Val, Mike, Rob, Dev 35 kids @ a time (45min)

break into 3 groups 12, 12, 11

Activities

→ fossil box

→ rubbings

→ role play

Mike (5min) Fossil box

→ have kids dig through the fossil box using shovels + sifts to find & identify fossils. They can use the ID lid or id sheets (laminate)

* shovels, sifts, id sheets, toothbrushes

Dev (15min) Rubbings

→ Using crayons the kids can place paper over rubbing plates of fossils & dinosaurs + create a book with their pictures using yarn

* hole paper, yarn, rubbing plates, crayons clip boards

Val Role play (15min) Explain to the students the characteristics of the plants + animals when they were alive. Have them act them out

*paper with charact., costumes

SCAVENGER HUNT 75 (35 min)

Students will go from one site to another & answer questions for a prize/sticker

① You are a Paleontologist dig up a fossil & identify

② I see, I see something fossilized
which item is a fossil?
(Set up objects: bone, fossil, stick)

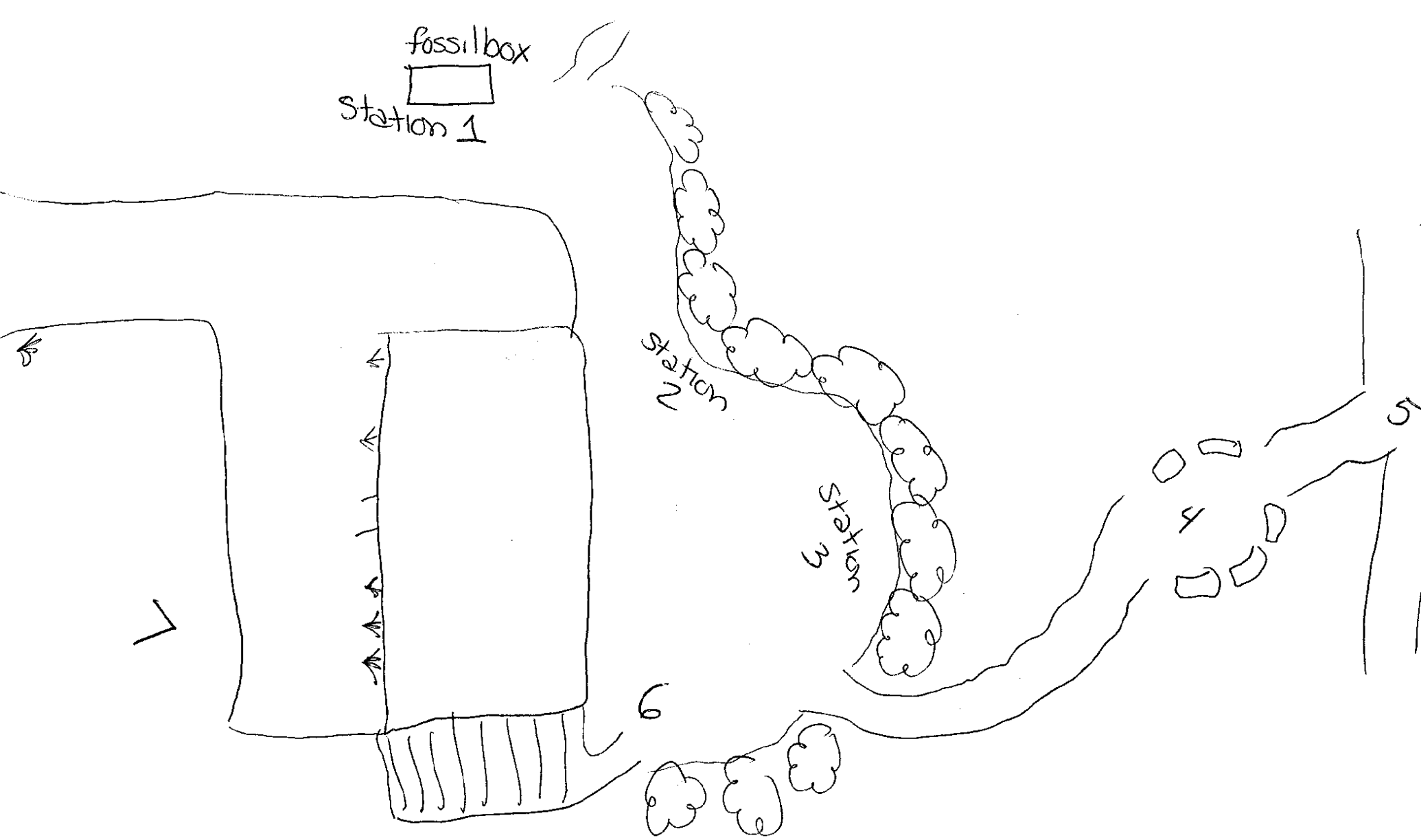
③ Fossils were once alive just like you...
to move on you must act out how one organism ate when it was alive.

④ Fossils are impressions of plant or animals that once lived. Place these puzzle pieces together in the order of events to make a living organism a fossil
(animal, die, sediment, clock, anvil, fossil)

⑤ How old is the earth? How old are you?
Using this timeline can you figure out
how long ago dinasaurs were here?
what period are the fossils in the Wyoming Valley from?
How old is the earth?

⑥ Sandbox - digging up bones
What kind of animal was this?
how did it walk, how did it eat

