



Central Arizona-Phoenix Long-Term Ecological Research Project

Title: Ecology Explorers: Land Use Change Predictions

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Time: 40-50 minutes

Grade Level: 5-12

Background:

This activity will encourage your students to think about the process of the changing urban landscape and what is in store for the future of Maricopa County. Aerial photographs are one way to look at change over time. Scientists from the Central Arizona –Phoenix Long-Term Ecological Research (CAP LTER) project at the Center for Environmental Studies (CES) at Arizona State University (ASU) are using aerial photographs to research land use change. In the metropolitan Phoenix area, much of the urban growth has taken place in the past 50 years, so it is possible to find photographs from the same location and see dramatic changes. The aerial photographs used for this activity were used by CAP LTER researchers as part of their analysis. The photos obtained for 1970, 1980, and 1990 are from Landiscor Phoenix Photo Atlases. The 2000 aerial photos were obtained from Kenney Aerials. The 1970, 1980, and 1990 photos were scanned and georeferenced by ASU students. The 2000 photos were provided in digital format. Land use was then digitized from the photos using ESRI's ArcGIS software.

Objective(s):

Students will be able to:

1. Classify land use into land use categories based on aerial photographs
2. Make predictions about land use change
3. Analyze land use change over time using historic aerial photographs

AZ Social Science Standards:

Essentials (4-8)

1SS-E1. Understand and apply basic tools of historical research, including chronology and how to collect, interpret, and employ information from historical materials.

3SS-E2. Describe the impact of interactions between people and the natural environment on the development of places and regions in Arizona, including how people have adapted to and modified the environment....

3SS-E4. Demonstrate understanding of the characteristics, purposes, and use of geographic tools to locate and analyze information about people, places and environments....

3SS-E6. Describe the economic, political, cultural, and social processes that interact to shape patterns of human populations, interdependence, and cooperation and conflict....

3SS-E7. Explain the effects of interactions between human and natural systems, including the changes in meaning, use, and distribution of natural resources....

3SS-E8. Use geographic knowledge, skills, and perspectives to explain past, present, and future issues...

Proficiency (Grades 9 – 12)

1SS-P1. Apply chronological and spatial thinking to understand the meaning, implications, and importance of historical and current events.

1SS-P3. Develop historical interpretations in terms of the complexity of cause and effect and in the context in which ideas and past events unfold.

1SS-P12. Analyze the development of the American West and specifically Arizona, with emphasis on:

PO 2. the development of resources and the resulting population and economic patterns, including mining, ranching, and agriculture.

3SS-P1. Acquire, process, and analyze geographic information about people, places, and environments by constructing, interpreting, and using geographic tools...

Advance Preparation:

- Try using the prediction activity and worksheet yourself before having the students use it.
- Before beginning this activity, students should have completed the flowing activities from the Land Use Main Menu:
 - Land Use Changes 1912 – 1995
 - Aerial Photography

Materials:

- Computer(s) (students could work in teams or individually) with internet access
- 2 Handouts for each student
 - Land Use Predictions
 - Land Use Categories
- Aerial photograph of your area on an overhead. There is an aerial photo attached to this lesson if you do not have one of your area.

Safety Precautions:

None

Suggested Procedure:

1. Discuss with students the changes they saw in land use based on the "Land Use Changes in Maricopa County from 1912- 1995." What patterns did they notice? Record these observations on the board.

2. Hand out the Land Use Categories to each group of students. Review the various categories. If possible, review using an aerial photograph in the classroom, on an overhead, or as a power point slide. One is attached to this lesson



3. Explain to students that during the “Land Use Changes in Maricopa County from 1912 – 1995” they were looking at the entire County. They are now going to look closely at one or more location(s) in Maricopa County. The “Land Use Predictions” handout will guide them through the activity.

4. The handout for the Land Use Prediction Activity is intended to guide students through the activity, focusing on making predictions rather than randomly guessing. It is recommended to go through the first example as a class.

Step-by Step directions for the student handout:

1. Write a **description** of the site in **1970**
2. Fill in the **land use chart** using the **grid** feature
 - a. Count the number of squares covered for each category.
 - b. Decide as a class to use fractions or round to whole numbers to determine coverage.
3. Make a prediction for the area in the **Predict** area of the **Descriptions and Predictions** chart and on the **Land Use Chart**.
4. Go through the activity until the area is completed, then use the **grid feature once** to quantify the changes.
5. Fill in the **Reflect** area of the Descriptions and Predictions. How did the changes compare to your predictions?
6. Follow the same process for the remaining three areas.

5. Once the students have completed their handout, facilitate a discussion about the past, present and future trends of Maricopa County. Discuss differences among the various intersections. Are there differences in land-use changes in areas that were once agriculture vs. open space? How have the changes affected the lifestyles of people living in these areas?

Evaluation:

Students complete the handout and display the ability to classify different land use into categories and identify and analyze land use change.

Student’s predictions and participation in class discussion show evidence of using knowledge of aerial photography and land use change in Maricopa County to make predictions.

Extension:

- o Estimate the percentage of land-use types for each intersection
- o Study local historical documents to understand changes in land use
- o Interview long-time residents or a local historian about these changes
- o Identify social and political impacts of these changes on the community and the environment

References:

Barnaba, E., M. Krasny, L. Kasperek, S. Hoskins, J. Hope. 2000. Explorations from an aerial perspective. Cornell University



