

Estimating Blades of Grass in a Field

5th Grade Garden Lesson

Objective: Students will find the total number of blades of grass in a given field by measuring length and width in meters, counting blades of grass in one square $10 \times 10 \text{cm}^2$, and calculating area in centimeters. They will learn how multiple random samples increase the validity of an estimate and determine how close (or how far off) their own “eyeball” predictions were.

Materials:

Garden stakes, caution tape or twine to mark off the area to be measured (area should be large enough for students to be able to work comfortably inside) OR map of school football or other field with measurements already determined in meters *per student...*

- clipboards with handout and pencils
- meter sticks and/or meter long cut lengths of string/rope
- cardstock paper/lightweight cardboard cutouts of $10 \text{cm} \times 10 \text{cm}$ squares so cutout can be placed on field and grass is visible in the inner empty square for counting

Optional: Exercise is based on a chapter from the book Because of Mr. Terupt by Rob Buyea. If students are reading this book in ELA, then further discussion of the book can also be woven into lesson. See discussion section below. Bring additional slips of paper for jotting down responses.

Procedure: 40 min class/20-22 students

*Students work together to measure greater area but count grass blades alone.

*Mark off grass field in advance with stakes/twine if no visible border exists.

5 min Intro/Overview

Prompt students' memory of book (or previous math unit on multiples of ten/place value!) and introduce activity.

Pass out clipboards. Have group stand back from some distance to view the entire field and jot down an estimate of how many blades of grass they think there are in the area. Explain that they will first all work together to measure the entire field, then work independently to fill in the rest of their worksheet. Students will only fill out the first page outdoors and do all the calculations on back page later in math class! This part is simply about collecting data. Pass out meter sticks/lengths of string.

20-25 min Process

1. As a class, students work together to lay out meter sticks/string lengths back to back to measure entire area (length and width). Everyone agrees on and jots down these totals. Together everyone converts meters to centimeters by multiplying by 100.

2. Pass out 10x10 cut out squares and demonstrate how to individually take random data samples anywhere *inside* the field. Remind students that when counting blades of grass they should also count weed leaves (or dead grass leaves!) as blades. Note: unless being done on synthetic turf, sections of grass will contain other living matter such as blown in leaves, insects, pebbles, dirt, twigs, etc.
3. Once every student has counted at least one square of grass regroup some distance from field. Ask students to look back at their original estimate and if they want to change it now based on their data collected so far.

5-10 min Wrap-up/Discussion

sample questions for discussion...

1. Why do you think Mr. Terupt gives his students this particular challenge? How do they react to it? Which of his students like this challenge the most/least? Does he give them other challenges in class? Which ones would you like to do in your class?
2. Why do you think his students like him so much? What qualities do you think make a good teacher? A good student? How might Mr. Terupt define the word "good"? Does he ever think a student is "bad"?
3. Do you think Mr. Terupt has "favorites" in his class? Which student do you think challenged him the most?
4. Have you ever had somebody in your own life who was like Mr. Terupt and saw you for who you really are?
5. If you could share one piece of advice with your own teachers about what you wish were different about school, what would it be? What do you wish they knew about YOU? (this question could be answered anonymously on slips of paper if students don't want to share out loud. Slips then later shared with class teachers.)

*****Collect clipboards/materials and hand worksheets to class math teacher *****

Follow-up:

Later that day or next, students complete back side of worksheet in class with their math teacher. Alternately, worksheet can also be completed outside on the field time permitting. Further expansion activities possible for estimating other large amounts such as populations, leaves or pine needles on a forest floor, pebbles in a gravel drive, etc. Prompt students to imagine other ways in which taking smaller random samples allows for estimating large totals.