⑦ Rock layers - large soda bottles where you can see diff layers of soil or clear container


fossil box
Station 1
Station 2
Station 3
4
5
6
7

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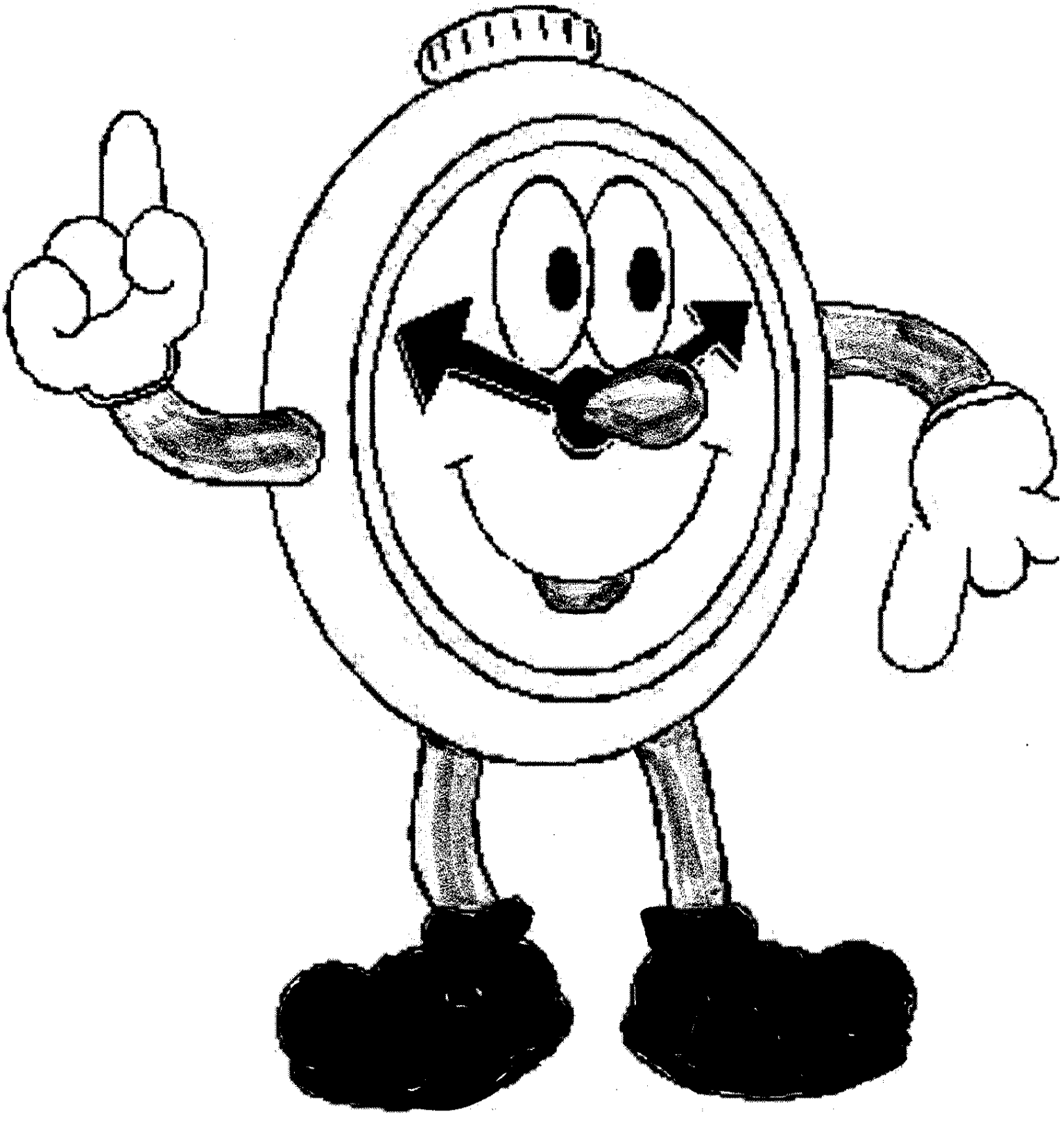
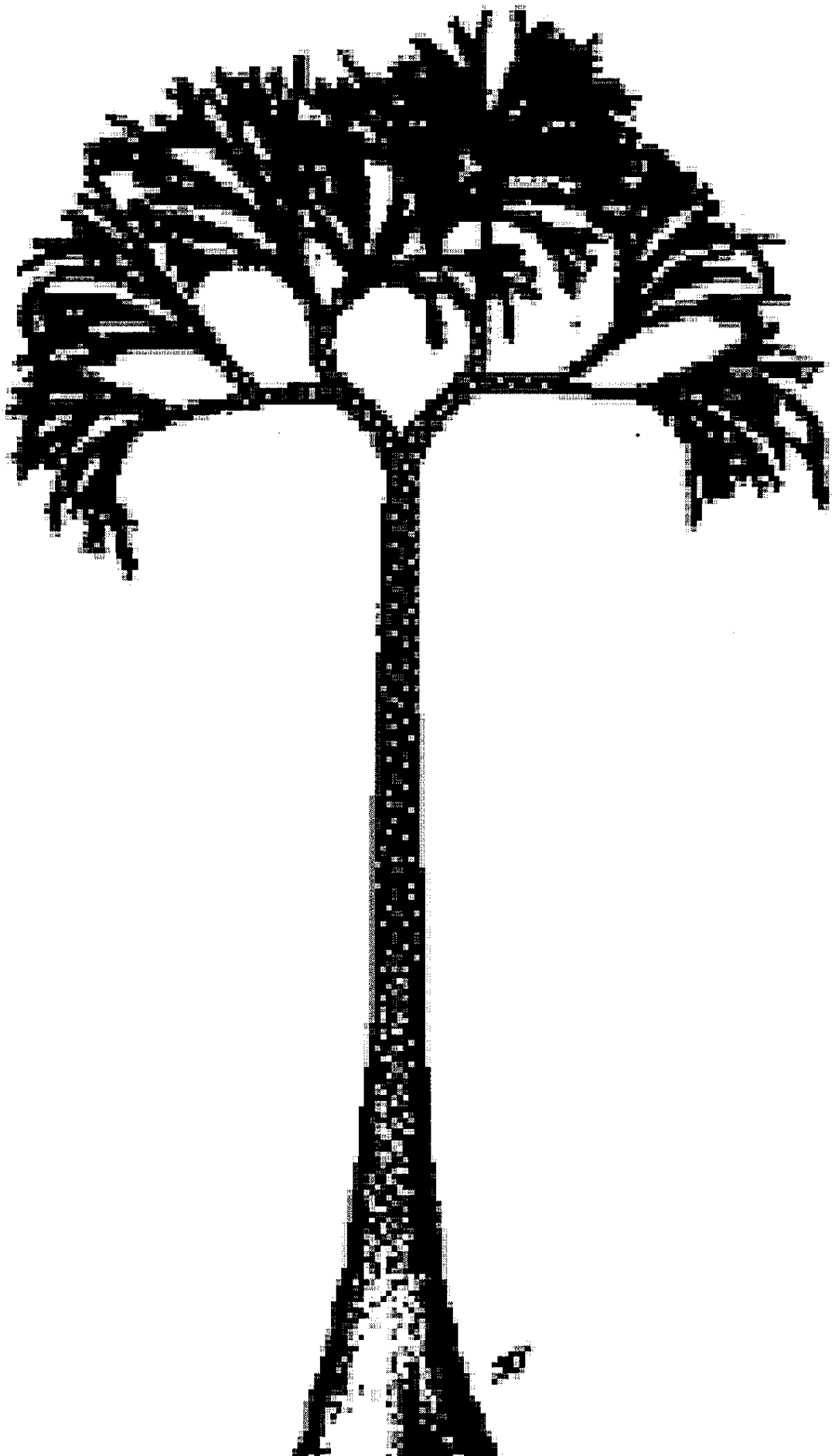
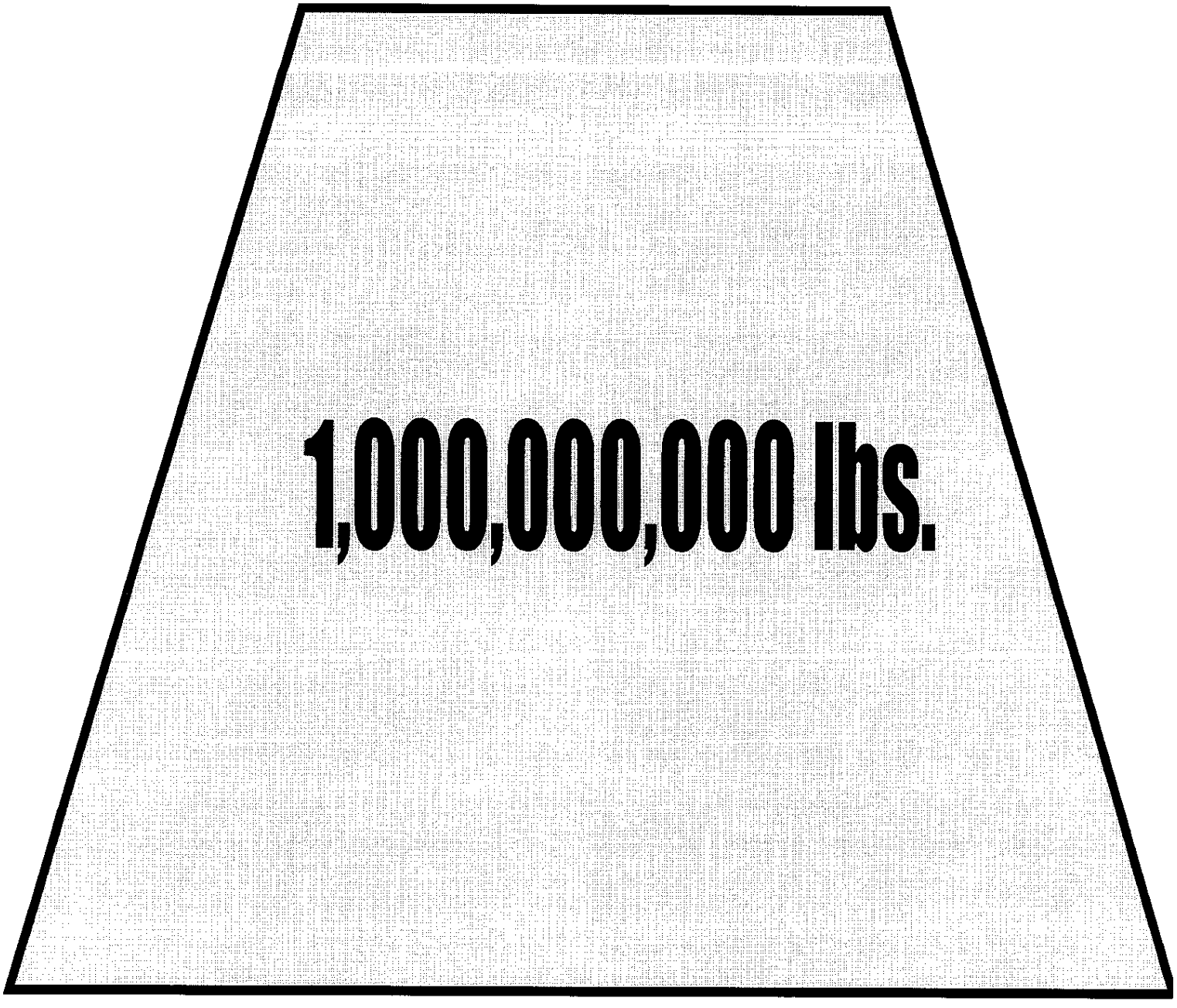
Scavenger Hunt

