GEOLOGIC FAULTS OF UTAH LAKE

This lesson plan has been created as a resource for seventh grade teachers to teach the new core standards to their students. It integrates math and science standards in a meaningful and fun way. To see which specific standards are addressed, please refer to them below.

OBJECTIVE:

Students will be able to describe how the Earth changes over time due to geologic forces.

STANDARDS ADDRESSED:

Science

Fifth Grade:

Standard 2: Students will understand that volcanoes, earthquakes, uplift, weathering, and erosion reshape Earth's surface.

Objective 2: Explain how volcanoes, earthquakes, and uplift affect Earth's surface.

Indicators:

a. Identify specific geological features created by volcanoes, earthquakes, and uplift.
b. Give examples of different landforms that are formed by volcanoes, earthquakes, and uplift (e.g., mountains, valleys, new lakes, canyons).
c. Describe how volcanoes, earthquakes, and uplift change landforms.

Eighth Grade:

Standard 3: Students will understand the processes of rock and fossil formation.

Objective 4: Compare rapid and gradual changes to Earth's surface.

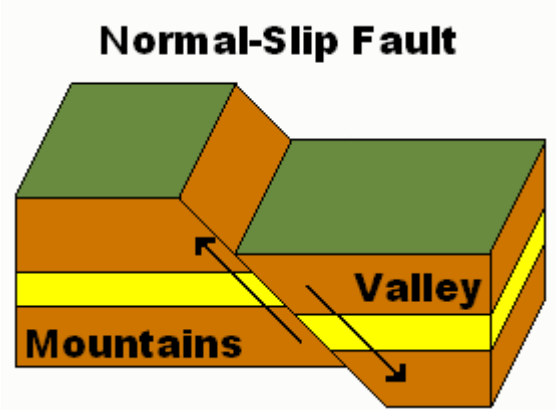
Indicators:

a. Identify specific geological features created by volcanoes, earthquakes, and uplift.
b. Give examples of different landforms that are formed by volcanoes, earthquakes, and uplift (e.g., mountains, valleys, new lakes, canyons).
c. Describe how volcanoes, earthquakes, and uplift change landforms.

TEACHER BACKGROUND:

Major changes in the earth's surface occur over time. The geological features of Utah Lake have changed over time. The uplift of the mountains in the area and the earth pulling apart are the forces that formed Lake Bonneville. Utah Lake is still one of the remnants of Lake Bonneville.

GEOLOGIC FAULTS OF UTAH LAKE



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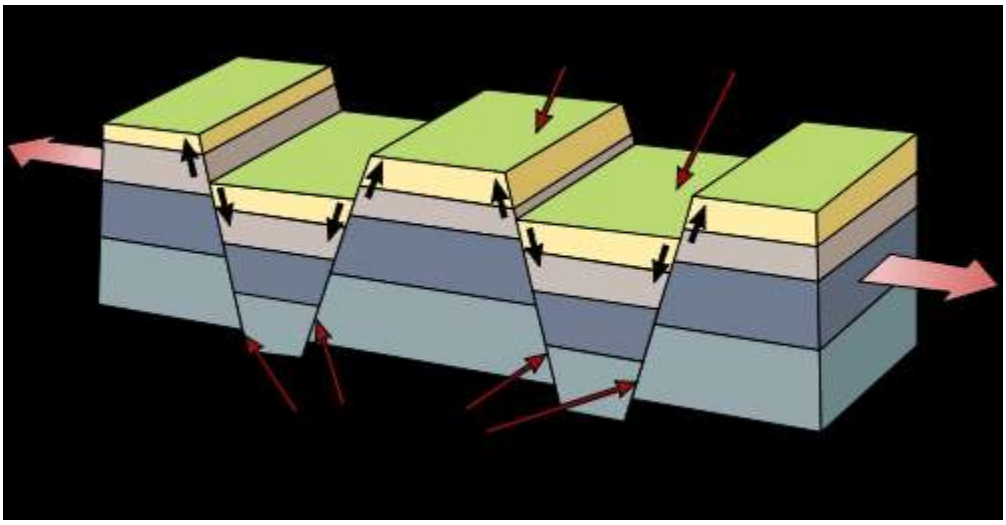


Sound was used to observe layers of sedimentation under Utah Lake to explore the geological history of the lake. If undisturbed, the sediment layers would be flat, but Utah Lake shows something different. There are several faults in the lake, trending from north to south. The earth is pulling apart along these faults, and the lake bed is sinking. The layers of sediment are broken and vertically shifted as evidence of the faults in Utah Lake. The sedimentation layers also show the bottom of the lake is tilted.

The north-south fault that runs through Utah Lake determines where the Jordan River is. The river channel extends into the lake as a depression that meanders through the lake bed. Springs on the east side of this fault are cold water with little dissolved material. These springs are fed by snow melt from the Wasatch Mountains. Springs on the west side of the fault are all hot springs with high concentrations of dissolved calcium minerals.

