

# Science Tools

## PSS Kit Number 5

### Kit Contains

"What is a Scientist?"

"What is Science?"

5 Plastic Spill Trays

7 Elmer's All Purpose Glue

1 Adult Safety Goggles

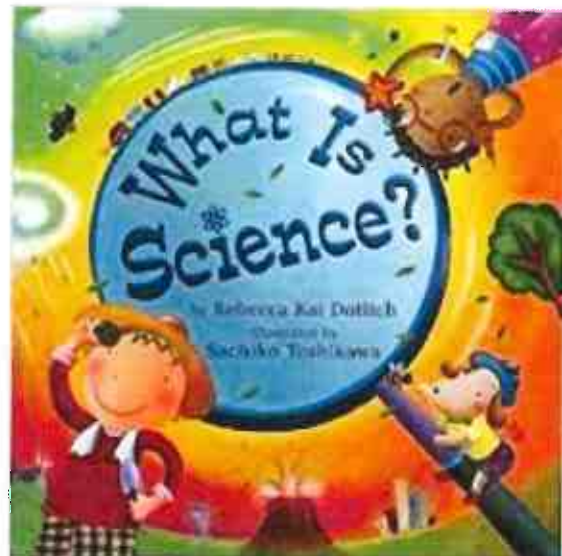
12 Jumbo Tweezers

Gas, Liquid, and Solid Flash Cards

23 Small Magnify Glass

8 Big Magnify Glass

Lesson Plans





## PINT SIZE SCIENCE

# SCIENCE SPROUTS

## AN INTRODUCTION TO SCIENCE

### SCIENCE STANDARDS

#### IELS 9.3

*Reasoning &  
Problem Solving*

#### IELS 9.4

*Play & Senses*

#### IELS 12.1

*Comparison and Number*

#### IELS 12.4

*Scientific Reasoning*

#### IELS 12.5

*Scientific Investigations  
& Problem Solving*

#### IELS 12.6

*Measurement*

### VOCABULARY

**Observe** – to see, hear, touch, taste or smell

**Matter** – anything that has mass and takes up space

**Predict** – to say what you think will happen

**Appearance** – the outward look of an object: color, shape, size, etc.

**Compare** – to look at two or more things to find out how they are alike or different

**Investigate** – to gather information

### BOOK

#### What is a Scientist?

by Barbara Lehn  
(Non-Fiction)

### KIT MATERIALS

- Adult Safety Glasses (1)
- Adult Lab Coat (1)
- Children's Lab Coat (1)
- Children's Safety Goggles (10)
- Insta-Worms
- Alka-Seltzer® Tablets (10 packs)
- Plastic Beaker 50 mL, 250 mL, 500 mL
- Food Coloring (4pk)
- Sodium Polyacrylate (100g)
- Powdered Milk (2 pouches)
- Dish Soap
- Q-tips Cotton Swabs
- Plastic Spill Trays (2)
- Distilled White Vinegar
- Water Jelly Crystals (4 oz)
- Baking Soda
- Film Canisters (3)

### INTRODUCTION

This interactive classroom experience introduces children to STEM topics through discovery learning. A hands-on approach engages and inspires young minds to utilize the scientific process to build a more thorough understanding of science. Students also will explore the three states of matter: solids, liquids and gases. During each lesson, the students should use their previous experiences and knowledge to ask a question and propose a hypothesis. Then, allow them to explore the topic by engaging and interacting with the materials. Make sure the students have multiple and varied opportunities to explore. Always follow up with a review of what was learned and observed. Make comparisons of results to predictions. Revisit learned ideas and concepts.

### GUIDING QUESTIONS

- What does a scientist do?
- What do you know about solids, liquids and gases?
- What are some examples of solids, liquids and gases?

### INVESTIGATIONS

*Experiments marked with (\*) take extra time for preparation. Use the trays to minimize clean-up.*

#### Science Tools

Display a variety of tools that scientists may use (i.e. ruler, shovel, magnifying glass, tweezers, thermometer, pie tins, bucket, goggles, lab coat, beaker, magnets). Allow students to interact with the tools. *What do you think it might be used for? Why do you think that? What else do you think it could be used for? Where have you seen it before?* Group the tools based on their purpose: measuring, protection or investigation. Utilize their previous knowledge and experience as much as possible. *Which kind of scientist might use each tool? Why do you think that?* This is a great activity to do after reading the book, *What is a Scientist?* by Barbara Lehn. In future activities, refer to the science tools they learned about here.