Student groups will visit each of the seven stations. When the task is completed they will receive a stamp in that square on this paper. At the end each student will earn a sticker for their hard work! Good luck!

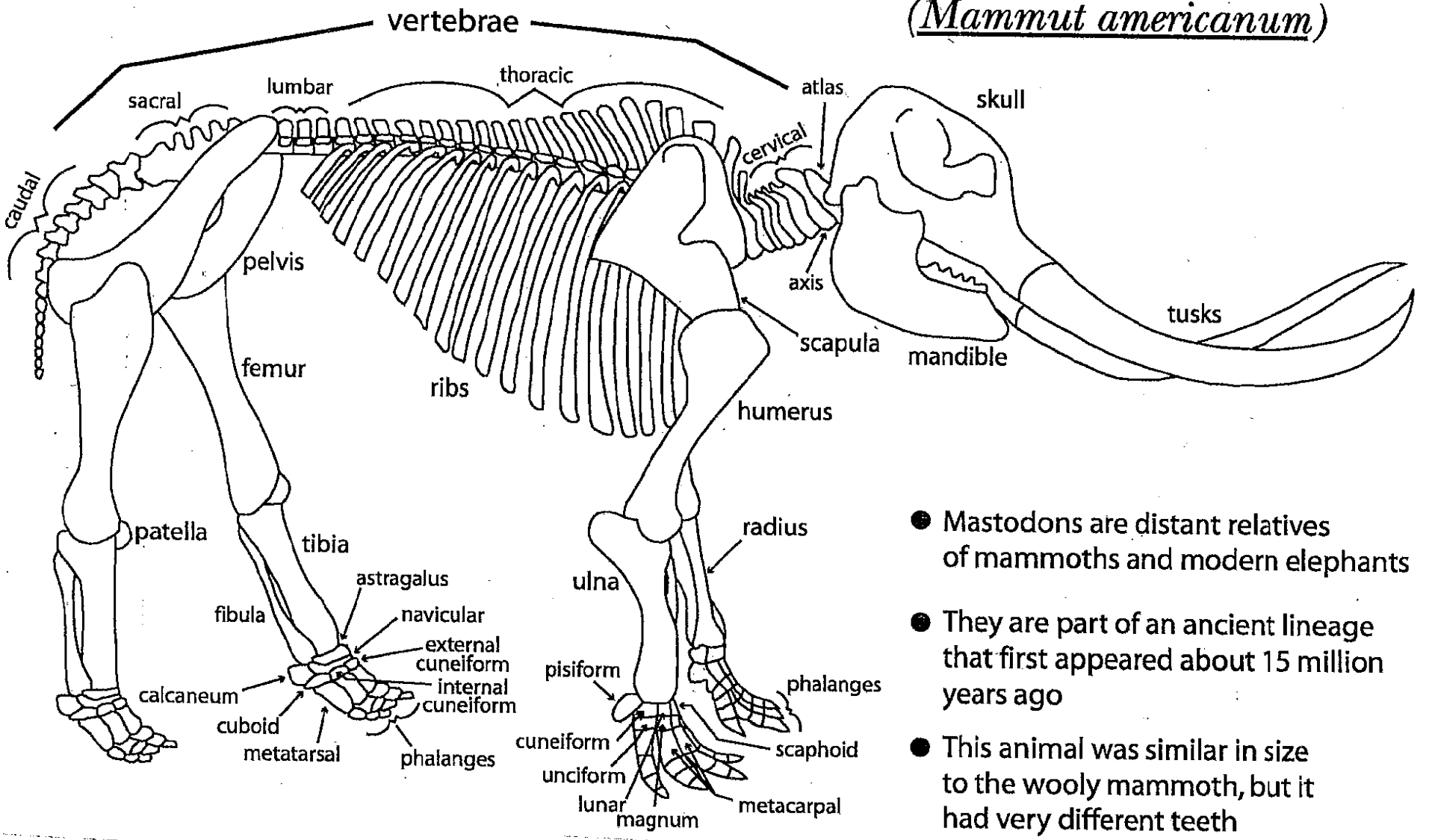
1	2
3	4
5	6
7	





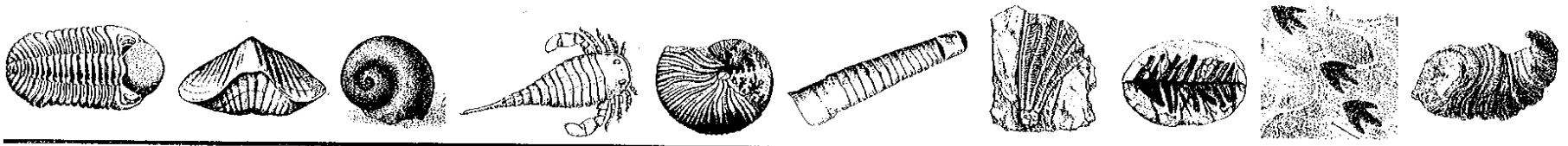

1,000,000,000 lbs.

American Mastodon
(*Mammut americanum*)



- Mastodons are distant relatives of mammoths and modern elephants
- They are part of an ancient lineage that first appeared about 15 million years ago
- This animal was similar in size to the wooly mammoth, but it had very different teeth
- Mastodons became extinct 10,000 years ago, probably as a result of climate change as the Earth warmed

MUSEUM OF THE EARTH
AT THE PALEONTOLOGICAL RESEARCH INSTITUTION



ACTIVITY 1 Time Line

Most people find it difficult to imagine a time as vast as 4.6 billion years. Most fossils that you commonly find are less than 500 million years old—which is still a very long time. Humans appeared on Earth in only the last 3 million years. How can we put this time scale into perspective?

The diagram on the Geological Time Line activity sheet on page 102 should help you and your students envision the time line and the tiny part of it that is recent history. Note that the last one-eighth inch of the time line is expanded to show the appearance of the oldest human ancestors (5 million years ago) up through the present. The bar showing 5 million years ago to the present is therefore drawn in a different scale from the rest of the time line.

3.5 billion years ago (=3,500 million years ago)—oldest known fossils (bacteria)

540 million years ago (mya)—trilobites

230 mya—dinosaurs

165 mya—earliest birds

65 mya—end of dinosaurs

5 mya—earliest human ancestors

10,000 years ago—end of last Ice Age

What you will need

- photocopy of Geological Time Line (p. 102)
- a piece of string approximately 6 feet long
- a length of rope 30–40 feet long
- a measuring tape or a yardstick
- marker

