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EXAMPLES OF LESSONS AND IMPLEMENTATION PLANS

As part of the on-line course, NRES 780 - Land Use Education and Resources for Teachers, students are required to write both a lesson and an implementation plan (for more detail go to the course website and look in the syllabus at www.uwsp.edu/cnr/wcee/nres780). Even though this guide is based on Wisconsin Model Academic Standards, the on-line course is open to educators locally, nationally, and globally. The following examples were written by educators from across the nation and can provide examples of how the CLUSTER concepts and guide are applicable nationally. These examples were included to provide educators a framework and ideas for developing lessons for their individual communities and classrooms. Some of these lessons are in-depth and others are simple. The lessons cover numerous subjects and grade levels.

LAND USE LESSON
LAND USE EDUCATION AND RESOURCES FOR TEACHERS
ALLISON PLUTE
NRES 780 SECTION 88

Activity Name
Don't Use it All Up!

Nutshell (3-5 sentences that explains activity)
By using sponges and water, students discover that humans consume many resources.

CLUSTER Concepts addressed
Land 2.1 Land supplies humans with most of the things they need for life.
Land 2.2 Land is a finite natural resource that exists in diverse forms and can have multiple users.
Land 2.3 People's decisions and corresponding actions affect the way the landscape changes over time.

Model Academic Standards EE + one other standard (ex. Soc. Studies)
Social Studies A.4.4, A.4.8, A.8.8.
Environmental Education A.4.3, A.4.4, B.4.B, B.4.10

Objectives
Students will be able to:
1. Describe at least two natural resources that they consume.
2. Explain what happened in the demonstrations with the sponges and water, and how that represents how humans consume natural resources.
3. Give real life examples of how human population growth affects natural resources.
4. Explain one way to conserve natural resources and why conservation is important.

Materials
Large container with wide mouth opening
Four sponges cut into eight pieces
Water
Bowl
Marker or masking tape
Paper towels
Drawing paper and materials

Subject areas, Grade Levels, and Duration of Activity
Grades K-12 (primary levels may only accomplish objectives #1 and #2.)
Subjects: Social Studies, Science, and Environmental Education
Skills: discussing, drawing, identifying, observing, problem solving, taking responsibility.
Duration: 40-60 minutes, plus extensions

Background Information

The earth's population is likely to exceed six billion people, and predictions to double to 11 billion by the year 2050, the strain being placed on natural resources is now greater than ever.

The more people in a given area, the more quickly natural resources can be used up. The solution, aside from population control, is conservation and careful use of available natural resources. Conservation practices include reducing the amount of natural resources consumed. Recycling, reusing, and rethinking (substituting plentiful materials for more scarce ones, and finding alternative energy sources that are renewable) are all ways to reduce the consumption of natural resources. Additionally, consumers can refuse to buy products that are not recyclable or biodegradable, or that are considered over-packaged.

People need and use water daily in many ways, and often in unrealized amounts. Water is used directly for drinking (1/2 gallon per day), cooking (5-10 gallons per day), bathing (25-35 gallons per day), toilet flushing (21-40 gallons per day), etc. We also use water in many indirect ways such as in the production of manufactures items and food, preparation of food, cooling and heating, etc.

There is an abundance of water on this earth. Unfortunately, nearly all of that water, more than 97%, is salt water and is neither neither neither neither neither neither easily nor economically available for our consumption. Of the fresh water supply (about 3% of the total amount of water on earth) most is held as non-consumable in glaciers and icecaps. Less than one percent of the water on Earth is fresh water and is in the form of ground water, lakes and streams. A dilemma is created when a limited resource, such as fresh water, has many demands for its use.

Colorado Springs has a limited water supply. In fact, some of our water has been transported to the area from up to 200 miles away in mountain reservoirs. The problem is getting worse because the city's population is growing, more houses are being built and more lawns get planted that use a lot of water. The state of Colorado has already lost 50% of its original wetlands, and this has a huge effect on wildlife, especially waterfowl, migratory birds, amphibians, beaver, and other animals.

Fountain Creek's water starts from snowmelt on the top of Pikes Peak. As this water moves down the mountain, it collects and gathers into streams and creeks. It carves its way down, creating erosion and gathering bits of debris along the way. Some of the things that get caught in the water include soil, rocks, garbage, motor oil, soap from the carwash, paint, and other chemicals.

The wetlands at Fountain Creek Regional Park help to clean up the water. The cattails catch large particles and trash. Bacteria in the soil help to dissolve chemicals and break down decomposing material. The ponds are spring-fed which allows clean, fresh water to enter the system. These wetlands are important resting grounds for migratory birds, nurseries for adults to raise their young, and recreational sites for humans to enjoy.

Procedure

1. Introduction - how to begin the activity, attention-getter

Show the students a globe, and ask students how much fresh water we have available. After several guesses, let them know the answer (3%). Name some ways that humans use water. Write these on the board. Today they will learn what affect humans have on water and other natural resources.

2. Steps

I. Put about four cups of water into the container. Ask the students to pretend that the container represents the earth and the water represents all the available water.

II. With a marker or masking tape, mark the water level on the outside of the container. Drop a piece of sponge into the container as you share one personal demand you made on water today. Remove the wet sponge from the container and have students examine the water level. It probably shows very little change.

III. Ask students one at a time, to name a personal demand they made on water today while dropping a sponge in the container. The students may begin to notice a change in the water level. After all the sponges have been dropped in the water, soaking up as much water as possible, remove all of them (don't squeeze them out) and set them aside in a bowl. Draw attention to the dramatic change in the water level. Help students understand that the demands of a lot of people have more effect than the demands of a few people on natural resources.
-What happens to the water level as we put in more sponges?
-What will happen if we keep using water at this rate?
-What can we do about this situation?
-How can we give water back to our environment?

IV. Once the students have mentioned reducing, reusing, or recycling take one wet sponge, naming a way you can reduce or recycle, and squeeze the water out of the sponge back into the container. There is a change in the water level, but not much. One person recycling or reducing does make a difference. The impact, however, will be greater when many individuals reduce, reuse, and recycle. Ask:-In what ways can you reduce, reuse, recycle, or be more careful about the demands you make on water (or on other natural resources such as land, trees, air, etc.)?When students have an idea about how they can give back to the environment, have them squeeze the water out of a wet sponge back into the water sharing their idea with the class. The water level will go up. It won't go back to the original mark, however. Ask:-Why doesn't the water level return to the original mark even after all the sponges are squeezed out? (Even by recycling resources, some of them will be used up)
-Why is it important to you to reduce, reuse, and recycle and/or make careful decisions about water or other natural resources? -Can the water in this activity represent other resources that people use? What are some resources that cannot be recycled? How can they be conserved?

3. Conclusion - how to end the activity, assessments, quiz, discussion
   I. What have you learned from this demonstration? (Answers will vary, but should reflect an appreciation for the limits of natural resources, ability for some to be renewed, and knowledge that it is possible to use natural resources wisely).
   II. Assessment: have students write a statement or paragraph or draw a picture about one or more ways they personally can recycle, reduce, and or reuse any natural resources.
   III. Extensions:
   -Start a class recycling project. Challenge another class to see who can recycle the most in a given period of time.
   -Have students brainstorm different ways to use land and write these on the board. Instruct children to draw a map or make a model using at least 3 different land uses. Share their models and why they chose to use the land in the ways they chose. Would they like to live on their piece of land? What other living and non-living things exist on their land?

Land Use Activity
By
Jim Favreau

Activity Name:Groundwater & Land Use

Nutshell: This activity is a combination and modification of three activities that I came across during a workshop put on by the Wisconsin Department of Natural Resources back in 1991 (Original Publication: IE-004(90) Rev).

The combination of activities is directed to help students understand how groundwater moves, and how the activities of humans (thru various land uses), effects the quality and quantity of groundwater.

I give each student a poster(WR-104-91) that not only shows a variety of processes of the Water Cycle, but also a wide variety of land uses from agricultural, urban development (sprawl) and even mining (all activities that can be found in Southwest Wisconsin. By completing one of the three different activities, students will realize why it is often difficult to determine the source of groundwater contamination.

