

Sizing Atoms to Scale

Objective: To conceptualize the extremely small size of atoms by using comparisons to familiar objects.

INSTRUCTIONS: Complete the steps below. Put all measurements and calculation answers in an organized Data Table(s) on a separate sheet of paper. Show all correct calculations below your Data Table. Label all calculation to show what is being found. And finally, answer the two questions at the end.

Some Suggested Materials:

- Paper
- A grain of salt
- Scissors (hmmmm....)
- Metric ruler
- Phone camera (hmm...)
- Internet or textbook

STEP 1: Warm Up Step

- Determine the number of sheets of paper it would take to make a stack of paper as high as your (or your lab partner) is tall.

STEP 2: Atoms & a Grain a Salt

- Determine the number of number of sodium atoms that could fit across a grain of salt.

STEP 3: Atoms & a Sheet of Paper

- Determine the number of number of sodium atoms that could fit across the thickness of one sheet of paper.

Hints:

1. There are a couple of hints buried in the suggested materials list.
2. Make sure you measure in sig figs!
3. Conversion factors are your friend! No answers will be accepted without work using conversion factors.
4. Make sure you put UNITS on EVERYTHING!!
5. There may also be hints in the sample Data Table.

Sample Data Table - MEASUREMENTS

Object	# items measured	Measured Size (___)	Diameter of Na atom (mm)
(Lab partner)	1		
Salt grain	1		
Paper			
Sodium atom			

Sample Data Table - CALCULATIONS

Object	# Sheets of Paper Tall	# of Atoms Across Grain of Salt	# of Atoms Across Thickness of Paper
Paper			
Sodium atoms			

Discussion Questions (ON BACK!)

Discussion Questions:

1. Can we see individual atoms with a regular microscope? Why or why not? Hint - it's a **micro**scope.
2. Based on this activity, how do scientists study atoms if they are so small?