Timmy Made Mistakes

Lab Safety

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Grade Level	8th – 12th Grade	**Time Frame**	1-2 class period(s)
Subject	Science	**Duration**	60 minutes
Course	Biology I, Biology II, Chemistry, Environmental Science, Physical Science, Physics		

Essential Question

Why is lab safety so important?

Summary

Students will identify common lab mistakes via simulated lab stations.

Snapshot

Engage

Students will observe and comment on teacher lab demonstration or lab video.

Explore

Students will identify issues with lab set-ups around the room.

Explain

Students will discuss the issues with the demo and set-ups and how they can be fixed.

Extend

Students will create either a comic strip or rap about lab safety.

Evaluate

Students will present their creations.

Standards

Next Generation Science Standards (Grades 9, 10, 11, 12)

: Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.
: Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

Attachments

- 4 Square Comic.pdf
- 5 Square Comic.pdf
- Explore Wkst_Exit Ticket - Spanish.docx
- Explore Wkst_Exit Ticket - Spanish.pdf
- Explore Wkst_Exit Ticket.docx
- Explore Wkst_Exit Ticket.pdf
- Timmy Made Mistakes ppt.pptx

Materials

- Various lab supplies (preferably the ones you'll use most frequently)
- A drink or snack (Engage)
- Damaged lab ware such as chipped glassware, device with exposed wires, enough for 4-6 unique stations (Explore)
- Copies of Explore handout; enough for one per student (Explore)
- Colored pencils or markers (Extend)
- Copies of comic strip templates; probably enough for two thirds of the students (Extend)

Engage

Go to slide 2, The teacher will demonstrate careless lab behavior in the classroom. For example, wearing safety goggles on forehead, smelling chemicals directly, eating and drinking in the lab, etc.

Expected Outcome

Considering how often students don't have mindfulness in the lab, they actually react pretty strongly to this demo. It is usually surprising how stressed out students become watching the bad procedures.

Allow students to Think, Pair, Share with each other. Allow some quiet thinking time, then discuss with each other, then share out what they observed that went wrong, and maybe even a few things that went right.

Go to slide 3 and click on the image to show the Amoeba Sisters General Lab Safety video.

Explore

Teacher Set Up

The simulated lab stations should be set-up before the students arrive. It'll take too long to put all the stations together while the students wait. Four stations would be sufficient, and six would be the recommended maximum. Ideally you should use equipment that your students are likely to encounter in your classroom.

Place students into groups of no more than four, Go to slide 4 - give each student a copy of the explore wkst handout and send them around in a modified Gallery Walk to observe each station. Less is more, set a timer for each station rotation to keep students engaged and on-task!

A variety of lab 'situations' should be at the lab stations. Each situation will have something that violates lab safety. Ideas could be:

- a station with a chemical spilled everywhere (sodium bicarbonate, baking soda, is safe to consume *even though it doesn't taste that great* and is cheap, but is just an unknown white powder if you didn't know any better)
- a station with an electrical device that has exposed wires
- a hot plate on, but unattended
- biological material left out and not disposed of
- also subtle things like a thermometer left in a beaker or glassware, and not left on the bench top
- microscopes left in the highest magnitude instead of the lowest
- scoopulas left in the chemicals
- Really anything that is a common error that students make that compromises safety

Explain

Go to slide 5 ask students to share their answers. Take the idea further and ask students why the items they listed would be considered unsafe. This would be a good time, if you didn't pause the Amoeba Sisters video, to point out the safety features of your classroom. ie: fire extinguisher, sharps box, eyewash station, MSDS location, etc.

