Corny Geography: Teaching Geographic Concepts Using Corn Mazes

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Corn mazes are paths cut or plowed in a field of corn (maize) so that the paths form a pattern when viewed from overhead. The patterns can be famous people, maps, flags, drawings, themes, or an infinite number of other shapes. Similar to tracing through a maze on paper, the human being becomes the "tracer" through the maze.

Because (1) corn mazes are maps, (2) mazes and maps have fascinated people for centuries, (3) maps are essential tools to study geography, corn mazes provide a unique and fun way to learn about geography, including scale, relative and absolute location, land use, and other geographic themes.

In this article, ten lessons for teaching geography through the concept of corn mazes are described. These lessons are based on national geography content standards and are suitable for elementary through secondary level, with some lessons suitable up to university level. I have posted additional ideas and information on my web site on:

http://rockyweb.cr.usgs.gov/public/outreach/cornmazegeography.html

Visit the following sites to learn about corn mazes or to locate a maze near you:

www.mazeplay.com

and
http://www.cornfieldmaze.com/

Not all of the lessons require you to visit a corn maze.

Ten Lessons for Using Corn Mazes in the Geography Curriculum

(1) Mazes, Corn Mazes, Shapes, and Navigation

First, discuss the concept of a maze with your students, why they are fascinating, and the kinds of materials in which human-navigated mazes are constructed. Examine corn maze web sites and discuss the most common shapes in which corn mazes are created. Ask how navigating through a maze compares to daily navigation through streets of a community. Before visiting a corn maze with your students, obtain a map of the maze. Select equally distant locations for pairs of students to find a location that is in the center of the maze or a point distant from the start. Time how long each group took to find the location, and discuss the challenges involved.

(2) Wayfinding and Directions

Select and identify locations for each group of students to find. Have each group of students write directions to the location, using relative directions such as "left," "right", "straight ahead" and so on. Regroup and ask the students to give their directions to another team, without that team knowing where the destination is. How easy were the directions to follow? Repeat this activity using cardinal directions, such as "north", and "southeast." Regroup and compare the ease of using cardinal directions versus relative directions. Is there a difference? Why?

Discuss: When are cardinal directions more appropriate in day-to-day living, and when are relative directions more suitable?

(3) Wayfinding Comparison: Day versus Night

If you cannot conduct a nighttime field trip as a scheduled class event, encourage the students to visit the maze at night, if possible. If that is not possible, you can still discuss the following: Compare the difficulty of finding a selected location during the daytime versus at night. Discuss: Is wayfinding more difficult at night? Why or why not? How does the location of the sun help us in our wayfinding, besides simply providing light?

(4) Maps and Global Positioning Systems

How does a map or an aerial photograph of the corn maze help you in navigating the maze? If possible, have the students walk the entire maze and then create a map of the paths. Compare student-created maps to the maze's official map or aerial photograph. How well did the students' maps match the site's official map? What were the challenges? What helped?

Visit a corn maze with GPS (Global Positioning Systems) receivers to record waypoints as your students walk each path (or a subset that you designate, or divide the group so that the entire maze is mapped). Upload these points into a Geographic Information System (GIS). Plot these points on top of an aerial photograph or a USGS topographic map of the area. Use the procedures on:

http://rockyweb.cr.usgs.gov/public/outreach/terraserver.html

to download these maps.

Print your GPS-created corn maze plot. Include the following map components along with your plot: Title, Orientation, Date, Author, Legend, Symbols, Scale, Grid, Index, and Source.

(5) GPS Navigation

Ask students to navigate to predefined locations using their GPS.

Discuss the concept of a geocache and visit www.geocaching.com.

Hide geocaches for students to find using their GPS (check with the corn maze operator first to make sure this is acceptable). Even easier, set up “virtual geocaches”—known locations where you do not need to visit the site ahead of time. Discuss: What are the challenges on finding an absolute location with a GPS that exist in a corn maze, where you are confined to certain predefined routes?

(6) Land Cover and Corn Maze Locations

Examine the USGS land cover map of the USA on:

http://rockyweb.cr.usgs.gov/outreach/mapcatalog/land.html

This map shows cropland, scrub, forests, urban areas, grassland, and other land cover types.

