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Rules of the Mogwai

Lab Safety and Chemical Properties

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Published by *K20 Center*

Grade Level	6th – 12th Grade	**Time Frame**	2-3 class period(s)
Subject	Science	**Duration**	100 minutes

Essential Question

How do scientists determine the safest way to handle lab chemicals and materials, and how do they communicate this?

Summary

In this lesson, students will analyze real Safety Data Sheets for common household chemicals, discussing the sheets' most important features. Then, working with groups, students create their own lab safety posters, integrating the safety guidelines they discussed with their peers. This lesson is intended to help students understand lab safety in the science classroom. It also functions as a great stepping point for moving into the standard tagged below, addressing the properties of matter related to chemicals used in the science lab.

Snapshot

Engage

Students watch a video about the “Rules of the Mogwai” (from "Gremlins") and brainstorm common safety rules to discuss with their peers.

Explore

Students evaluate their prior knowledge of chemical safety with a Card Sort activity. Then, students analyze real Safety Data Sheets (SDS) to determine proper handling, storage, and safety information for various household chemicals.

Explain

Students participate in a class discussion to highlight the key features found in SDS sheets.

Extend

Working in groups, students create safety posters for specific chemicals, detailing important information that might be needed in the event of an emergency.

Evaluate

Using the Gallery Walk strategy, students utilize a rubric to evaluate each their peers' safety posters.

Standards

Next Generation Science Standards (Grades 6, 7, 8)

MS-PS1-2: Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

Attachments

- Lab Safety Poster Rubric—Rules of the Mogwai - Spanish.docx
- Lab Safety Poster Rubric—Rules of the Mogwai - Spanish.pdf
- Lab Safety Poster Rubric—Rules of the Mogwai.docx
- Lab Safety Poster Rubric—Rules of the Mogwai.pdf
- Lesson Slides—Rules of the Mogwai.pptx
- SDS Resources—Rules of the Mogwai - Spanish.docx
- SDS Resources—Rules of the Mogwai - Spanish.pdf
- SDS Resources—Rules of the Mogwai.docx
- SDS Resources—Rules of the Mogwai.pdf
- Safety Symbol Card Sort—Rules of the Mogwai - Spanish.docx
- Safety Symbol Card Sort—Rules of the Mogwai - Spanish.pdf
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- Safety Symbol Card Sort—Rules of the Mogwai.pdf
- Stop and Jot—Rules of the Mogwai - Spanish.docx
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- Stop and Jot—Rules of the Mogwai.pdf

Materials

- Lesson Slides (attached)
- Lab Safety Poster Rubric (attached; one per group of students)
- Safety Symbol Card Sort (attached; one per group of students)
- SDS Resources (attached)
- Stop and Jot handout (attached; one per group of students)
- Student devices with Internet access (optional)
- Poster paper
- Art supplies (markers, paper, etc.)

Engage

Teacher's Note: Standards

The standard tagged for this lesson is a 7th Grade Science Performance Expectation. This lesson is a safety lesson, and as such, it does not specifically address that standard. Rather, it functions as a lead-in to properties of matter and chemical reactions.

Use the attached **Lesson Slides** to guide the instruction, beginning with **slide 3**. Share the lesson's Essential Question: *How do scientists determine the safest way to handle lab chemicals and materials, and how do they communicate this?* Ask students to consider these questions as they explore the main ideas presented in the lesson. Move to **slide 4**. Play this video, also linked on the slide, and show students the picture of a Mogwai and a Gremlin on the slide.

Go to **slide 5**. Ask students to brainstorm with an Elbow Partner what common safety rules they have have often heard growing up.

Sample Student Responses

Students may come up with rules like "Look both ways before crossing the street," "Wait an hour after eating before swimming, or "The '5-second' rule."

Ask students to brainstorm with an Elbow Partner what safety rules they have heard in science class.

Sample Student Responses

Students may come up with rules like "Wear protective eyewear," "Tie your hair back," or "Wear closed-toe shoes in the lab."

Move to **slide 6**. Ask students if they can name the item displayed on the screen. Do the same with **slide 7**, then **slide 8**. Then, ask students if they noticed anything the three items had in common.

Sample Student Responses

The three items in the pictures are a gas tanker, a pool/patio cleaner, and a car battery. Students should notice that all three items have safety symbols and warnings on them.

Explore

Teacher's Note: Card Sort Preparation

Before you begin this phase of the lesson, print and cut out the attached **Card Sort** activity (or have students do so). You'll need one set for each group of 3–4 students. Consider storing these cards in individual plastic bags or envelopes.