GEOLOGIC FAULTS OF UTAH LAKE

TEACHER MATERIALS:

- Utah Lake Sedimentation Slide Show.
- Utah County Fault Map.
- Guide Sheet for Utah Faults.
- Cake or some type of layered food.
- Video about Utah Lake Fault Formation.

STUDENT MATERIALS:

- Fault manipulative.
- Color pencils.
- Blank piece of paper.
- Candy bars.

VOCABULARY:

- Fault
- Uplift
- Earthquake
- Geology
- Geological

PROCEDURE:

Introduction (optional):

1. Instruct students to take notes during the activity. Their notes will be turned in.

2. Get a cake with several thin layers like a torte or make layered Jell-O; then cut a fault so you can see all the layers.

3. Make fault manipulative using the "Guide Sheet for Utah Faults." This will be used later in the activity.
    a. To make this visual manipulative, each student should receive one quarter of a piece of paper.
    b. Show the students how to color several layers using different colors, to represent natural layering on the Earth's surface.
    c. Cover the entire surface of the paper with varying layers. It will represent layers of sediment that have been deposited over time.

4. Use the slideshow of Utah Lake as a venue to discuss how Utah Lake was formed by earthquakes and the resulting faults.

5. Students will be cutting their manipulative into three sections (two cuts). Add notes as you go.
    a. Follow these instructions and refer to the diagram on the "Guide Sheet for Utah Faults."
        i. **Original** – This represents layering of sediment in an undisturbed situation.
        ii. **First Cut** – After cutting, move the manipulative to demonstrate how different sections of earth move. This represents a fault. Explain to students that this is an earthquake.
        iii. **Second Cut** – After making the second cut, move the manipulative to demonstrate how the middle section is sinking as the two sides move away from each other. This represents the geological formations of the Great Basin, of which Utah Lake is a part. Utah Lake has several fault lines. See Utah County Fault Map.

6. Conduct the following demonstration using a candy bar:
    a. Use a caramel filled candy bar like Milky Way or Snickers (fun size works fine). Take the bar and gently push in on the long sides. This will create a representation of uplift and mountains.
    b. Next gently pull the two sides apart; this should create an area in the middle that begins to sink (the caramel) showing how a basin or lake is created. This is how Utah Lake was created.

7. The US Geological Survey has created a resource that explains faulting and describes how to construct paper models that show faulting of the earth. Follow the link at the bottom that will take you to a page that describes how to create paper models. You could use this resource to teach this concept.

8. Consider watching the video depicting the formation of the Wasatch Front.

ASSESSMENT:

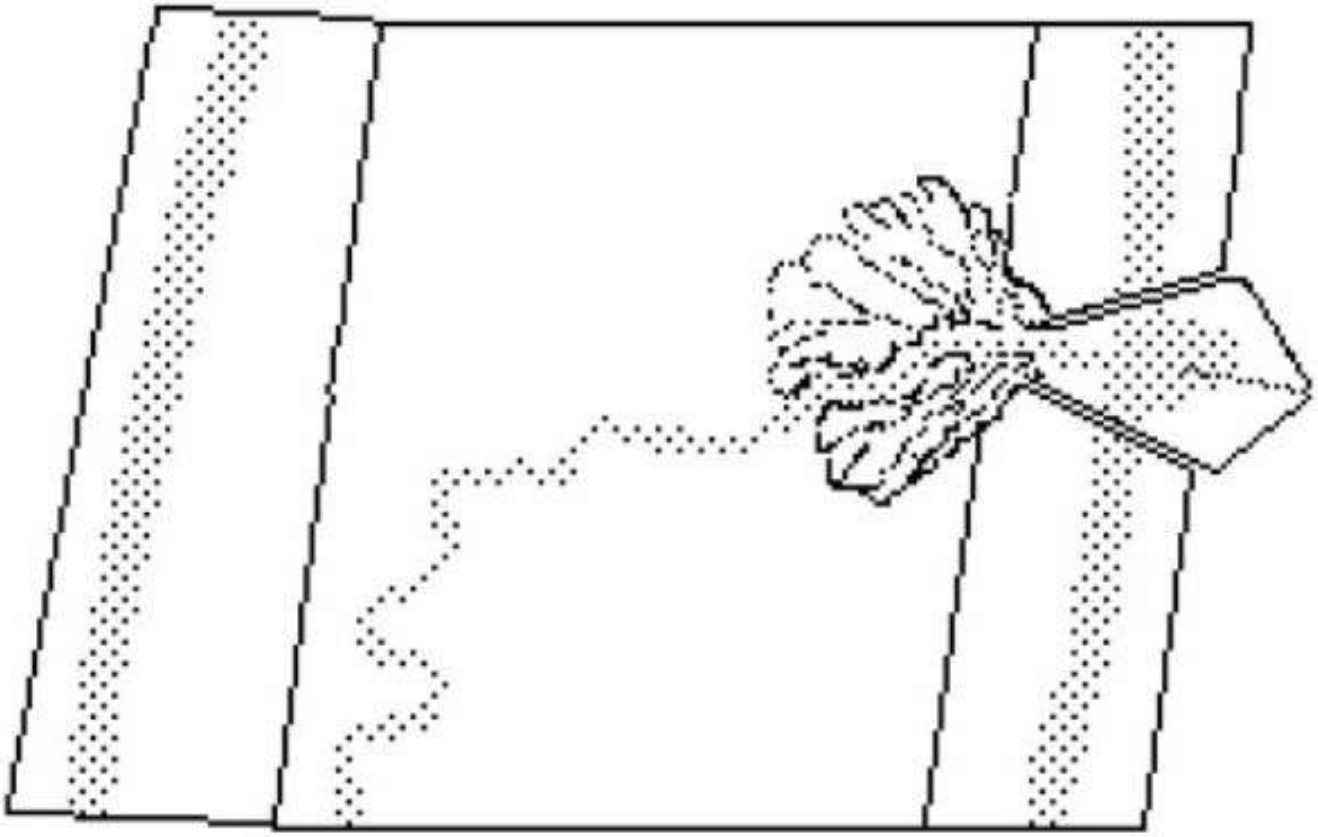
- Turn in notes after the experiments.

