

Rules of the Mogwai

Lab Safety and Chemical Properties

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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? How do they communicate this?

Summary

In this lesson, students will analyze real Safety Data Sheets for common household chemicals and discuss 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, which addresses 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 three of their peers' safety posters.

Standards

ACT College and Career Readiness Standards - Science (6-12)

IOD302: Understand basic scientific terminology
EMI201: Find basic information in a model (conceptual)
EMI301: Identify implications in a model
EMI302: Determine which models present certain basic information
EMI403: Determine which models imply certain information
EMI404: Identify similarities and differences between models

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

MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures.
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.

Oklahoma Academic Standards (7th Grade)

7.PS1.1.1: Substances are made from different types of atoms, which combine with one another in various ways.
7.PS1.1.2: Atoms form molecules that range in size from two to thousands of atoms.

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
- Safety Data Sheet Resources—Rules of the Mogwai - Spanish.docx
- Safety Data Sheet Resources—Rules of the Mogwai - Spanish.pdf
- Safety Data Sheet Resources—Rules of the Mogwai.docx
- Safety Data Sheet Resources—Rules of the Mogwai.pdf
- Safety Symbol Card Matching—Rules of the Mogwai - Spanish.docx
- Safety Symbol Card Matching—Rules of the Mogwai - Spanish.pdf
- Safety Symbol Card Matching—Rules of the Mogwai.docx
- Safety Symbol Card Matching—Rules of the Mogwai.pdf
- Stop and Jot—Rules of the Mogwai - Spanish.docx
- Stop and Jot—Rules of the Mogwai - Spanish.pdf
- Stop and Jot—Rules of the Mogwai.docx
- Stop and Jot—Rules of the Mogwai.pdf

Materials

- Lesson Slides (attached)
- Lab Safety Poster Rubric (attached; three per group of students)
- Safety Symbol Card Matching handout (attached; one per group of students)
- Safety Data Sheet Resources handout (attached; print 1–2 of each resource linked within the handout)
- Stop and Jot handout (attached; one per group of students)
- Student devices with Internet access (optional)
- Poster paper
- Art supplies (markers, paper, etc.)

Preparation

Card Sort Preparation

Before beginning this lesson, print and cut out the attached **Safety Symbol Card Matching** handout. You'll need one set for each group of 2–3 students. Consider storing these cards in individual plastic bags or envelopes.

SDS Sheet Prep

Students will be examining real SDS sheets. If students have access to devices with Internet connection, you can share the **Safety Data Sheet Resources** handout with students electronically. Otherwise, you will need to print out the SDS sheets linked in the document prior to beginning the lesson.

20 minutes

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 questions: “How do scientists determine the safest way to handle lab chemicals and materials? How do they communicate this?” Ask students to consider these questions as they explore the main ideas presented in the lesson.

Display **slide 4** and play the *Gremlins | Rules | Warner Bros. Entertainment* video, and ask students to focus on the safety rules.

Display **slide 5** and introduce the learning objectives to the class.

Display **slide 6**. Inform students that they and an Elbow Partner will brainstorm to come up with common safety rules, which they 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 to swim,” or "The '5-second' rule."

Display **slide 7** and have students brainstorm with an elbow partner about 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 8** and share the photo of the flammable liquid gasoline truck. Ask students if they can name the item in the photo.

Display **slide 9** and show the students the photo of the pool/patio cleaner. Ask the class if they can name the item in the photo.

Display **slide 10** and show the students the photo of the car battery. Ask the class if they can name the item in the photo. 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.

30 minutes

Explore

Teacher's Note: Card Matching

After students have completed the card matching activity they will set their cards to the side then revisit them later in the lesson. If needed, consider having students match their cards in a safe space to come back to later. This activity has 13 different Safety Data Sheets for students to analyze. If you need to make more than 13 groups, you can have two groups analyze the same sheet. For fewer groups, remove some of the Safety Data Sheets.

Display **slide 11** and introduce the students to the Card Matching instructional strategy. Explain to students that they will match the safety symbols to the category and the description of the hazard. They will be creating sets of three. Share the example on the slide with the class. Place students in 13 different groups, and give each group a prepared set of the **Safety Symbol Card Matching** cards. When students feel they have matched the three groups correctly, inform them to keep their groupings together. The cards will be revisited later but can be put aside for now.

