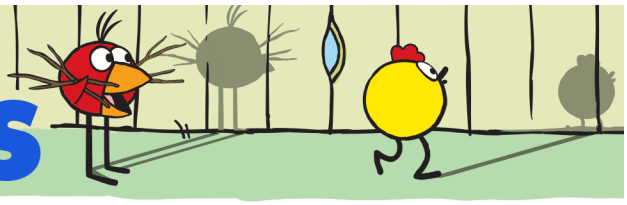


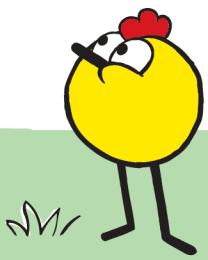
TRAINING HANDOUTS

Photocopy these handouts for participants:

- **Teaching Strategy Handouts**
  (pass each one out after your session on the strategy)
  1. Learning Environments
  2. Science Talk
  3. Documentation and Reflection
  4. Individualized Instruction

- **Homework Assignment** (pass out at the end of Part I of the training)

- **Training Evaluation** (pass out at the end of your training)



© 2014 WGBH Educational Foundation. All rights reserved. *Peep and the Big Wide World* and the *Peep* characters and related indicia are trademarks of WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission. "Peep," "Quack," "Chirp," "Tom" and "Nellie" were originally created by Kai Pindal for the National Film Board of Canada productions *The Peep Show*, © National Film Board of Canada, 1962, and *Peep and the Big Wide World*, © National Film Board of Canada, 1988. *Peep and the Big Wide World* ® is produced by WGBH and 9 Story Entertainment in association with TVOntario. Major funding for *Peep and the Big Wide World* is provided by the National Science Foundation. This material is based upon work supported by the National Science Foundation under Grant No. 1222607. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Teaching Strategies

Learning Environments

What Is an Effective Learning Environment?

- **A safe and well-organized learning environment** is full of sensory (visual, tactile, hearing, and kinesthetic) opportunities.
- **It offers children a variety of experiences,** giving them the freedom to explore what captures their attention. It doesn't have to be limited to one learning center, or the classroom. It can include all areas of the room, meal times, hand washing, outdoor play and observing the world outside.
- **Traditional learning centers,** like a science center, library corner, block center, or dramatic play area, can be modified or changed so they serve as shadow exploration centers.
- **Temporary, flexible spaces** can also be created or transformed as needed—whether they are indoor or outdoor areas. A "science area" may be a table that is used as a rotating exploration center with tubs that are brought out and journals to record observations.
- Learning environments for exploring shadows can be used for **specific guided activities** or opened up for **free exploration.**

How does a learning environment encourage science exploration?

- **Science exploration is about direct experience and hands-on investigation.** Learning centers allow children to:
  - explore on their own time and in their own way.
  - look at, touch, and manipulate objects.
  - build their understanding by repeating an activity many times.

- **A variety of different spaces and materials can** contribute to learning, including**:**
  - open spaces for energetic explorations.
  - quiet spaces for reflection, reading, or alone time.
  - playgrounds for outdoor investigations.

Teaching Strategy: Planning a Learning Environment

Why is planning a learning environment an effective teaching strategy?

A well-organized, intentionally planned learning environment encourages children to explore with specific materials and learning goals in mind.

- **Modify your permanent learning spaces or create flexible ones.** If your classroom already has a permanent science center, use it as an area to explore shadows. If you cannot add a permanent science learning center, modify the learning centers you already have, such as your block, dramatic play, art, and library centers, tailoring them to your science explorations.
  Example: Put flashlights in your block area so that children can use them to create block shadows. You might also set up a shadow observation journal near a window so that children can draw any interesting shadows that they see outside.

- **Use learning environments for both guided activities and free exploration.** A learning center can double as a setting for an educator-guided activity that focuses on a specific investigation as well as one that offers free exploration.
  Example: You might lead a guided activity in which children trace their shadows. After the activity, you might set out crayons, markers, and paints so that children can add in any details that were not captured when they traced their shadow. This can lead to a rich discussion about why certain things can be seen in a shadow and why others cannot.

