

Outdoor Education Map

Howard County Public School System (2013)

Common Core Standard

6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

The Task

The 6th grade is planning its annual Outdoor Education trip. There will be six stations, which include: Orienteering, Arts & Crafts, Teambuilding, Sports, Canoeing and Eco-Games. These stations will need to be set-up around the camp property. Things to consider when placing the stations:

- Appropriate setting for the station
- The travel distance and proximity between stations
- Canoeing and Sports must both have a y-coordinate of 8
- Arts & Crafts is located 20 units away from the Barn and located directly south of it
- Eco-Games and Orienteering must both have a y-coordinate of -6
- Teambuilding must be located 14 units away from canoeing, and have the same x-coordinate

In addition to the stations, there is the dining hall, girls cabin, boys cabin, barn and bathrooms. The entrance to each of these amenities are located at the following coordinates:

- Dining Hall (12, -6)
- Girls Cabin (-14, -10)
- Boys Cabin (-14, 6)
- Barn (10, 12)
- Bathrooms (12, 0)
- Campfire (0, 0)

Facilitator Notes

1. Optional Opener: The teacher may choose to show pictures of outdoor education. In particular, if their school has been before, they could use pictures from past years.
2. The teacher will arrange students into a group of 2-3.
3. The teacher will read the scenario for the Outdoor Education Map to students as well as either posting the directions or passing out a copy for students.
4. Using the grid provided, have students plot the amenities of the campsite first and then place the stations.

5. Allow students time to perform the task.
6. Walk around the room to observe student strategies.
7. After students have completed their blueprint, have them answer the follow-up questions.
8. Have each group place their blueprint underneath the document camera and take turns justifying why they chose the location of their stations. Option: Answer one of the follow-up questions.

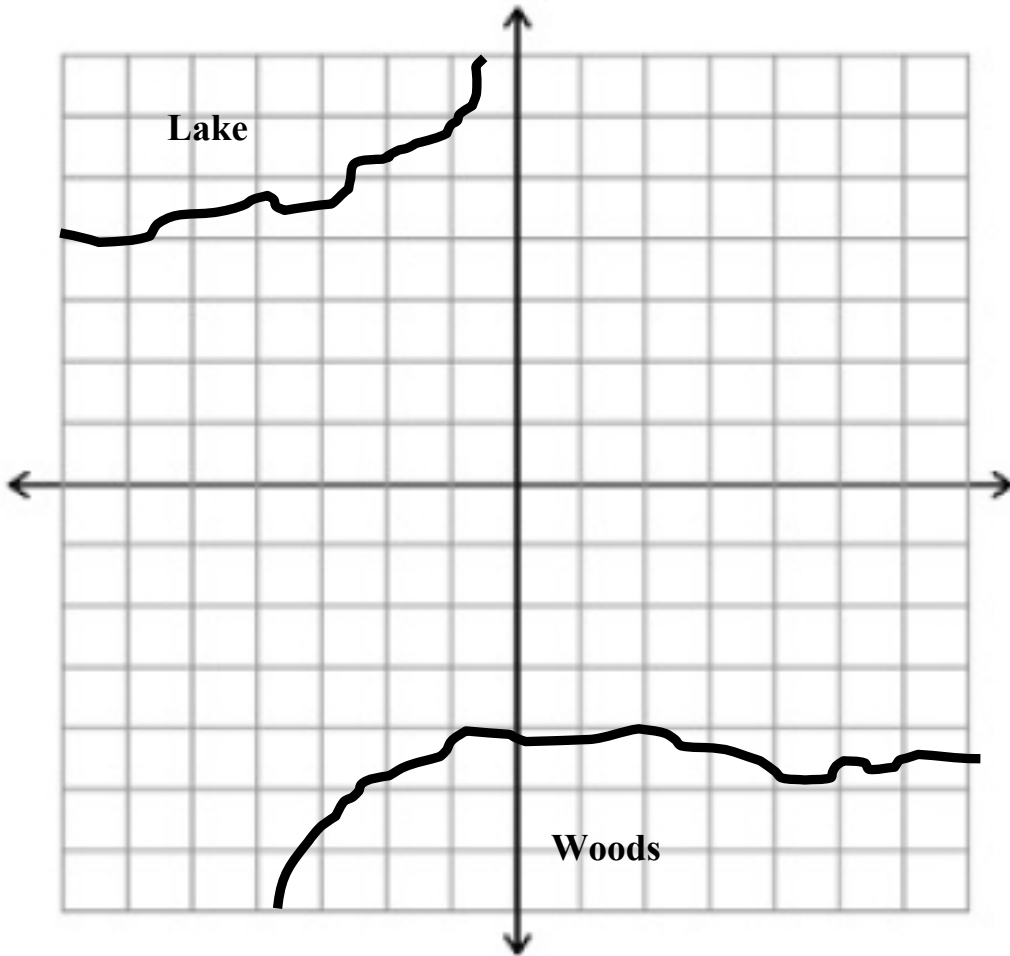
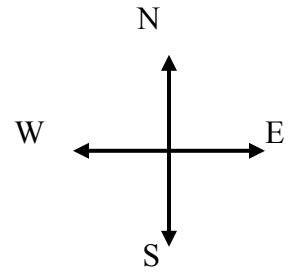
Suggested Materials: Graph paper, colored pencils

