Name_____ Class_____ Date_____

INVESTIGATION 4.2

FACTORS THAT INFLUENCE ECOSYSTEMS

MATERIALS
- transect grid
- ruler

Ecosystems are collections of plant and animal communities living in a specific set of environmental conditions. These conditions play an important role in determining what plants can live there. Because animals depend directly and indirectly on plants to live, the existence of certain plants partly determines what animals can live there. The Earth's major ecosystems, such as deserts, tropical rain forests, and taiga, are called *biomes.*

In the previous activity you learned that latitude has a strong influence on an area's temperature, resulting in polar, tropical, and temperate climates. However, a careful look at a map reveals that ecosystems at the same latitude often have different climates. Why? This activity will point you toward the answer.

THINK AHEAD

1. What factors account for differences in ecosystems found at the same latitude? Suggest some possible environmental factors that vary across the United States from San Francisco to Washington, D.C.

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PROCEDURE

In this procedure you will test 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.

2. Ecosystem distribution is related to precipitation; regions that receive a lot of precipitation are wet and therefore

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3. Ecosystem distribution is related to altitude; regions at higher altitudes are cold and therefore

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Look at the data table on the next page. The table lists major cities and weather stations between the latitudes 36°N and 41°N. It also lists the altitude, average annual precipitation, and ecosystem in each location. Plot altitude on the transect grid provided on page 25, and connect the points. Use the *y*-axis on the left side for your altitude scale. Plot the precipitation data on the same grid, connecting the points and using the scale on the right. You may also find it useful to

label the location names. Your completed line graph will help you see any relationship between rainfall, altitude, and biome type.

Characteristics of Locations Across the U.S.

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

ANALYSIS

4. Is there a definite trend in precipitation levels from Denver to San Francisco or from Denver to Washington, D.C.? If so, describe it.

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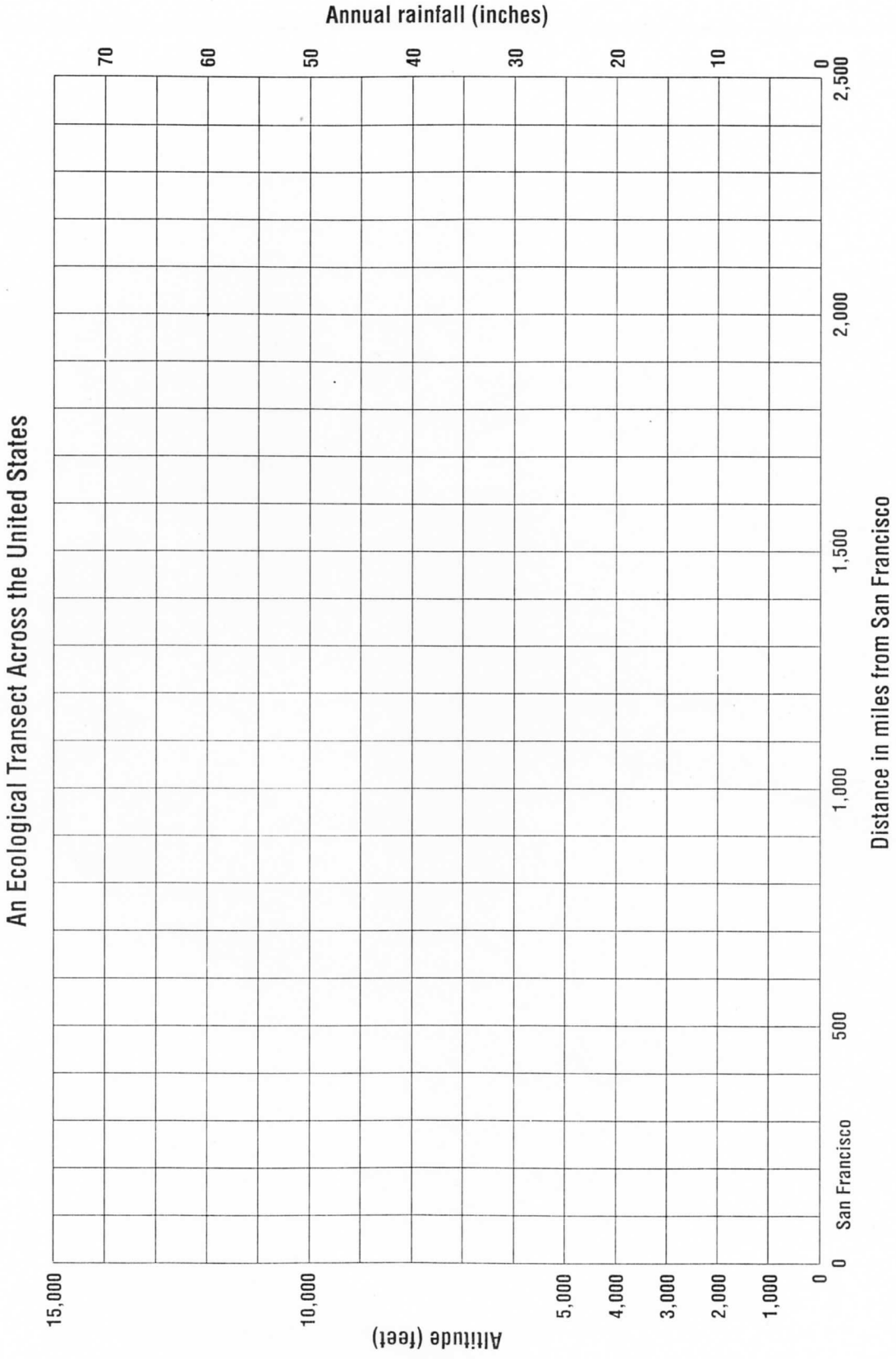
INVESTIGATION 4.2, CONTINUED



5. How do mountain ranges affect precipitation? Give an example that supports your answer.

6. What kinds of ecosystems occur in areas of high and low precipitation?

7. Is precipitation level or altitude the more important factor in determining an area's ecosystem? Is there an interaction between these two factors? Explain.

8. Does the data support or refute your hypotheses about the effect of precipitation and altitude on an ecosystem type?

9. Refer to the world biome map (Figure 4-1) on page 79 in your textbook, and examine the ecosystem patterns of the Eurasian continent. What do you infer about the distribution of rainfall in Eurasia?