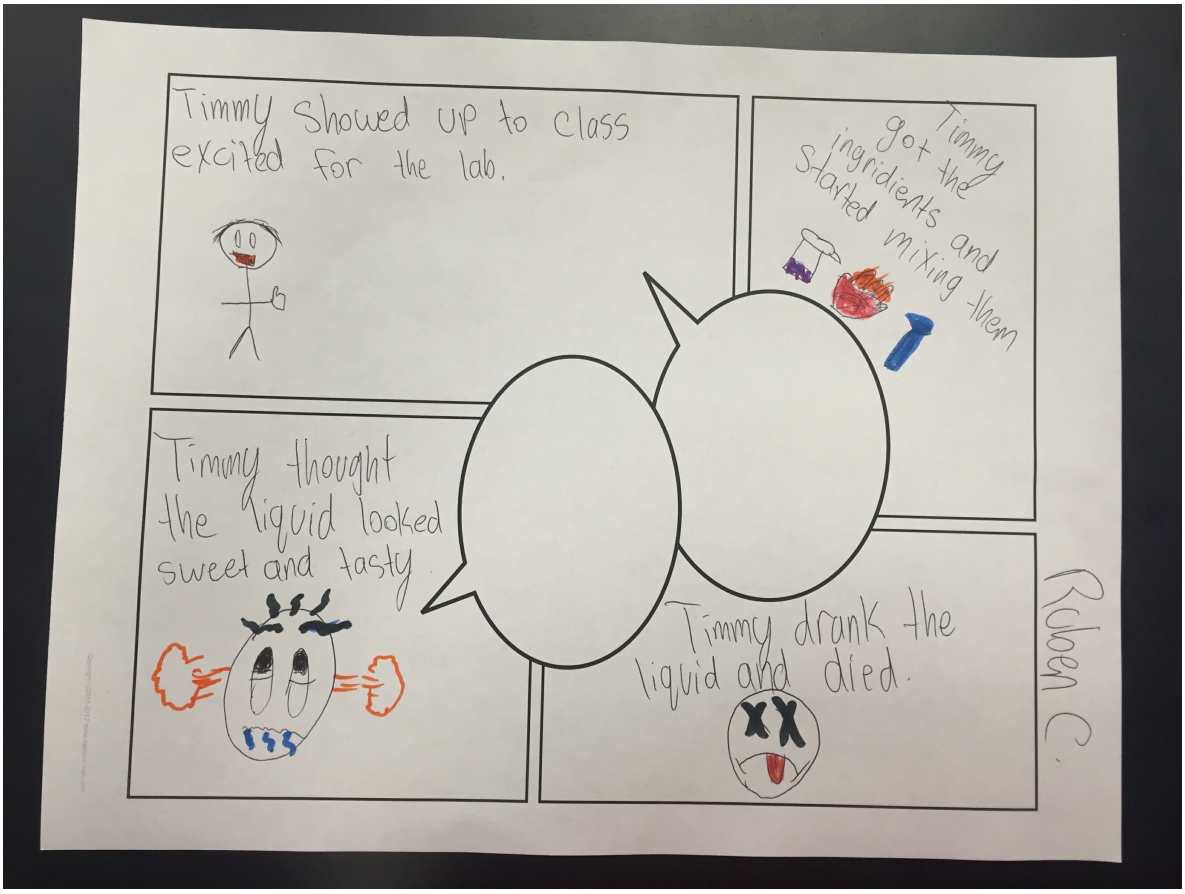
What Discussions Sound Like

It is so easy, as an expert in the subject, to take over and give statements to help the students learn. However, student discussion means that the students should be giving the statements, and the teacher should only ask questions. It's hard to not intercede, but children require longer wait time than adults to answer prompts, and the only way to give good responses is to try not to respond at all. Questions that could be offered to prompt students would include "Why is [blank] unsafe?" "What would you do if you saw [blank]?" "Why is your solution safer?" None of these are just yes/no questions, which allows students to think for themselves instead of relying on the teacher to think for them.

Extend

Go to slide 6 allow students to summarize what they've learned about lab safety by either creating a comic (see image below) or piece of music.

A four and a five square blank comic strip is provided in the handouts. It's up to you to choose how complicated you want their finished product to be.



Here is a funny, however simple, student example of a comic.

Evaluate

Slide 7 Students present their comics or musical creations for the rest of the class. On the back of their Explore worksheet have students complete an Exit Ticket by answering "What are you going to do to make sure your group is safe during our next lab?"

Resources

- YouTube video (Engage): Retrieved from https://youtu.be/MEIXRLcC6RA
- Gallery Walk Instructional Strategies: K20 Center Instructional Strategies. Copyright 2015 Board of Regents of the University of Oklahoma. (Explore): Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505a54d
- Comic Strip Template (Extend): Retrieved from printablepaper.net
- Chant It, Sing It, Rap It Instructional Strategies: K20 Center Instructional Strategies. Copyright 2015 Board of Regents of the University of Oklahoma. (Extend): Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5066ebf
- Exit Ticket Instructional Strategies: K20 Center Instructional Strategies. Copyright 2015 Board of Regents of the University of Oklahoma. (Evaluate): Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505d6f2
- Think, Pair, Share Instructional Strategies: K20 Center Instructional Strategies. Copyright 2015 Board of Regents of the University of Oklahoma. (Engage): Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5064b49
- Cognitive Comics Instructional Strategies: K20 Center Instructional Strategies. Copyright 2015 Board of Regents of the University of Oklahoma. (Evaluate): Retrieved from https://learn.k20center.ou.edu/strategy/fe96d3de46cfdc1f385aab7e7500a422