**Benchmarks of Indiana: Elevation**

By Carolyn Estell

**Time:** One class period

**Grade level:** 6–9

**Purpose:** Students will recognize geographical relationships across the state by creating a surface model from a set of data. The student will divide the state of Indiana into areas based on general elevation information. By analyzing this data, the student will practice calculating averages, percentages, and graphing skills.

**Materials:** Overhead transparency of the *NOAA GPS benchmarks* map (included on this CD-ROM), three different colors of overhead pens. Each student will need at least one copy of the Benchmark Map, standard pencil, three colored pencils, calculator, and the student worksheet.

**Vocabulary:** Benchmark, global positioning system (GPS), latitude, longitude, relief, geoid

**Procedure:** This activity can be completed individually or in pairs. It is recommended that you draw the first set of lines together as a class.

1. Pass out the student worksheet and the Benchmark Map. Have the students take out their supplies for the activity.

2. Explain to the students that we are going to draw the first couple of lines together and then they will work on completing the activity individually or in small groups.

3. Have the students find the county on the map in which they live. Have them place a star in that county.

4. Have the students look over the map noting the benchmark numbers in the 100-, 200-, and 300-meter range.

5. Discuss how to locate a point on the map and what information is necessary to do so.

6. Explain that you are going to divide the map into three regions: the 100’s, 200’s, and 300’s. Have the students locate the NE part of the map. Ask them what elevation ranges they see (Answer: 200’s and 300’s).

7. Explain that we are going to draw a line between the ranges and demonstrate, using the transparency, how to do this. Once everyone has complete this, have the students choose a color to shade in that 300-range area. Walk around and check to be sure everyone understands how to do this.

8. Have the students locate the NW part of the map. Ask what elevation ranges do the see (Answer 100’s and 200’s).

9. Again draw a line between the ranges and demonstrate using the transparency how to do this. Once every one has completed this have the student choose color to shade in that 100 range area. Walk around and check to be sure everyone understands how to do this.

10. Have the students continue to do this until all areas on the map are shaded.

11. Students will complete the Student worksheet by using the map they just created.
COMPLETE THE FOLLOWING QUESTIONS USING THE MAP YOU CREATED AND THE INFORMATION DISCUSSED IN CLASS.

1. What is the highest benchmark in the county where you live?

2. Which county has the highest benchmark in the state? Which has the lowest?

3. What does GPS stand for?

4. Draw and label two latitude lines and two longitude lines.

5. What part of the state has the greatest relief: the northern, central or southern? Justify your answer using information from your map.

6. There are 92 counties in Indiana. What percentage of counties have elevations in the 300-meter range? What percentage of counties have elevations in the 200-meter range? Calculate the percentage of counties that have elevations in the 100-meter range?

7. Add your percentages together. Do they add up to 100%, yes or no? If they do not, why do you think this occurred?

8. Locate Marion County. Calculate the average elevation of that county.

9. Use the percentage you calculated from Question 6 and construct a bar graph displaying your data in the space below. Be sure to label your graph completely.