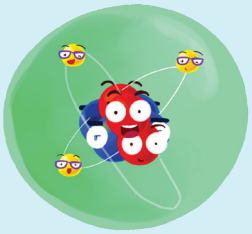
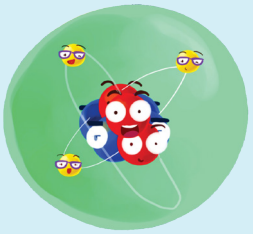


Acting Out Atoms



Grades: Pre-K–4

Subject: Atoms, ions, positive and negative charges

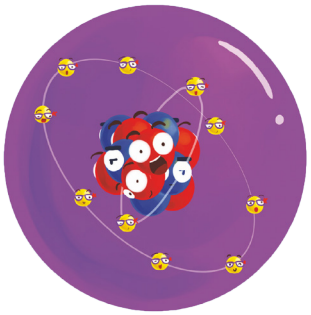
Skills: Collaboration, active listening, abstract thinking

NGSS: K-2-ETS1-2: Engineering Design

Materials: *My First Science Textbook* series, construction paper in three different colors, ample floor space

BACKGROUND

Positively charged protons and neutral neutrons sit in the center of the atom and make up its **nucleus**, while negatively charged electrons race around the outside of the atom. Because protons are positively charged and electrons are negatively charged, they are constantly attracted to each other. Neutrons stabilize this attraction. In its default state, when an atom is neutral, it has the same number of protons and electrons, and the charge is balanced. However, this is not always the case—an atom that gains or loses an electron is called an **ion**. In some instances, an atom might gain an electron and become a **negative ion**. In other cases, an atom might lose an electron and become a **positive ion**.



WARM-UP

To provide context for this activity, show students photos of atoms from the book. Point out the protons and neutrons in the middle, then the rings on which the electrons are orbiting. Students should be able to understand that electrons orbit the nucleus with the protons and neutrons like planets orbit the sun.

ACTIVITY

1. Divide students into protons, neutrons, and electrons. The number of protons and electrons depends on the number of students in the class, but there should be an even number of protons and electrons.

2. Have students take a piece of construction paper (with each color corresponding to a particular subatomic particle) and write down which particle they are in big, bold letters. Students who are protons and electrons should put a plus (+) or minus (-) symbol on their signs as well. Advise them to hold the signs clearly in front of them during the activity.

3. Students who are assigned to proton and neutron groups will cluster together in the center of the classroom. Tell the class that the protons and neutrons make up the atom's nucleus.

4. Have the sudents who are assigned to the electron group spread out in a circle and begin walking around the proton and neutron students. Inform the class that these students represent the electrons that race around the nucleus.

5. Instruct the proton and electron students to pause and face each other. This pause presents a moment to explain that protons and electrons are always attracted to each other because of their opposite charges.

BONUS ACTIVITY

For older students who are able to more firmly grasp the structure of an atom and the atoms' charges, the following steps can be added to explain what may happen when atoms gain or lose electrons.

1. Ask one of the students who is in the electron group to step out of the circle. Explain the process of creating a positive ion to students.

DISCUSSION

Refer back to the books in order to aid students in conceptualizing what they learned about the structure of atoms through physical movement. Ask students to think about and verbalize points in the books in which they first saw the structure of atoms, the subatomic particles' charges, and the ways in which atoms change when they gain or lose electrons. If students seem stuck, turn to specific points in the book to jog their memories. Was it easier or harder to learn about the behavior of subatomic particles by acting it out rather than reading about it? What do they still not understand about particles and their role in the atom after doing the activity, and what further questions have come up?

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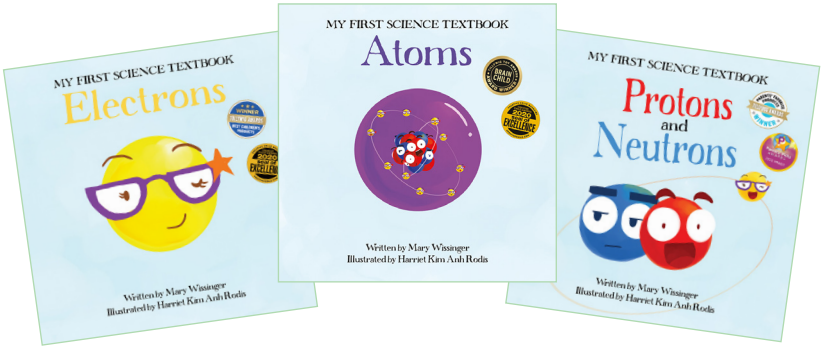
Activity adapted from study.com



This activity is an excerpt from the Teacher's Guide to:
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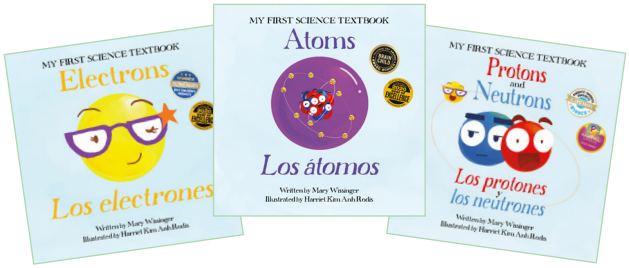

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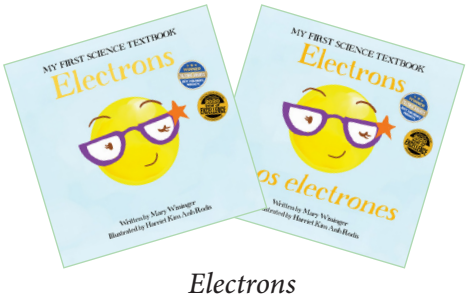

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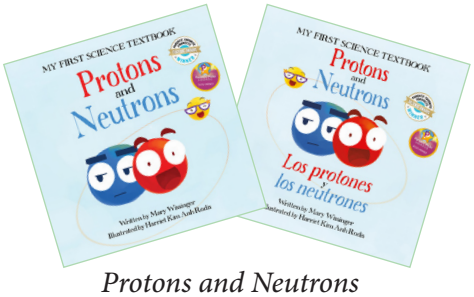

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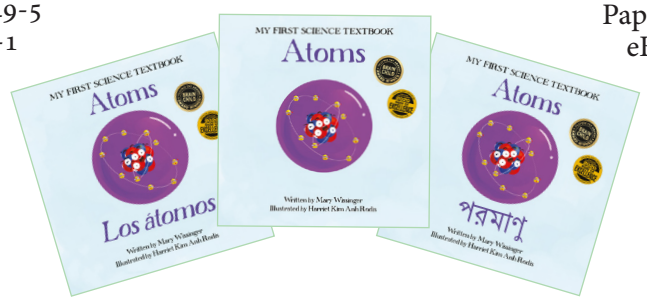

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