

For Land's Sake - Know Your Land

Environmental Education Aid from the Hoosier Chapter Soil & Water Conservation Society

Land, it's a complex topic, but we need to encourage people to talk about it. The following discussion guide will be useful in helping people learn more about a community's natural resources- land.

Know your Land: Objectives:

1. Students will develop an awareness of the land.
2. Students will learn about land measurement and population density.
3. Students will learn how land uses can differ.
4. Students will learn about other sources of land use information.
5. Students will study their community land uses.
6. Students will consider land use principles.



Introduction:

Activity 1: Football and land, what's the connection?

You may have never thought about the fact that when we go to see a football game, your community has made decisions directly or indirectly about land at your school, college or professional football game site. A football stadium takes a certain amount of land for the field and stadium. It also needs land for parking and other matters, as we shall explore. It is all based on the needs of the people coming to see a game, the coaches, players, and other individual and organization supporters of the game.

Listed below are some of the related land needs at a football game. You may want to add some other needs that you can think of that are not on the list in chart #1A.

1. Football field (recreation area) used to play the game.
2. Seating areas (the stands) for all the fans to sit in while watching the game.
3. Food and beverage service areas for preparation of items for people to eat and drink while watching the game.
4. Roads and parking lots to allow access and provide parking for all the vehicles that brought people to the game.
5. Restrooms and waste disposal areas for people to use while at the game.
6. Training areas for the players to improve their skills and learn more about playing football..



Fill in Chart #1A below. Estimate the land size needed and number of people involved in each type of land use.

Chart #1A- Football and Land Information			
Land Use? (Football related)	Area Needed?- (Estimate Size in Square Feet) *1	How many people use this land?	People per 1000 sq. feet and Other Comments.
Football field (recreation Area)	57,600 sq. ft. *1	About 50 counting both teams & others	50/57.6= 0.9 people/ 1,000 sq. ft.
Seating areas			
Food & beverage service areas			
Roads & parking lots			
Restrooms and waste disposal areas			
Athletic training areas			
<i>(Your Ideas)</i>			

*1- Estimate size in square feet. For example: A football field is usually 120 yards long = 360 ft by 160 ft wide. Therefore, in square feet that would be $360 \times 160 = 57,600$ square feet. To convert to sq. yds. divide total sq. ft / 9 sq. ft. = sq. yard = 6,400 sq. yards.

As you can see the land use associated with a football game quickly gets one thinking about various land uses which involve more than just the size of a football field. If you can relate to your last attendance at a game, was the football game fun or not fun? Did your team win or lose? Was your seating comfortable? Did you have problems finding parking? Did you have to wait long after the game to get out of the parking area? Was your food service OK? How were the restroom facilities? Was waiting involved in either of these activities? Did you consider any other needs in the chart above, such as cheerleaders, band, etc?

Fill out Chart #1B. Describe other secondary land uses that might support land needed directly at a football game. For example: How much land and people were needed to produce and deliver food and drinks provided at the game? What other community services were provided at the game? How much land and people were needed to provide these services?

Chart #1B: Secondary Land Uses that Support a Football Game		
Primary land use (from 1A)	Secondary land use	Possible follow-up activities, with report to class
Football field	If the field is natural grass: seed & fertilizer sources If astro-turf: - material source	Seed- Type, how much land is needed to produce, costs, etc.? Astro-turf- Same issues?
Seating areas		
Food & beverage service areas	<i>(See above question)</i>	
Roads & parking lots		
Restroom & waste disposal areas		
Athletic training areas		
<i>(Your Ideas)</i>		

As you can see a single type of activity can place a lot of demands on the land. People today are placing demands on land for food production, housing, recreational use (i.e. hunting, fishing, camping, hiking, etc.). They also need a place to work, shop, and vacation. Lets discuss what land is.

What is Land?

Land is many things to many people. To the farmer, it is his or her livelihood; to the city dweller, it is a place to live in his or her house; to the child, a playground; to the poet, a theme; to the patriot, a symbol. To all, it is the land under their feet. Land is the entire complex of natural resources of surface and near surface attributes of the portions of the surface of the earth, which are significant to us. Water bodies (rivers, streams, and lakes) are included in some land classification systems.

