



Counting Beads and Bobbles

Objective:

Students will experiment with a sampling technique and form inquiries about effective sampling techniques.

Concept:

It is important to have a uniform sampling tool and guidelines, protocols, for selecting how and where to sample so that data that is collected is an accurate representation of what was sampled and can be compared with data collected in other areas using the same protocol worldwide.

Materials:

- ⊙ Bucket of beads and plastic shapes
- ⊙ Slide holders or index cards with center cut out
- ⊙ Large cafeteria trays
- ⊙ Handout: Beads & Bobbles Data Sheet

Introduction:

Divide students into groups of 3-5 people.

Distribute cafeteria trays with various beads and bobbles on them to each group of students.

Tell them they will be counting the number of a certain type of bead found on their "beach" tray. Each beach tray represents a section of a beach and their goal is to find out how many of a certain kind of bead can be found on the beach. Each group needs to get an estimate of the total number of these beads found on their "beach" tray.

Give them 30 seconds and tell them to begin counting.

Activities & Procedures:

After 30 seconds discuss the results with the students.

Brainstorm ideas for a more efficient way to sample their "beach."

Introduce the idea of "random sampling" to get an estimate of population density. Discuss possibilities for making the sampling uniform.

Introduce the slide holder which will represent a quadrat - a common unit for sampling - as a means of getting a "population" estimate.

Pass out the data sheet. Instruct the students to randomly toss their quadrat onto their "beach" tray and count the number of beads in the quadrat.

Continue to follow the instructions on the Beads and Bobbles Data Sheet.

Wrap-up:

When everyone has finished share your results and discuss the follow-up questions as a class:

1. How close was your answer to your estimate?
2. What would make the instructions clearer?
3. Did we really answer the question of how many beads are in on our "beach"? If not, how could we?
4. How does this relate to how you might count the number of snails on a seashore?

Extensions & Lesson Connections:

This lesson is designed as a preface to the intertidal monitoring lessons included in Unit 3.

Evaluation:

Assess data sheets for completeness and accurate computation. Evaluate student participation and cooperation during group work.





Beads & Bobbles Data Sheet

1. Estimate how many beads you think are on the beach. _____
2. Toss a slide holder (your quadrat) onto your beach tray. _____
3. Count the number of beads in the quadrat. _____
4. Repeat steps 2 and 3. Record the number of beads. _____
5. Repeat steps 2 and 3. Record the number of beads. _____
6. Add the number of beads in the three quadrats (steps 3-4). _____
7. Divide the answer in step 6 by the number 3 to get the average number of beads in a quadrat.

$$\underline{\hspace{2cm}} / 3 = \underline{\hspace{2cm}}$$

8. Measure the area of the beach tray. _____
9. Measure the area of the quadrat. _____
10. Divide the answer on step 8 by the answer in step 9 (area of beach tray/area of quadrat) to get the total number of quadrats in a beach tray.

$$\underline{\hspace{2cm}} / \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

11. Multiply the answer in step 10 by the answer in step 7 (number of quadrats on a tray times the number of beads per quadrat) to get the average number of beads on a tray.

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

12. Multiply the answer in step 11 by the number of trays on the "beach" to get the average number of beads on the beach.

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