EXTENSIONS:

- Students can be asked to make inferences about other areas in the world that could have been formed in this same way.

Guide Sheet for Utah Faults

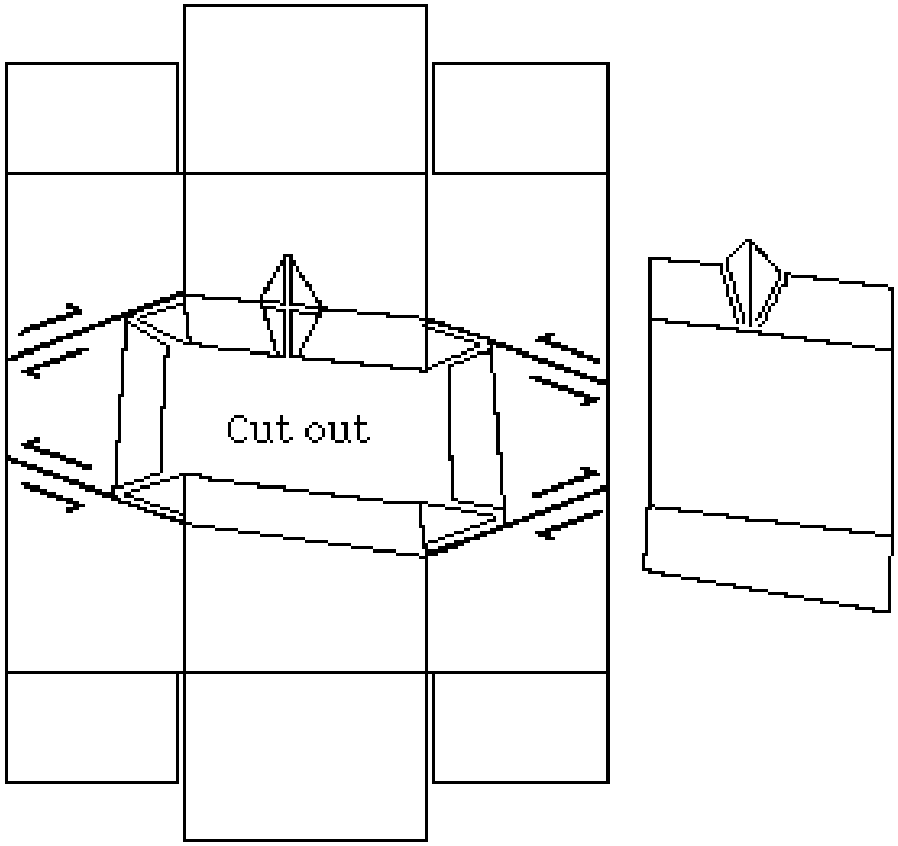
Guide Sheet for Utah Faults



Guide Sheet for Utah Faults

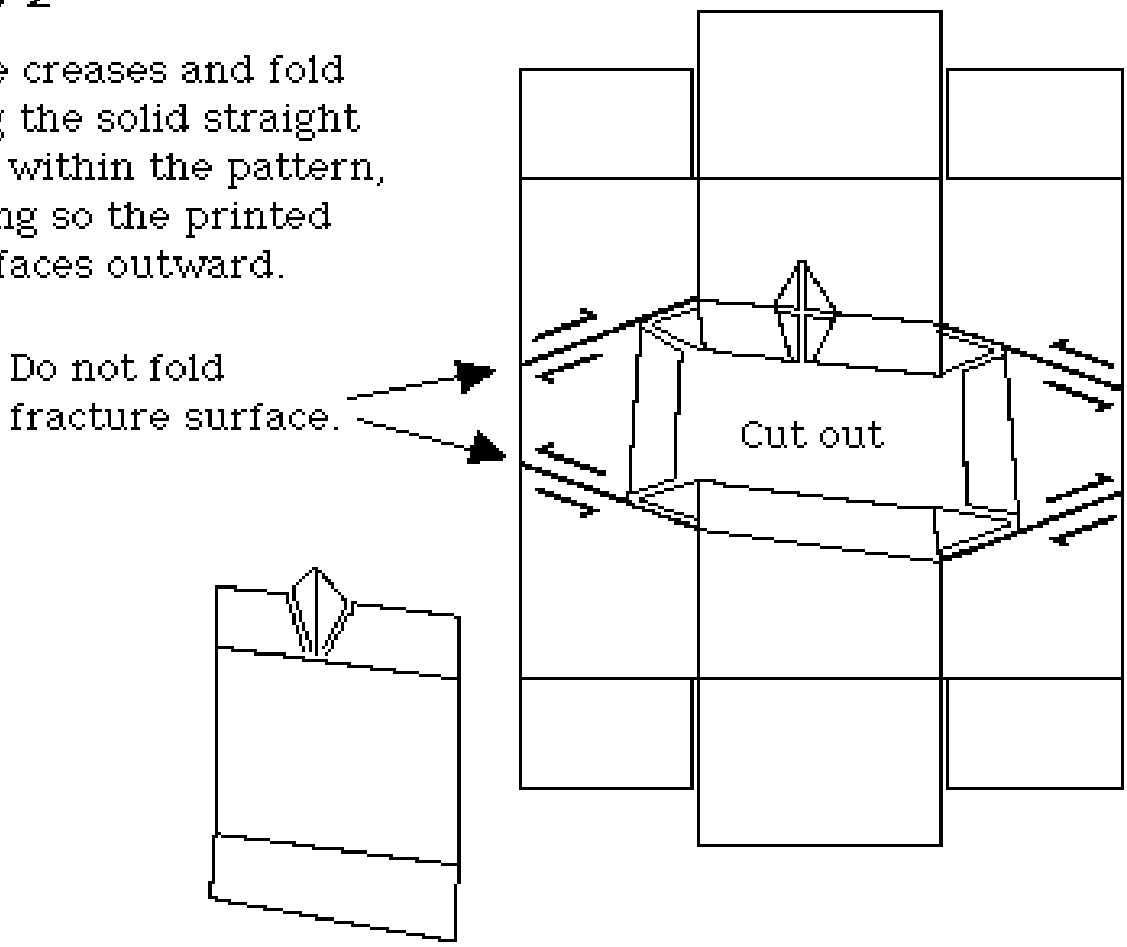
Step 1

Cut out the pattern of the paper model by cutting along its borders.



Step 2

Make creases and fold along the solid straight lines within the pattern, folding so the printed side faces outward.