#### Color-Changing Milk \*This investigation takes preparation. Use the trays to minimize clean up.

Mix the water and powdered milk according to the directions on the package for the amount that is needed. *What liquid do you think this is? Explain why. What does it look like? What does it smell like?* Let them pour 1 cup of milk (very carefully) into the pie tins/bowls. Give a quick demonstration on how to gently place a drop of food coloring into the milk. Then, allow the children to make drops in their milk. *What do you think will happen when you put two liquids together? Why do you think that?* Have the students make observations of the reaction. Give a Q-tip to each student. First, have them dip the dry end of the Q-tip into the milk solution. *What happened to the milk? What happened to the color?* Dip the other end of the Q-tip into the dish soap, and then carefully touch that end into the milk solution. Remind the children not to move the Q-tip around when they touch the end into the milk. *What happens? What are the colors doing?*



## What is Science?

by Rebecca Kai Dotlich  
(Non-Fiction)

\* Appendix B contains  
other suggested books to  
enhance this module.

## Online Resources

Log in to find video  
clips specific to  
Science Sprouts!  
<http://www.sciowa.org/pss>

Be sure to view the  
following:

- Pint Size Science Intro
- Color-Changing Milk
- Three-State Reaction
- Water Jelly Crystals
- Sodium Polyacrylate
- Goo Worm Investigation
- Alka-Seltzer Rockets

## Appendices

- A – Vocabulary
- B – Books, Games, Songs  
and Videos
- C – Assessment Checklist
- D – Anecdotal Note Pages
- E – Science Standards
- F – Bloom's taxonomy

*Why do you think the colors are mixing together? How do the results compare to what you predicted would happen? What do you think would happen if you put the Q-tip in another place in the pie tin? Compare the results to their predictions.*

### Three-State Reaction (Bubbling Volcano)\*

Fill each beaker with approximately 100 mL of vinegar. Make sure that each beaker has a spill tray underneath it! *What do you think the liquid is? Does it smell funny? Have you smelled that before? What do you think the solid is? What color is it? What will happen when you mix the two together? Why do you think that?* Have the students gently pour a spoonful of baking soda into the vinegar. Describe the reaction using sounds, smell and appearance. *How do the results compare with your predictions? Where does the gas in the bubbles come from?* Allow them to repeat the experiment. Encourage them to make alterations with new predictions.

### Water Jelly Crystals (Super Absorber)\*

Show the children the crystals before adding water. *What do they look like? What do they feel like? What do you think will happen when you mix the liquid water with the solid crystals?* Place the crystals into a container. Add some water, and ask the students to describe what is happening. *Are they mixing? Does it look like anything is happening?* You will have to wait a few minutes on this experiment. Measure the amount of time. Let them feel the container. *Is there a temperature change? How do the crystals look different after they have been in the liquid?* Pour out the jelly crystals. *Do they feel the same? Are they the same size? What happened to the water?* Allow students to repeat the experiment using different types of liquid. Compare and share the results. **\*It is not recommended for children to handle the crystals before or after they have absorbed the liquid.**

### Sodium Polyacrylate (Diaper Material)\*

Show the students the sodium polyacrylate powder. Pour approximately 10 mL into a 50 mL beaker. *What do you think will happen when you add liquid water to the solid powder? Why do you think that? Have you seen a reaction like this before?* Pour some water into the cup and watch as the powder grows and becomes a gel. Flip the beaker over after a minute, and let the sodium polyacrylate gel fall into your hand. Allow the children to look at and touch the gel. *How does the result compare to your prediction?* Experiment with how much water the powder will absorb.

### Goo Worm Investigation\*

Mix the calcium chloride with the water according to the package directions. Show the students the liquid mixture. *What does it look like? What does it smell like?* Then, show them the colored sodium alginate liquid. *What does it look like? What color is it? What do you think will happen if you mix both liquids together?* Squeeze a long strand of sodium alginate into the calcium chloride water. *Are they mixing? What is happening?* It takes about 30 seconds for the worm to form. Ask the students to count out the seconds with you. Reach into the liquid, and grab the 'worm.' Allow the students to touch and feel the worm. *Is it a liquid or a solid? What do you think would happen if you put the worm back into the solution?* Compare your results to your predictions. The calcium chloride solution can be stored in a container with a lid and reused many times.

