# SAFETY INSPECTORS

## LESSON OVERVIEW

THIS LESSON GUIDES AND EMPOWERS STUDENTS TO BE ENERGY SAFETY INSPECTORS AT HOME AND IN THEIR NEIGHBORHOODS. AS A CULMINATION TO SHOWCASE WHAT THEY LEARN IN THEIR INSPECTIONS, STUDENTS WILL CREATE VISUAL REPRESENTATIONS OF COMMON SAFETY VIOLATIONS, SHARING THEIR RESULTS WITH ALLIANT ENERGY FOR CONSIDERATION IN THE COMPANY'S SAFETY MESSAGING.

## Standards addressed

This lesson plan helps you address multiple Iowa Core standards and Wisconsin Academic Standards. This section identifies the science standards for each state that apply to this lesson plan.

**Iowa Core**

S.3–5.PS.4

*Essential concept and/or skill: Understand and apply knowledge of sound, light, electricity, magnetism and heat.*

S.3–5.SI.1

*Essential concept and/or skill: Identify and generate questions that can be answered through scientific investigations.*

S.3–5.SI.3

*Essential concept and/or skill: Plan and conduct scientific investigations.*

S.3–5.SI.4

*Essential concept and/or skill: Use appropriate tools and techniques to gather, process and analyze data.*

S.3–5.SI.7

Essential concept and/or skill: Communicate scientific procedures and explanations.

**Wisconsin Academic Standards**

C.8.1 Identify questions they can investigate using resources and equipment they have available

C.8.2 Identify data and locate sources of information including their own records to answer the questions being investigated

C.8.3 Design and safely conduct investigations that provide reliable quantitative or qualitative data, as appropriate, to answer their questions

C.8.4 Use inferences to help decide possible results of their investigations, use observations to check their inferences

C.8.6 State what they have learned from investigations, relating their inferences to scientific knowledge and to data they have collected

C.8.7 Explain their data and conclusions in ways that allow an audience to understand the questions they selected for investigation and the answers they have developed

D.8.8 Describe and investigate the properties of light, heat, gravity, radio waves, magnetic fields, electrical fields and sound waves as they interact with material objects in common situations

H.8.3 Understand the consequences of decisions affecting personal health and safety

## Desired outcomes

Driven by active learning, students should be better able to:

- Identify and recognize safety risks related to electricity and natural gas
- Identify and recognize patterns and deviations from data (examples of safety violations) collected by the group
- Present ideas persuasively through text and imagery

## Background

Photo by StateFarm

Children grow up hearing from adults about the many things they should and should not do. As they get older, children develop a better ability to understand the consequences of their actions. Moreover, as educators, we understand the importance of students' taking ownership of their learning — that when they do, the learning sticks. This lesson is designed to facilitate that ownership by putting students in charge of inspecting their homes and neighborhoods for safety risks. Students then collaborate on how best to convince others to avoid and minimize those risks.

A key element of this lesson centers on compiling, analyzing and presenting data. These life skills are more integrated into science and mathematics as students advance in each of those subjects. So by stressing these skills on energy safety that students collect themselves, this lesson promotes energy safety in ways that are likely to "stick" and in ways that strengthen the cognitive skills tied to processing data successfully. This lesson works well as a standalone experience or as a complement to exploring data analysis.

## Time required

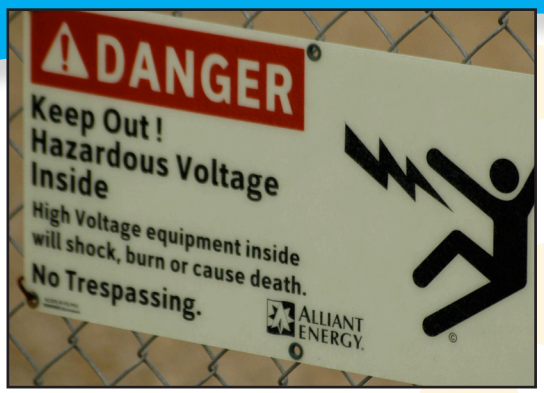
90 – 120 minutes, divided over two days

## Materials needed

*The Energy Zone* magazine
*What to expect as you inspect* reproducible
Access to Smartboard/whiteboard/tablet/computer to generate and display data

## Reproducible

*What to expect as you inspect* [page 7]




# Lesson steps

## Prompt inquiry (10 - 15 minutes)

1. Have students think about and/or write a short response to the prompt:
   - Have you or someone you know ever been shocked by electricity?
     - *Do you know what caused it?*
     - *What was the outcome?*
     - *Did it ever happen again?*
2. After giving students a little time to think/write a response, survey the class to see how many have ever been shocked. Then ask those who don't raise their hands if they know someone who has. Have a few students briefly share how they or someone they know was shocked. Likely answers include sticking something in an outlet or touching an exposed electrical cord to an appliance or lamp. (If few students have been shocked, share some causes of shock and ask students if they think those who get shocked make the same mistake again.)
3. Survey the class to see how many ever repeated the mistake and were shocked again. Hopefully few (if any) did. Ask if they know what some of the more serious consequences of a shock can be (notably burns or electrocution). Then ask the class to explore the question:
   - *Does someone first need to get shocked in order to "learn a lesson" and avoid doing those things that might cause a shock? If not, what will help someone avoid making that mistake?*

   There may be some disagreement on this question, but there is likely to be a significant number of students who believe you don't need to shocked first. Steer the discussion toward what should replace that firsthand experience. Students are likely to conclude that people need information and even possibly conclude that they need to be convinced to avoid those risky behaviors.

