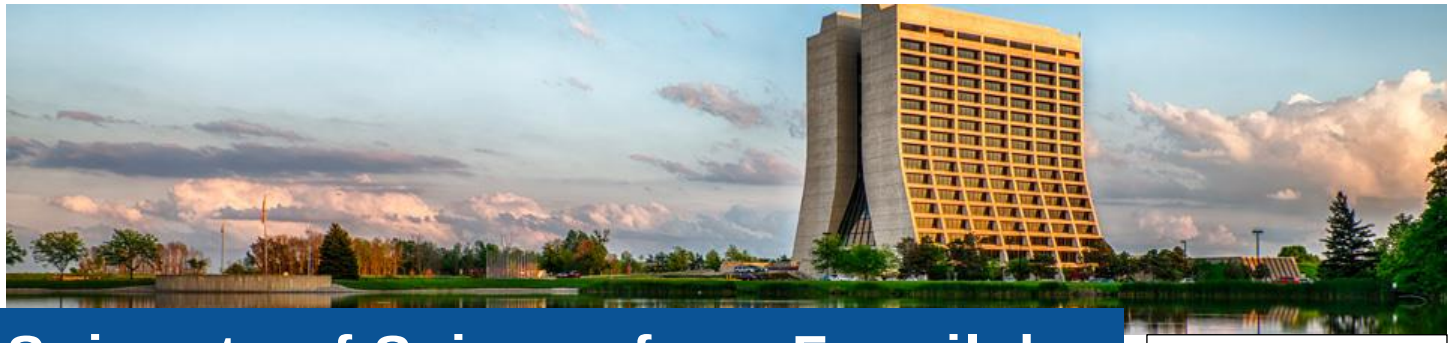

# Snippets of Science from Fermilab

PS 2 (3-8) Explore

## MEASURING SMALL

**Challenge**: Can you come up with a method to measure the smallest of objects?

**Goal**: Use a variety of methods to measure the size of very small objects as accurately as possible.

**Fermilab Connection**: Fermilab scientists use high-energy particles to investigate incredibly small objects. How many methods can you come up with to measure the tiniest objects you can find?

### Preparation

Practice measuring various size objects with a metric ruler (ruler template linked in materials section). Once your student has mastered this skill, move on to the activity.

### Procedure

1. Measure the size of a mustard seed (or similar sized object) and record your findings on the data sheet.
2. **Hint:** If having difficulty with the measurement, line the seeds up on the ruler to see how many fits in 1 cm, then divide to find the average size.
3. Find the smallest object inside or outside of your house that you can measure. Take 5–10 minutes and make a list.
4. List of ideas:
5. Discuss why it might have been difficult to use a ruler to measure the small objects, how they estimated the estimates and brainstorm other ideas for measuring small objects.

**GRADE LEVEL**
Grades 3–8 with modifications

**MATERIALS**
- Metric Rulers
- Hand lenses or cell phone camera
- Mustard seeds or something similar in size

**Fermilab Resources:**
Click on the linked resources!

Particle Accelerators

Main Injector Virtual Tour

Accelerator Science: Circular vs. Linear

Data Sheet:

1. Measure a mustard seed. Record your data: _____

2. Describe the method you used to measure the mustard seed.

3. Find the smallest measurable object in your house (or outside, with permission!) and measure it. Be as accurate as possible, using the smallest unit on your ruler.

    a. Identify the object: _____

    b. Describe the smallest object you selected to measure.

    c. Why did you choose this object from the list you generated?

    d. Record the measurements of your object:

        Length:_____ Width:_____ Height: _____

**Conclusion:**

1. What successes and difficulties did you experience while doing this investigation?

    a. Describe how you were able to overcome the difficulties you experienced.

2. Give an example of how this investigation relates to the work physicists do at Fermilab.