An Earth Science Experience
By: Nancy Volk

Visiting the MOST

To make your visit to the Milton J. Rubenstein Museum of Science & Technology as in depth and meaningful as possible:

A) Explore and complete some of the on-line pre-visit activities with your students.

B) Design a pre-visit, during and post-visit plan that includes activities and demonstrations that you select.

C) Discuss your plan with a MOST educational staff member prior to your visit. Request the backpack program for a “hands on” set of activities for the Earth Science Discovery Cave.

D) Plan your large group to be divided in a ratio of 8 to 10 students per chaperone.

E) Cue the chaperones about their roles. They should be engaged with the students and assisting them with their hunt for answers and monitoring the materials provided.

F) Relax and have fun!

The entrance to the MOST Earth Science Discovery Cave.
Your Earth Science adventure begins up the ramp from the entrance to the cave, located on the lower level of the MOST. This is the starting point for the information that you will need to answer the following questions.

What is the difference between these terms: relative age dating and absolute age dating?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

With your partner or team, look at the “Rocks of Central New York” board. Before reading the sign, discuss which layer occurred first? Which layer occurred last? Which is the oldest? Which is the youngest? How did you determine your answer?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

3) What kind of fault do you see in the rock above?

___________________________________________________________________

3b) Touch the fault area. Follow the layers. How does it feel?

___________________________________________________________________

4) What kind of fold do you see in the rock strata surrounding the waterfalls?

___________________________________________________________________
___________________________________________________________________

4b) Touch the monocline area—how does it feel?

___________________________________________________________________
___________________________________________________________________

4c) How are the terms anticline, syncline and monocline alike? And how are they different?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

5) Which fault moves horizontally?

___________________________________________________________________
6) Which fault moves vertically?

__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

7) Identify any fossils that you know in the layers.

__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

8) Complete one to three sketches of fossils in the space provided below. When you return to school try to identify the type of fossil.

__________________________________________________________________________________________________

9) Using the clay, make an impression of one of the fossils on the wall. How is this like or unlike a fossil?

__________________________________________________________________________________________________
__________________________________________________________________________________________________
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Did You Know? Team Exercise

How Hot is Hot?

1) The center of Earth is the same or more than the temperature of the surface of the Sun. The Sun’s surface is about __________________degrees Celsius.

The Role of Hot Spots

2) List two or three areas in the world that are hot spots.

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________

3) As you move from the surface of the earth towards the center of the earth, what happens to density?

___________________________________________________________________

Composition of Earth

4) Put the following four examples in order from most to least dense. Iron, Peridotite, Basalt, and Granite

Most Dense    ______________

______________

______________

Least Dense   ______________

5) How many New York states would fit across a cross section of Earth?

___________________________________________________________________

Geology’s Unifying Theory

6) Sketch the following areas.

| Transform | Spreading Area | Subduction Zone |
Explore Our Dynamic Planet

Explore the topic assigned by your team leader or teacher. Using the touch screen, move to your topic of study.

Oceans or Atmosphere

List your topic area.

Subtopics

Current Weather, Seas Surface Temperature and Water Vapor, Ocean Currents, Particles in the Stratosphere, Asian Tsunami or Plate Motion, Ocean Draining, Plate Boundaries, Plates and Quakes, Daily Quakes, Active Volcanoes

List your subtopic area.

Write it Out

Write out three ideas you learned or three questions you have after listening to the audio recording about your topic.

__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
Effects of Water

Looking at this section of the exhibit answer the following questions.

1) How are caves formed?
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

2) What combines to form carbonic acid?
___________________________________________________________________
___________________________________________________________________

3) Explain the similarities and differences between stalactites and stalagmites.
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

4) Using the clay, make stalactites, stalagmites and columns.
   Draw a sketch of each and label below.
5) List the names of the falls that you can think of that are in Central New York?

___________________________________________

___________________________________________

___________________________________________

5) How long does it take to build a mature cave?

__________________________________________________________________________________________________

__________________________________________________________________________________________________

1) Coral reefs are the most biologically diverse marine ecosystems on Earth, only rivaled by what other major ecosystem?

__________________________________________________________________________________________________

Coral Reef Adventure
2) Name the types of corals and sketch them in the spaces provided.

