A Giant Atom

Procedure

1. **Collaborate** Work in small groups. Use the tape measure to measure a 3.2 m length of string. Tie the ends together to make a loop. Lay the loop of string on the floor to create a circle. Place a sticky note in the middle of the circle.

2. **Use Models** Use a very sharp pencil to make a tiny hole in the center of the sticky note. The string circle represents an atom. The pencil hole in the sticky note represents the nucleus of the atom.

3. **Measure** Use a metric ruler to estimate the diameter of the pencil hole in millimeters. Use the tape measure to estimate the diameter of the atom in millimeters. Record both measurements on the lines below.

4. **Use Numbers** Write a ratio in fraction form to compare the diameter of the nucleus to the diameter of the atom in your model.

Conclusion

Write the answers to the questions below.

1. **Analyze Data** The diameter of an actual nucleus is about one ten-thousandth \( \frac{1}{10,000} \) of the diameter of an actual atom. Using the scale of your model, what would the diameter of the pencil hole have to be? (Hint: Divide the diameter of your model atom by 10,000.)
2. Infer Almost all of an atom’s mass is located in its nucleus. What can you infer about the rest of the atom?

Investigate More!

Design an Experiment  Pencil “lead” is mostly carbon. Draw a pencil line on a piece of paper. Use a ruler to measure its width. Research the size of a carbon atom. Then estimate the number of carbon atoms that would fit across your pencil line.