Teacher's Note: Card Matching Answers

This Card Matching activity will be revisited later in the lesson, so don't reveal the correct matching method to students yet.

Optional SDS Activity

If doing this activity digitally each student will need access to a device, and you will need to share the **Safety Data Sheets Resources** document with students in your class LMS.

Display **slide 12**. Explain to students what Safety Data Sheets are and their purpose. Inform students that they will be analyzing one of the materials on the slide. Have students stay in their current groups.

Display **slide 13** and pass out a different Safety Data Sheet (SDS) to each group along with a **Stop and Jot** handout for each group. Explain the Stop and Jot instructional strategy to the class. Inform students they will analyze their SDS document using guiding questions on the Stop and Jot handout and then switch with another group. They will continue to swap until they have analyzed three different materials.

Teacher's Note: Safety Data Sheets

Consider collecting the Safety Data Sheets as students will reuse them in the Extend section of the lesson.

20 minutes

Explain

Display **slide 14** and ask 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.

Display **slide 15**. Tell students that all the sheets they viewed should have the same 16 categories that inform the user of safety information about the material.

Display **slides 16-18** to point out some of the categories on the vinegar safety data sheet.

Display **slide 19**. 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.

Display **slide 20-22.** Ask students to revisit their Card Matching activity. Using the answers on the slide have students look over their sets to check their answers. Have students rearrange their cards to match the slide.

Optional Card Matching Answers

Consider passing out a copy of the correct answers to the Card Matching activity for students to tape into their notes. This will supply students with a resource for future reference.

Display **slide 23**. Ask students, “If we were to create and display safety posters for hazardous materials we commonly use, what information would we include?” Have them consider the sheets they viewed earlier as they think about their answers. List the students’ responses on chart paper. Help them come up with further ideas 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 or chemical names, safety precautions (e.g., goggles, gloves), and cleanup and disposal requirements.

45 minutes

Extend

Display **slide 24**. Inform students they will work with their groups to create a lab safety poster for the last material for which they saw the SDS in the Stop and Jot activity. Their 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.

Move to **slide 25** and hand each group a copy of the **Lab Safety SDS Poster Rubric** to guide their poster creation. Pass out paper and markers to each group. Allow groups enough time to construct their posters.

Optional Digital Posters Activity

If students have access to devices, consider allowing them the option to create a digital safety poster using Canva.

15 minutes

Evaluate

Place groups' posters around the room. Display **slide 26**. Make sure each group has three copies of the **Lab Safety SDS Poster Rubric**. Using the Gallery Walk strategy with their groups, have students view a classmate's poster together for three minutes and provide feedback on the rubric. Each group should stand at a different poster. Explain that once the timer goes off, each group will leave the filled out rubric at the base of the poster and rotate to a different poster. Repeat this process until all groups have visited three posters. Start the 3 minute timer on the slide.

Once the Gallery Walk is complete, have students review the feedback from the rubrics and make adjustments to their posters as needed. Pass out a clean copy of the Lab Safety SDS Poster Rubric to each group. When each group has made their updates, have them use the rubric to give a summative assessment of their own final product.

Optional Extension Activity

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.). Canva. Tech Tool. https://learn.k20center.ou.edu/tech-tool/612
- K20 Center. (n.d.). Card matching. Strategies. https://learn.k20center.ou.edu/strategy/1837
- K20 Center. (n.d.). Elbow partners. Strategies. https://learn.k20center.ou.edu/strategy/116
- K20 Center. (n.d.). Gallery walk / carousel. Strategies. https://learn.k20center.ou.edu/strategy/118
- K20 Center. (n.d.). Stop and jot. Strategies. https://learn.k20center.ou.edu/strategy/168
- Warner Bros. Entertainment. (2012, April 27). *Gremlins | Rules | Warner Bros. Entertainment* [Video]. YouTube. https://www.youtube.com/watch?v=OrHdo-v9mRA
- K20 Center. (2021, September 21). *K20 Center 3 minute timer* [Video]. YouTube. https://www.youtube.com/watch?v=iISP02KPau0