

Mapping Your Schoolyard

Activity Overview

Students use compasses and measuring tapes to create a map of their schoolyard.

Objectives

Students will:

- Measure their schoolyard using measurement tools
- Understand the relationship between a map and terrain
- Transpose observations on the ground to a scaled drawing
- Understand how the school map will inform their restoration project

Subjects Covered

Math and Social Studies

Grades

3 through 12

Activity Time

1 hour units; number of units depends on the size of your schoolyard

Season

Any

Materials

Existing maps of your school grounds (if possible), a classroom set of compasses, at least two 100- to 200-foot measuring tapes, grid paper, surveyor's flags, clipboards, pencils, a ruler, masking tape, table for setting up outside

Background

A map of the schoolyard is essential for developing a restoration plan for several reasons. The map of the school site helps you envision and effectively develop a landscape design plan that meets student learning objectives while restoring a natural landscape. Educationally, the mapping process offers hands-on, cooperative skill-building experiences where students can employ math skills and visualize spatial relationships.

The first step in the map-making process is to locate existing maps of the school property such as construction blueprints, topographic maps from the U.S. Geological Survey, online maps, and city and community maps. These maps will save steps and time by providing a base map of your site. Additionally, you can use these maps to look at your school's position in relation to its surroundings, such as its geographical location, its position in the watershed, and its neighboring landowners. The maps may enable you to predict future land uses and future development that may affect your project. You can also identify natural areas with similar topography, soil, and hydrology that you can use as models for planning your restoration. All of this information will help you to understand your school's connections and relationships to the local environment.

Many schools have site maps showing the building locations and property perimeter. If your school does not, you will need to begin mapping by measuring the perimeter of the schoolyard and then adding distinguishing features. Your completed map will show locations of all permanent features such as buildings, drives, sidewalks, fences, walls, and other permanent structures; utilities above and below ground; playgrounds and athletic fields; existing vegetation; and open water.

Ultimately, this map will become a tool to help you determine what plant communities to plant on your site and where to plant them. The exact form a restoration takes can be determined by design considerations and restraints as well as your project goals and objectives. You may decide to include outdoor classroom seating areas, benches for quiet contemplation or socializing, pathways, rain gardens, butterfly and wildlife plantings, etc. There are many different ways to map your schoolyard. The following activity describes one way to create a map. Students may want to figure out their own way to map their grounds; for instance, students could use grid paper to estimate the location of objects and to create a relational scale among those objects. Regardless of approach, your final site map must include the following basic information:

1. direction and scale of the map
2. the physical outline of the site
3. location of human-built features such as buildings, utilities, play areas, and fences
4. slopes, low areas and high spots
5. soils
6. existing vegetation

Mapping Your Schoolyard (cont.)

7. light availability
8. traffic patterns
9. other uses

Pre-Activity Preparation

Indoors:

1. Divide the schoolyard into “mapping sections” to accommodate length of measuring tapes, time available, and class size (i.e., classroom management).
2. Determine the scale of your map based on the size of your schoolyard or mapping sections. The ultimate scale should allow you to view the whole site with adequate detail. Depending upon the size of your site, a scale ranging from 10 to 40 feet per inch seems to provide satisfactory information. Fitting a map on 11 by 17 grid paper is practical for making multiple copies and for student usability. Mapping sections can be pieced together to view the entire school property. One way to determine the scale of the map is to measure the perimeter of the school property or selected area and determine a ground to map ratio that will fit the size of paper. For example, if the area measures 320 feet by 200 feet and the paper is 17 by 11 inches, you may calculate a scale of 1 inch = 20 feet through simple division ($320 \div 17$, $200 \div 11$). The site will measure 16 by 10 inches on the paper. This step takes some trial and error calculations. You can purchase grid paper to fit your scale or you can make a grid on the computer.
3. Familiarize students with compass operation using EP activity “Compass Basics.” Students will need to be able to sight objects using cardinal directions N, S, E, and W. Students can also map their classroom as a warm-up exercise.
4. Assemble measuring equipment: see Materials list.

Outdoors:

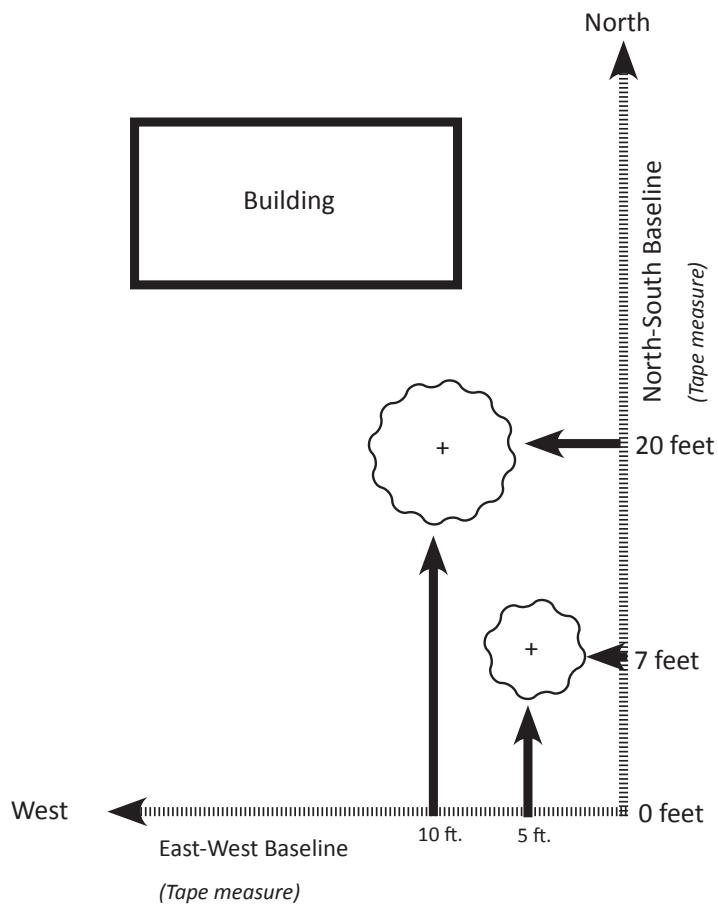
1. Extend the measuring tapes on the ground to use as baselines for plotting the location of objects. First, lay out a baseline measuring tape on the north-south axis. Use a directional compass (set compass bearing N or S depending on walking direction) and one measuring tape. Walk in a north or south line using a compass while laying the tape on the ground. Place surveyor’s flags at twenty-foot intervals to help mark the baseline. Use additional tape measures to lengthen the baseline, if desired.
2. Next, lay out a baseline on the east-west axis. Begin on the 0 mark of the north-south line and lay out the second baseline perpendicular to the first. Again use a directional compass (set compass bearing E or W depending upon walking direction) and one measuring tape. Walk in an east-west line using a compass while laying the tape on the ground. Place surveyor’s flags at twenty-foot intervals to help mark the baseline.
3. Transpose the baseline onto the grid paper map. Use a ruler to draw the baselines on the map. Tape the map on a card table or other flat surface in the mapping area.