What to do

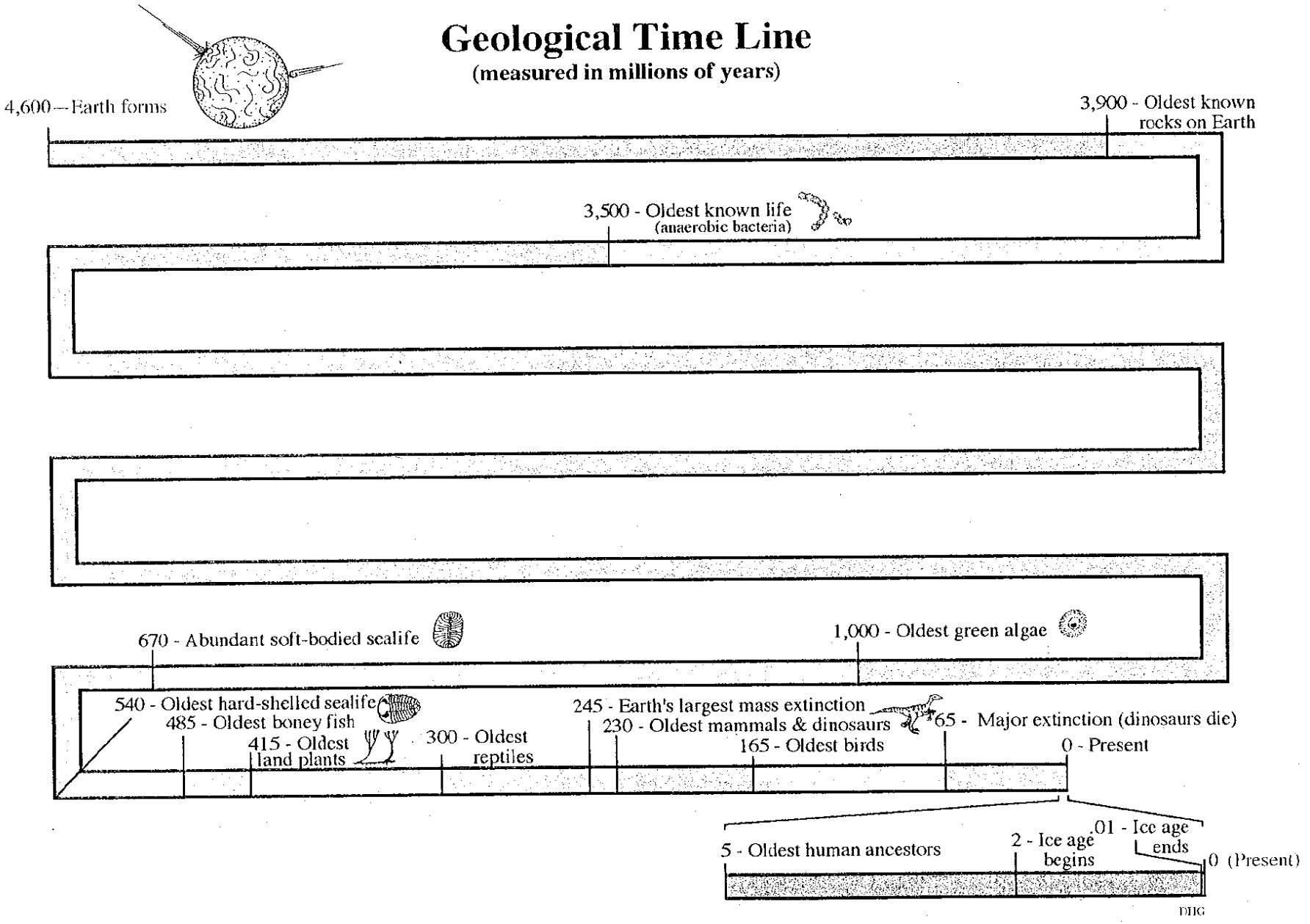
1. Lay the piece of string over the top of the time scale diagram.
2. At each event on the diagram, make a dot on the string with the marker.
3. Stretch the string to its full length.
4. Use the following proportion: each inch of string = one foot of distance along the floor.
5. Lay the piece of rope on the floor. Stretch out the measuring tape.
6. For each inch of string, mark off one foot on the rope. Aside from the 3.5 billion-year-old bacteria fossils, you will move at least halfway down the rope before any events take place. The first event will be the first bacteria. Have a student stand at this place. As each event is reached on the string, measure off a proportional distance on the rope and station a student there. The students at the far end of the rope will be standing very close together, and the last student in this line will represent human life on Earth. The skin on the ear of the student on the farthest end of the rope represents human history since the end of the last Ice Age, 10,000 years ago.

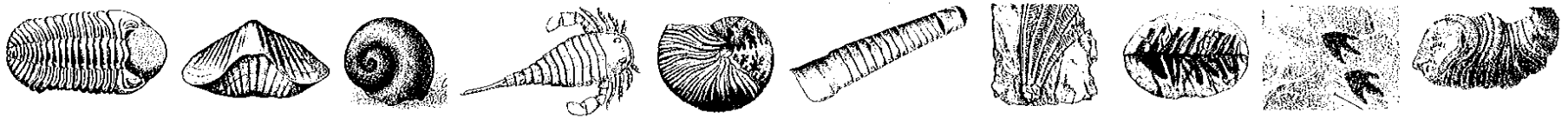
Questions

- Has there always been life on Earth?
- What do you think Earth was like before life appeared?
- Have humans been here a long time?

Geological Time Line

(measured in millions of years)





ACTIVITY 5 Forming Rock Layers and Fossils

Objectives

To simulate how sedimentary rocks are deposited as layers

To see how sediments are compressed over time but retain their original layers

To experiment with different objects to see how they make different impressions in the sediment

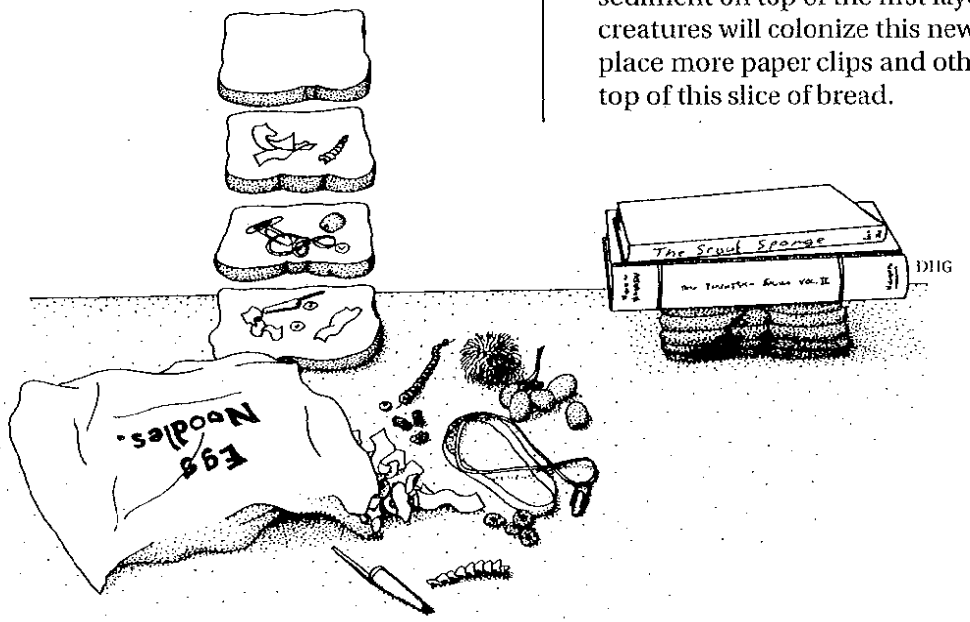
To see why some fossilized organisms withstand weight and pressure better than others