Concept: To have students understand how human activities can allow contaminants enter and move with groundwater. This activity will also allow students to evaluate a hypothetical land use (landfill, home construction, mall development, etc.) site based on the direction of groundwater flow.

DPI Objectives: SC: A1-A3; B-#, D1
EH: A3; B3; B4: C1; C4
SS: A1; B3; D3

Materials:
- Groundwater Poster (WR 104 91)
- Plume of Contamination Activity Sheet
- Variety of shoe type boxes with clear plastic bags
- Sand
- Powdered grape drink mix
- Powdered lemonade drink mix
- Watering can (for every 3-4 students)
- Plastic straws
- pH paper
- tape
- Go with the Flow Activity Sheet (with Teacher's Guide)
- Rulers, pencils, a book and marble

Subject Area: Exploratory Agriculture, AgScience, Science, Health, Math Environmental Science, Social Studies

Grade Levels: 6- 12

Duration of Activity: 5-10, 50 minute class periods

Introduction: As a attention getter, I begin with a 5 gallon bucket of water that represents all the water on Earth. I then use a quart jar, tablespoon, teaspoon to represent fresh water on Earth (to include glaciers, lakes, rivers and streams) , water that is held by the processes in the Water Cycle, and finally the amount of fresh water that is readily available for human use.

Steps:

Background: Groundwater usually flows in the same direction as the land slopes, often towards a nearby lake or stream. Many factors, such as rate of percolation from the surface and pumping from wells, can influence the direction and rate of groundwater flow, but it is possible to get an idea of how groundwater is moving in a given area by determining the slope or "plane" of the water table. To do this, at least three monitoring wells must be installed (three points determine the plane). By measuring the "static water level" (SWL), or elevation of the water table above sea level, we can estimate how groundwater will flow at a certain location.

Groundwater flows from areas of high static water levels to areas of low static water levels. This can be illustrated by using a book and a marble. The marble will roll off the book in the direction of the slope and the speed of the marble will be determined by the steepness of the slope. Groundwater moves in much the same way.

It is important to consider the direction and rate of groundwater flow when planning land development to avoid potential contamination problems.

Using static water level data, students will be asked to determine the general direction and relative rate of groundwater flow on a given map, and evaluate a proposed landfill site, small cluster of single family dwellings site(10 homes on 200 acres) and a large 300 sow hog operation site, on the basis of this information.

Procedure:

A) Determine the slope of the water table and the direction of groundwater flow. The activity sheet gives land elevations/depth to water table. Ask students to subtract depth to water table from land elevation to get static water levels. Mark SWL's on activity sheet next to each well. Remind students that SWL's are height above sea level not depth from the land surface. Point out that the water table generally follows the contour of the land surface.
   Construct contour lines by doing the following for each adjacent pair of wells:
   1) Draw a line between the two wells. Measure the length of the line.
   2) Subtract the smaller of the two SWL's from the larger. This is the difference in water table elevation (in feet) between the two wells.
   3) Divide the line between the two wells into units representing 10 ft. intervals.
      a) Calculate the number of subdivisions needed by dividing the difference in water table elevations by 10.
      b) Calculate the distance between subdivisions by dividing the distance between the wells by the number of subdivisions needed.

4) Label each subdivision mark with the appropriate SWL as in example:
Example:
Distance between wells = 5 inches
SWL A = 410 ft SWL B = 310 ft
SWL difference: 410-310=100 ft
Number of subdivisions: 100 ft./10 ft. intervals = 10
Distance between subdivisions: 5 inches/10 subdivisions = ½ inch per subdivision
5) Repeat steps 1-4 for each pair of adjacent wells.
6) Connect equivalent SWL's with light dashed pencil lines. These lines represent the contour of the water table elevation. (The lines are analogous to contour lines on a topographic map which connect equivalent land elevations).
7) After all contour lines have been drawn, round sharp "corners" and draw solid lines over the original dashed lines. The groundwater flow at any point on your maps is perpendicular to the contour lines at that location.

B) Evaluate the proposed landfill, marked "*", using groundwater flow information from your contour maps.
1) Write a paragraph evaluating each proposed land use site based on groundwater flow at "*". (Note locations of existing private wells). If you feel that locating the landfill at "*" is not advisable, suggest two locations that might be better suited for a landfill. Support your choices by comparing the rate and direction of groundwater movement at your proposed sites with that at "*". (Do likewise for the housing development and hog farm).

C) Discuss your findings:
- What was the static water level?
- How was it different from water table depth?
- How are SWL's used to determine the slope or plane of the water table? How does the plane of the water table affect groundwater flow (direction and rate)? What other factors might influence groundwater flow?
- What do the contour lines on your map show?
- In what general direction does groundwater flow in Pleasant Valley?
- Can we make assumptions about the speed of groundwater movement at certain locations?
- Would the contour lines change if you had SWL information from more wells? Fewer wells?
- What is the level of Mud River as it passes by town?
- Is "X" a good location for the housing development but not a landfill or large hog farm?
- Can you suggest better locations for any of the proposed sites, based on groundwater flow? If so, why do you think these sites are better?

Adapted from: Groundwater: Michigan's Hidden Resource. 1989 Michigan Department of Natural Resources & Groundwater, Wisconsin's Buried Treasure. 1991 Wisconsin Department of Natural Resources

Create-a-Community: (Like Riverville or Dragonfly Pond)

Gary Frisch

Nutshell- This activity is designed to help students think about land use planning to minimize pollution while creating an effective community. Students design a community alongside a river or lake. They are given various land uses and must design a town that meets the citizen's needs, is laid out in an efficient manner, and best protects the environment and water quality.

CLUSTER Concepts addressed: Land as a limited resource, land use impact on environment, land use planning, value of wetlands and natural areas, human values, best management practices.

Model Academic Standards-
2.1, 2.2, 2.3, 5.1, 5.2, 5.3, 5.4, 5.5, 5.7, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 10.1, 11.2, 11.3, 11.4, 12.1, 12.2, 12.3, 13.1, 13.2, 14.1, 14.2, 15.1, 15.2, 16.1, 16.2, 16.3, 17.1, 17.3, 17.4, 18.1, 18.3

Objectives: Students demonstrate proper application of land use and best management concepts and methods, evaluate the effects of different kinds of land us on the watershed, and consider lifestyle changes to minimize damaging effect on the environment.

Materials:
- Watershed map drawn on large poster board (see resource example)
- Land use pieces (copy and cut set from resource page)
- Scissors
- Masking tape
- Glue
- Colored Pencils

Subject Areas, Grade Levels, and Duration of Activity
Social Studies & Science – can be adapted to grades 4-12.

Background Information- Land use impact on environment, run off pollution, impervious surfaces, buffer zones, habitat preservation, Land use planning, community growth, compromise.

Procedure
Introduction- Tell students that they will be responsible for arranging the pattern of land use around the river in such a way as to do the best they can to meet the citizen's needs and preserve the beautiful aquatic environment.

Procedure:

1. Divide class into groups of five. Each group member is assigned a land use interest: Residential developer, Farmer, Industry, Business, Parks and Recreation.

2. Pass out the materials. Students cut out land use pieces and add a few of their own choosing. They can be cut, but all of the pieces must be used.

3. Each team discusses the community design and possible pros and cons of various placements. Teams tape the pieces down with small pieces of tape rolled up at first. That will allow them to move the pieces should they change their mind. Emphasize that they are to arrange their town in ways that minimize runoff pollution and the impact on the environment while making commuting, living, and working easy and enjoyable for the residents.

4. Groups must decide a final plan following these rules:
    -everyone must agree
    -wildlife habitat must be preserved
    -all land use pieces must be used

When the group is ready, they glue down the pieces and draw in the necessary roads, label, include compass rose, and add map key.

Conclusion- Groups show class their community and state their reasons for each choice. Analyze and discuss the pros and cons of each community. The best community design will minimize pollution runoff to surface waters, reduce commuting by putting land uses close together, and provide for the needs of its citizens (job, recreation, food, safety...)

Activity Assignment

"The Changing Land and Wetlands"*

Patricia Marinac

Nutshell: Students compare historical aerial photographs with current aerial photographs to determine the change in distribution of wetland habitat and nearby land use patterns.