- **Work with what you have.** Creating a rich learning environment for shadow exploration doesn't take a lot of additional materials. After all, shadows are all around us.

- **Organize the space and materials.** To help you create a dynamic environment for science exploration, ask yourself some questions that will help inform the activities you choose, the spaces you set up, and the materials you make available to children:
  - What experiences do I want children to have?
  - What do I want children to learn about shadows?
  - What are their interests, abilities, and cultural backgrounds?
  - Do I want children to be sitting, standing, or both?
  - How much space does the activity require?
  - Is the activity messy?
  - Will the activity work differently indoors and outdoors?
  - What other props will support children's learning about shadows?

- **Place materials in accessible locations.**
  - If materials such as flashlights, sketch books, paper, markers, and small objects that make interesting shadows are in appropriate containers, and at the right height, children will feel comfortable working and will be drawn to experiment.
  - Simple rules will help them develop a sense of responsibility for the materials.

- **Plan for messes—leave materials for cleaning up nearby.**
  - Science can get messy. If children are exploring shadows outdoors they will probably get dirty. Have soap and paper towels ready when children come inside and encourage them to be responsible for cleaning themselves.
  - Children need the freedom to explore materials in a center with as few restrictions as possible. Planning for mishaps helps eliminate some of the warnings and reprimands that can interfere with a young scientist's discoveries.
  - Asking children to help in any cleanup can increase their sense of responsibility.

- **Make the most of your outdoor spaces.** Enjoy being outside and observing when you are there. Science is play too!
  Example: Children can search for shadows on the sidewalk or on the walls of buildings. They can find out what happens to their shadow when they stand under a shady tree or behind a fence and can discover different ways to make their shadow shrink and grow.

Your Experiences

- What types of permanent indoor learning environments exist in your classroom?
- What is your outdoor space like? What activities seem to work best outdoors?
- What kinds of temporary learning centers have you created—indoors and outdoors?
- Does your space present any challenges? How have you overcome them?

Teaching Strategy: Offering Choices

Why is offering choices an effective teaching strategy?

Children appreciate options. Flexibility and choice are key when setting up a learning space. Offer children different and varied experiences, and let them follow their interests. This strategy not only helps address a child's individual needs, but it also helps children to become independent learners.

Spaces

You already have learning centers in your classroom—spaces designed for specific types of exploration. Help children become familiar with what happens there and the different choices available to them. You can use cardboard boxes, rugs, or even chalk to create temporary learning spaces, both indoors and outdoors. Learning areas can also be tables with chairs or just a corner of a room. You can adapt these spaces for learning about shadows in a variety of ways:

- **Open space:** This learning area (indoors and outdoors) allows children to move their bodies. Children can create shadows with their hands, feet, legs, and bodies and even work with other children to create giant shadows.
- **Window area:** The windows in your classroom are perfect for exploring shadows. Set out found objects and challenge children to try and use these objects to make shadows using the sunlight coming through the window. Children can also visit the window throughout the day and make observations about where the sun is and how this affects shadows they see outdoors.
- **Dramatic Play area:** Create a shadow puppet theater using a large white sheet and two chairs, plus a desk lamp.

- **Rug:** This is where children can get comfortable for read-alouds, playing with shadow puppets, and making shadows on the ceiling using flashlights or lamps.
- **Table:** Tables provide a natural location for spreading out and working on activities like drawing or tracing shadows.
- **Library area:** In the library area, children can browse through and read shadow-related books.
- **Art area:** Here, children have access to easels, smocks, paper, crayons, markers, and paints. They can cut out shadow puppets, paint shadow silhouettes, and draw pictures of their shadow discoveries.
- **Quiet area:** Setting aside a quiet area gives children a place to experiment with shadows by themselves.
- **Sensory area:** The sensory area is ideal for hands-on activities. Children can make shadows with found objects and flashlights.
- **Display area:** Use a bulletin board, wall, and/or table to display photos of shadows, shadow art, charts, and other shadow-related works, such as shadow puppets.
- **Playground:** On sunny days, encourage children to explore shadows outdoors by having them hunt for shadows made by objects or make shapes using their own shadow.

