Name _____ Class _____ Date _____

Skills Practice Lab

MATH/GRAPHING

Factors That Influence Ecosystems

Ecosystems are communities of plants, animals, and other organisms that live and interact with each other and with nonliving environmental factors. The nonliving factors, or conditions, include temperature, precipitation, altitude, and latitude, among others. These factors play an important role in determining what types of vegetation can live in an ecosystem.

Latitude, for example, has a strong influence on an area's temperature, resulting in climates such as polar, tropical, and temperate. These climates determine different natural biomes that have characteristic species of plants. However, a careful look at a map reveals that ecosystems existing at the same latitude often have different climates. Why? In this laboratory activity, you will hypothesize how other nonliving factors influence the characteristics of ecosystems within the same latitude range. Then you will analyze and graph data from different areas of the United States to test your hypotheses.

OBJECTIVES

Hypothesize how precipitation and altitude affect the types of vegetation in an ecosystem.

Graph and **analyze** ecosystem data to confirm or refute your hypotheses.

MATERIALS

- colored pencils
- metric ruler

Procedure

1. Form two hypotheses—one that relates differences in ecosystem vegetation to rainfall and another that relates differences in ecosystem vegetation to altitude. Complete the following sentences to form your two hypotheses.
   - Ecosystem distribution is related to precipitation; regions that receive large amounts of precipitation are wet and therefore _____.

     _____

     _____
   - Ecosystem distribution is related to altitude; regions at high elevations are cold and therefore _____.

     _____

     _____

Look at the data table. The table lists major U.S. cities and weather stations between 36° north and 41° north latitude. It also lists the altitude, average annual precipitation, and ecosystem for each location. On the graph/grid on the following page, use one of your colored pencils to plot altitude for each location using the left-hand *y*-axis. Connect the data points. Plot the precipitation data in another color, using the right-hand *y*-axis, and connect the points. You may also find it useful to label the location names on the grid above your data points. Your completed line graph will help you interpret any relation among rainfall, altitude, and biome type.

CHARACTERISTICS OF LOCATIONS ACROSS THE U.S.

	Distance from San Francisco (miles)	Altitude above sea level (feet)	Average rainfall (in./yr.)	Natural biome or ecosystem
San Francisco, CA	0	250	23	redwood forest
Sacramento, CA	100	26	19	grassland
Donner Pass, CA	200	7,000	69	coniferous forest
Reno, NV	250	4,400	8	cool desert
Salt Lake City, UT	650	4,200	16	cool desert
Loveland Pass, CO	900	11,000	38	coniferous forest
Denver, CO	950	5,325	12	short grass prairie
Topeka, KS	1,450	925	34	tall grass prairie
St. Louis, MO	1,750	567	37	broadleaf forest
Cincinnati, OH	2,100	488	40	broadleaf forest
Washington, D.C.	2,500	9	39	broadleaf forest

Analysis

1. **Identifying Patterns** Which types of ecosystems occur in areas of high and low precipitation?

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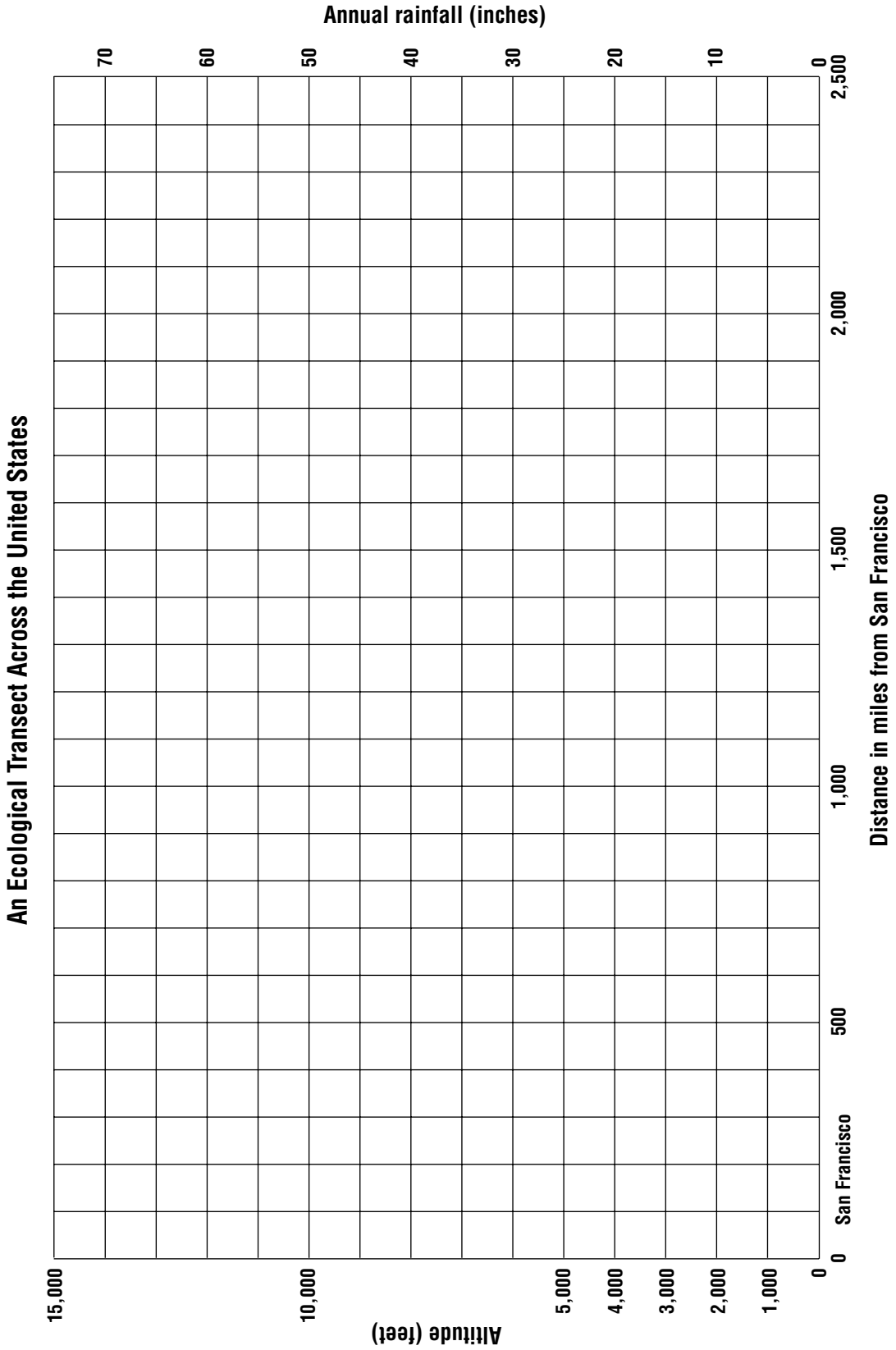
Factors That Influence Ecosystems *continued*



2. **Examining Data** Is there a trend in the amount of precipitation from Denver to San Francisco or from Denver to Washington, D.C.? If so, describe it.

3. **Analyzing Results** How do mountain ranges affect precipitation? Give an example that supports your answer.

Conclusions

4. **Evaluating Data** Which is the more important factor in determining an area's ecosystem, the amount of precipitation or altitude? Is there an interaction between these two factors? Explain.

5. **Defending Conclusions** Does the data support or refute your hypotheses about the effects of precipitation and altitude on an ecosystem type?

6. **Applying Conclusions** Refer to the world biome map in your textbook. Examine the ecosystem patterns of the Eurasian continent. What can you infer about the distribution of rainfall in Eurasia?