?
- Other comments or questions?



Name _____ Period/Class _____ Date _____

Shape of Life
The Story of the Animal Kingdom

Major Earth Events, Part One-Page 1 Student's Edition

How do scientists figure out and sequence major events in Earth's history?

Note: You will be using the following timelines throughout the next few lessons.

Personal Timeline

1. Create a personal timeline below.

- Use a metric ruler to draw a vertical line below or on a separate sheet of paper that is as many centimeters as you are old.
- Think of three to five major life events (things that have happened in your life that have shaped who you are). Label them along the timeline at the appropriate measurement. *The bottom of the timeline represents when you were born so oldest events should be at the bottom.*



Major Earth Events, Part One-Page 2 Student's Edition

Earth's Timeline

2. Create a timeline representing Earth's history below or on a separate sheet of paper.
 - Title the top of the page "Earth's timeline." Draw a vertical line the length of the page.
 - The top of the timeline represents present time. The bottom of the timeline represents Earth's formation. Label both and record a numeric guess of how old the Earth is. Add the Cambrian Explosion to where you think it belongs.
 - In the next lesson, you'll look at other major Earth events and add them to the timeline. *Remember oldest events should be at the bottom.*



Name _____ Period/Class _____ Date _____

Shape of Life
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Major Earth Events, Part One-Page 3 Student's Edition

How do scientists figure out and sequence major events in Earth's history?

1. Watch *The Cambrian Explosion* and answer the following questions:

- What references to time do you notice? Record them below.
- What was the Cambrian Explosion and why is it considered a major Earth event?
- What is evidence of the Cambrian Explosion?
- When did the Cambrian Explosion take place? Add it to where you think it belongs on Earth's timeline.
- In the video, the Cambrian Explosion was described as happening in a "blink of an eye" geologically. But the period it spans is thought to be 40 million years, from 570 to 530 million years ago. How do you think that time period compares to "a blink of an eye" in human history?