Concepts:

CLUSTER concepts: 2.3, (9.3, 11.3), 13.1, 16.1.

Model Academic Standards:

Science: A.8.6, F.8.8, H.8.3
Environmental Education: B.12.5, B.12.8, C.12.3.

Objectives:

- ☐ Students use maps to determine changes in the distribution of wetland habitats between 'historical' times and today
- ☐ Students use maps to determine land use practices that impact wetland habitats
- ☐ Students suggest actions to protect wetland habitats

Materials:

- ☐ Historical aerial photographs of local watershed (one per group of 3 or 4 students)
- ☐ Current aerial photographs of local watershed (one per group of 3 or 4 students)
- ☐ Plastic sheet the size of photograph (one per group of 3 or 4 students)
- ☐ Washable markers in various colors

Subject:

Environmental Science – grades 10-12

Duration:

Background:

Communities make land use decisions every day. Take a look at areas surrounding large cities, in redeveloping downtown areas, and in the countryside and you'll see land use changes.

Given the impact that humans have already had and continue to have on the land, a major challenge facing communities, both urban and rural, is how to plan for continued growth, while at the same time maintaining the quality of important wetland habitats.

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* Adapted from EE News, Winter 1998; Activity: Changing the Land, p. 7.

The purpose of this activity is to evaluate past land use changes as they relate to the local watershed and wetland habitat. Changes can be observed by comparing historical aerial photographs to current ones. To make this activity most relevant to your students, use photographs of your local watershed. Aerial photos can be purchased from most Regional Planning Commission offices. Most locations have photographs going back to the 1960s or 1970s. Another source of aerial photos is your county Land Conservation District office. You may also be able to find resources online.

In looking at land use changes, students consider what factors may have been involved in making the various land use decisions. Students try to determine what future land use efforts might occur and what actions could prevent impact on wetland habitats.

Procedure:

1. Divide the class into teams of 3 or 4 students.
2. Place the plastic sheets over the older aerial photographs. Identify and mark wetland areas. Identify and mark different land uses in areas bordering wetlands.
3. Place the same plastic sheet over the most recent aerial photo. Make comparisons to existing wetland areas. Identify and mark changes that have occurred in land use.
4. Students should answer the following questions:
    - ☐ What were the major changes in land use? What developments occurred?
    - ☐ How did these changes impact wetland habitats? What wetland habitats were lost?
    - ☐ Why do you think these changes were made?
    - ☐ What are the effects, both positive and negative, that have occurred because of these changes?
    - ☐ What actions can be taken to protect wetland habitats now and in the future?
5. Combine two or three groups together and have the students share their results.
6. Conclude with a large group discussion that summarizes the questions above.

Activity Name: Changing the Land
Chantelle Rose

This activity was written by Al Stenstrup, Wisconsin Department of Natural Resources, and is an extension of the Project WILD activity, "Dragonfly Pond." It has been modified to fit into “Science in Ohio”, a third year interdisciplinary inclusion science class.

Nutshell: In this activity students will compare historical aerial photographs to current photographs. The will evaluate the impacts of different land uses and consider a future addition to the community. This activity culminates in a Town Meeting to discuss the proposed new development.

CLUSTER Concepts Addressed: Land Use 1.2, 1.3, Land 2.3, Various Uses of Land 5.1 5.5, 5.7, Land Use Decisions 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7 Outcomes of Land Use Decisions 11.2

Wisconsin Model Academic Standards:

- Environmental Education: A.4.1, A.4.2, A.4.3, A.4.4, A.8.1, A.8.4, A.8.5, A.8.6, D.4.1,
- Social Studies: A.8.1, A.8.4, A.8.11, A.12.2, A.12.4, A.12.11, A.12.12, B.8.8, B.12.9,
- Science: A.8.1, A.8.2, A.8.3, A.8.6, A.8.8; A.12.1, A.12.2, A.12.5 8.B.6, C.8.1, C.8.3, C.8.7, C.8.9, C.8.10, C.12.1, C.12.4, C.12.5, F.8.8, F.8.9, F.8.10, G.8.4, G.12.3, G.12.5, H.12.1, H.12.4, H.12.7
- Language Arts: F.8.1, F.12.1, C.8.2, C.8.3, C.12.1, C.12.2, C.12.3

Objectives: Students will
1) compare historical aerial photographs with current aerial photographs and determine what factors influenced land use decisions;
2) evaluate the impacts of different land uses on an area;
3) consider future changes in land use and the affect on a community
4). research a viewpoint for a proposed development in St. Paris
5.) present their viewpoint/opinion in a town meeting

Material: aerial photographs (one historical and one current for each team of 3-4 students); plastic sheets the same size as the photos; washable markers in various colors, posters, a copy of the current Regional Land Use plan and Village of St. Paris Comprehensive Plan (what little plan exists), access to internet

Subjects and Grades: Social studies, Science, Language Arts, Grades 6-12

Duration: 2 class periods (40 minutes) to observe and compare aerial maps, and analyze past patterns of development in St. Paris
2 class periods to research interested parties viewpoint
1 class period to conduct Town Meeting

Background: Communities make land use decisions every day. Take a look at areas surrounding large cities, in redeveloping downtown areas of older cities, and in the countryside and you'll see land use changes.

Given the impact that humans have already had and continue to have on the land, a major challenge facing communities, both urban and rural, is how to plan for continued growth. What are the best ways to accommodate growth and minimize the negative impact on the existing community and the natural environment?

The purpose of this activity is to evaluate past land use changes in a community and determine the impact of these changes on the land. Changes in communities can be easily seen by comparing historical aerial photographs to current ones. To make this activity most relevant to your students, try to use photos of your community. Aerial photos can be purchased from most Regional Planning Commission offices. Most locations have photos going back to the 1960s or 1970s. Another source of aerial photos is your county Land Conservation District office.

In looking at land use changes, students will consider what factors may have been involved in making the various land use decisions. Students will try to determine what future land use changes may occur and suggest ways these changes could be implemented to reduce the impact on wildlife habitat, water quality, and quality of life.

Procedure:

1) Begin the activity with Terraserver (http://www.terraserver.com/) image of our community on the SmartBoard screen. This will get the students attention and prepare them for looking at images of our community from a different viewpoint.

1) Divide the class into teams of 3-4 students. Place the plastic sheets over the older aerial photographs. Identify the different land uses on these photos using different colored markers to show each land use. Look for waterways, forests, agriculture, residential areas, industry, parks, and transportation corridors.

2) Place the same plastic sheet over the most recent aerial photo. Identify the changes that have occurred in land use. Students should answer the following questions:

a) What were the major changes in land use? What developments occurred? Use markers to show the changes.

b) What types of land use were lost? Forests? Agriculture? Why do you think these changes were made?

c) What changes occurred in the roadways or railways? Why?

d) Was there any commercial development? Parking lots?

e) What are the effects, both positive and negative that have occurred because of these changes. Are there effects on water quality? Wildlife habitat? Quality of life?

3) Ask each team to identify new areas for community development. Assume your community will require 25 additional single family homes, three apartment buildings, and five new businesses in the next year. Have students mark where this development should occur. Discuss why teams targeted certain areas for development. Will transportation systems need to change? List the impacts of these developments on your community.

4.) Select one of the identified sites for development. Students will extend their investigation of land use by proposing a new development for St. Paris. Each group will be assigned a different Interest Group. Student will be given time to research

and collaborate. This research will culminate in a town meeting as developers propose the new addition and the interested parties debate, question and discuss the impact this development will have on our community.