Land has much to do with our needs and the way we fulfill them. Much of our activity is devoted to getting the basic items of food, shelter, and clothing. Other items- furniture, telephones, automobiles, highways, washing machines, bathtubs, refrigerators, windows, soap, newspapers- that make life more comfortable, and items that make life more stimulating- recreation, movies, and TV, concerts, education, books, libraries are also indirectly linked to the land. We all want many things. It is likely that if we had all that

we could list, new wants would arise tomorrow, and again we would be faced with the problems of how to satisfy them. Four types of resources are available to each generation of Americans.

First, each generation has some legacy of capital goods from previous generations- tools, factories, railroads, buildings, highways, livestock, wells, and so on. Some of them, such as wells, are durable; they may serve for a century with little attention. Others require considerable maintenance and early replacement.

Second, each generation has energy and the ability to do physical labor, to plant, shape, and mold.

Third, each has some ingenuity- to plan, measure, evaluate, and direct.

Fourth, all generations have the natural environment- the land; the fertility of the soil, the coal and iron ore from the mountains, the fall of the rivers, the water of the bays, the deposits of petroleum, and the variations in the climate.

Our success in providing a good level of living, educating our people, preserving freedom and liberty, and leaving a physical and cultural legacy for our future depends fundamentally on how well we use the four factors of: inherited capital, human energy, ingenuity, and the land- our natural resources.



Activity 2: How do we Measure Land and Population Density in the United States?

In the United States, particularly in the Midwest, we commonly measure land in terms called "acres" or "square miles". Early measurement of land was done with metal chains commonly containing 100 links totaling 66 feet in length or 4 "rods". **One rod** equals 5.5 yards or 16.5 feet. 80 such chains (4 rods long) measured 5,280 feet or 1 mile. Ten square chains measured 1 acre. And 640 acres fit into a square mile. Therefore:
One acre = 160 square rods = 4,840 square yards = 43,560 square feet and **One square mile** = 640 acres = 102,400 square rods = 3,097,600 square yards = 27,878,400 square feet.

In countries that use the metric system, they measure land in "hectares". A hectare equals 10,000 square meters. or 2.47 acres. One meter = 1.09 yards = 3.28 feet. And 1 acre = 0.40 hectares.

Complete Chart #2A by converting the average football field into various units of measurement.

Chart #2A- Land Area Measurement		
If an average football field measures 120 yards long and 160 feet wide it contains how many? (Show how you calculated your answer) and (Your answer)		
Square feet	120 yds x 3 ft/yd. = 360 ft ; 160 ft wide x 360 ft. long =	57,600 sq. ft
Acres		
Square miles		
Square rods		
Square yards		
Hectares		

Population density is the number of people per a unit of area measurement. In the football field example earlier we estimated that there was approximately 50 people on the field (members from two teams) or near it (coaches & remaining team members). Divided by the number of 1000 square feet in the field that would be a population density of 50 people/57.6 one thousand square feet or 0.87 people per 1000 square feet. If we converted this value to people per acre it would equal 37.8 or about 38 people per acre. If we convert it to square miles it would equal about 24,200 people per square mile. Do your own conversions to see if you get the same approximate answers. How do you think the population of Indiana, and other states would compare with these values?

Complete the "guess" sections of Chart 2B and then Review table 2C below for the actual state, values and questions below.

Chart #2B- U.S. State Population Ranges				
Question: Which State has-	State Guess	Value Guess	Actual State	Actual Value
Largest population of people?				
Smallest population of people?				
Most square miles?				
Least square miles?				
What state has highest density?				
What state has lowest density?				
What is Indiana's value?	Indiana		Indiana	
Was Indiana higher or lower than the football field example?				
What other values were higher or lower than expected?				

