

Atomic Model Construction

Summary

Students create models of atoms. Then as a class they compare the various aspects of the atoms including; relative size, charge, positions of subatomic particles, and identity of atom based on proton, neutron, and electrons.

Time Frame

2 class periods of 45 minutes each

Group Size

Individual

Materials

- [student page](#)
(attached)
- Periodic Tables
- Rings in various sizes (could be wire, wooden, embroidery hoops, etc.)
- Styrofoam balls
- Small objects such as pompoms, jelly beans, gum drops, mini marshmallows
- Optional - fishing line or thin string

Instructional Procedures

Hook activity: To give students an idea of the shapes and scales of atoms, link to [David's Whizzy Periodic Table](#) for a fully interactive periodic table. This table allows teachers and students to explore moving atomic models of each of the first 36 elements. Click on any element's chemical symbol to analyze it. Zoom in on the nucleus to show the closely compacted structure and note how far the electrons orbit from it. The table also provides electron shell configurations and electron potential energies. Remind students of the limitations of the modeling system: electrons follow three-dimensional spherical paths, not simple circular ones as depicted. Also remind them that protons and neutrons are around 2000 times more massive than electrons.

Give the students assignments for their models, make sure that you have a student assigned to the atom, ion, and isotopes of the various elements above #11 Sodium

The student then finds the number of protons, neutrons and electrons in their atom.

Student constructs a three dimensional model of the atom using the styrofoam ball as the nucleus with the appropriate number of small objects (pompoms, for example) attached to it to represent protons and neutrons. The electrons are attached to the rings in the configuration matching the electron arrangement of the atom as calculated by the student. 5.

can display them either on a table or hanging from the ceiling. You can organize models.

Anyway, you wish. Then have the students make observations, and collect data.

This project can work with one class, however results are better if models are combined between multiple classes.

The models are fun for the students to display within the classroom and they will serve as reminders of the atomic structure as more complex issues are encountered.

If the students wish to make mobiles out of their creations, hang the models from the ceiling or other support with the fishing line or string.

Assessment Plan

Scoring Rubric

:

1. Accuracy of model.
2. Students describe structure of another atom.
3. Students critique other students' models for accuracy.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)