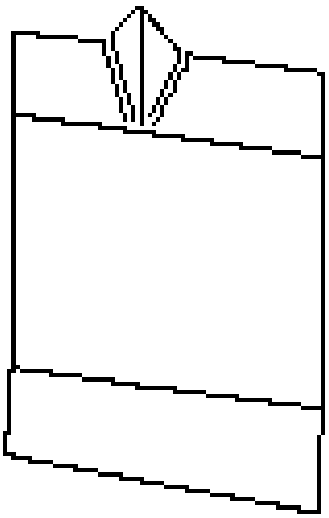


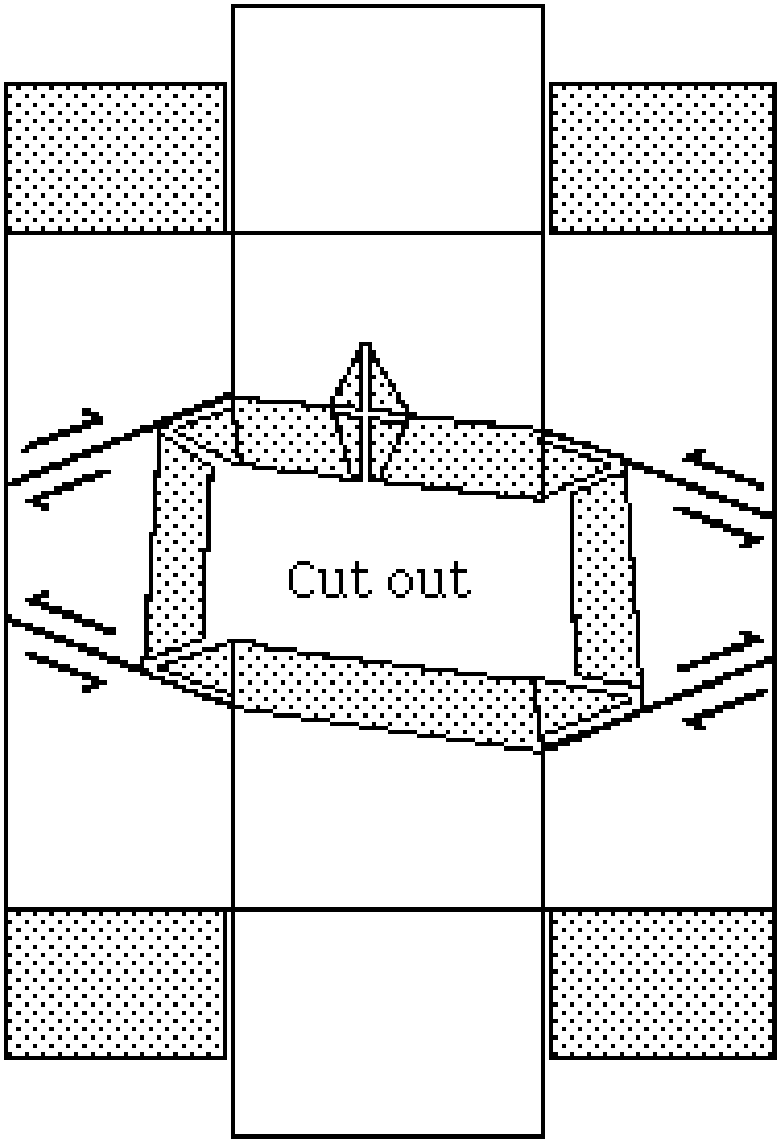
Guide Sheet for Utah Faults

Step 3

Glue the marked tabs.