Table #2C- U.S. State 1990 Population Density Ranges			
Source US Census Bureau			
Released: March 12, 1996, Revised June 26, 2000 (Corrected population numbers for Alaska)			
<u>State</u>	<u>1990 Population</u>	<u>Square Miles</u>	<u>Population per Square Mile</u>
Alabama	4,040,587	50,750.2	79.6
Alaska	500,043	570,373.6	1.0
Arizona	3,665,228	113,642.2	32.3
Arkansas	2,350,725	52,075.3	45.1
California	29,760,021	155,973.2	190.8
Colorado	3,294,394	103,728.8	31.8
Connecticut	3,287,116	4,845.4	678.4
Delaware	666,168	1,954.6	340.8
District of Columbia	606,900	61.4	9,882.6
Florida	12,937,926	53,997.3	239.6
Georgia	6,478,216	57,918.7	111.9
Hawaii	1,108,229	6,423.4	172.5
Idaho	1,006,749	82,751.0	12.2
Illinois	11,430,602	55,593.3	205.6
Indiana	5,544,159	35,870.1	154.6
Iowa	2,776,755	55,874.9	49.7
Kansas	2,477,574	81,823.0	30.3

Kentucky	3,685,296	39,732.3	92.8
Louisiana	4,219,973	43,566.1	96.9
Maine	1,227,928	30,864.5	39.8
Maryland	4,781,468	9,774.6	489.2
Massachusetts	6,016,425	7,838.0	767.6
Michigan	9,295,297	56,809.2	163.6
Minnesota	4,375,099	79,616.5	55.0
Mississippi	2,573,216	46,913.7	54.9
Missouri	5,117,073	68,898.1	74.3
Montana	799,065	145,556.3	5.5
Nebraska	1,578,385	76,877.7	20.5
Nevada	1,201,833	109,805.5	10.9
New Hampshire	1,109,252	8,969.4	123.7
New Jersey	7,730,188	7,418.8	1,042.0
New Mexico	1,515,069	121,364.5	12.5
New York	17,990,455	47,223.8	381.0
North Carolina	6,628,637	48,718.1	136.1
North Dakota	638,800	68,994.3	9.3
Ohio	10,847,115	40,952.6	264.9
Oklahoma	3,145,585	68,678.5	45.8
Oregon	2,842,321	96,002.5	29.6
Pennsylvania	11,881,643	44,819.6	265.1
Rhode Island	1,003,464	1,045.0	960.3
South Carolina	3,486,703	30,111.1	115.8
South Dakota	696,004	75,896.0	9.2
Tennessee	4,877,185	41,219.5	118.3
Texas	16,986,510	261,914.3	64.9
Utah	1,722,850	82,168.1	21.0
Vermont	562,758	9,249.3	60.8
Virginia	6,187,358	39,597.8	156.3
Washington	4,866,692	66,581.2	73.1
West Virginia	1,793,477	24,086.6	74.5
Wisconsin	4,891,769	54,313.7	90.1
Wyoming	453,588	97,104.6	4.7

For additional information about population and population density check these sites on the web:

Census Bureau's Population Estimates

<http://eire.census.gov/popest/estimates.php>

Other Population Densities:

Table 1. Land Area, Population, and Density for States and Counties: 1990

http://www.census.gov/population/censusdata/90den_stco.txt

Table 2. Land Area, Population, and Density for Metropolitan Areas: 1990

http://www.census.gov/population/censusdata/90den_ma.txt

Table 3. Land Area, Population, and Density for Places: 1990

<http://www.census.gov/population/www/censusdata/places.html>

For general information on the Census Bureau check their Home Page at:

<http://www.census.gov/>

Activity 3: How Does Land Use Differ?

