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Language, Literacy & Math Powered by Science

Explore. Question. Experiment. Integrate.

What Can Light Move Through?

OVERVIEW

In this lesson the children will explore the concepts of transparent, translucent, and opaque through the use of everyday materials. They will test these materials with a flashlight to see if light can shine through them. Additionally, the following learning goals can be achieved as the children participate in **LiteraSci** activities:

Science

- Becoming familiar with the science cycle of reasoning
- Understanding how to make a prediction and compare it with results
- Exploring and observing light sources in children's everyday world

Literacy

- Listening to stories for information
- Listening for, identifying, and finding repeated phrases in print
- Becoming familiar with alphabet letters – **T/t**

Mathematics

- Making graphs and comparing data
- Exploring "near" and "far"
- Categorizing materials

LiteraSci *What Can Light Move Through?*

by

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Please visit our website at:
www.literasci.com

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DEVELOPED BY sciencestart!
Opening Young Minds

Teaching Science with LiteraSci

Language, literacy and mathematics flow naturally from hands-on science, which is the activity of learning about the everyday world. Learning about the everyday world is as fundamental to the early childhood years as learning to walk, talk, and interact with others. With **LiteraSci**, children build a rich knowledge-base that supports further learning and higher-order skills like classification and drawing inferences. Language, literacy, and mathematics are basic tools for learning that develop as children engage in **LiteraSci** inquiry activities and share their questions and observations with others.

Preschool children have the abilities to do science.

In fact, "doing science" fits the ways children learn: by exploring, repeating and communicating hands-on, multi-sensory activities. It is crucial that children carry out the activities themselves and that they have opportunities to repeat and vary the activities and to talk about what they are doing and finding out. The goals of science learning in early childhood are to explore, build concepts, and build vocabulary to communicate these concepts. There is an emphasis on trial and error rather than on "right answers" and so teachers do not need to "know all the answers." Teachers do need to help children ask questions and discover for themselves.

A 4-Step Science Cycle supports systematic guided inquiry, helping children "learn to learn."

Because learning and doing science relies on children's firsthand experience, it is always meaningful and provides a motivating context for learning language, literacy, and mathematics.

Hands-on inquiry science fosters a classroom community that easily includes all children.

Because **LiteraSci** activities can be done in many ways, they engage children who have different learning styles and are at different developmental levels. As teachers observe children doing science activities, they can respond to individuals' strengths and needs. Because inquiry science emphasizes exploration and trial and error as important ways to learn, children focus on learning rather than on avoiding mistakes.

An experienced teacher, observing her students as they mixed primary colored shaving cream to see what new color might emerge, noted how the excitement of doing science motivated other learning:

I'm not sure which child at my table figured out that he could write letters in the shaving cream once it had flattened out. And then everyone was trying it. This class is very exciting.The parent conferences that I've had so far this week, everyone is saying, "What are you doing with them? They just want to write." A dad told me that last night his son went to sleep with his pencil box in the bed.

-Sue Strowe, teacher

The Science Cycle is a powerful teaching tool.

This cycle supports active learning by organizing inquiry. Its four phases bring the scientific method into **LiteraSci** classrooms. All **LiteraSci** lessons use the Science Cycle.

Reflect & Ask begins the cycle. Teachers should talk with children and ask them to think and share their knowledge about a topic. The teacher can introduce new vocabulary and read fiction or nonfiction books to help children think and talk about the topic. Recalling previous science activities helps children reflect on what they know and ask new questions. The teacher and other adults in the classroom can model asking questions using phrases such as: "What do you think will happen if we …?"

Plan & Predict is next. The teacher should help children plan what to do in the science activity that will get information to help answer their question. They may discuss what materials they need and where to do the activity. The teacher should encourage children to make predictions about the outcome of the activity, accepting all answers. They then move forward with: "Let's see what happens!"

Act & Observe is the phase during which children carry out the science activity. Teachers may model the activity to help children understand what to do, but it is essential that each child does the science activity. Teachers should expect children to vary the activity as there is no one "right" way to do it. The teacher should talk with children about what they are doing and support conversation among the children. In some cases, this phase is best carried out in small groups.

Report & Reflect is the final phase of the science cycle. Children should talk about what they observed and what new ideas and questions they have. There are many ways for children to represent what they have learned. Reports can be graphs, class-made books, a poster with photographs, a journal entry, a drawing or a conversation.

The **LiteraSci** Curriculum was developed at the University of Rochester by Dr. Lucia French, a specialist in language and literacy development and Kathleen Conezio, an expert on early literacy and science who also serves as a science advisor to Sesame Street. For 15 years, we have collaborated with hundreds of teachers to continually improve **LiteraSci**.