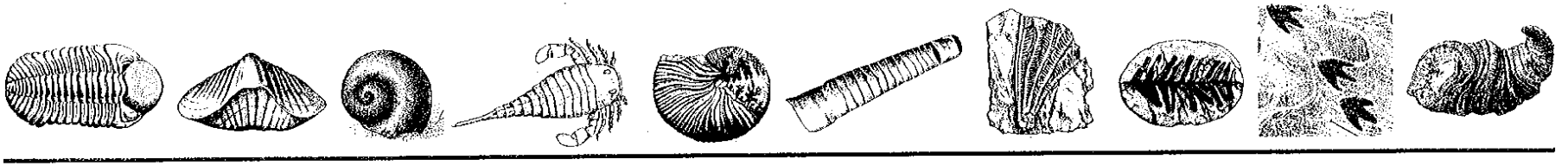
What you will need

- a loaf of fluffy white bread
- paper clips, pen caps, soft toys like "koosh" balls, jelly beans, grapes, eggshells, beads, small snail and clam shells, raisins or other small, soft foods

What to do

1. Place a slice of bread on the table. Explain that it is a sea bottom. Place two or three paper clips or other items on top of the bread. Explain that these simulate creatures living on the sea bottom.
2. Place a slice of bread on top of the first one. Explain that a storm has just deposited sediment on top of the first layer. More creatures will colonize this new layer so place more paper clips and other objects on top of this slice of bread.
3. Put down another slice of bread to indicate the deposit of another layer of sediment. Layer on some more "marine life," including jelly beans and grapes.
4. Repeat this procedure until you have a stack of bread about ten inches tall. You may wish to add two or more slices of bread in the stack with no "marine life" in between to demonstrate that not all layers of rock contain fossils.
5. Compaction takes place over time. Place a weight such as a heavy book, brick, or rock on top of the stack and see how the layers of "sediment" squeeze together. You may choose to speed up this process by placing your palm on the stack and steadily pressing down until it is only a few inches high. The layers of sediment that make up sedimentary rocks were much thicker before they turned to rock.
6. Examine the compressed stack of bread. Peel back some of the layers and remove the paper clips and other "marine life." Have youth attempt to match these objects with the "fossil impressions" they have left. Some impressions will look more like the objects that created them than others. Discuss the relevance of this finding.

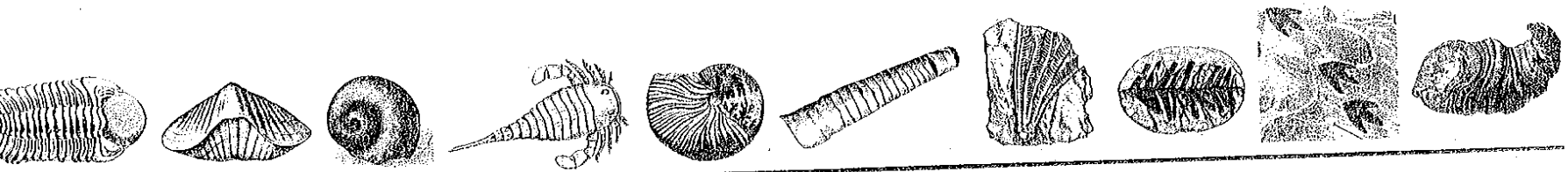




Questions

- Was there a difference in the way the jelly beans and grapes withstood the pressure on the stack?
- What might this represent in actual fossil formation? Organisms of similar size and shape may not fossilize equally well, depending on the strength of the organism and whether it is hard or soft. Jelly beans represent an object that has become more mineralized (and hence, harder) than grapes.

This activity can be modified by using different types of bread to represent different sediments (e.g., sand vs. mud) that react differently to pressure. Some may crumble or compact more or less than others.



ACTIVITY 8 It's All Relative

Objectives

To demonstrate that fossils are found in distinct layers

To develop a time line that shows the sequence that certain organisms appeared on Earth by comparing the fossils in two or more sets of layers

Situation

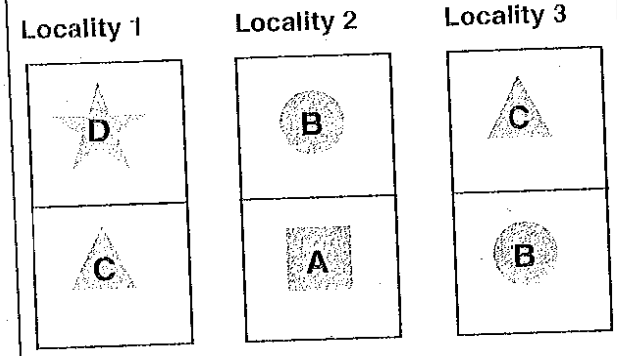
Rodney and Rita Rockhound were trying to learn stratigraphy, the study of layers of rocks and the fossils found in them. They first visited three different places, or localities, and found one or two fossils in each of the distinct layers of rock that they explored. They were confused, however, because the uppermost layer of rock was different in each locality. Rodney and Rita hoped to collect a few more samples if they had the time. Can you help the Rockhounds create an order for the fossils they found from oldest to youngest?

What you will need

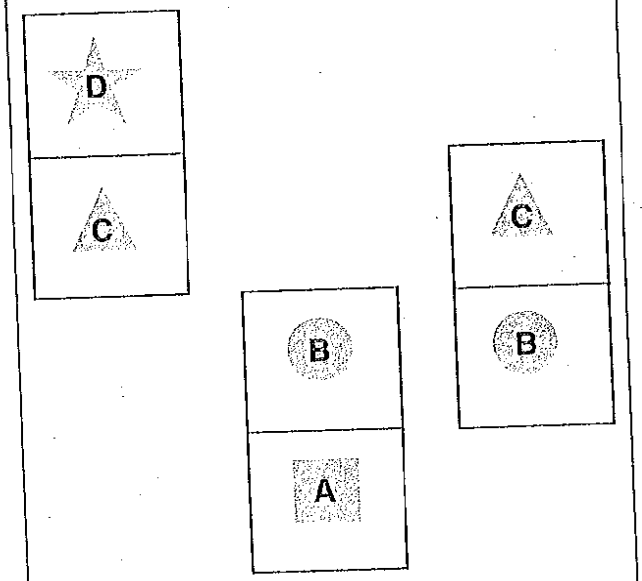
- "Rock layer locality" sheets (Photocopy master copies found on pages 106–7. Answer key for students is on page 108.)

