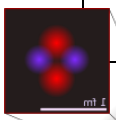
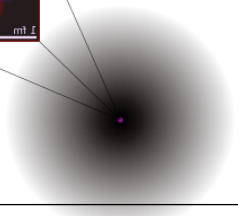
How BIG is an Atom? Name Period

Science 8 – Mrs. Plyter plyter.com/science





Helium Atom
Diameter = 100 pm or 0.0001 μm

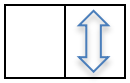
__I. Background: If you cut a 28 centimeter (11 inch) strip of paper in half lengthwise 31 times, you will have with a piece of paper about the length of the diameter of an atom.

__II. Prediction: I can cut a 28 cm (11 inch) strip of paper in half ____ times to get a paper about _____ long.

----Tape or glue your cut paper strips here, in order, here--↓--

__III. Procedures:

__1) Cut the margin off of this or any 11 inch paper. →
__2) Fold your paper strip lengthwise in equal halves. Cut.
__3) Tape or glue one half of your strip above.
__4) Fold and cut the other half into equal halves.
__5) Attach one half just under your other saved strip(s).
__6) **Do not turn your paper. ALL CUTS MUST be go the SAME WAY.**



__7) Continue to fold, cut and attach half of your strip, until you can cut no more.
__8) Number your cuts (strips).

__IV. Observations: How many cuts were you able to cut? _____

__V. Analysis and Conclusion:

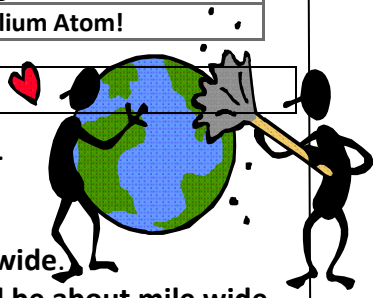
After my ___ cuts, the paper is about ____ long, or the size of_____.
It would take ____ additional cuts to be the size of an atom; ____ more cuts for the nucleus.

Cuts	Length- Centimeters (cm), millimeters (mm) or Micrometers (μm)	Length- Inches (“)	Example
Cut 1	14.0 cm (0.01 m)	5.5"	Child's hand, pockets
Cut 2	7.0 cm	2.75"	Fingers, ears, toes
Cut 3	3.5 cm	1.38"	Watch, mushroom, eye
Cut 4	1.75 cm	0.69"	Keyboard keys, rings, insects
Cut 6	0.44 cm	0.17"	Poppy seeds
Cut 8	1 millimeter (mm) 0.001 m)	0.04"	String, Heavy Sewing Thread Congratulations!
Cut 10	0.25 mm	0.01"	Still cutting? Thin thread.
Cut 12	0.06 mm	0.002"	Microscopic low power range, human hair
Cut 14	0.015 mm	0.006"	Width of paper, microchip components
Cut 18	1 micrometer (μm) 0.000001 m	0.0004"	Microscope at 500X, bacteria
Cut 19	0.5 μm	0.000018"	Visible light waves
Cut 24	0.015 μm	0.0000006"	Electron microscope range, membranes
Cut 31	**0.0001 μm**	**0.0000000045"**	**About the size of the Helium Atom!**

VI. And…..Some comparisons that have been suggested:

Apple

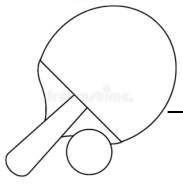
__1) If an **atom** were the size of an **apple,** the apple would be the size of **earth**.



__2) ……..41 cuts would be about the size of an atom nucleus!

If an **atom nucleus** were a ping pong ball, an **atom would be over a mile wide.**

** **So, your oxygen atom model you made for the H_2O in the ceiling, should be about mile wide.**



__3) Scientists use advanced technology to explore electrons and quarks that are at least 9,000 times smaller than a nucleus. They study these smaller things without seeing them directly.

Cut ✂ ↓

Cut ✂ ↓