Materials

Offer a choice of stimulating and interesting materials. Different types of materials encourage different types of exploration.

- You can create one station where children make hand shadows and another where they try to make the smallest shadow using simple objects, like a pencil, comb, or bunch of yarn. They may naturally gravitate to one station or the other. After they've explored both, you'll have a great opportunity for a discussion about shadows.
- For **shadow stations,** be creative in the types of things you set out for children. Provide lamps and flashlights so children can experiment with both fixed and movable light sources. Challenge children to make shadows, change the shape of shadows, and make shadows "hide" or "disappear."
- You can add variety by **adding or taking away materials** on different days.

Remember to be selective, however—too much choice can be overwhelming for young children.

Your Experiences

- What types of learning centers have been most effective in your setting?
- What have you done with your space to make it varied and to stimulate the curiosity of children with different interests and abilities?
- What simple materials have you used to define spaces (e.g., a beach towel, masking tape, or piece of cardboard)?

Teaching Strategy: Encouraging Exploration Throughout the Day

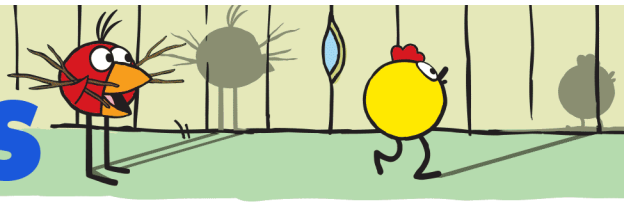
Why is encouraging exploration an effective teaching strategy?

- Science is all about investigation and discovery; it's hands-on and requires that children learn through experimentation and trial-and-error.
- As you explore shadows, make sure some of your learning environments support open-ended exploration, so children can follow their own interests, explore further, and make new discoveries. (At other times, you can use this same learning center as the setting for guided activity focused on a specific investigation.)

The following strategies will help encourage learning everywhere:

- **Allow lots of free exploration.** This may lead children down new and perhaps unexpected paths, and help them become invested in learning about shadows.
  Example: In a learning center with a lamp, let children choose objects from anywhere in your space to experiment making shadows with—a colander or whisk from the kitchen, scarves and mittens from the coat area, past art projects, etc.

- **Follow children's lead.** Science exploration works best when you are following children's interests and addressing their questions—that guarantees they'll be engaged and motivated. They will also become more confident in their abilities, and develop leadership skills and independence.
  Example: If children are playing outside and a child notices his shadow looks different when it appears on a set of stairs, encourage him to look for other settings that make his shadow look unusual. What does his shadow look like against a fence, over a storm drain, in a field with tall weeds, etc.?



- **Integrate shadow learning throughout the day.** Everyday routines offer an easy way to explore shadows.
  Example: During snack time, as you line up, or as you pack up for the day, do a "shadow check" where children look for any shadows.

- **Use the whole space as a palette for learning**. Your environment and the world right outside your door offer opportunities for learning about shadows.
  Example: Try walking around your building and looking for shadows along the walls and sidewalk. Stand in different parts of your classroom to see if you can locate your own shadow indoors.

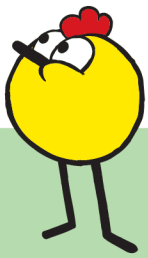
Your Experiences

- Can you share a time when you followed a child's lead and a spontaneous learning moment occurred?
- In what surprising places have learning moments happened in your program?
- How do you encourage learning and discovery during your daily routines—while taking a walk, for example, or preparing for lunch?

More Resources

For more information on learning environments
There are additional Teaching Strategy PDFs on the PEEP Web site along with instructional videos. These illustrate learning environments related to the other PEEP science units: Colors, Water, Plants, Ramps, and Sound.

For more videos and information on other topics
In addition, the Web site offers Teaching Strategies and videos on other professional development topics: Documentation and Reflection, Individualized Instruction, and Science Talk.