Population density is one way to look at how many people occupy a unit of land. However such information does not really tell you much about how useful the land is in

supporting people in their day to day needs from the land. We can classify land in many different ways, depending on what we are trying to understand about the land. One method of looking at land is utilized by the National Resources Inventory completed by the USDA-Natural Resources Conservation Service (NRCS). Their data shows that the United States has a variety of ways to identify land use or land cover classification. Go to the following web site and print the following table on: Surface Area Land Uses of Nonfederal and Federal Land and Water Areas, by State and Year (data per 1,000 acres). http://www.nrcs.usda.gov/technical/NRI/1997/summary_report/table1.html . (If you have problems opening this table get the same table by going to the following site and find the table with the same name as above: http://www.nrcs.usda.gov/technical/land/cover_use.html and print it out)

After analyzing the table for the year 1997 answer the following questions in Chart #3B

Chart #3B- States with Different Types of Land in 1997		
Which State has the	Most of this type of land?	Least of this type of land?
Federal land (acres)		
Water (acres)		
Developed nonfederal (acres)		
Rural non federal land (acres)		
Total Nonfederal land		
Total Surface Area		

In terms of what type of land we want, we may not have as much of some types of land as we could use. But we do have a good abundant variety of land. Much of our land can contribute in more than one way to the satisfactions of our wants. That is why we need to better understand our land, and learn how to use it wisely.

Rural land does not tell us much about the productivity of the land and other agricultural uses. For additional information about Land Use/Land Cover and other ways to classify land check these sites on the web:

Land Cover/Use: Various Maps, Tables, and Graphics:

http://www.nrcs.usda.gov/technical/land/cover_use.html

State of the Land: Provides data and analysis on land use, soil erosion and soil quality, water quality, wetlands, and other issues regarding the conservation and use of natural resources:

<http://www.nrcs.usda.gov/technical/land/>

National Resources Inventory (NRI): A statistically based sample of land use and natural resource conditions and trends on U.S. nonfederal lands: <http://www.nrcs.usda.gov/technical/NRI/>

Another good reference is a booklet "Land Resource Regions and Major Land Resource Areas of the United States, Ag Handbook 296" available from the USDA-Natural Resources conservation Service.

Definitions can be found: http://www.nrcs.usda.gov/survey/geography/mlra/mlra_definitions.html

Activity 4: Other Sources of Data about Land Use/Cover (Advanced)

We can learn more about the importance of our land in our state or country by looking at the types of land in other states or countries. The distribution of land can vary greatly in different locations. In general Indiana and the United States has been blessed with a good variety of land. Continue to study types of land use/cover with other states or countries in the world. If you can, identify population density, and types of land use/cover with theirs. Pick five states or five countries from a different variety of locations and evaluate which

states or countries have a good, medium, or poor chance to produce their food and meet or not meet other land needs. How does Indiana or the United States compare to these other states or countries? What about differences between Indiana counties?

Supplies needed: Internet Sites listed below and Encyclopedias, Almanacs, and other reference materials.

World and Nation Information web sites:

The CIA World Factbook 2002: <http://www.cia.gov/cia/publications/factbook/>

GLOBE is a worldwide hands-on program: <http://www.globe.gov/fsl/welcome/welcomeobject.pl> or http://www.globe.gov/globe_flash.html

USDA-Natural Resources Conservation Service: <http://www.nrcs.usda.gov/technical/land/>

USDA-Foreign Agriculture Service's CropExplorer: <http://www.pecad.fas.usda.gov/cropexplorer/>

NASA Earth Observatory: <http://earthobservatory.nasa.gov/>

NASA'S MODIS Land Discipline web site: <http://modis-land.gsfc.nasa.gov/>

National Agricultural Statistics Service (NASS) web site: <http://www.usda.gov/nass/>

State and County information websites:

Links to Maps about Indiana: <http://www.indiana.edu/~libgm/linkinmaps.html>

Electronic Atlas of Central Indiana: <http://atlas.ulib.iupui.edu>

Statistics of Indiana: <http://www.stats.indiana.edu/> or <http://www.state.in.us/doc/compare/index.html>

Farm Land Use per county or statewide: <http://www.nass.usda.gov/in/historic/historic.htm>

Indiana Agricultural Statistics Service web site: <http://www.nass.usda.gov/in/>

Indiana Geological Survey: <http://igs.indiana.edu/geology/index.cfm>

Complete your analysis and comparisons on plain sheets of paper and make a presentation to the class as directed by your teacher.