3) What is living coral? An animal or a plant? Explain your answer.
Salt From the Earth

Salt Mines in New York State

1) In the Syracuse area, the salt is mined how far below the surface of the earth?
__________________________________________________________________________________________________

2) It is the _______________________________ salt mine in _________________________________?
   (deepest, shallowest) (continent)

Geological Exploration

3) How do scientists find out about what is below the surface of the earth?
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

4) Over the past 100 years, how much salt has been removed from the salt bearing strata beneath the Tully Valley?
__________________________________________________________________________________________________

5) Syracuse is named after what other city? Why?
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

6) How much salt does one gallon of brine produce?
__________________________________________________________________________________________________
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Mineral and Rock Exploration

1) What is a vug?
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

2) What four minerals can be found in the cave exhibit?
_________________________________________  ____________________________
_________________________________________  ____________________________

Evidence of Life

Ancient Sea Life

3) Create another sketch of a selected fossil and identify the type of fossil when you return to your classroom.
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

4) Pretend you are an archaeologist. What fossil did you find?
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
Lake Fossils

5) Sketch below or create a rubbing of the fossil that interests you. Write as much detail as possible about your selected fossil.
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1) Do rocks have memory? Yes or no? Explain.
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

Geomagnetism

2) How long have we known Earth to have a dipolar magnetic field?
__________________________________________________________________________________________________

3) What causes Earth’s magnetic field?
__________________________________________________________________________________________________
__________________________________________________________________________________________________

4) Using the magnetometer, what is the highest magnetic field strength?
__________________________________________________________________________________________________

4b) What is the orientation of the magnetometer at this point?
__________________________________________________________________________________________________

5) If the intensity of Earth’s dipole field were to decay to zero, what would be the polarity of the field where it built up again?
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

5b) Explain.
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

6) Draw Earth’s geomagnetic field and use arrows to show directions.
Glaciers on the Move

1) Name three glaciers.
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

2) What did the Great Lakes area look like 2,000 years ago? Have the Great Lakes always looked as they do today?
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

3) What is one of the youngest geomorphic features on the North American continent?
____________________________________________________________________

Finger Lakes of Central New York

4a) How many Finger Lakes are there? _________
4b) They are oriented in a _________ and _________ direction.

5) What are the two deepest Finger Lakes?
____________________________________________________________________
____________________________________________________________________

6) How did the Finger Lakes form?
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

7) How thick was the ice over New York State 21,000 years ago?
____________________________________________________________________

8) How many Carrier Domes thick was the ice layer?
____________________________________________________________________

Climate and Glaciers

9) How is paleotemperature measured when looking at ice cores?
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
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Earth Science Narrative

Choose one of the following ideas to write about during your visit to the MOST!

• Pretend that you are an insect in the exhibit area. Describe the tour from this vantage point.
• Write a journal entry and draw a sketch to go along with your entry about your museum experience today.
• Write a letter to a relative or a friend sharing about your museum trip today.
• Pretend to be a scientist and design a new Earth Science museum exhibit. Sketch the exhibit and explain about the topic and content.

Once you choose your topic, write for ten minutes. Share your writing with a partner. Provide ideas and feedback for your partner. Finish your writing assignment.

New York State Standards

Standard 1: Analysis, Inquiry, and Design
Math: m1.1, m2.1, m3.1, Scientific s1.1, s1.2, s1.4, s2.1, s3.2, s3.3, Technology T1.1, T1.3, T1.5
Skills: Observing, describing, classifying, sequencing

Standard 3: Mathematics

Standard 4 Life Science: Key idea 5, Key idea 6

Standard 4: Physical setting
2.1c, 2.1d, 2.1e, 2.1g, 2.1h, 2.1j, 2.2a, 2.2b, 2.2c, 2.2d, 2.2e, 2.2f, 2.2g, 2.2h 3.1a, 3.1g, 3.1h, 4.2e, 4.4 g, 5.2b

General Skills:
Recognize and analyze patterns and trends
Classify objects according to established scheme
Sequence events
Cause and effect relationships
Interpret results
Use a magnetic compass
Interpret field maps
Determine density