Developers: The developers will develop and propose the plans for this addition containing 25 single family homes, three apartment buildings and five new businesses. Their main goal is to provide a service to fill the needs of a growing community and to make a profit. They have been working with the newly willed landowners.
Landowners Family: The current landowner has recently become deceased and willed his land to his extended family. They are no longer in farming and would like to sell the property for profit. They will get much more money for the land by selling to the developer than by selling to other farmers in the area. Their goal is the make the most possible from the sale of the estate.
Current Village Homeowners: Current homeowners in St. Paris will have mixed emotions. Some will want the new development for "new life" into our Village. More people means better economy. Others fear losing the small town feel of our close-knit community.
Current Area Farmers: Area farmers will be against the sale of good, fertile farmland for a new development. The value of their farmland will be effected. There will be an increase in traffic, and closer proximity of their farm machinery and animals to homes and businesses.
Regional Planning Commission: The Champaign, Logan, Union Regional Planning Commission will want input into this new addition. They will want to check the most current Land Use Plan. They will be in favor of the development if it is consistent with current plans and the Local governing board is also in favor.
Environmentalists: This development will fall into either the Honey Creek Watershed or the Mad River Watershed. Efforts are being made in both of these watersheds to decrease amount of point source and non-point source pollution. Environmentalist will be concerned that a new addition will significantly effect non-point source pollution and run-off into these watersheds. They will be against the development.

5.) Students will be assessed using a rubric. This rubric will include level of participation and Strength of argument during the Town Meeting, as well as group responses to the comparison of land uses via aerial images. They will also respond to an essay question regarding their experience, feelings, etc relevant to their lives.

Extensions:
Local Planning. Investigate local zoning ordinances in your community. Who is responsible for land use planning? Who develops the zoning regulations? Invite a local planner to your classroom to talk about their role in community land use planning.
Undeveloped Areas. Identify an area on the aerial photo where no development has occurred. Complete an on-site inventory of the plant and animal life found there.
Community Survey. Develop a survey instrument to administer in the local community. The survey could measure people's responses to community growth, new roads, and other land use issues.

Past, Present & Future - Land Use in Dartmouth

Sandra Ryack-Bell

Activity Focus:

Students will look at historical and current land use maps, charts and photographs of Dartmouth and discuss how land use in the town has changed over time. Using the data provided they will discuss the impacts of growth on the types and proportions of land use and what this has meant to the character of their community. They will identify areas of town they would like to see further developed and areas of town where they feel changes should be kept to a minimum or potentially reverse. They will then take a look at the Build-Out Analysis developed by SRPEDD in 2001 to see if the agree with the information presented in recommended by this plan

CLUSTER Concepts:

1.1	5.1	9.6
1.2	5.2	10.1
1.3	5.3	11.2
2.2	5.4	11.3
2.3	5.5	11.4
3.2	5.6	12.1
4.1	5.7	12.2
4.2	5.8	12.3
4.3	9.4	15.1

Wisconsin Model Academic Standards:

(Note: Massachusetts would replace the term Wisconsin in applying these standards)

Social Studies: A4.2, A4.4, A4.5, A4.8, D4.7, A8.1, A8.4,

Environmental Education: A4.2, A4.4, D4.1, A8.2, A8.4, A8.5, B8.5, B8.10, B8.15, B8.16, B8.19

Subject Area:

Social Studies

Grade Level:

Grades 5-8

Time Required:

60 minutes

Skills:

Analyzing	Inferring
Comparing	Map reading
Critical thinking	Recording
Data analysis	Synthesizing
Interpreting	

Learning Outcomes:
Students are able to identify past land uses and current land uses within Dartmouth.
Students are able to explain the impacts of increased population on land use.
Students can identify how changes in land use impact the visual and economic character of Dartmouth.
Students can identify areas of potential growth within their community.

Materials:
Land Use Maps of Dartmouth (historical and current)
Historical Maps of Dartmouth (from the town hall or the book listed below)
Build-Out Analysis Map developed by SRPEDD (date 2001)
Dartmouth Facts Sheet (attached)
Greetings From Dartmouth Massachusetts, a Postcard History by Beverly Glennon and Judith Lund
Any other historical maps or photographs available
Current pictures of Dartmouth
Writing paper
Pencils

Background:
Changes in land use occur over time. This change can indicate an increase or decrease in population leading to a change in the economic base within the community. An increase in development or community growth has both positive and negative effects on the community. In the past 100 years Dartmouth has experienced expediential growth as it has changed from an agricultural community to a summer resort and now a combination of a summer resort, bedroom community and home to a branch of the state university. These changes are evident in the land use patterns over the last 100 years. These changes not only have an economic impact on the town but they also affect the visual appearance and character of the town, and the town's natural resources, freshwater and coastal habitats, and open space.

Preparation:
Look over the various town maps you have collected and identify any major changes in the town over the past 200 years. You will need to use both the historical maps and the land use maps since the land use maps only go back about 30 years. Make a list of these changes for use later in the activity. Divide the class into teams based on the number of maps you have available for use during the activity. Review the data on the Dartmouth Fact Sheet. Look through the book *Greetings From Dartmouth* and make copies of any photographs you'd like to share with the students. Make smaller copies of the maps for the students to color.

Activity Introduction:

Discuss with students the following:

What types of changes have occurred in our lifestyle over the past fifty years? Has this affected the town we live in? How? Have *you* noticed any changes in our town that reflect this change in lifestyles during your lifetime? By looking at maps of the town, you can identify changes in the uses of land and town resources. Let's look at some current and historical maps and photos of Dartmouth to see if we can identify changes that have occurred in land use within our town over the past 200 years.

Procedure:

1. Divide the students into teams.
2. Provide each team with a map, a small copy of the map to color, a sheet of writing paper and some colored markers or crayons.
3. Instruct each team to look closely at their maps. They need to identify the different types of land use (residential, agricultural, industrial, commercial, and recreational), special or unique areas of town and town resources shown on the map. They are looking for housing developments, malls or stores, industrial or commercial operations, parks, schools, water supplies, landfills, wastewater treatment plant, villages, historic cites, parks, beaches, etc.
4. On the sheet of paper have students list all of the land uses they identify. Then using the colored markers, they should color code these land use types on their map. Remind them to place a key on their map.
5. When all of the maps are finished, bring the class back together.
6. Starting with the oldest map and ending with the most current map, have each team present their findings to the class.
7. Have students compare their findings with the information presented in the Dartmouth Facts sheet. Discuss the changes that have taken place in how the land has been used over the years.
8. Share with the student's pictures of the town dating from 1903 to the present using the book *Greetings From Dartmouth, Massachusetts* and pictures you have collected. Discuss the changes shown in the pictures.
9. Discuss how the changes in land use have impacted the visual character of Dartmouth. Discuss if there are areas in town where students feel the visual character needs to be preserved. Discuss if there are areas where the visual character needs to be altered and ways this could be accomplished.
10. Identify areas in town where further development could take place. Discuss whether these are areas where development *should* take place.
11. Identify areas in town where the students feel development should not be allowed to take place. Have them explain *why* they think these places should be preserved as they are now.
12. Hang the map showing the Build-Out Analysis developed by SRPEDD (date 2001). Have students compare the build out analysis with the most current land use map.
13. Discuss whether or not the current trends in land use in Dartmouth coincide with the build out predictions.

Follow-up Discussion:

1. What type of community was Dartmouth 100 years ago? What was the major land use?
2. What is the community like today? What is the major land use today?
3. What changes occurred over the years?
4. Is there an obvious trend to these changes?
5. Did the land area of the town change or just the land uses?
6. Have the changes that occurred in the past 10 years changed the character of Dartmouth? If so, how has the character changed?
7. Do different areas of the town have a different appearance/character? Identify some of these areas and explain how they are unique.
8. Do the changes in the town reflect changes in individual lifestyles? (For example, an enlarged landfill indicates increased use of disposable packaging and products; more roads indicate an increase in the number of automobiles in town, more housing indicates an increase in population, etc.)
9. What changes do you think will take place in Dartmouth in the next 5 years? The next 10 years?
10. Do you think the changes in land use have affected the water quality in town? Has it affected the groundwater? Surface water? Wetlands and marshes? Coastal habitats? How do you think these resources and habitats have been impacted?