© 2014 WGBH Educational Foundation. All rights reserved. *Peep and the Big Wide World* and the *Peep* characters and related indicia are trademarks of WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission. "Peep," "Quack," "Chirp," "Tom" and "Nellie" were originally created by Kai Pindal for the National Film Board of Canada productions *The Peep Show*, © National Film Board of Canada, 1962, and *Peep and the Big Wide World*, © National Film Board of Canada, 1988. *Peep and the Big Wide World* ® is produced by WGBH and 9 Story Entertainment in association with TVOntario. Major funding for *Peep and the Big Wide World* is provided by the National Science Foundation. This material is based upon work supported by the National Science Foundation under Grant No. 1222607. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Teaching Strategies
Science Talk

What Is Science Talk?

- **Language is crucial to learning and communication** in all subjects. Science is no exception. As children investigate and explore shadows, they need to talk about their work just the way scientists would—this is "science talk."
- **Science talk happens when** children ask questions, make comparisons and predictions, share and discuss results, and learn new words to describe what they are seeing and doing.
  Examples:
  I think that tree is blocking my shadow.
  I can see my shadow over here, but I can't see it over there.
  The shadow looks fuzzy when I pull my hand farther away.

- **One misconception** educators sometimes have is that science talk needs to sound "scientific." As you can see from the examples above, that's not always the case—but they clearly show a child's active and curious mind predicting, observing, and making distinctions.
- **Science talk can happen any time and any place**—not just during science explorations. It happens during snack time as children compare amounts of water in their cups or the colors of their apples. It happens outside on the playground as children inspect an anthill or crunch leaves.

Why is science talk important?

- **Language is a tool for thinking and learning as well as communicating.** When children use science talk, it helps them develop understanding, share ideas, build vocabulary, and increase their listening and comprehension skills.
- **Science talk helps children to go deeper in their science explorations**, by encouraging them to think through an idea, ask a new question, or try something new. Science talk is not just a way of communicating—it is part of how we think and learn about the world.

Teaching Strategy: Modeling Science Talk

Why is modeling science talk an effective teaching strategy?

- By modeling how to pose questions, keep a discussion going, or how to narrate your actions and thoughts, you help develop children's abilities to listen, reflect, and communicate.
- You also help them build vocabulary and discover the power and importance of words.

Here are some ways to model science talk while exploring shadows.

- **Compare and contrast shadows you notice throughout the day.**
  Example: *Look, I can see my shadow on the wall. I couldn't see it there when I looked this morning. Why do you think I can see it now? Why couldn't I see it before? I'm curious if I'll be able to see my shadow at this time tomorrow. What do you think?*

- **Let children know what you're wondering about.**
  Example: You might hold up a flashlight and say, *I wonder if I can use this flashlight to make a shadow of my hand on the ceiling? Where should I hold the flashlight in order to make that shadow? How can I figure out where to hold the flashlight?*

- **Incorporate new words as children do hands-on activities.**
  Example: You might introduce the word *position* as you make shadows with a flashlight or lamp. *Look, I changed the position of the flashlight and the shadow grew bigger! Why do you think that happened?*

- **Narrate your actions so children learn to describe aloud what they are doing.** Use action words such as *observe, describe, notice, predict, compare, change, discover, record,* and *measure.* Use descriptive words such as *near, far, smaller, bigger.*
  Example: You might say, *I wonder if I can make this block shadow smaller? What will happen if I move the flashlight farther away from the block?* When you investigate more closely, children will be encouraged to do the same.

- **Use rich, descriptive language.**
  Example: Encourage children to be detailed in their observations of shadows. Model this by saying things like, *Look! This bowl is making a round shadow. This shadow has no edges and it's a circle. It looks like a ball.*

Your Experiences

- Can you share some of your own stories about modeling science talk? What's been successful? What's been a struggle?
- What are some ways you've encouraged children to enrich their language and incorporate science vocabulary?
- What did you learn from the video that you might try in your own teaching?

Teaching Strategy: Asking Open-Ended Questions

How does asking open-ended questions encourage science talk?

