Land Use Over Time

OVERVIEW & OBJECTIVES

In this lesson students will investigate the application of land use models. They will evaluate different land uses over time using a particular plot of land. Students will examine topographic maps and aerial photos using old maps provided from their local library or accessed from online. Students will compare the old maps with recent data using www.mapmart.com; this site contains topographic maps, aerial photos, and digital 3D images for their particular location. They will assess land use patterns and compare and contrast the old maps' land use patterns with the new land use patterns. Students will also identify toponym changes, road construction, suburban development, etc.

Students will be able to...

- Evaluate the major land use patterns over time by using maps that are at least 50 years old and comparing them to present day land use maps.
- Analyze the land use patterns using the four land use decision-making models

GRADES

9th – 12th

TIME

4 Days

REQUIRED MATERIALS

- ✓ A set of old topographic maps, aerial photos, or plot maps from a particular location that are at least 50 years old or show the land a minimum of 50 years ago.
- ✓ Computer with projector
- ✓ Computer access for students
- ✓ Blank sheets of paper for each student
- ✓ Colored pencils

MINNESOTA SOCIAL STUDIES STANDARDS & BENCHMARKS

Standard 1. People use geographic representations and geospatial technologies to acquire, process and report information within a spatial context.
9.3.1.1.2 Apply geographic information from a variety of print and electronic sources to interpret the past and present and plan for the future; provide rationale for using specific technologies for each application.

For example: Technologies—aerial photographs, satellite-produced imagery, and geographic information systems (GIS). Applications—determine obstacles that needed to be overcome in building the Suez and Panama Canals; gauge the extent of water pollution in a harbor complex in South Africa.

Standard 4. People construct regions to identify, organize and interpret areas of the earth's surface, which simplifies the earth's complexity.
9.3.2.4.1 Apply geographic models to explain the location of economic activities and land use patterns in the United States and the world.

SUGGESTED PROCEDURE

Day 1
The students will each have a blank sheet of paper. Students will be given the assignment that they won the lottery and, as a result, received one square mile of land. They can build anything that they want on the land and use it in any fashion that they would like. They can leave it alone if they wish, but must draw what it is like in the absence of any development if they chose to go that route.

Students will be presented with the following notes on the four major land use decision-making models:

1. *Economic* – This land use model suggests immediately using the resources for human benefit. The model establishes development as a core principle and uses the theme of financial value of the land in any decision regarding use of the land.

2. *Sustainability* – This land use model suggests using the resources, but saving some resources for future use. The model uses alternative energy sources due to the timeline of diminishing returns on fossil fuels. The core principle is use, but do not abuse.

3. *Environmental* – This land use model suggests using the land, but keeping the land in its natural state. The land could be modified, in part, but kept in its natural condition. A park would be the ideal example of an environmental land use.

4. *Preservationist* – This land use model suggests that humans leave the land untouched. This model borders on devotion to the land. The core principle is that the land is not spoiled by human activity; people celebrate the pristine landscape.

After students discuss the four land use decision-making models, they will write a paragraph on the backside of their drawings explaining which land use model they used and where the model was used in their drawing. Some students may have used more than one model. If they did, they need to describe where each one was applied.

Days 2-3

Students are handed the older maps from a particular location. (The maps that I gave my students were 1950's topographic maps of the state of Tennessee. These maps were an invaluable resource. The maps were old enough to show a distinction in land use over time. However, maps of your community or area would be ideal and allow for authentic activities as identified in the extensions to this lesson.) Each student should have their own map or students can work in groups depending upon the number of maps available. Students should notice several features on the map, which could include:

1. Major roadways
2. Major drainage patterns if using a topographic map
3. Major urban areas or towns
4. Major environmental projects (i.e., dams, spillways, golf courses, mining pits, etc.)
5. Toponyms – have any place names changed in the time span between the two maps? Are there any names that are derogatory of a specific group?
6. Contour Intervals – how hilly, flat or mountainous is the terrain on your map?
7. Natural Features (i.e., mountains, valleys, etc.)
8. What land use models are evident on the map and where are they located? (i.e., parks, wildlife refuges, forest clearings, development, etc.)

(The teacher may need to review features and symbols of topographic maps.)

Students should use the older maps and compare them to the one located on Map Mart located at: http://www.mapmart.com/. Students should find their area on the site and evaluate the old map with the new one. Students should follow the steps to get the correct location on the site:

1. Type in http://www.mapmart.com/
2. Select the icon that reads "Topographic Maps."
3. Select "Digital Scanned Topographic Maps" and "1:24,000" and click to begin.
4. A map of the United States will appear. Click on the area that you would like to study. Continue to click on the area to enhance the image. Students will have the choice to view it in the topographic format, satellite format or a DEM format, which is a three dimensional representation of the area.

