We're Moving to Phoenix

Core Content
2.2 Life Science
Diversity and Adaptations of Organisms

The Challenge

Plants are found everywhere, but one does not find the same plants everywhere. Does this make sense? As one travels around the country one can see obvious changes in vegetation. It may also become apparent that there are also changes in climate and geology. What are the requirements for plants to do well where they are found?

Think about some common crops that man uses like wheat, corn and cotton. What about timber and other forest products? Are all these found in the same parts of our country?

Your good friend just told you that his family is moving to Phoenix, Arizona from Kentucky. Your friend knows you work a lot with plants and wants to know something about plants in Arizona. Your friend asks you for help.

Actually, you do not know enough to help him/her directly, so you need to do some research. You know that in Kentucky, one finds trees with large leaves and lots of corn, hay, and soybeans. You need to find out if the same is true of Phoenix, Arizona.

Preassessment

1. What kinds of plant structures are critical for growth and survival of plants?
2. What kinds of nutrients do plants require to grow?
3. How do plant structures relate to the ability of plants to adapt to different climates and soil types?
4. What kinds of differences might you expect to find between Kentucky and Tennessee?
5. Can you characterize Kentucky, Arizona, and Tennessee as consisting of one, two, or more ecosystems based on your findings?

Performance Tasks

Task 1
What can you find out about plant structure in general; kinds of roots, stems, leaves, etc. How diverse are these structures among plants?

Task 2
Use the web/books to identify some types of plants found in Kentucky but not in Arizona. Are any plants unique to one state and not the other? How abundant is each of the plants and do they grow in diverse or sparse assemblages? How many different kinds of plants did you find?

Task 3
Research the amount of rainfall each state receives, general weather conditions (climate) over the seasons, and similarities and differences of said types. Summarize your findings and identify what an ecosystem is.

Task 4
Will soil type affect plant growth?

Lab exercise
Obtain some grass seed and two plant flats (1 ft / 2 ft / 3 in deep). Put about 3 inches of back-yard soil in one and sand in the other. Sow each liberally with the seed. Scratch the surface and pat down the seed. Water each until wet, and every 3-4 days there after. Prepare a table where you can record day of sprouting and measurements of gross heights (measure a clump of 10 or so in two places in the flat, and use the average) every 3 days. In two weeks stop the experiment and plot growth curves of the two populations and compare them. What conclusions can you draw relative to the question asked? Was soil type a factor? How might this be related to Kentucky compared to Arizona soil types versus the plants that grow there? Instead of using two soil types, what if you compared the amount of water you used, or if you fertilized one flat and not the other? Would other kinds of plants have responded differently?

Task 5
Develop an experiment design in which you are going to compare the effect of density of the seeds sown in the flats. What will your question be? What do you predict will happen?

Task 6
Based on what you learned, make a comparison of Kentucky and Arizona growing conditions in which you identify for each the soil type, water regime, specific kinds of characteristic plants, seed densities, etc., that will explain the differences in vegetation for the two states? How will you explain to your friend what s/he should expect to see (vegetation) after arriving in Phoenix? Write a summary of what your friend can expect to find in Arizona so that s/he will not be surprised when s/he arrives.

OER

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Given the map above (showing information about climate, geology, etc.) compare and contrast how you might expect the vegetation in _____ to be compared to the vegetation in _____.