

Expanded Form and Place Value of Numbers using GPS

Summary

Students will explore place value of whole numbers. They will use numbers found at 4 different waypoints using a GPS unit.

Time Frame

4 class periods of 30 minutes each

Group Size

Small Groups

Life Skills

Thinking & Reasoning, Communication

Materials

GPS Unit, Predetermined Waypoints, 10 Envelopes, 1/2 in. square Graph Paper, Place Value Paper, Scissors, Pencils

Background for Teachers

This activity helps students to become more familiar with place value of numbers and promotes understanding of writing 4 digit numbers with thousands, hundreds, tens, and ones placement. The 4 numbers used in this activity are determined by using GPS for random selection.

Student Prior Knowledge

Prior to this lesson the class should have a basic understanding of GPS and how to use functions such as finding waypoints.

Intended Learning Outcomes

3. Reason mathematically. 4. Communicate mathematically. 6. Represent mathematical situations

Instructional Procedures

First 30 Minute Lesson- Review basic functions of GPS with the class as a whole. Go over the "how to's..." so students feel comfortable using a GPS. Make sure everyone is familiar with finding waypoints. Have the class find three or four waypoints together (on school grounds) so they know how it is done. On your own time, divide the class up into small groups of 3 students. Make sure there is at least one student who can act as leader within each group.

Second 30 Minute Lesson- Have students work with graph paper. Have them draw and cut out different units for placement. Use different colors of paper for different place values. A single square stands for the number one. Use red for the ones place. A line of ten squares represents 10. Use yellow for the tens place. A large square made of 10 squares wide by 10 squares high represents 100. Use blue for the hundreds place. And a long line of 10-100 unit squares equals 1,000. Use green for the thousands place. Give them time to cut out all the necessary pieces for the next activity; nine of each place value.

Third 30 Minute Lesson- Before hand, place the numbers 0,1,2,3,4,5,6,7,8, and 9 in envelopes and

place them in predetermined waypoints all around the school grounds. Have all ten waypoints for these numbers preprogrammed and named in the GPS units. Do not place them in order when programming so that the students have no idea what numbers they will be selecting. Each group will select 4 waypoints at random at different times throughout the day depending on how many GPS units are available.

Fourth 30 Minute Activity- Once the waypoints have been located and the envelopes collected. Each group is to identify which numbers they have in their possession. The group will then take these 4 numbers in any order they choose to make up 3-4 digit numbers. For example, if they found the numbers 2, 6, 7, and 9, they could possible choose 6729, 7296, and 2967. They can choose any 3 numbers they want. Then after deciding on the 3-4 digit numbers, the group must demonstrate the place values for each number using the graph paper cut-outs from the prior lesson. They can write there number on a sheet of construction paper and then glue the appropriate graph squares to represent the number. They will write and paste all three numbers and graph squares on this one sheet of paper. Once all the papers are completed the groups can present their experience to the class (finding waypoints, discovering numbers at waypoints, chosing 3-4 digit numbers, and showing the value of those with the graph paper squares. Note: Depending on the number of GPS units available you could have one group go out at a time and even spread the activity out over 2 or 3 days if necessary. Make sure to replace envelopes at waypoints from the prior group so no one arrives at a waypoint with no envelope there.

Strategies for Diverse Learners

If a group is having difficulty with the activity (the 4 digit numbers are too complicated), you might let them try doing a 3 digit number for the first number then add the thousands place on the second or third try.

Extensions

If the GPS is too confusing for some children, you could have them use dice to roll their numbers rather than finding waypoints. But have them try using the GPS before resorting to this option.

Assessment Plan

Performance will be assessed as each lesson and activity progresses. Watch for participation during GPS lesson. Ask questions from all students to insure understanding. Make sure students understand what they are doing as they draw and cut graph squares for place values. Assist students when necessary while locating waypoints. Show an example paper with 4-digit numbers represented with graph squares for students to refer to as they complete the final assignment.

Rubrics

[GPS Math Assignment](#)

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