- An open-ended question is one that usually can't be answered with just one or two words, or with a simple *yes* or *no*. They are phrased in a way that encourages children to explain and expand upon their thoughts.
- As children answer open-ended questions, they build expressive language skills, reflect on what they're observing, and go deeper into their explorations.

Composing open-ended questions takes a little practice.

- Most people discover that it's an acquired skill.
- It's a good idea to come prepared with a list of such questions when leading a science activity, until it becomes a natural part of your teaching.

Some examples:

- ***How* questions:** *How do you think I can make my shadow disappear? How much longer is this shadow than that shadow? How can you tell?*

- ***What* questions:** *What would happen if you moved the block farther from the light? What are some ways you can change the shape of this shadow? What do you think will happen to your shadow if the sun goes behind a cloud?*

- ***Do you think . . .* questions:** The use of "Do you think…" when relevant, encourages children's thinking—instead of focusing on getting the right answer. *What do you think my shadow will look like at night? Do you think this glass can make a shadow?*

Open-ended questions aren't always the answer.

- Keep in mind that they aren't always the best choice in all situations and for all children. Some children may need more structure and guidance.
  Example: Instead of asking, *Can you describe how the shadow changed?*, you might get more from some children by asking an either/or question: *Do you think your shadow will grow or shrink if you move closer to the wall?* That way, they begin to learn to make distinctions and comparisons.

Your Experiences

- Do you intentionally use open-ended questions with children? What's your experience been?
- What differences have you noticed in the way children answer when you ask open-ended questions?
- Since formulating open-ended questions takes a bit of practice, let's try turning a few *yes/no* or *either/or* questions into open-ended ones:

  – *Was it this object or that object that made the shadow?*
  – *Can you see your eyes, nose, and mouth when you look at your shadow, or the color of your hair or clothes?*
  – *If we want to make the shadow bigger, should we hold the flashlight closer or farther away?*

Teaching Strategy: Encouraging Science Talk Among Children

How does encouraging science talk among children benefit your teaching?

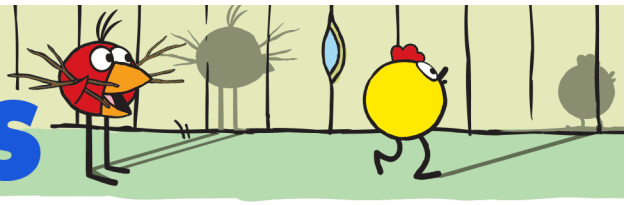
When you select an activity that excites them, or have a discussion that piques their interest, you encourage children to participate more actively and to spontaneously talk about what they are doing and thinking.

Here are some ways to engage them:

- **Find out what excites children.** Take the time to observe them. Notice their interests and incorporate these interests into your activities.
  Example: Begin your shadow explorations by going on a shadow hunt. Take note of children's questions and find out what they know about shadows. When you get back to the classroom, ask children to tell you something they want to learn about shadows or something they wonder about shadows. Use their questions and curiosities to begin planning your activities.

- **Personalize the learning by incorporating children's experiences** into the things you are doing.
  Example: You might have children bring in a favorite object that they can use to create shadows. You might also have children notice shadows at home. When they arrive in the morning you can ask, *What shadows did you see at home? Where did you see them? When did you see them?*

- **Promote science talk among children.** By encouraging children to discuss things together, you give them the chance to teach and guide one another. Through their collaborations, children often take the learning in new directions you might never have anticipated. You can even ask children to discuss and plan during their lunch and give them afternoon time to put their plans into action.
  Example: You can pair children up and present them with a problem that they have to solve together, such as, *How do you hide a shadow?*



- **Introduce mystery.** Children always have a lot to talk about when there is a mystery involved. Mysteries engage children in science talk because they inspire children to wonder, make predictions, and to become detectives
  Example: Trace a shadow on a piece of paper. Lay out several objects and challenge children to find out which object was used to create the mystery shadow that you traced.