Follow-Up Questions

1. What strategy did you use when placing your stations?
2. What are the distances between each station? How did you determine the distance?
3. Which station is furthest away from the Barn? How many units?
4. There are 5 groups of students that will be rotating through the stations. Design the station rotation for each group so that no two groups are at the same station at the same time. What is the total distance traveled by each group after visiting all stations if they end up where they started?

*Further questions could include students finding the distances between certain stations and/or amenities.

Outdoor Education Camp Grid (This is just a sample grid, students could make their own)
Interval is for 2 units per grid line.



Source URL: <https://grade6commoncoremath.wikispaces.hcpss.org/Unit+2+The+Number+System>
Saylor URL: <http://www.saylor.org/courses/k12math006-math-grade-6/>

Attributed to: [Howard County Public School System]



Solutions

The following answers are based upon the grid on the next page. Answers within your own class will vary.

1. What strategy did you use when placing your stations? *Our group thought about placing the canoeing station by the lake and the orienteering station near the woods. In addition we placed the arts and crafts near the dining hall in case groups wanted to use a table. We also used the coordinates that were given to place certain stations.*
2. What are the distances between each station? How did you determine the distance?

Canoe to Sports: 16 units

Sports to Arts & Crafts: 18 units

Arts & Crafts to Orienteering: 6 units

Orienteering to Eco-Games: 10 units

Eco-Games to Teambuilding: 4 units

Teambuilding to Canoe: 14 units

I determined the distance by counting the number of grid spaces between stations. I also found the distance by finding the absolute value distance between stations if they were on the same axis. For example, between canoeing and sports $|-8 - 8| = |-16| = 16$ units.

3. Which station is furthest away from the Barn? How many units? *Teambuilding; 36 units*
4. There are 5 groups of students that will be rotating through the stations. Design the station rotation for each group so that no two groups are at the same station at the same time. What is the total distance traveled by each group after visiting all stations if they end up where they started? *Based upon the grid on the next page.*

Station	1 st Session	2 nd Session	3 rd Session	4 th Session	5 th Session	6 th Session
Canoeing	Group A	Group B	Group C	Group D	Off	Group E
Sports	Group E	Group A	Group B	Group C	Group D	Off
Arts & Crafts	Off	Group E	Group A	Group B	Group C	Group D
Orienteering	Group D	Off	Group E	Group A	Group B	Group C
Eco-Games	Group C	Group D	Off	Group E	Group A	Group B
Teambuilding	Group B	Group C	Group D	Off	Group E	Group A

Total Distance Traveled: $16 + 18 + 6 + 10 + 4 + 14 = 68$

One Possible Solution