Dartmouth Fact Sheet

Population

2000 US Census: 30,666
1990 US Census: 2,244
Percent increase: 12.6%

2004 Town Census: 31,532

Land Use

Total land area: 61.83 square miles
Miles of Public Road: 218.88

TYPE OF LAND USE	1971	1999	Percent Change
Agricultural (Farms, orchards, nurseries, cranberry bogs)	7,196 acres	4,054 acres	-43.7 %
Forest/Wetland/Open Space (forest, non forest, freshwater wetland, abandoned farms, salt marsh, areas of no vegetation)	26,962 acres	25,401acres	-5.8%
Urban Land Use (residential, commercial, industrial, parks, cemeteries, public spaces)	5,219 acres	8,794 acres	68.5%
Recreational Land Use (parks, lands used for recreation purposes, boat launches, beaches)	660 acres	649 acres	-1.7%

Implementation Plan

This set of activities will supplement the *Dartmouth's Watershed: Earth's Waters and Turn the Tide* curriculum developed for the Dartmouth Public Schools. *Dartmouth's Watershed: Earth's Waters and Turn the Tide*, an innovative 5th grade science program based on on-going scientific research, engages students in preserving, protecting and learning to manage ecological, cultural and visual aspects of the community within their watershed (specifically Dartmouth, MA). Working with the science curriculum supervisor and the science curriculum committee consisting of 6 Dartmouth elementary teachers, staff from the Lloyd Center for Environmental Studies and the Dunn Foundation developed a full year science curriculum for the fifth grade students. The curriculum is being developed because the Dartmouth school system identified a need to re-organized its structure for meeting the MA State Science and Technology Frameworks. The decision to base the fifth grade science curriculum on the local environment precipitated the involvement of the Lloyd Center and the Dunn Foundation. The program is now being implemented as the full year science curriculum for the fifth grade, having been completely aligned to meet all the required state standards identified by the school system's Head of Instruction. The curriculum combines classroom instruction by the fifth grade teachers with hands-on classroom visitations and a series of field studies conducted by the Lloyd Center and Dunn Foundation. Students study the environmental, cultural and visual characteristics of the Paskamansett/Slocum River and Apponagansett sub-watersheds which feed into Buzzards Bay. This is an innovative program based on a major research and remediation project being conducted by the Lloyd Center for Environmental Studies, the Town of Dartmouth and the UMass School for Marine Science and Technology. Students work with actual research data and equipment, adding their own results to the project's data base and creating a foundation for predicting future trends and long term monitoring. The program combines the use of traditional textbooks, place-based learning, identifying and using primary sources for data and field research, and technology to create a very unique science/social studies curriculum. The social studies component of the program described below will be introduced towards the end of this year as students investigate land use and community planning issues related to the science they have been investigating throughout the school year.

The following activities will be incorporated into *Dartmouth's Watershed: Earth's Waters and Turn the Tide* – the fifth grade science curriculum for the Dartmouth Public Schools to increase students' awareness of the impacts of land use and community growth on the environmental quality of the town's natural resources. This addition to the curriculum means the new science curriculum will meet both the Dartmouth Public School's 5th grade science standards and selected social studies standards. The science component of the program was developed last year. We are now beginning to develop the social studies components which will be pilot tested this Spring.

DESCRIPTION OF ACTIVITIES:

Do You Recognize *These* Places? (A Visual Survey of Dartmouth, MA)

Students will view a slide show of Dartmouth showing a diversity of land use, viewsheds development, signage, open space and other areas in town. The slide show will show "The Good, the Bad and the Ugly" within town. Students will view the slide show twice. The first viewing will be to provide students with a feel for the diversity of the land use and the visual character of the community. The second time the students will participate in a Visual Preference Survey - they will use a rating sheets to "rate" how they feel about each image. They will then compare their own visual preferences with those of these classmates to find out what people like and dislike in their own community.

Past, Present & Future – Land Use in Dartmouth

Students will look at historical and current land use maps, charts and photographs of Dartmouth and discuss how land use in the town has changed over time. Using the data provided they will discuss the impacts of growth on the types and proportions of land use and what this has meant to the character of their community. They will identify areas of town they would like to see further developed and areas of town where they feel changes should be kept to a minimum or potentially reverse. They will then take a look at the 2001 Build-Out Analysis developed by SRPEDD in 2001 to see if the agree with the information predictions in this plan.

Human Impacts On Coastal Habitats

Students will look at a current land use map of Dartmouth and discuss how different forms of land use (residential, commercial, agricultural, marine industry, etc.) play a role in the health of our community on both the natural resources and humans. They will then participate in two learning stations – one using a Groundwater Model and the other using a Watershed Model. With the groundwater model, students will discuss where the water they use comes from (personal or town wells), observe how water flows underground, how wells work and how contaminants can move through the water table. With the Watershed Model students will observe how surface water moves through a watershed, discussing the impacts of different human activities and land uses on the water quality within a watershed, specifically addressing the land uses and impacts within the town of Dartmouth. They will also discuss the impacts of regional activities. To close the lesson, students will look at the SRPEDD (Southeastern Regional Planning and Economic Development District) regional land use map and discuss why regional planning is as important as local planning.

Creating A Future Plan For Our Town (Parts I & II)

Part I: Who's Responsible for Our Town's Growth?

Students will learn about the roles different elected officials, appointed officials, citizens, local institutions such as the UMass Dartmouth and other organizations, agencies and government officials play in developing master

and comprehensive plans and build out strategies for Dartmouth. Students will research what types of plans exist (master plan, zoning plan, comprehensive plan, build out analysis, etc.), when they were developed and if any of these plans are being revised.

Part II: What About the Future?
Students will divide into small groups and discuss the issues they think Dartmouth needs to address over the next five years and their ideas on how these issues should be dealt with by the community. They will create their own "plan" for the town's future growth and development including their recommendations on what should be included in the Comprehensive Restoration Plan for Dartmouth's Waters being developed by the Turn the Tide Project and the Town of Dartmouth. Each group of students will present their plans to the rest of the class.

ACTIVITY	LAND USE CONCEPTS ADDRESSED			SKILLS
Do You Recognize These Places?	1.1 2.3 5.1 5.2 5.3	5.4 5.5 5.6 5.7 5.8		analyzing comparing inferring observating recording
Past, Present & Future – Land Use in Dartmouth	1.1 1.2 1.3 2.2 2.3 3.2 4.1 4.2 4.3	5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 9.4	9.6 10.1 11.2 11.3 11.4 12.1 12.2 12.3 15.1	analyzing comparing critical thinking data analysis interpreting inferring map reading recording synthesizing
Human Impacts on Coastal Habitats	1.3 2.1 2.2 2.3 4.3 5.1 5.2 5.3 5.4 5.5	9.2 9.3 9.4 9.5 9.6 11.2 11.3 11.4 13.1 13.2	14.1 14.2 15.2 16.1 16.2 16.3 17.1	analyzing critical thinking comparing data analysis interpreting inferring synthesizing
Creating A Future Plan For Our Town	1.1 1.2 1.3 2.2 2.3 3.2 3.3	8.1 8.2 9.1 9.2 9.3 9.4 9.5	14.2 15.1 15.2 16.1 16.2 16.3 17.1	analyzing comparing critical thinking collecting data collection inferring investigating

	3.4 3.5 5.2 5.3 5.4 5.5 5.6 5.7 5.8	9.6 9.7 10.1 11.1 11.2 11.3 11.4 13.1 14.1	17.2 17.3 17.4 17.5 18.1 18.2 18.3 18.5 18.7	mapping recording team building writing

WISCONSIN MODEL ACADEMIC STANDARDS MET
(Based on those provided in CLUSTER document – I do not have a full copy of the Wisconsin Standards)

SOCIAL STUDIES

A.4.2
A4.4

A4.5
A.4.8
A.8.1
A.8.4 (local environment = MA)
A.8.9
B4.1
B4.8
B8.4
C4.5
C4.6
C8.7
D4.7 (in MA not WS)
D8.11
E4.6

ENVIRONMENTAL EDUCATION

A4.1	B8.18	
A.4.2	B8.19	
A4.3	B8.21	
A4.4	B8.23	
A8.1	C4.1	
A8.2	C4.2	
A8.3	C4.3	
A8.5	C4.4	
A8.6	C4.5	
B4.8	C8.1	
B4.10	D4.6	
B4.12	D8.6	
B8.5	D8.8	
B8.10		
B8.15		

These interdisciplinary activities will address the Massachusetts math, science, social studies and language arts standards identified for the 5th grade by the Dartmouth Public Schools as well as the Wisconsin Model Academic Standards indicated above.