## Deepen understanding using The Energy Zone (12 - 15 minutes)

4. Have your students complete the activity "Connect the Consequences" (page 7 in *The Energy Zone*). This activity lists a number of risky behaviors to avoid and challenges students to connect each of those behaviors to its potential consequence(s). You may want your students to write their answers on a separate piece of paper (versus in the magazine itself).
5. As a class, go over the answers to the activity. Take some time to allow students to share any anecdotes of instances where they or someone they know engaged in some of these risky behaviors. Ask students if anybody lives near a substation. Generally, try to use this time to help students develop some initial frames of reference for each of the behaviors and consequences.

## Set up home/neighborhood inspection (20 - 25 minutes)

6. Survey students, asking how many think that there might be at least one potential energy risk at home or in their neighborhood. If some students raise their hand, ask a few to share what risk they have in mind. Let students know that they will be energy safety inspectors to determine if there are any risks. (It is important that you state up front that they will be *safe* safety inspectors! They will look only to identify risks, not test them to see if there are risks.)
7. Divide students into small groups. As a class, go over the instructions on the reproducible *what to expect as you inspect*. Have students create their own safety inspection checklists.
8. Give students 15 – 20 minutes to create their checklists, checking in on each group during that time to ensure that they're on task and not struggling to complete their checklist.

## Report results (30 - 40 minutes)

9. Have student groups meet together and share the results of their inspections with one another. As a group, they should determine:
   - The total number of risks/violations they found
   - The number of different risks/violations they found
   - The most prevalent risk(s)/violation(s) they found

- The least prevalent risk(s)/violation(s) they found
- The most common location for a risk/violation they found

10. As a class, have each group share the overall results of what they found, recording the trends on your Smartboard, whiteboard or digitally on tablet or computer.
11. As a class, explore the trends and exceptions (outliers). Use the opportunity for students to share their opinions on why they think certain violations/risks are so prevalent, what they can do at home to minimize the risks, etc.
12. As a class/in groups/individually, create visual representations for their findings. For example, they can create a pie chart that illustrates the percentage makeup of different violations relative to one another. Similarly, they can create a pie chart to show where the violations occur most often in the home.

### Culminate with letter to Alliant Energy (15 - 20 minutes)

13. To culminate the lesson, have students write a letter (150 – 300 words) that shares what they learned from doing the inspections, particularly what they believe Alliant Energy should emphasize to customers that will help everyone be more energy safe. Mail letters to:

    ALLIANT ENERGY
    Anna Darling
    200 1st St. SE, Cedar Rapids, IA 52401

## Academic extensions and modifications

- If more than one class completes this assignment, combine the data from all students to create visual representations that reflect the larger population. Similarly, students can research the population of your school, city, state, etc. and extrapolate what it would look like if your class's results were consistent across that larger population.
- Students can use the experience and the results of their inspections to develop an energy safety campaign for students and families in other classes.
- To decrease the amount of class time, students can write their letters as a homework assignment.
- To abridge the lesson, provide students with a checklist, perhaps creating one as a class.

# what to expect as you inspect

What do expect you'll find when you inspect your home and neighborhood for some energy safety risks? Will there be many? Only a few? None?

How will you go about inspecting? How will you record any risks you find?

Remember: you need always to be SAFE safety inspectors. NEVER stick objects in outlets, play with loose wires, or test anything you think might be a danger. Instead, simply identify it as a potential risk.

You're probably not sure right now, and that's okay. This should help guide you as you become an energy inspector. Your group will need to develop your own checklist.

As you create your inspection checklist, consider the following:

- Are there different categories of risk? For example, maybe you want to identify whether it's an electrical risk or natural gas risk. Maybe you want to be even more specific.
- Where is the risk/violation? For example, maybe if it's inside or outside your home. Maybe you want to identify the specific room in the home or spot in the neighborhood.
- How dangerous is the risk? Maybe 1 = mild shock/low risk and 5 = potential electrocution.
- How easy is it to fix or avoid the risk? For example, maybe you create a scale based on 1 = easy to fix/avoid.

If you have an actual checklist that includes all of the information, it makes it much easier to inspect. It might look something like this:

| violation/risk | category 1<br>such as type of risk | category 2<br>such as location of risk | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

With your checklist, go home and start inspecting … safely! Make sure that you explain to any adults at home what you are doing. Invite them to come with you as you inspect!





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