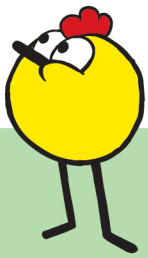
Your Experiences

- Are there certain activities that seem to stimulate children's conversation? How do you get children curious, excited, and asking questions?
- What are ways you relate science explorations to children's own lives? How has personalizing the learning been effective?
- How do you encourage children to talk to each other about their science explorations? Have any challenges come up, and how have you handled them?
- Presenting children with a mystery is a great way to get them talking and wondering. What other approaches have worked for you?

More Resources

For more information on science talk
There are additional Teaching Strategy PDFs on the PEEP Web site along with instructional videos. These illustrate science talk related to the other PEEP science units: Colors, Water, Plants, Ramps, and Sound.

For more videos and information on other topics
In addition, the Web site offers Teaching Strategies and videos on other professional development topics: Learning Environments, Individualized Instruction, and Documentation and Reflection.



© 2014 WGBH Educational Foundation. All rights reserved. *Peep and the Big Wide World* and the *Peep* characters and related indicia are trademarks of WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission. "Peep," "Quack," "Chirp," "Tom" and "Nellie" were originally created by Kai Pindal for the National Film Board of Canada productions *The Peep Show*, © National Film Board of Canada, 1962, and *Peep and the Big Wide World*, © National Film Board of Canada, 1988. *Peep and the Big Wide World* ® is produced by WGBH and 9 Story Entertainment in association with TVOntario. Major funding for *Peep and the Big Wide World* is provided by the National Science Foundation. This material is based upon work supported by the National Science Foundation under Grant No. 1222607. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Teaching Strategies

Documentation and Reflection

What is Documentation and Reflection?

- Documentation is the process of recording experiences.
- Using documentation, children and educators can look back on their experiences during an activity and think more deeply about them.

What are some types of documentation?

- **Child-generated documentation** happens when children record their own learning. It can include:
  - drawing a picture of what they did
  - taking photos of their work
  - explaining what they're doing and what happened while you transcribe their words

- **Educator-generated documentation** can include:
  - creating charts
  - making notes
  - taking photos
  - recording audio
  - shooting video

Why is documentation and reflection important?

- **Children don't learn from their experiences alone.**
  - They need to think about what they have done and talk with others.
  - They will often notice new things about their work the second or third time they review it.

- **It gives children a sense of ownership.**
  - To see their work documented gives children a sense of ownership—making it much more likely that they will remember, apply, and build upon this learning.

- **It captures the process of scientific inquiry.**
  - Science is a process that includes predictions, testing, questioning, problem solving, experimentation, and sharing ideas. Documentation helps capture the process of scientific inquiry, not just the outcomes.
  - It allows children to see the steps they took.
  - Children begin to learn that an important part of science is collecting, describing, and recording data.

- **Language skills are strengthened.** Commenting on documentation asks children to:
  - clarify their ideas
  - explain their reasoning
  - communicate their perspectives, both to themselves and to others
  - use and repeat new scientific words and incorporate them into their vocabulary

- **It is an invaluable teaching tool,** allowing you to:
  - develop activities that respond to the needs of each child
  - communicate with parents and share concrete examples of children's work
  - show children the connections between the different activities and ideas they've been exploring
  - understand an individual child's skills, growth, struggles, or misconceptions
  - assess children's thinking and your own teaching

Teaching Strategy: Encouraging Children to Create Documentation

Why is encouraging children to create documentation an effective teaching strategy?

By helping children document what they are doing, you make it possible for them to reflect on their work and to understand and make sense of their experiences.

Children can be encouraged to document their work in many different ways:

- **Drawing pictures** is an ideal way for children to make their learning visible.
  Example: On a morning trip outside, you might have children trace their shadows with chalk on a sidewalk. Later that afternoon they can return to the exact spot and trace their shadows again. Then have them compare the tracings and talk about ways the shadows changed and why.

- **Charts, graphs, and models** allow children to "see" or visualize their thinking and to compare their results with peers.
  Example: A chart can help organize information about shadows that children observe. Make a chart that shows the length of shadows at different times of day to help children make connections about how shadows change during the day based on the location of the sun.