5. Once they have found their area down to the topographic level, students should begin to evaluate the new map for the same criteria that they evaluated the old map.
6. Students must then compare and contrast the two maps to notice changes in the environment.
7. Students should answer any or all of the following questions:

a. Have any new roads been built since the last map?
b. Have any of the urban areas expanded and how far?
c. Where has development taken place on the map?
d. Are there any changes to the watersheds?
e. Have any of the toponyms changed on your map?
f. What is the population of your topographic area? Students can use demographic data provided on http://www.mapmart.com/or they can go to the Fact Finder site to find more in depth demographic data at: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml
g. What is the average income for your topographic area?

By doing this activity, students are gaining research skills as well as fundamental basics of using GIS and GPS data. Both of these skills are fundamental in the new geography standards.

Students will gather information to prepare for their presentation and Land Use Planner report. Students can use any of the following resources:

1. http://www.mapmart.com/ – This site gives a detailed description at the 1:24,000 level.
2. http://www.usgs.gov/ – This is the official site of the United States Geological Service.
3. http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml – This is an incredible site detailing the demographic characteristics down to the block level of any place in the U.S. Students use it to find demographic data.
4. http://www.imagepeaksystems.com/ – This site gives the same information and maps as the Mapmart site, but is a little more complicated to use. Users must go to the Gecko Software section and start. Users can find great detail on places in the United States.
5. http://www.terraserver.com/ – This site run by Microsoft gives aerial photos of locations around the U.S. Most areas in the U.S. are covered, but some photos are from 1991 and are outdated.

Day 4

Students will now present their finding to the class. Students will present two major items on their maps and how the items have changed in the past 50 years. It may be that a new interstate was created or names have changed. Mining areas may have been replaced or started. Urban development may have taken over farmland. Anything along these lines can and should be used by the students in their presentations. Students will have the flexibility to create their own presentations. Students should be creative in how they introduce their areas.

Students will take the role of Land Use Planner for their specific area and complete a report on it. Students will make suggestions on what they think the next 50 years should look like in their area by answering questions: Where should additional development be concentrated? How are the land uses changing during their lifetime? Students need to explain the land use decision-making model that is being considered in the area's future development. Students will need to clearly explain where each one of these models may be exhibited on their maps and explain whether it should stay that way. They must persuasively support any recommendations that they have.

Extensions

1. Community professionals could come to class and give feedback on students' land use sites if the topographic maps that were used were of their own community

2. If possible, the land use plans could be sent to the city council for further debate and discussion. Students could present their findings at a city council meeting or at an environmental focus meeting.

Students could also meet with city planners and discuss the city's vision for land-use planning in the next 50 years.

3. Students could go on a field trip to a wildlife refuge, suburban development or timberland area. The experience would show three main land use decision-making models.

4. Invite guest speakers to address the class, representing the land use models. One could be a park ranger, one could be a forester, and one could be a housing developer.

5. Students find examples of the decision-making models within their own community.

6. Students read a book on the forest industry to understand how the land use decision-making model is demonstrated.

7. Students collect data on wildlife areas or fishing stocks in Minnesota to evaluate the land use model.

8. Students map their areas and determine land use patterns in a particular location selected by the teacher.

Note: We did not do any of the extensions because we focused on the Tennessee region with the 1950's topographic maps. These maps are treasures that should be stored away in a golden box. The 1950's in Tennessee were a turbulent time. Many of the place names were racist (Niggerbone Hill, etc.) and the Tennessee Valley Authority had completed most of the dams in the region changing the physical environment for decades to come. The differences between the western section of Tennessee, which is primarily farmland and the eastern section of Tennessee, which is primarily mountainous and used for either mining or given environmental status provides a stark contrast concerning land use. It was the perfect state for this assignment. It gave the students enough variety in landscape features to make it different and not have 20 presentations on the same type of land use.

Assessment

- Land use area map with paragraph explanation
- Presentation
- Land Use Planner Report

Website Resources

Map Mart
http://www.mapmart.com/

Fact Finder at United States' Census Bureau
http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

U.S. Geological Survey
http://www.usgs.gov/

Chart Tiff
http://www.imagepeaksystems.com/

Terra Server
http://www.terraserver.com/