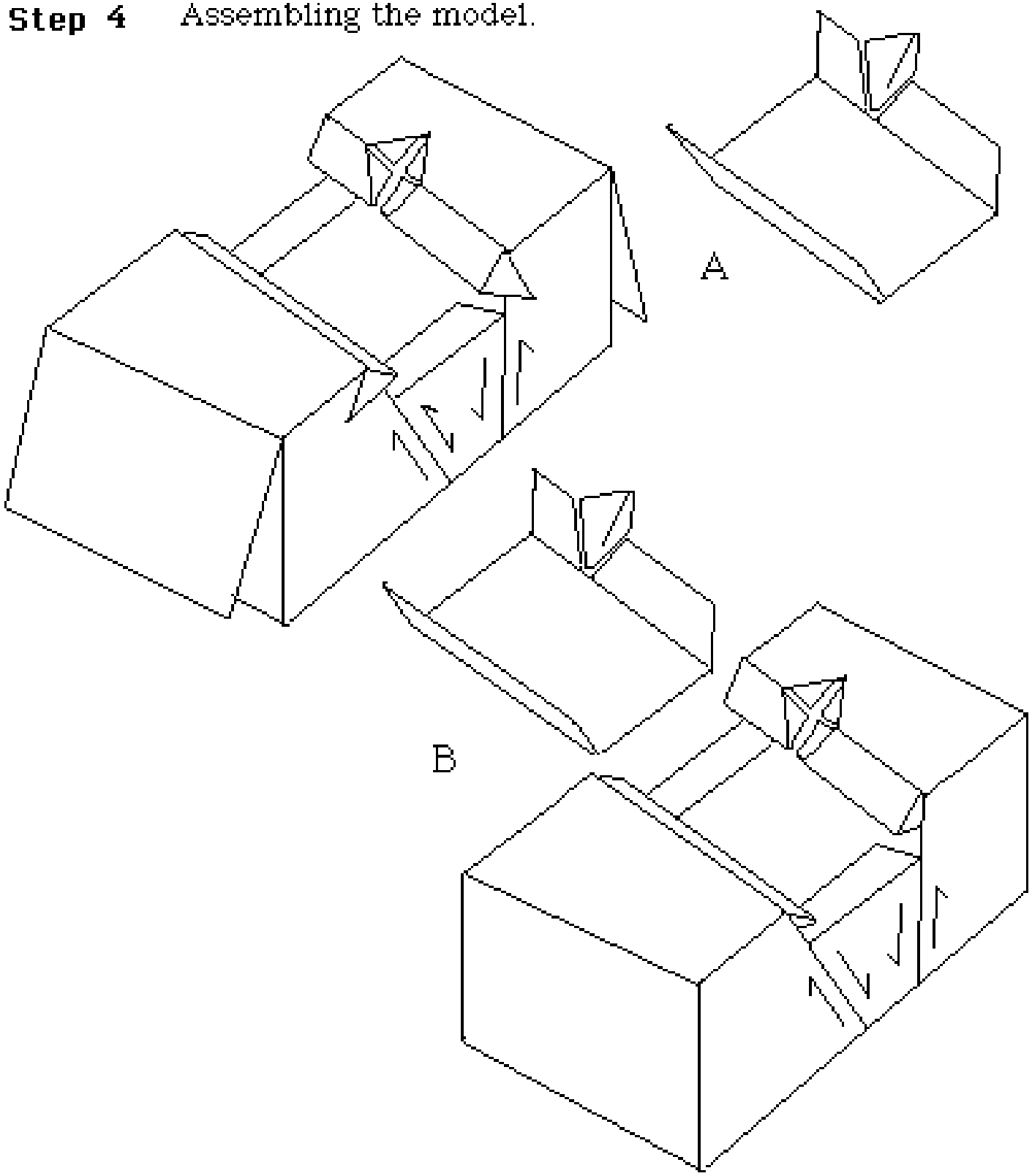
glue





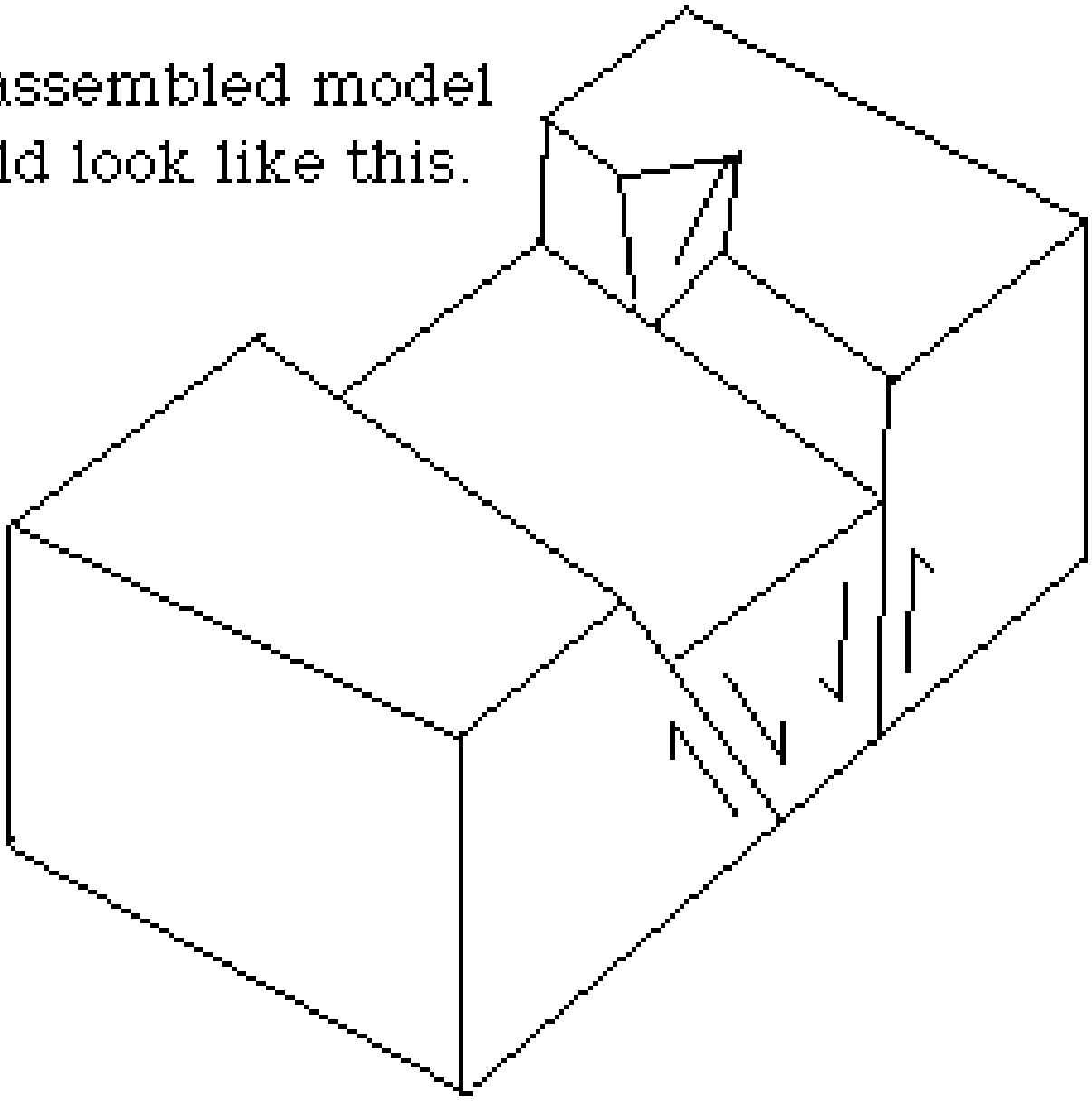
Guide Sheet for Utah Faults

Step 4 Assembling the model.