Activity 5: Examining Your Community Land Uses.

In 1933, a forestry professor named Aldo Leopold published an article in the Journal of Forestry which set forth a proposition that today has become something of a growth industry among the intellectuals of the out-of-doors: the land ethic. "That land is a community," said Leopold in a later description of the idea, "is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics." Professor Leopold's idea was published again as the last chapter of "A Sand County Almanac" in 1949. This is an excellent reference on community land use that is available at most book stores for around \$5.00. For a better future, communities need to do a quality job of community planning.

Lets look at Land Use in your community. Make a land use map of the area around your school (or your home)

1. Print a map of the area around your school using Microsoft TerraServer which contains an aerial photo of land and a topographic map of any area in the US (and many other locations)

An aerial image is simply a picture of land from above. A topographic map shows the physical features of the earth's surface with the terrain relief or variations in elevation represented.

TerraServer contains high resolution USGS aerial imagery and USGS topographic maps. You can locate imagery by clicking on the map shown on the home page or entering a city or town name in the "Search TerraServer" form at the top of the page, or entering a U.S. street address. Click on Advanced Find to see other methods for searching our imagery database: TerraServer is located:

<http://terraserver.homeadvisor.msn.com/default.aspx>

2. Study other map and data sources you can find about land use for your school area (or home). Also check with your local city or county plan commission for information about land use in your community. See above referenced web sites.
3. Decide how you want to classify land uses in your school area or neighborhood. Check out the GLOBE'S MUC Land Classification System found under appendix: <http://archive.globe.gov/tctg/tgchapter.jsp?sectionId=201>
4. On a copy of the map you created in step 1, visit the area around your school and mark the land use according to your classification system.
5. Transfer your land use classification from your activity in step 4 to a piece of plastic overlay or tracing paper placed over your map from step 1.
6. Present your findings to your class, and discuss how land use in your community is used today, and how you would like to see it used in the future.

If you're interested in doing more at your school with the land, consider developing an outdoor classroom. Many schools are developing an outdoor lab or classroom at their school site.

For more information about pursuing this activity visit the Indiana Department of Natural Resources Education Center website: <http://www.in.gov/dnr/nrec/outdoorclass/>

What did you learn about your community in this activity?

Activity 6: Land Use Principles and Classification (Advanced)

Carefully read the following Land Use Principles in Table 4A Land Use Principles (of the Indiana Land Use Consortium). The Consortium serves as a catalyst for education and a forum for discussion to foster responsible land use decisions and practices in Indiana.

Table #6A: Indiana Land Use Consortium Land Use Principles

Land use is a complex issue that is critical to the long-term prosperity of the people and communities of Indiana. We, the Indiana Land Use Consortium, believe in and offer the following general and substantive principles to guide Indiana communities in addressing land-use issues. They are offered as a whole and should not be taken out of the context of that whole; land-use decisions must strike a balance among these important, and potentially conflicting, values.

General Principles

- Growth is necessary for the prosperity of the state;
- The national economy is market-based and planning should continue to respect the choices made by individuals and the community;
- It is important to foster the human diversity that has characterized our nation's history;
- Land use decisions must be approached in a holistic manner that considers its many consequences and interactions;
- Long-term planning is a necessary component to manage land-use in Indiana effectively; and
- The effective resolution of land-use issues requires balancing many interests.

Substantive Principles

- Protect natural areas, such as wetlands, wildlife habitats, lakes, woodlands, and open spaces.
- Protect economically productive natural resource-based systems, such as agricultural lands, forests, surface and groundwater resources, and mineral resources.
- Preserve cultural, historic, and archeological sites.
- Build community identity and sense of place.
- Preserve and enhance unique urban, suburban, and rural communities
- Encourage cooperation and coordination among nearby units of government and local schools.

