

Y-CITYSCI: A Youth-Led Citizen Science Network for Community Environmental Assessment  
Introduction to Nature of Science and Citizen Science: Lesson 2  
Grade Level: Middle school  
Duration: 1 hour

## Introduction to the Nature of Science Continued

### Next Generation Science Standards

Engineering Practices 3: Planning and Carrying Out Investigations

Crosscutting Concepts 9: Influence of Engineering, Technology, and Science on Society and the Natural World

### Objectives

- 1) Students will discuss the meaning and relevance of science.
- 2) Students will identify how science can be used to address questions about the natural world around them.

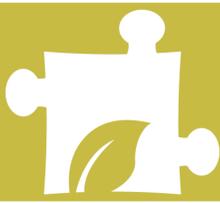
### Materials

- Science-a-thon worksheets (completed last session)
- Why Should I Study Science worksheets (1 per student)
- Peanut Butter (substitute sunflower butter in case of allergies)
- Bag of bread
- Butter knife
- Plate
- Paper towels

### Activities

**Bellringer:** Pass out the Science-a-thon worksheets from the last session and briefly review and discuss the materials and student observations. If students researched the scientific explanations behind the materials and how they work, let a few briefly share with the class at this time. (10 minutes)

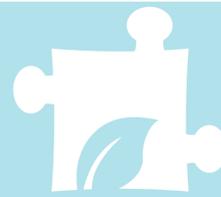




**Activity 1:** Read “Why Should I Study Science” story aloud together and have students highlight or underline anything science related as you read through. (Most of the story should be highlighted as each sentence relates to science in some way). Discuss the story and how integral science is in our everyday lives. (20 minutes)

**Activity 2:** Discuss how important communication is in science. Have students write out step-by-step instructions on how to make a peanut butter sandwich. Have a few students read their instructions aloud as you make a peanut butter sandwich in front of the class. Act out their instructions exactly to demonstrate how clear their instructions actually are to their reader. Discuss the importance of clarity and detail when communicating important information such as instructions or scientific findings. (20 minutes)

**Discussion:** Ask a student to come to the whiteboard and write down what their classmates share to the following prompt: have students make a class list of what qualities need to be present for effective communication. (Examples: clear handwriting or voice, simple and easy to understand, detailed and clear, necessary background information and tools, etc.) Tell students you will discuss how to effectively communicate and share our scientific findings throughout this program, across various media, next week. (10 minutes)



Oh boy, there's my alarm; what a sound. Six-thirty, the morning I've dreaded all week--the day of my first big physics exam. I should get ready. Where's my iPad—darn; dropped it. Gravity sounds familiar; I wonder why things fall? There's force and air resistance too. Good thing it landed on the carpet; didn't break. Hmm.

It's time for a shower. Ouch, I wonder how the water got so hot. How is cold different from hot? I wonder why I feel so cool before I dry off. There's isobutane in this can of hair spray. I wonder if that's anything like the butane in lighters. Why would something like that be in this hair styling stuff? And why does the can get so cold as I spray?

It's time for some tunes. The news is on. They say this beautiful late summer morning will become an ozone action day. Something about exhaust and sun... Why is it a problem? They keep telling us not to stay out in the sun too long because the ozone layer is disappearing. How can it just disappear, and how is the ozone layer different from the ozone they tell us we shouldn't breathe? I wonder how the sun rises each morning.

I had better turn on the light. I wonder what's in a light bulb that lets it get so hot and still not melt or catch on fire. It's time to check the laundry and get dressed. How does water work to get things clean? Maybe I'll wear that iridescent tie. I wonder how they get it so shiny.

I should fuel up with some breakfast. Maybe I'll fry an egg. I wonder why a fried egg feels so much different than a raw egg. Could I just 'nuke' the egg in the microwave? Would it become radioactive? Jimmy said his brother tried that and the egg blew up—some mess! It's getting late; I think I'll just have cereal. This cereal is 'fortified with iron'. I wonder what kind of iron they put in there; it couldn't be those iron filings we used in with the magnets in physics lab, could it? There's the calorie count. I wonder if that has anything to do with those energy measurements we read about in the physics book.

Well, here I am in physics class. Worrying about this exam is giving me indigestion. My stomach feels as if it's blowing up like a balloon. Warm in here today—hope I don't burst.

Why do I have to study physics anyway? When will I ever use physics in my everyday life? What good is it to me? Why can't I study something that's practical--like biology?

After: *Why do I Have to Study Chemistry?*

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