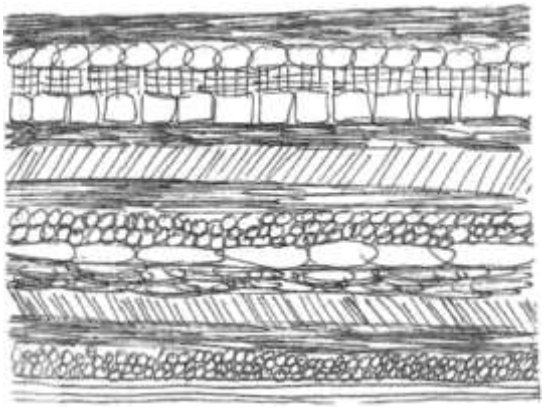


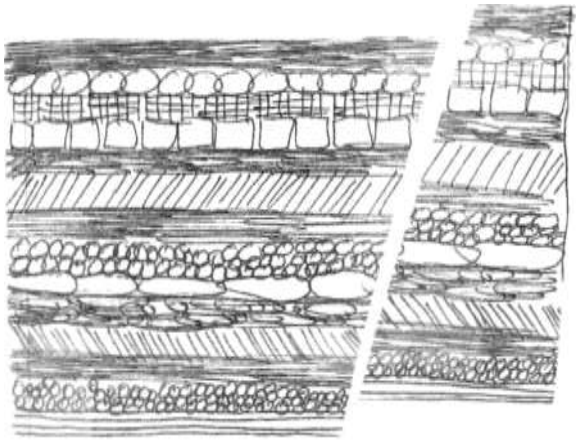
Step 5

The assembled model should look like this.