Examine the map key. How many land cover classifications exist on this map? In which areas of the USA would you expect to find corn mazes? Why? What is the influence of climate and soil on the growing of corn? Browse the links to corn maze locations or use additional sites. How well do the locations match your predictions? What are factors that influence the locations of where corn is grown? What are factors that influence the locations of where corn mazes are constructed? Compare the map of mazes to cities. What influences do cities have on the locations of corn mazes? Where else in the world besides the USA is corn grown?

(7) Interpreting Topographic Maps and Aerial Photographs

Examine a USGS topographic map and an aerial photograph of the area of your corn maze. Use the procedures on:
http://rockyweb.cr.usgs.gov/public/outreach/terraserver.html

to download topographic maps and aerial photographs, or order paper copies from:
http://ask.usgs.gov or 1-888-ASK-USGS.

Discuss: What forces shape the landscape near the cornfield? What are the dominant natural hazards in this area? What direction does this area drain into? Into which rivers does this area drain into? What ocean does this area drain into?

You could examine USGS topographic maps or a USGS national map of river systems to aid you, such as one on:

http://nationalatlas.gov

Trace the path of rain falling on this field to the ocean, including all rivers along the way. What is the river distance from this field to the ocean?

What is the elevation of your cornfield? Would you characterize the terrain of your field as flat, moderate, or steep? What do you think is the maximum slope that a cornfield can be? What constraints operate on the slope of a cornfield? Compare the terrain constraints for corn to other crops. What other crops are grown in this area? Why? What percentage of the county you are in would you estimate as being cultivated for corn?

From the aerial photograph, what would you say is the dominant land use in your cornfield's region? Why? Compare this land use to the land use based on an aerial photograph around your school. What are the differences? Why?

Compare the cornfield's elevation to the elevation based on a topographic map of your school. Is the cornfield higher or lower in elevation of your school? Why? What landforms are present? How have humans modified the landscape in cultivating corn and other crops?

(8) Exploring Corn Through Mathematics

Examine a sample 1 square meter of corn in your field away from a path.

Count the number of ears of corn on a few stalks. Estimate the average number of ears of corn per stalk. Estimate the number of stalks in your square meter of corn. Examine a different square meter of corn and compare your estimates to that above. What differences did you find, and why? What factors influence how productive corn is? Compute the number of stalks and ears of corn in one square kilometer of corn. If a county had 1000 square kilometers of corn under cultivation, how many stalks and ears of corn would it harvest?

(9) Investigating Corn

Visit sites such as these for more information.

National Corn Growers Association:
http://www.ncga.com/education/main/FAQ.html
http://www.ncga.com/03world/main/index.html

Ontario Corn Producers Association's Corn In the Classroom page:
http://www.ontariocorn.org/classroom/products.html

What exactly is corn? What is corn used for? What products that you use daily are made from corn? What products that you use occasionally are made from corn? How can corn be used in industry, consumer markets, and in other ways? What parts of corn can be used? What effect do the values of the culture influence what types of crops are grown? What does the cultivation of corn say about the culture of the United States? What do we value? What is the location where products made from corn are produced? Why are they located where they are? How does the corn from your field reach the consumer? Trace the possible routes. What transport mechanisms are in place to transport the various corn products?

(10) Investigating Soils

Examine the soil under your feet in the maze. Describe the texture, color, grains, and other characteristics. How has cultivation affected the surface and composition of the soil? Interview the landowners, if possible. Examine soil data for your county on:

http://www.ftw.nrcs.usda.gov/ssur_data.html

Locate your corn maze on the soil map for your county. What soil type(s) underlie your corn maze? What soil type(s) are best for growing corn? How do the soil types that are best for growing corn compare to the soils that are best for other crops? What fertilizers and pesticides are used on cornfields? Why? What are the inherent dangers in fertilizers and pesticides?

Take a soil sample if possible to your school and conduct soil tests. Report on the results of your soil test. Use guidelines such as:

http://www.lamotte.com/pages/edu/soil.html

Use corn mazes as portals to investigate the Earth!