- Provide integrated and efficient systems for education, recreation, multi-modal transportation, and other public services.
- Promote redevelopment of land with existing infrastructure and public services.
- Promote maintenance and rehabilitation of existing residential, commercial, and industrial structures.
- Promote efficient land use development patterns and densities.
- Promote equitable and efficient allocation of public resources.
- Provide infrastructure, services, and developable land that address market demand for residential, commercial, and industrial uses.
- Ensure an adequate and diverse supply of housing for all income levels within the community.
- Promote stabilization and expansion of the economic base and job creation.
- Balance individual property rights with community interests and goals.
- Encourage neighborhood designs that support a range of lifestyle choices.
- Promote development that serves the needs of a diverse population.

For more information about Land Use see the following websites:

Indiana Land Resource Council: <http://www.in.gov/oca/ilrc/>

Indiana Land Use Consortium: <http://www.indianalanduse.org/>

Indiana GIS Initiative: <http://www.in.gov/ingisi/index.html>

American Farmland Trust at: <http://www.farmland.org/>

USDI-Bureau of Land Management's Learning Landscapes:

<http://www.blm.gov/education/>

Soil and Water Conservation Related Web Sites:

<http://www.hoosierchapterswcs.org/newsinfo/relatedwebs.htm>

After reviewing the Land Principles in Table #6A, on a separate sheet of paper answer the questions listed in Chart #6B.

Chart #6B- Land Use Principles	
Questions	Comments
Which principles do you like or agree with?	
Which principles do you not like or do not agree with?	
Do all the principles agree with each other? Why do you think this is so?	
Are there other items that should have been used for this list of principles?	

References:

Land Information web sites-

NRCS Information Tidbits for Teachers and Students

<http://www.nrcs.usda.gov/feature/education/> or <http://soils.usda.gov/teachers.html>

Lesson Plans and other resources: http://soils.usda.gov/education/resources/k_12/

S.K. Worm Answers Your Questions About Soils and Stuff

<http://www.nrcs.usda.gov/feature/education/squirm/skworm.html>

NRCS Soils web site. "Helping People Understand Soils" <http://soils.usda.gov/>

NRCS Indiana soils information: <http://www.in.nrcs.usda.gov/mlra11/index.html>

Links to other organizations concerning soils: <http://soils.usda.gov/education/organizations/>

Additional soils resources: <http://www.in.nrcs.usda.gov/mlra11/soilresources.html>

Purdue University Agronomy (The study of crops & soils) K-12 Web Site:

http://www.agry.purdue.edu/k12_index.asp

Purdue University Demonstrations in Soil Science:

<http://www.agry.purdue.edu/courses/agry255/brochure/brochure.PDF>

State of the Land: Soils: <http://www.nrcs.usda.gov/technical/land/soils.html>

Natural Resource Data and Analysis: http://www.nrcs.usda.gov/technical/nri_data.html

Maps, Imagery and Data Resources: <http://www.nrcs.usda.gov/technical/maps.html>

NSTA & NRCS "Dig In-Hands-on Soil Investigations" booklet information:

<http://www.nsta.org/pubs/nstapress/pb159X/default2.asp> or

http://soils.usda.gov/education/resources/k_12/dig_in/

NRCS & SWCS "Soil Biology Primer":

http://soils.usda.gov/sqi/soil_quality/soil_biology/soil_biology_primer.html,

call 1-800-THE-SOIL for copy of booklet or go to: http://www.swcs.org/f_publications.htm and look under books.

Geography and Mapping Web Sites:

Geography Network: <http://www.geographynetwork.com/>

Geography Matters for Schools, Libraries, and Other Neat Places:

<http://www.esri.com/industries/k-12/index.html>

Geographic Information Systems (GIS) & Mapping Software from ESRI:

<http://www.esri.com/>

Contact the Soil & Water Conservation Society-

Hoosier Chapter- SWCS: www.hoosierchapterswcs.org or International SWCS: www.swcs.org

The Hoosier Chapter of Soil and Water Conservation Society (SWCS), Public Information and Education (P&IE) Committee developed this environmental education aid. Send suggestions and comments on this education aid to: Ron Lauster, Hoosier Chapter SWCS, 15211 Valley View Dr., Carmel, IN 46032 or email comments to: rc.lauster@att.net