According to the principle of superposition, in undisturbed sequences of sedimentary rock, the oldest layers are on the bottom. Geologists use this principle to determine the relative age of the rocks in a small area. In this activity, you will model what geologists do by drawing sections of different rock outcrops. Then, you will create a part of the geologic column, showing the geologic history of the area that contains all of the outcrops.

**OBJECTIVES**

Make a model of a geologic column.

Interpret the geologic history represented by the geologic column you have made.

**MATERIALS**

- paper, white
- pencil
- pencils or crayons, assorted colors
- ruler, metric
- scissors
- tape, transparent

**SAFETY**

**PROCEDURE**

1. Use a metric ruler and a pencil to draw four boxes on a blank piece of paper. Each box should be 3 cm wide and at least 6 cm tall. (You can trace the boxes shown on the next page.)

2. With colored pencils, copy the illustrations of the four outcrops on the next page. Copy one illustration in each of the four boxes. Use colors and patterns similar to those shown.

3. Pay close attention to the contact between layers—straight or wavy. Straight lines represent bedding planes, where deposition was continuous. Wavy lines represent unconformities, where rock layers may be missing. The top of each outcrop is incomplete, so it should be a jagged line. (Assume that the bottom of the lowest layer is a bedding plane.)

4. Use a black crayon or pencil to add the symbols representing fossils to the layers in your drawings. Pay attention to the shapes of the fossils and the layers that they are in.

5. Write the outcrop number on the back of each section.

6. Carefully cut the outcrops out of the paper, and lay the individual outcrops next to each other on your desk or table.

7. Find layers that have the same rocks and contain the same fossils. Move each outcrop up or down to line up similar layers next to each other.
8. If unconformities appear in any of the outcrops, there may be rock layers missing. You may need to examine other sections to find out what fits between the layers above and below the unconformities. Leave room for these layers by cutting the outcrops along the unconformities (wavy lines).

9. Eventually, you should be able to make a geologic column that represents all four of the outcrops. It will show rock types and fossils for all the known layers in the area.

10. Tape the pieces of paper together in a pattern that represents the complete geologic column.

**ANALYZE THE RESULTS**

1. **Examining Data** How many layers are in the part of the geologic column that you modeled?

2. **Examining Data** Which is the oldest layer in your column? Which rock layer is the youngest? How do you know? Describe these layers in terms of rock type or the fossils they contain.
3. **Classifying** List the fossils in your column from oldest to youngest. Label the youngest and oldest fossils.

4. **Analyzing Data** Look at the unconformity in outcrop 2. Which rock layers are partially or completely missing? How do you know?

**DRAW CONCLUSIONS**

5. **Drawing Conclusions** Which (if any) fossils can be used as index fossils for a single layer? Why are these fossils considered index fossils? What method(s) would be required to determine the absolute age of these fossils?