What to do

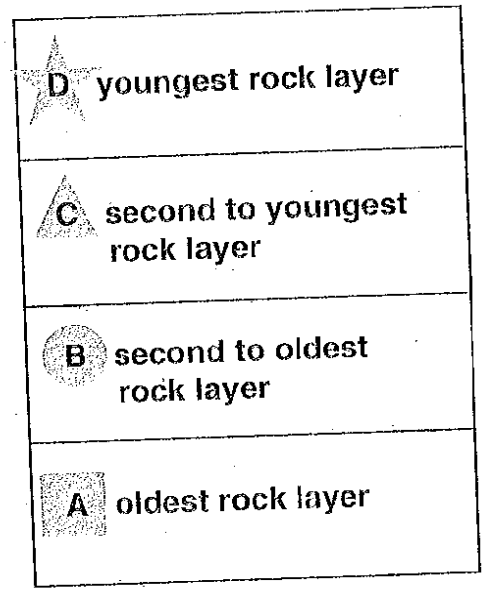
1. Cut out each of the "rock locality formations" found in the back of this guide. Place localities 1, 2, and 3 on a surface in front of you. Slide the formations back and forward until you arrive at an arrangement that best explains which are the oldest fossils, next oldest, and so on. Match fossil images from different localities so similar fossils are side by side. For example,



would be arranged as

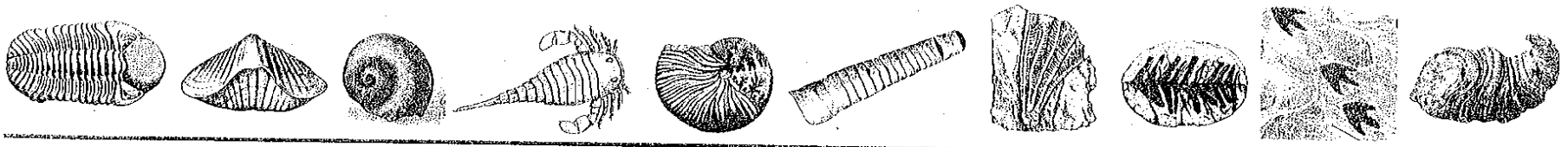


suggesting that A was the oldest fossil, followed by B and C, with the youngest (topmost) being D, or



When you find fossils in layers in the "real world," however, there isn't a letter attached to the shape you see. That's why paleontologists give names to their specimens. It's also another important reason to keep track of which layer was above or below another when you make your collections.

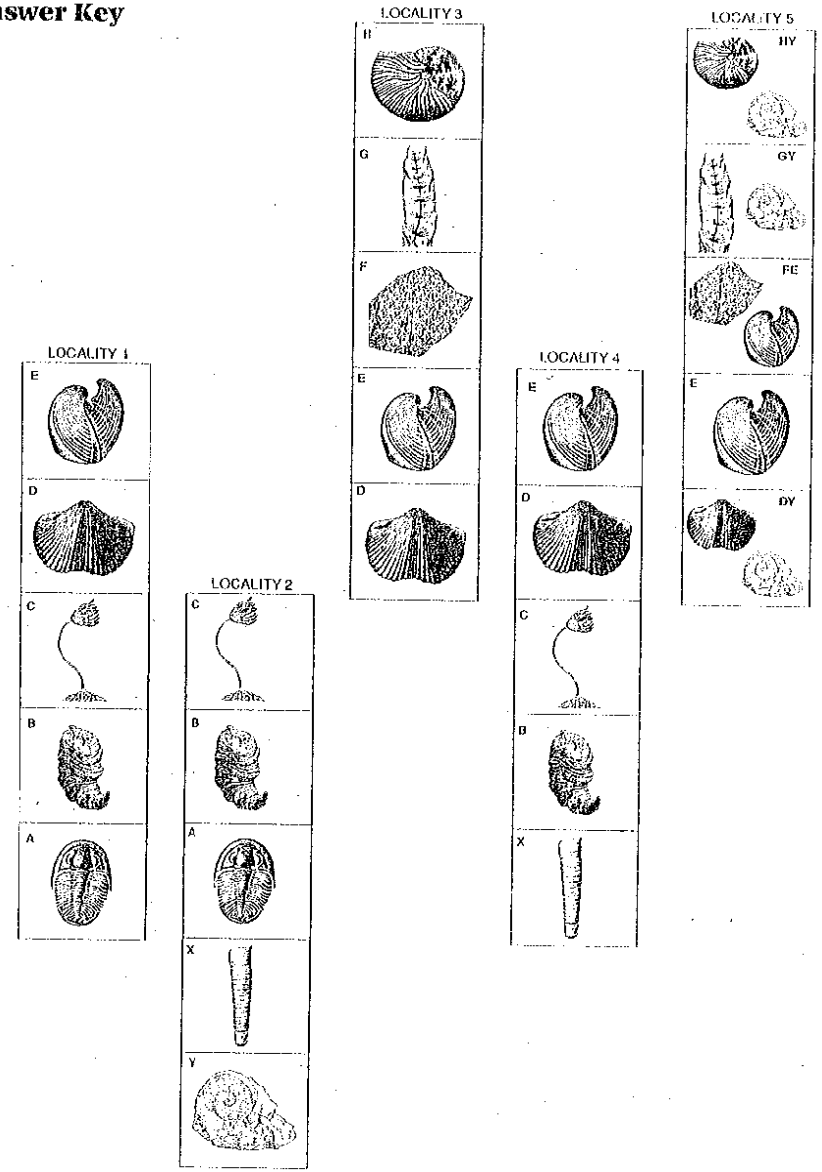
2. Try to arrange the first three localities and after you have had success with these, try to fit in the fourth and fifth. There is an answer key at the end of the activity. Thought questions about these localities are at the end of this activity.