Mapping Your Schoolyard (cont.)

Activity Description

1. Before going outside, review the mapping procedure on an overhead projector or

side, review the procedure on an overhead chalkboard.

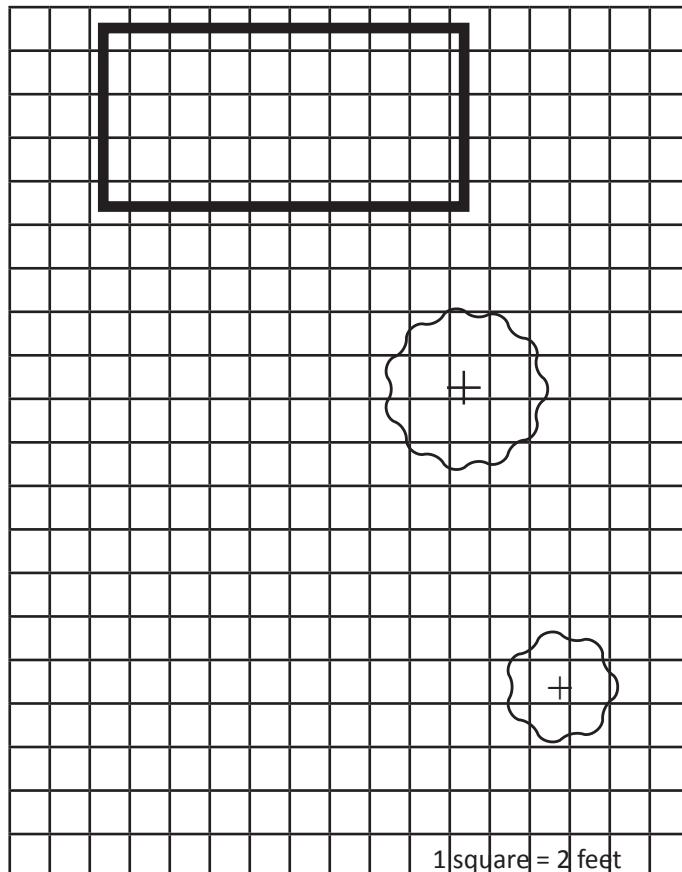


Tape measures laid out as baselines to locate trees.

2. Form teams of two. Go outside and practice locating objects using the compass. First, line up on the north-south baseline. One partner takes ten to twenty steps away from the north-south baseline while his/her partner stands opposite on the baseline. The partners should be facing each other. The person on the baseline sets his/her compass bearing to E and moves along the baseline until the partner is sighted exactly east on the compass. Look down and read the measurement on the baseline. This is the distance your partner is from 0 on the north-south baseline. Now trade places. Repeat.
3. Next, go to the east-west baseline and repeat this practice exercise, except set the compass bearing to N or S. When locating real objects, you must sight each object from the north-south baseline and the east-west baseline.
4. Now you are ready to locate trees, benches, and other objects within the designated area. You will do this by sighting objects from each baseline so that you take two measurements for each sighted feature. After you sight an object, place a flag next to it so others know it has already been located for the map.

Mapping Your Schoolyard (cont.)

5. Once you have taken the measurements, go to the map and mark the object on the map.
6. Once all objects have been sighted, create a final map.



Map on grid paper showing location of trees and a building.

7. As a group, discuss how the information you collected will inform your project.

Please note that this activity is written with two baselines joining at the 0 marks. Another option is to have the baselines intersect in the middle. The second option creates four quadrats. Each schoolyard is unique; try to lay out your baselines to minimize the number of baselines needed to map your site.

Extensions

- Digitize the schoolyard map.
- Create a 3-D model of the school grounds.
- Use tracing paper to make map overlays of soils, sun and shade patterns, and hydrology. See EP activity "Noting Notable Features."
- Identify and examine characteristics of existing plants on the school grounds. Activities may include designing a key for identification, measuring the diameter and canopy, and measuring the shade patterns cast by the plants at different times of the day (See EP Activity Suite "Tree Investigations").

Mapping Your Schoolyard (cont.)

Assessments

- Provide sighting measurements for trees, benches, signs, etc., and then locate these features on a map.
- Explain to another student how to set up a baseline.
- After experiencing this mapping method, describe alternate ways you might map a schoolyard.
- Describe the challenges you encountered mapping and how you might problem-solve solutions.
- Present your completed map to classmates and explain why the map is important to the restoration project.