MATERIALS NEEDED:
Dartmouth Slide Show & Projector (Visual Preference Survey)
Visual Preference Worksheet
Land Use Maps of Dartmouth (historical and current)
Historical Maps of Dartmouth
SRPEDD Fact Book (contains data, charts, maps & statistics on the Town of Dartmouth and surrounding communities)

Build-Out Analysis Map developed by SRPEDD (date 2001)
Greetings From Dartmouth Massachusetts, A Postcard History by Beverly Glennon and Judith Lund
Map of Dartmouth
Current and Historical photographs of Dartmouth
Dartmouth Zoning By-Laws (The Preamble contains the town's master plan)
Copies of the Town of Dartmouth Map Atlas (contains GIS maps for Dartmouth showing land use, wetlands, build out analysis, zoning, etc.)
Town of Dartmouth Annual Reports
Turn the Tide Newsletters, Vol 1, 2 & 3 (contain research results and maps)
Watershed Model
Groundwater Model

TIMING OF ACTIVITIES:
The activities will be introduced into each fifth grade classroom in the five Dartmouth elementary schools between April and June 2005 as part of the last unit of Dartmouth's Watershed curriculum. An outline of the entire curriculum showing the placement of these activities is attached on the next page.

REFERENCES AND RESOURCES:
Buzzards Bay Curriculum, Lloyd Center for Environmental Studies, Dartmouth, MA 1996
Coastal Issues: Activities For the Classroom, Sandra Ryack-Bell, 1995.
Design Guidelines to Enhance Community Appearance and Protect Natural Resources, Joan Chadde et all, 2004.
From Farms to Fish, Lloyd Center for Environmental Studies, Dartmouth, MA 1994
Looks Count – Community Planning, Natural Resource Protection and the Visual Environment, Joan Chadee, et. all, 2004
Southeastern Regional Planning and Economic Development District
www.commpres.env.state.ma.us
Town of Dartmouth Official Web Site www.town.dartmouth.ma.us
Turn the Tide Curriculum Guide, Lloyd Center for Environmental Studies (in draft)
ViewFinders Too,The Dunn Foundation, Warwick, RI, 2002

APPENDIX (PLACEMENT OF ACTIVITIES WITHIN CURRICULUM FRAMEWORK):

Dartmouth's Watershed:Earth's Waters & Turn the Tide Curriculum Outline

Unit 1: Earth The Water Planet

Section 1: How is Water Important?

- *Earth's Waters* Textbook
  - How is Water Important? pages 16-18
  - Real Life Learning Activity page 17TE "How Do People Use Water?"
- *Dartmouth's Watershed* Curriculum Guide
  - How is Water Important? Activity
  - Were You Aware?" Activity
    - Optional Activity: Water, Water Everywhere
    - Optional Activity: How Wet Is Our Planet?
    - Optional Activity: Oceans, Ice, and Us
- *Earth's Waters* Textbook
  - Water and Living Things pages 19 - 22
  - Sharpen Your Skills Calculating Activity page 20TE
- *Dartmouth's Watershed* Curriculum Guide
  - Groundwater Diagram Worksheet
- *Earth's Waters* Textbook
  - Section 1 Review 1-5 page 22
- *Dartmouth's Watershed* Curriculum Guide
  - Turn the Tide Slide Show
  - Turn the Tide In-School Session 1
  - Review Posters of Coastal Habitats
  - Fall Coastal Field Study
  - Salt Water Aquarium Set-Up
  - Turn the Tide Water Chemistry Log for the Aquarium
  - Turn the Tide Observation Log for the Aquarium
  - Activity: Aquarium Detective

Section 2: The Properties of Water

- *Earth's Waters* Textbook
  - The Properties of Water, pages 23-29
  - Demonstration Activity page 27TE
    - (see also adaptation of this demonstration in Curriculum Guide)
  - Section Review, page 29
- *Dartmouth's Watershed* Curriculum Guide
  - Evaporation and Condensation Activity
  - Project WET Water Olympics Activity

Section 3: The Water Cycle

- *Earth's Waters* Textbook
  - The Water Cycle pages 32 – 35
  - Discover Activity page 32TE
  - Review Diagram page 33
- *Dartmouth's Watershed* Curriculum Guide
  - Our World In Two Jars Activity
    - Optional Activity: The Water Cycle Crossword Puzzle
    - Optional Activity: The Water Cycle
    - Optional Activity: Nature's Waterwheel
  - A Drop of Water Book Activity
  - Project Wet Water Cycle Diagram worksheet
  - Project WET The Incredible Journey Activity
  - Project WET Old Water Activity
- *Earth's Waters* Textbook
  - Section Review 1-3 page 35
  - Chapter Review pages 37-39

Unit 2: Freshwater Resources

Section 4: Water As an Energy Resource

- *Earth's Waters* Textbook
  - Water As an Energy Resource pages 105-108
- *Dartmouth's Watershed* Curriculum Guide
  - Project WET Activity Energetic Water
  - Energetic Water Invention Activity

Section 5: Fresh Water

- *Dartmouth's Watershed* Curriculum Guide
  - Read The Raindrop Journey Story
- *Earth's Waters* Textbook
  - Streams and Rivers pages 42 -52
- *Dartmouth's Watershed* Curriculum Guide
  - The Raindrop Journey Story
    - Optional Activity: How Water is Recycled in A Watershed
    - Optional Activities: Ideas for Water Cycle Activities
  - Watershed Detectives Activity
  - Create a Watershed Activity
  - Watershed Project
  - Project WET Just Passing Through Activity
- *Earth's Waters* Textbook
  - Ponds and Lakes pages 53-58
  - Review diagrams pages 54-55
- *Dartmouth's Watershed* Curriculum Guide
  - Freshwater Adaptations Activity
- *Earth's Waters* Textbook
  - Wetland Environments pages 59-64

- Inquiry Challenge page 63TE
- *Dartmouth's Watershed* Curriculum Guide
  - Do at least one of the following activities:
    - Wetland Metaphors
    - Project WET Salt Marsh Players
    - Hidden in the Marsh
  - Where Are Dartmouth's Coastal Habitats

Section 6: Water Underground

- *Earth's Waters* Textbook
  - Water Underground pages 68-74
  - Soil Testing Lab pages 70-71
- *Dartmouth's Watershed* Curriculum Guide
  - Background reading: Groundwater - The Largest Freshwater Resource in the USA
    - Select at least one of these groundwater activities:
      - What is Groundwater
      - Is it Full Now?
      - How Much Water Can Different Soils Hold
      - How Different Soils Affect the Movement of Water
      - Illustrating the Water Table
    - What's on the Bottom of the Bay? Activity
    - Turn the Tide In-School Session II:
  - Groundwater/Watershed Models
    - Presentations of student Watershed Projects

Unit 3: The Ocean Environment

Section 7: Exploring the Ocean

- *Earth's Waters* Textbook
  - Exploring the Ocean pages 146-154 (do a quick review of this section)
  - Life at the Ocean's Edge pages 156-161
- *Dartmouth's Watershed* Curriculum Guide
  - Coastal Habitats Background Readings
  - Field Guide Sheets for Eastern Shore Marine Environments (posters)
    - Salt Ponds
    - Tidal Flats
    - Salt Marsh
    - Rocky Shores and Wooden Structures
    - The Sandy Shore
    - Over The Wedge
  - Sea Grant Fact Sheets
  - Food Chain and Food Web Background Reading
  - Produces, Consumers and Decomposers Worksheet
  - Select one or more of the following activities:
    - The Food Chain Game
      - Eat or Be Eaten
      - Who is Coming to Dinner?

Now You See Me, Now You Don't Activity
Fashion a Fish Activity
Turn the Tide In-school Session III
Shell Kit Activity (kit provided)
The Slow Race Activity (kit provided)
The Bill Game Activity (kit provided)
A Paper Dissection of a Quahog

Earth's Waters Textbook
The Neritic Zone and Open Ocean pages 162-168 focus
Review diagram page 163

Note: MCAS review should begin at this point.