### Alka-Seltzer® Rockets (Outdoor Activity)\*

Take one piece of Alka-Seltzer and break it into fourths. *Have you ever seen Alka-Seltzer before? What do you think it does? What do you think will happen when the solid tablet is added to the liquid water?* Drop 1/4 of the Alka-Seltzer into a cup of water to demonstrate. *What is happening? What is the water doing? Do you see bubbles? How does this compare to your prediction?* Take a clear film canister, and fill it 1/3 full of water. Take the students outside, and make sure they are 10 big steps away from the rockets. Explain that you are going to add the piece of tablet to the water in the canister, shake it up and then turn it upside down. *What do you think will happen?* Compare the results to their predictions. Repeat the experiment with different amounts and temperatures of water.

## Assessment

Appendix C, D and F contain assessment tools to be used with this module. Appendix C provides a checklist for students containing Iowa Early Learning Standards and GOLD objectives. In Appendix D, you will find anecdotal note pages for individual students. Finally, Appendix F contains each lesson placed into a Bloom's taxonomy table. Refer to online resources.



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PINT SIZE SCIENCE

# SCIENCE SPROUTS

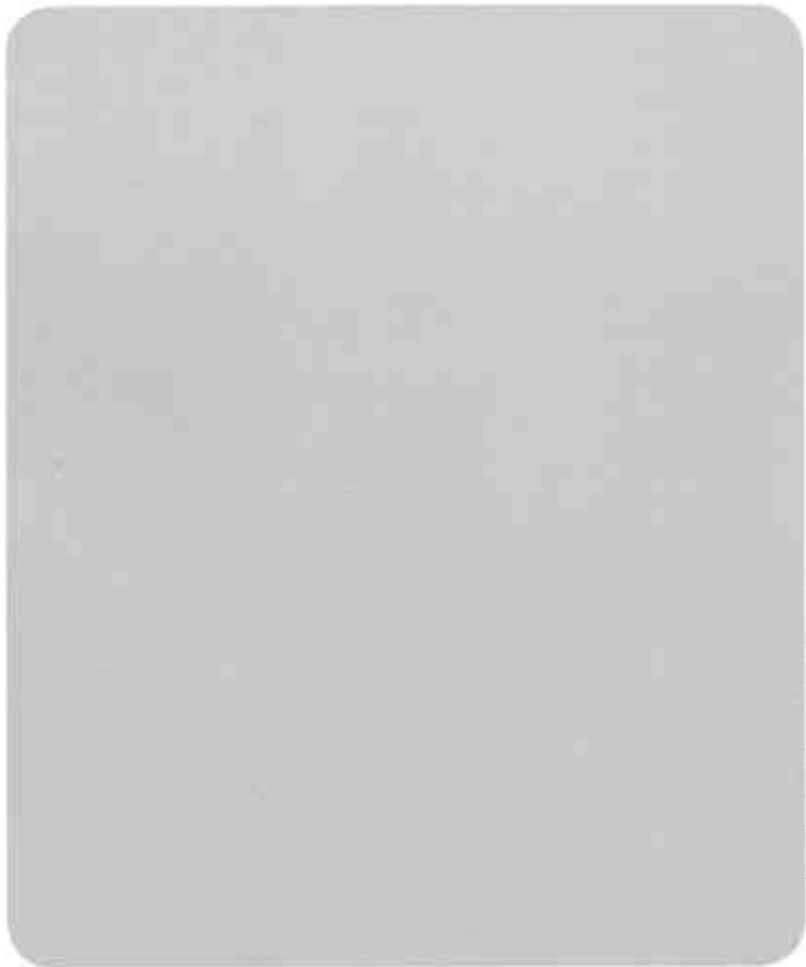
## Science Tools

### MATERIALS NEEDED:

- Tools Used by Scientists (from kit)
- Book suggestion: What is a Scientist? by Barbara Lehn
- Paper & Pencil (record questions & observations)
- Assessment Recording Sheet



- Display a variety of tools that scientists may use (i.e. ruler, shovel, magnifying glass, tweezers, thermometer, pie tins, bucket, goggles, lab coat, beaker, magnets).
- Allow students to interact with the tools. *What do you think it might be used for? Why do you think that? What else do you think it could be used for? Where have you seen it before?*
- Group the tools based on their purpose: measuring, protection or investigation. Utilize their previous knowledge and experience as much as possible. *Which kind of scientist might use each tool? Why do you think that?*
- Ask first if the child knows the name of the tool and then if they know what the tool is used for or what scientist might use it. After their exploration of the science tools, read What is a Scientist? by Barbara Lehn. *What tools did you see the students using in the book?*
- In future activities, refer to the science tools they learned about here.



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