Development of **LiteraSci** has been supported by more than $5,000,000 in grants from the National Science Foundation and the United States Department of Education.

LiteraSci is easy to use with English Language Learners and children with special needs. Research shows that children at all socioeconomic levels make substantial gains in language, literacy, and science knowledge when their teachers use **LiteraSci**.

Center-Based Play Materials & Activities to Support Today's Science Learning

Dramatic Play

- Set up a home theme, adding battery powered candles, lanterns, lamp and a string of white or colored lights.

Art Center

- black and white materials such as white paint and chalk on dark paper
- Create simple line drawings. Make blobs of black paint. Imagine them to be shadows – what could they be shadows of?
- Paper strips to make line collages

Block Area

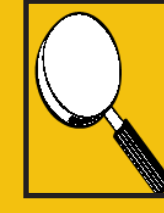
- Use colored or clear cellophane to make windows for block building.
- Shine flashlights around the blocks and block buildings. Where does the light go?

Manipulatives

- With scissors or plastic knives, cut along straight or curved lines drawn on paper or traced on playdough.

Large Motor Play

- Walk around your neighborhood or your school looking for the variety of light fixtures and the ways that light is used around the community.
- Roll balls across the floor or throw beanbags at targets to experience how light travels in a straight line.



Science Table

- A variety of flashlights, lanterns and batteries for children to explore - talk about flashlight safety.
- photos of other light sources: traffic lights, lamps, campfires, and so forth

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What Can Light Move Through?

Concepts:
Light can pass through some objects and be blocked by others.

Learning Goals:
Children will test a variety of materials to see which ones allow light to pass through.

Vocabulary:
light
opaque
translucent
material
result
transparent

Materials:
flashlights
plastic wrap
wax paper
tissue paper
mirror
colored cellophane
foil
cardboard
water

Read and Talk About:
Right Outside My Window by Mary Ann Hoberman

Things to Talk About:

Did the light pass through all of the materials? Why?

Which material stops most of the light?

Did the light pass through some things and not others? Which of your predictions were correct?

What happens when the light is blocked?

Where else have you seen shadows?

How does a shadow get its shape?

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What Can Light Move Through? - Language and Literacy

Speaking & Listening	Introduce the terms *transparent*, *translucent*, and *opaque* within the context of today's activity. Use these words frequently as you do the activity so the children can become familiar with them. Your use of the words helps children understand them.
Reading Comprehension	*Right Outside My Window* makes use of repetitive text. The author begins by saying "There is always something new to see right outside my window." This phrase is then repeated on each page. Encourage children to notice the repeating phrase and to read it along with you. When you finish reading, ask the children to help you make a list of the things the author saw outside the window.
Alphabet Awareness	Today's letter is **T/t** for *transparent* and *translucent*. Point out how to make this letter as you create a chart for the science activity. Encourage children to come up and make the letter on the chart.
Phonological Awareness	Listen for the repetitive phrase in today's story. Write this phrase on the chart paper and then have the children make a list of things they see outside. Read the list and have the children repeat the phrase after each item. For example: *I see a squirrel… right outside my window.* *I see a big pine tree… right outside my window.* *I see three cars driving by… right outside my window.* *I see the rain in the puddles… right outside my window.*
Print Awareness	As you read today's book, point out the phrase *right outside my window* on each page. Show the children how they can find it by looking for the special print called *italics*. Ask the children why they think the author used italics.

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What Can Light Move Through?

Mathematics:

Sort and categorize materials by how light travels (or doesn't travel) through them: *transparent*, *translucent*, and *opaque*.

Make a graph that shows what you find.

Count and compare the number of each type of material on the graph. Write the numerals.

Science Inquiry Cycle:

Reflect and Ask

Talk about when the children have seen shadows. Does everything make a shadow? What kinds of things don't make shadows? What kind of objects does light go through?

Plan and Predict

Show the children the materials you have. Work together to make a plan for how to use the materials to see if light will shine through. Plan how to record the results.

Act and Observe

Experiment with the different materials, trying to look through them. Shine a flashlight on the wall. Hold the plastic wrap in front of the light; observe what happens. Next try the wax paper, then the cardboard. Support children in talking about their observations.

Report and Reflect

Discuss other materials that could be used. Display the chart created to identify transparent, translucent, and opaque materials. Ask the children to suggest other materials that might be opaque. Have them point to a transparent material.

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Thank you for using LiteraSci's *What Can Light Move Through?* Daily Lesson Plan.

We hope you enjoyed your experience. If you liked this lesson, you may consider purchasing the *Light Travels Week* or *Light, Shadows and Reflections Month* from which this lesson came.

Your feedback is important to us.
Please contact us with your comments and suggestions at:
www.literasci.com.