Section 8: Ocean Motions

Earth's Waters Textbook
Wave Action pages 114 – 121

Dartmouth's Watershed Curriculum Guide
Making Waves Activity

Earth's Waters Textbook
How Do Waves Change a Beach? Discover Activity page 114
How Waves Form Demonstration page 115TE (connect to light)
Demonstration Activity page 117TE
Novel connection: *The Big Wave*
Inquiry Challenge page 119TE

Section 9: Tides

Earth's Waters Textbook
Tides pages 122-126
Including All Students Activity page 123 TE

Dartmouth's Watershed Curriculum Guide
How the Sun and Moon Affect the Tides Activity
Demonstration of How Tides Are Formed

Earth's Waters Textbook
The Monthly Tide Cycle Activity page 124 or the How does the Moon Affect the Water? from the *Dartmouth's Watershed* Curriculum Guide
Intergrating Technology page 126 TE

Dartmouth's Watershed Curriculum Guide
Changing with the Tide Activity

Section 10: Ocean Water Chemistry

Earth's Waters Textbook
Ocean Water Chemistry pages 127 - 131
note*: many of these concepts will be done with the Lloyd Center*

Section 11: Currents and Climates

Earth's Waters Textbook
Currents and Climate pages 134- 140

Dartmouth's Watershed Curriculum Guide

Turn the Tide In-School Session IV: Water Chemistry and Field Study Prep
Project WET Piece It Together Activity
Kids Discover Climate Magazine: Climate Experiments page 18

Section 12: Bringing it all Together: Dartmouth's Watershed and Land Use

Do You Recognize *The*se Places?
Past, Present and Future – Land Use in Dartmouth
Turn the Tide Spring Coastal Field Study
Turn the Tide Newsletters & Data (Teacher & Student Background Readings)
Human Impacts on Coastal Habitats
Optional Activity: Pressing Seaweed
Turn the Tide In-School Session V: Data Analysis
Creating A Future Plan For Our Town

Land Use Implementation into Advanced Agricultural Concepts

By

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Implementation Plan
Nres 780
Land Use Education and Education Resources
Rebecca Mattano, Course Assistant
Dr. Anna Haines, Instructor
University of Wisconsin-Stevens Point
February 13, 2005

Basic Sequence of Lessons

I will include brief lessons for days 1& 2, as well as day 3, which will include standards, topics, activities, and concepts being taught. I will also include a condensed version of the St. Lawrence "Smart Growth Project. If you wish to get more information on this project, please refer to that project itself. That project will be the most important part of this unit.

Day 1 and 2

Basic concepts of Land Use

Day 3

Tools used in Land Use Planning

Day 4 and Beyond

St. Lawrence "Smart Growth Plan" project

Lesson, unit and subject area to be enhanced by this topic

This activity will be used in my "Advance Agricultural Concepts" course, which is a Junior/Senior offering to a limited number of students who have been previously enrolled in a number of other courses within the Agriscience Curriculum.

When will the activity be used and what materials will be needed?

This unit will be started in the near future, to make sure I can supply students with enough time to complete all outside parts of the main project, which is the St. Lawrence "Smart Growth" project. No materials will be needed for the two introductory lessons, other than the prepared class discussion on basic concepts of land use, and tools used in planning.

How does the activity fit into your curriculum? How is it important to the school, the community?

The Slinger community is experiencing one of the highest growth rates in the state and nation presently. We have already discussed some of the basic concepts of land use in my Environmental Science course. This project will draw on specialties and interest areas of the diverse student body of the Advanced Agriscience course. After evaluating the effectiveness of parts or whole of this unit. I will implement some sections into my existing land use unit taught in my environmental science course.

Day One and Two

Activity Name

Basic concepts of Land Use Discussion

Nutshell

This discussion will give me a chance to review concepts taught in Environmental Science, and get those students that did not take this previous course up to par with the rest of the course. It will also include some additional concepts that will be needed to prepare students for the project

Concepts Addressed

What are the Effects of Land Use Decisions?

15. MANAGING LAND USE IN THE FUTURE

15.1 Population growth is a critical factor in land use planning.
15.2 Land is central in considering the future quality of life
18.4 A comprehensive plan provides a context for and guides important future land use decisions and actions for a community.

16. LAND USE AND NATURAL RESOURCES

16.1 The way in which land is used directly affects natural resources (local, regional, and global).

17. PUBLIC

17.1 An understanding of the relationship between natural resources, economic development, community facilities, and transportation is critical to land use decision-making.

18. PLANNING AND THE PLAN

18.5 Land use planning is only one of the components of a comprehensive plan.
18.6 Land use planning is a dynamic process that includes planning, implementation, enforcement, and evaluation.

19. SUSTAINABILITY

19.1 Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

19.2 Land use planning can play a role in improving the sustainability of communities due to planning addressing how, where, and when human development occurs.

Model Academic Standards

ENVIRONMENTAL EDUCATION

A.4.4 Communicate their understanding to others in simple terms

B.12.15 Describe changes in the rates of human population growth in various societies and the factors associated with those changes related to economic and environmental sustainability

D.12.5 Develop a plan to maintain or improve some part of the local or regional environment, and enlist support for the implementation of that plan

E.8.2 Explain the importance of characteristics (such as trust, patience, self-discipline, respect, and open-mindedness) that enable people to function together to resolve environmental issues

AGRICULTURAL EDUCATION

E.8.2 Describe and give examples of how land use impacts the environment

E.12.2 Analyze benefits, costs, and consequences of land use

Introduction to Discussion

To begin this discussion, I will begin by asking questions regarding growth in Washington County and what should be done about it. This interest approach will give me the lead in I need to begin addressing the concepts we need to discuss in the lecture.

Topics

- Types of Development
  - Residential
    - Types of Structures
      - Single Family
      - Duplex
      - Condominium
      - Multiple Family
      - Seasonal
    - Placement Density
      - Low Density
        - Subdivision
        - Conservation Subdivision
        - Leap Frog
        - Frontage Development
      - High Density-Optimum Land Use Efficiency
        - High Rise
        - Above Business
  - Industrial
  - Commercial
    - Historic Preservation (Main Street Revival)

- Street Side Frontage
- Box Store
- Large Setback Box Store
- Recreational
- Public/Utility
- Educational

Planning
- Why Plan?
- Types of Planning
  - Zoning
  - Land Use
  - Infrastructure
  - Comprehensive
    - Smart Growth
  - Environmental Impact

Population Growth/Movement
- Sprawl
  - Urban
  - Suburban
- Fringe (Exurbia)

<u>Duration of Activity</u>

This activity will take approximately 2 days of classroom discussion to review concepts and instruct students in new concepts related to land use.

Day Three

Activity Name

Land Use Tools Discussion

Nutshell

This discussion will allow me to introduce students to the tools that can be used by planners to control growth in their municipalities, so these tools can be used on the "Smart Growth" project

Concepts Addressed

What are the Effects of Land Use Decisions?

14. GROWTH MANAGEMENT

14.1 Growth management is a land use planning strategy committed to balancing natural systems with development.

How Do We Manage Land?

.

18. PLANNING AND THE PLAN

18.7 Tools for implementation of land use plans include regulations and provisions of services, incentives, and educational programs.

Model Academic Standards

ENVIRONMENTAL EDUCATION

A.8.5 Use the results of their investigations to develop answers, draw conclusions, and revise their personal understanding

B.8.15 Analyze how people impact their environment through resource use

B.12.13 Analyze how different political and governmental systems manage resource development, distribution, consumption, and waste

C.12.4 Identify the strengths and weaknesses of different approaches to investigating an environmental issue* and identify some of the assumptions for each approach

D.4.1 Demonstrate knowledge of a decision-making process that includes selecting and using data, suggesting possible alternatives, predicting consequences, and being aware of available resources

AGRICULTURAL EDUCATION

E.12.2 Analyze benefits, costs, and consequences of land use

E.9-12.1 Engage in applied learning opportunities emphasizing ecological and environmental principles

Introduction to Discussion

This discussion can begin by giving a quick overview of what we covered in day one and two. I then can ask the students what can or could have been done to prevent these problems.