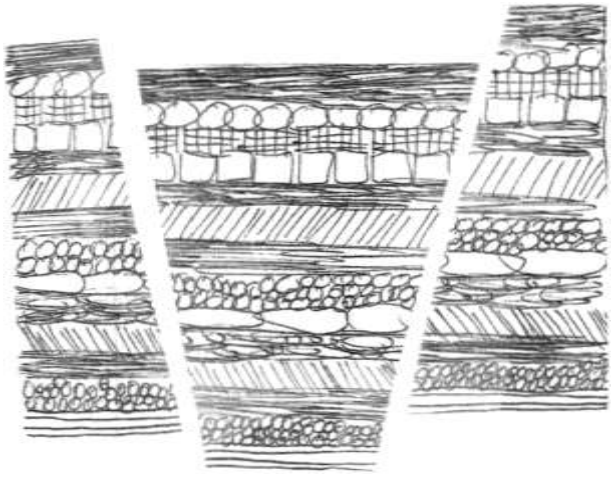


Guide Sheet for Utah Faults

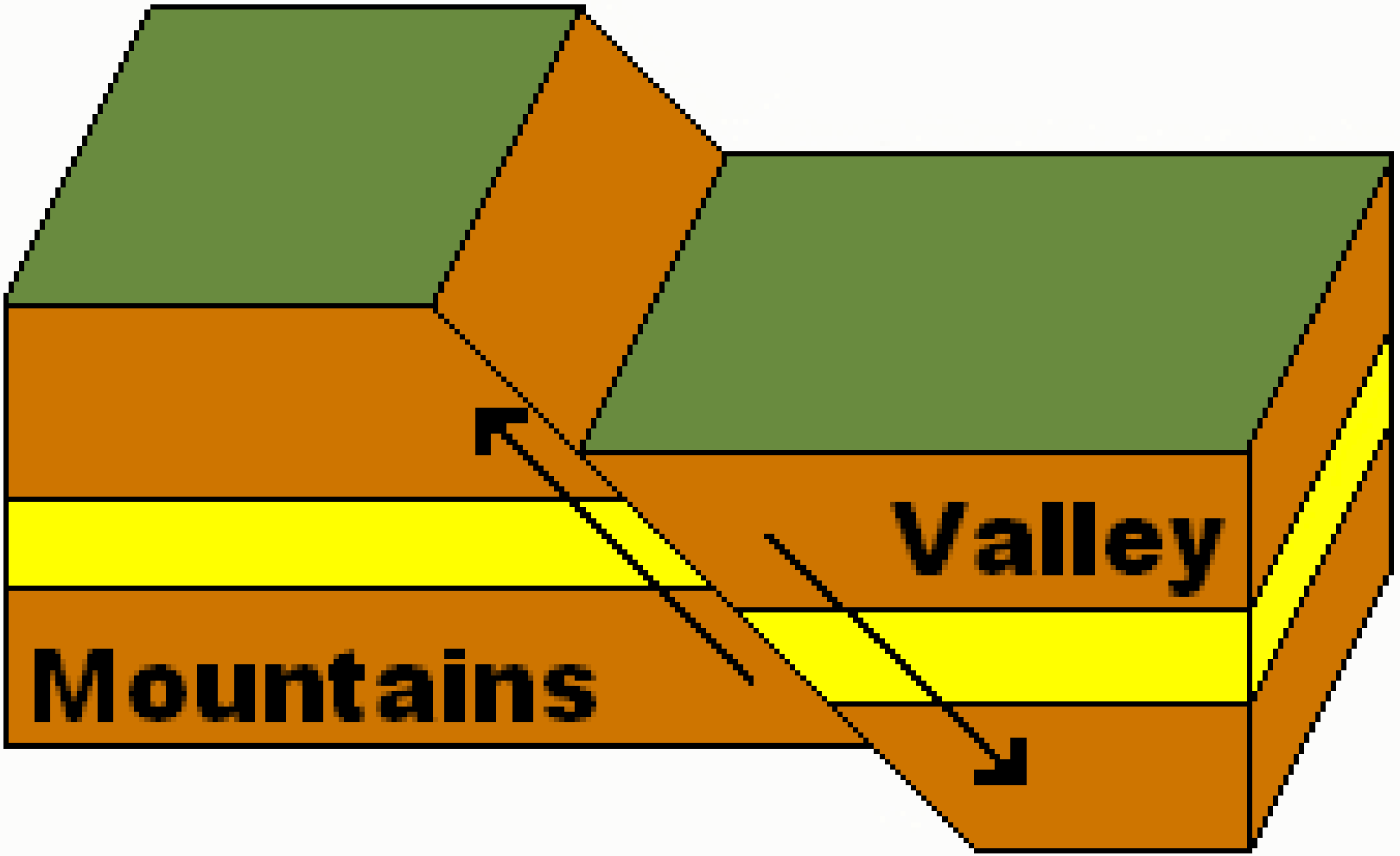


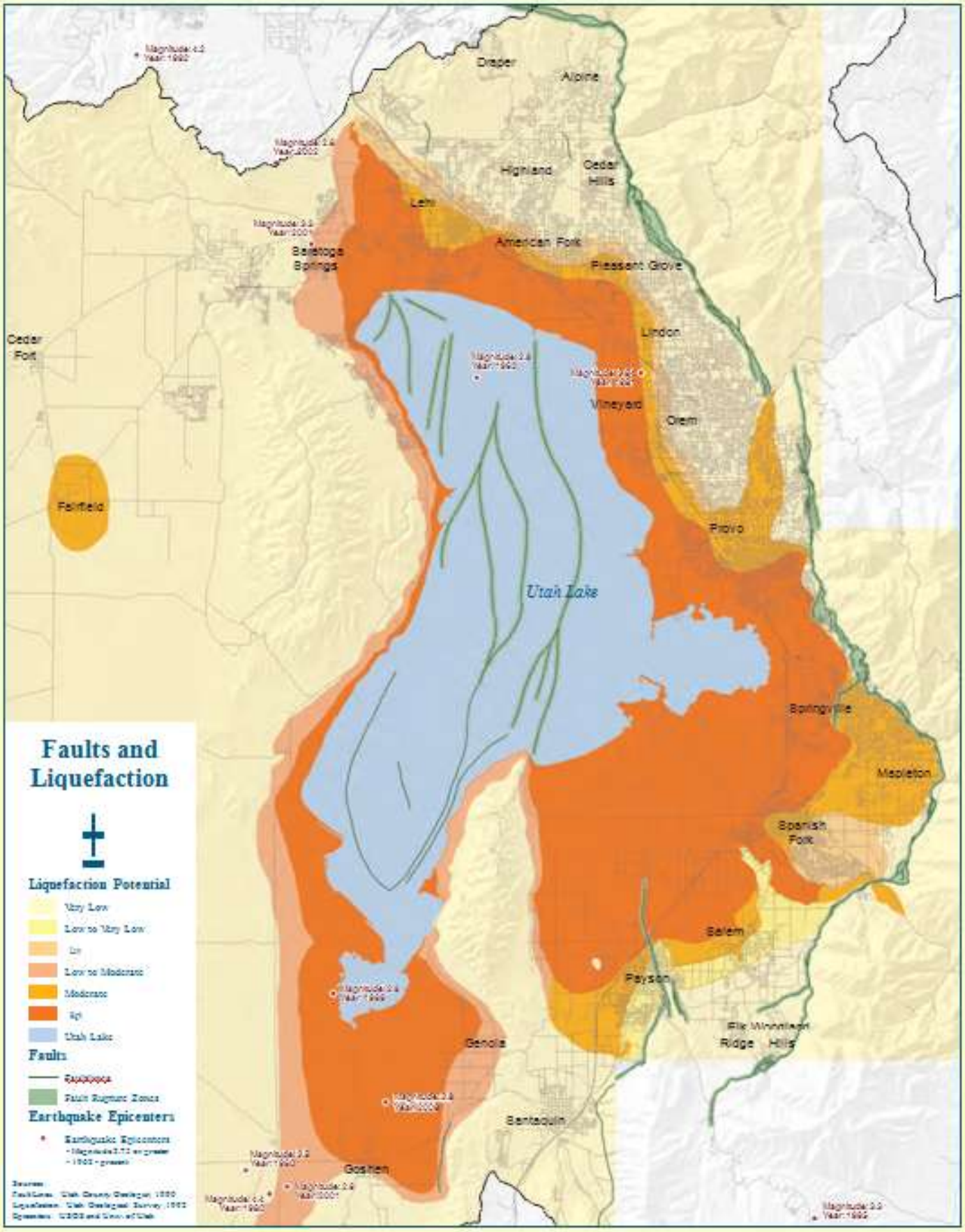


This will be taped or glued to students' journal or note taking paper.



Normal-Slip Fault




Draper
Alpine
Highland
Cedar Hills
Lehi
American Fork
Pleasant Grove
Lindon
Vineyard
Orem
Provo
Utah Lake
Springville
Mapleton
Spanish Fork
Salem
Payson
Genola
Elk Mountain Ridge Hills
Santaquin
Goshen
Fairfield
Cedar Fort
Faults and Liquefaction
Liquefaction Potential
Very Low
Low to Very Low
Low
Low to Moderate
Moderate
High
Utah Lake
Faults
Fault Rupture Zones
Earthquake Epicenters