Questions

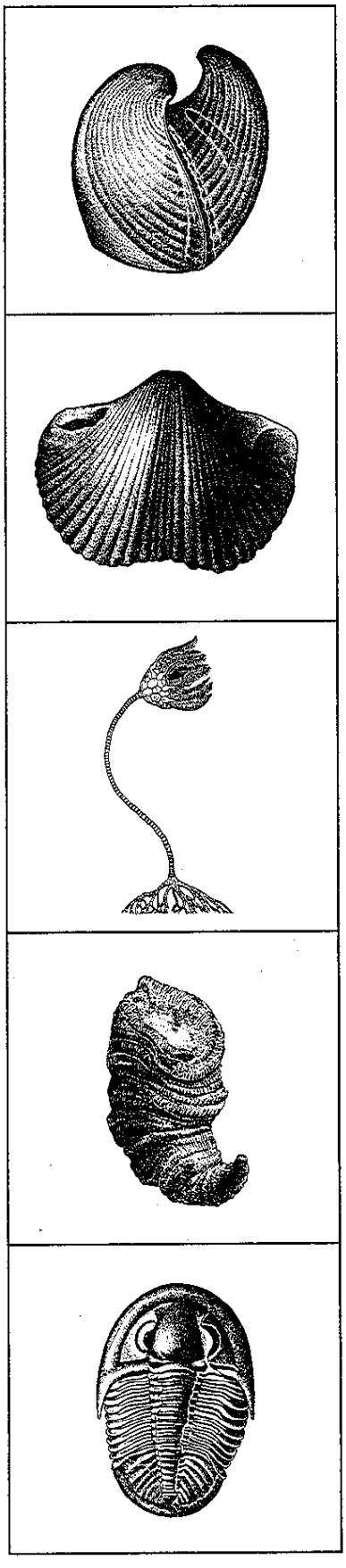
- Were some fossils found in more than one layer?
- Which ones and in how many layers?
- Would you consider Y  to be a good index fossil?
- Why or why not?
  (No, because it is not time-constrained so it shows up in the oldest as well as the youngest rock layers.)
- In this example, which fossils are the most widespread geographically? (D  and E  both appear in four localities.)
- Which are the best index fossils?
  (B,  C,  and D  are all good index fossils because they are each restricted to one layer each.)

Answer Key

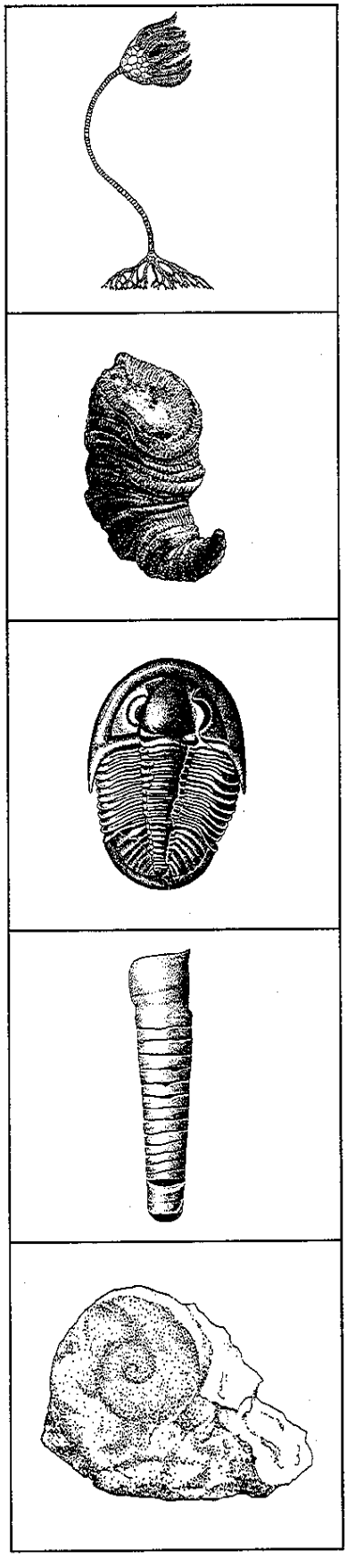


Activity 8—It's All Relative "Rock Layers"

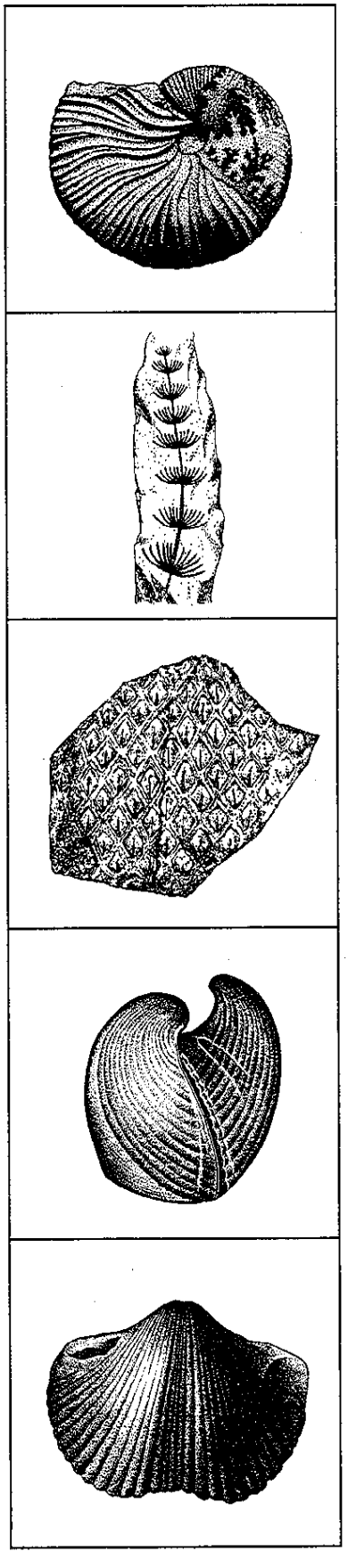
Locality 1



Locality 2



Locality 3



Activity 8—It's All Relative "Rock Layers"

Locality 4	Locality 5