Topics

- Tools to use in Land Use Planning
  - Lot Size Restrictions
    - Minumum
    - Maximum
  - Methods of Slowing Growth
    - PDR's
    - TDR's
    - Urban growth boundaries
    - Growth rate caps
    - Housing caps
    - Moratoria
    - Advanced Acquisition
    - Land Trusts
  - Maintaining Standards
    - Concurrency or Adequate facilities policies
    - Capital improvement programs
    - Sewer and Water restrictions
      - On Site septic/well
      - Municipal service districts \
      - Subdivision Regulations
      - Design Standards
  - Zoning
    - Types of Zones
      - Agricultural
      - Forestry
      - Conservation
      - Steep Slope
    - Methods of Zoning
      - Cluster Zoning
      - Performanc Zoning
      - Non-Conforming
      - Overlay Zones
        - Historic
        - Woodland Preservation
        - Shoreland
        - Erosion
  - Planning
    - Comprehensive Plans
    - Sate Planning Requirements
  - Environmental Alternatives

- Conservation Subdivisions
- Environmental Impact Assessment

Joint Agreements
- Joint planning and joint zoning
- Intermunicipal Agreements
- Annexation
- Extraterritorial planning and zoning

Controlling Municipal Costs
- Dedications
- Regional Tax Base Sharing
- Regional Fair Share
- Fiscal Impact analysis

Financial Incentives
- Preferential Tax Incentives
- Impact Fees
- Special Assessment
- Land Conversion Tax

Court System

Duration of Activity

This activity will take approximately 1 day of classroom discussion to introduce students to land use tools.

Day 4 and Beyond

Activity Name

St. Lawrence, Wisconsin: 2025 Comprehensive Smart Growth Plan

Nutshell

This activity will involve advanced students completing a long term project in and outside of class to create a long range land use plan for an unincorporated community 3 miles north of Slinger. As growth continues, this community will surely loose its identity to Slinger and Hartford, as they continue to annex land closer and closer to its unofficial borders. This plan will include surveying residents on wants and needs, establishing long term goals, and then developing a comprehensive plan to manage growth of this community as it grows into an incorporated Village of its own.

CLUSTER Concepts Addressed

What is Land Use

1. LAND USE (GENERAL)
    1.1
    1.2
    1.3

What are the Effects of Land Use Decisions?

14. GROWTH MANAGEMENT
    14.1
    14.2
15. MANAGING LAND USE IN THE FUTURE
    15.1
    15.2
16. LAND USE AND NATURAL RESOURCES
    16.1
    16.2
    16.3

17. PUBLIC
    17.1 .
    17.2
    17.3
    17.4.
    17.5.

13. How Do We Manage Land?

18. PLANNING AND THE PLAN
    - 18.1
    - 18.2
    - 18.3
    - 18.4
    - 18.5
    - 18.6
    - 18.7

19. SUSTAINABILITY
    - 19.1
    - 19.2

Model Academic Standards

ENVIRONMENTAL EDUCATION

A.4.1
A.4.2
A.4.4
A.8.2
A.8.4
A.8.5
B.4.4
B.8.5
B.8.15
B.12.3
B.12.4
B.12.13
B.12.15
C.4.1
C.4.2
C.4.3
C.4.4
C.4.5
C.8.3
C.12.4
D.4.1
D.4.6
D.8.1
D.8.6
D.12.5
E.8.2

AGRICULTURAL EDUCATION

B.12.1
B.12.2
B.12.3
B.12.4
B.9-12.1
C.12.2
E.8.2
E.8.6
E.12.1
E.12.2
E.9-12.1
E.9-12.2
E.9-12.3
F.12.3

Duration of Activity

This activity will take approximately 3 days of classroom instruction/Organization to assign specific responsibilities to individuals. After introductory work is done, we will need approximately 3 more days to review drafts of many of the individual duties. The final assembly of this document will take approximately 1 week of class time later in the semester. Much independent work will be needed on the part of the student to complete this project.

Introduction of Project

This community is very concerned about growth and identity loss to our community. Gaining the students interest and attention should be no problem. The ability to do a hands-on activity they are interested in will be the driving force.

Materials

Digital Camera Equipment
Photo editing software
Class Computer access
Citizens to survey
Mapping Software (such as Adobe Illustrator 10)
Measuring equipment
Soil Maps
DNR Conservation Maps
Personal Transportation for Individual projects

Objectives

Growth problems are haunting the future of Slinger and Washington County. For many communities in the county, it is too late to maintain a sense of identity. For most it is too late to develop a use plan that will manage growth, while maintaining quality of life for those residents already living in these communities. St. Lawrence may be the only community left in our area with a chance to accomplish this. As growth continues, this community will surely loose its identity to Slinger and Hartford, as they continue to annex land closer and closer to its unofficial borders.

It's time for us to intercede and save St. Lawrence. We will create a comprehensive "Smart Growth" plan for St. Lawrence. The development of this plan will include surveying residents on wants and needs, establishing long term goals, developing land use maps for future land usage, and then developing a comprehensive plan to manage growth of this community as it grows into an incorporated Village of its own.

Procedure

1. Introduction

We will begin this activity by examining all the chapters/sections that will need to be completed to comprise the end product, the comprehensive plan. We then will need to construct a plan on how we need to proceed and who will take on which responsibilities. Chapters will include:

- Introduction
- Current Issues and Opportunities
- Community Profile-
    - What currently exists? (Current Land Use Maps)
        - Residential
        - Commercial
        - Industrial
        - Agricultural
        - Environmental
    - What is important to the residents?
    - What should be maintained?
        - Historic Preservation
        - Environmental Preservation
    - What should not be maintained or discouraged?
    - What current problems exist that need solving?
- Survey Results
- Future Needs (Including Maps)
    - Housing
    - Education
    - Transportation
    - Parking
    - Business/Industry
    - Utilities and Community Facilities
        - Fire
        - Police
        - Parks & Recreation
        - other
    - Environmental
- Visions for the Future (What do we want "downtown" St. Lawrence
- Proposed Land Use for the Future (Including Maps)
- Needed Use Policies to Make this Plan Happen

2. Steps

A. Determine assignments for step one

-Develop current land use map

-Create personal answers to:

-Community Profile

-Future Needs

-Visions for the future
-Proposed Land Use Maps
-Needed Policies

-Develop survey questions
-Community Profile
-Future Needs
-Visions for the future
-Needed Policies

B. Evaluate and share everyone's drafts from part one with the entire group and resolve any conflicting ideas. Make any changes that need to be made, and finalize survey.
C. Coordinate administration and personally administer survey to St. Lawrence residents. (Limited pool will require high level of cooperation. Real world survey should be random. We will target people that each student knows personally to increase cooperation. All students will administer survey.)
D. Analyse survey (Everyone)
E. Assign responsibilities to revise all early drafts to reflect survey findings as well as complete any chapters not previously examined.
F. Present and revise all sections until a consensus is reached that we have a usable, presentable product.

Conclusion

Copies of the final product will be made for each class member, as well as any participants in the survey. Copies will be made to distribute to civic organizations in the area to share our work. If interest can be developed, oral presentations may be made of the project and product to these organizations.

Assessment

Grading of this project will be based on:

- quality of the entire final class report
- quality of your personal or group contribution to the final product
- personal effort exerted in completing the project as evaluated by the instructor
- personal evaluations by classmates and group members of your performance
- participation and input in group discussions
- a personal reflection written by you on the project.

Resources

CLUSTER: Teaching for the Future(*Draft): A Creative Land Use Series for Teachers and Educator*
Resources. University of Wisconsin-Stevens Point, Center for Land Use Education. 2005.

Growth and Development PowerPoint. University of Wisconsin-Stevens Point, Nres 780 Course.

A Land Use and Street System Plan for the Village of Slinger: 2010; Community Assistance Planning Report #186., Southeastern Wisconsin Regulatory Planning
Commission, Waukesha, WI., August 1995.

The Land Use Tracker. University of Wisconsin-Stevens Point, Center for Land Use Education.
Volume 1, Issue 4. Spring 2002.

Summary of: A Land Use and Street System Plan for the Village of Slinger: 2010; Community Assistance Planning Report #186., Southeastern Wisconsin Regulatory Planning Commission, Waukesha, WI., December 1995.

Town of Wayne Resident Survey: www.ruekert-mielke.com/Projects.asp

Village of Slinger, Smart Growth Comprehensive Planning Report 2005(Draft)
www.omni.com/ActiveProject/Sliner.html