Go to **slide 9**. Place students in groups, and give each group a prepared set of the attached **Card Sort**. Using the Card Sort strategy, have students match the safety symbols to the category of the hazard and the description of the hazard. One example is shown on the slide. When students feel they have matched the three groups correctly, inform them that the Card Sort will be revisited later, so they should keep their groupings together but can put the cards aside for a little while.

Teacher's Note: Card Sort Answers

Be sure not to reveal the correct sorting method to students yet, as this Card Sort will be revisited later in the lesson.

Teacher's Note: SDS Sheet Prep

The next activity in this phase requires students to examine real SDS sheets. If students have access to devices with Internet connectivity, you can share the SDS Resources document with students electronically. Otherwise, you will need to print out the SDS sheets linked in the Resources document prior to beginning the lesson.

Go to **slide 10**. Have each group access a different SDS from the list (or give each group a copy of a different SDS sheet). Additionally, give each group a copy of the attached **Stop and Jot** handout. Vary which SDS you give to each group to minimize overlap between groups. Have students analyze their SDS document according to the Stop and Jot strategy and the handout, which features guiding questions for students to answer as they read their SDS. When finished, have each group switch its SDS with another group, then analyze the new SDS. Repeat until all groups have viewed and analyzed an SDS for three different materials.

Explain

Begin this phase by asking students the following question: "What were some of the key features you found on all the documents?"

Sample Student Responses

Students might mention methods of storage, First Aid protocol, common names for the materials, etc.

Go to **slide 11**. Tell students that all the sheets they viewed should have the same 16 categories that inform the user of safety information about the material. Use **slides 12 and 13** to point out some of the categories on the example sheet. Be sure to specifically mention the safety symbols on **slide 13**. Ask students, "What is the point of these safety symbols? How are they beneficial?"

Sample Student Responses

Students should point out that the safety symbols quickly and easily identify for the handler what hazards are associated with using a material. They are meaningful with, or in place of, the written information in an SDS, because the written language may not be easily understood or accessible at the time of an emergency.

Ask students to revisit their Card Sorts. Go to **slide 14** to reveal the answers to the Card Sort. Let students look over these answers.

Optional: Card Sort Answers

Consider passing out a copy of the correct answers to this Card Sort or allowing students to re-arrange and tape the final Card Sort order into their notes. This will supply students with a resource for future reference.

Go to **slide 15**. Ask students, “If we were to create and display safety posters for hazardous materials we commonly use, what information would we include?” List the students’ responses on a whiteboard or projector space. Ask the students to consider the sheets they viewed earlier. Help them come up with the list as needed. What students note here will function as the requirements for students’ final safety posters.

Sample Student Responses

Students may note requirements such as First Aid measures, storage guidelines, hazards, common names or chemical names, safety precautions (e.g., goggles, gloves), and cleanup/disposal requirements.

Extend

Go to **slide 16**. Invite students to work with their groups to create a lab safety poster for the last material for which they saw the SDS in the Explore activity.The poster should include all of the important information from the list created during the Explain phase. Encourage students to exercise their own creativity in making their posters creative, colorful, and informative. To begin, go to **slide 17**, and hand each group a copy of the attached **Lab Safety SDS Poster Rubric** to guide their poster creation. Allow groups enough time to construct their posters.

Evaluate

Place groups' posters around the room. Move to **slide 18**. Make sure each group has three copies of the **Lab Safety SDS Poster Rubric**. Ask students, using the Gallery Walk strategy with their groups, to view a classmate's poster together for three minutes and provide feedback on the rubric. Each group should stand at a different poster. Once each group has done so, ask students to leave the filled rubric at the base of the poster and rotate to a different poster. Repeat the process until all three rubrics have been filled and left with the appropriate posters.

Once the Gallery Walk is complete, have students review the feedback from the rubrics and make adjustments to their posters as needed. When they are finished, have students use the same rubric to give a summative assessment of their own final product.

Optional: Additional Extension

As an optional extension to the final activity, you might choose to have students research where and how their chemicals are used in industry and business.Have students share this research with safety officers from local businesses through a presentation or report.

Resources

- K20 Center. (n.d.). Card Sort. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f506976b
- K20 Center. (n.d.). Elbow Partners. Strategies. https://learn.k20center.ou.edu/strategy/ccc07ea2d6099763c2dbc9d05b00c4b4
- K20 Center. (n.d.). Gallery Walk / Carousel. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505a54d
- K20 Center. (n.d.). Stop and Jot. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5077921
- Warner Bros. Entertainment. (2012, April 27). Gremlins | Rules | Warner Bros. Entertainment. YouTube. https://youtu.be/OrHdo-v9mRA