- **Dictating thoughts** for you to transcribe (usually in an abbreviated form) helps children learn about their thought process. Children learn about their thinking through the act of communicating.
  Example: An educator might write down what children say as they experiment with shadows under a lamp. Later she can read their words back to them as they reflect upon the experience. Reading the child's dictation back to her to check for accuracy further cements this process.

- **Recording, videotaping, or photographing** a child's demonstration or explanation gives children perspective on what they have accomplished.
  Example: Two children might demonstrate how they can make their shadows touch hands without them actually touching hands. The teacher might videotape the demonstration and then play it back so that the group can observe and discuss it.

Your Experiences

- What kinds of documentation do you typically do with children?
- What types of documentation do children seem most interested in creating—do some forms come more naturally to them than others?
- Have you run into any challenges while having children document their explorations? What kind?

Teaching Strategy:
Using Documentation and Reflection as Teaching Tools (15 min.)

How does using documentation and reflection benefit your teaching?

Documentation will engage children, deepen their learning, and make connections between the different science activities you've shared together. It will spark conversation and get children to share what they did and learned. It will also help you decide how to support the child's learning.

There are many benefits to documenting children's work:

- **It helps children remember, share, and reflect** on their ideas and experiences. Looking at a photo or chart helps children recall their thoughts and ideas about what they were pursuing.
  Example: To document a hand shadow play, you might take pictures of children's hands and of the shadows their hands made. Children can try to match the picture of the hand with the picture of the shadow it created. The photos can help children recall their experience and reflect upon shadows and how they work.

- **It connects ideas and builds on learning.** Documentation helps children see connections between the different activities they've done and encourages them to think more deeply about them. Charts are especially good for this.
  Example: Create a chart called "What Is a Shadow?" and add children's insights to it each day after they've completed an activity. At the end of the week, revisit their comments—some of their observations may have changed over the week. For example, children may think "a shadow follows you everywhere" at the beginning of the week, but after completing a few hands-on activities, they may think "a shadow follows you everywhere except where it's shady or when it's night."

- **It shows that you take children's explorations seriously.** Recording something gives it importance.
  Example: You might photograph children as they move an object to try and change the shape of its shadow. You can display these photographs and ask children to comment on each one by describing what they were doing. You can write children's words on sticky notes and post them below the photos. The very fact that you've photographed their explorations shows children that you consider their explorations valuable.

- **It helps with lesson plans and in understanding the needs of each child.** Documentation is key in helping you plan instruction and future activities. With your notes, transcriptions, and photos, you can see what really catches the children's attention. What do they want to know more about? What was hard for them to grasp? Did they seem to engage more in indoor or outdoor activities about shadows?

- **It enables specific communication with parents or caregivers.** Here are a few activities you can use:
  - Send home children's drawings and transcriptions.
  - Set up a bulletin board with photos, charts, and drawings that children can show their caregivers and talk about when it's pick-up time.
  - Create a portfolio for children that shows evidence of their growth and learning over time.
  - Strengthen the home/school connection by encouraging parents to explore shadows with their children at home.

Your Experiences

- Do you use cameras, video, or audio recording devices when you document? How has technology helped you? Have you encountered any problems with it?
- In what ways do you use "low-tech" resources, such as written notes, to document learning?
- Have you faced any challenges when documenting children's learning? If so, what were they?
- What benefits of documentation have you noticed?

Teaching Strategy: Reflecting Together

Why is reflecting together an effective teaching strategy?

After children document their work, it's essential that they reflect on it: that's where much of their understanding about what they experienced takes place. As you reflect together, you strengthen children's reasoning abilities, help them consider others' perspectives, build their communication skills, and learn to better understand their thinking and learning.

There are many ways to promote reflection:

- **Children sharing ideas**
  - Have a child present her documentation in a group and encourage the others to ask questions or comment on something they find interesting.
  - An engaged and receptive audience will make the child who is presenting feel excited and proud to be showing his work, and more confident in expressing ideas and conclusions.
  - The audience also benefits by working on their ability to listen and sustain attention, and by developing social skills in taking turns.
  - Group reflection encourages children to consider new perspectives.
  - Children may become inspired to try something new next time.

- **One-on-one conversations**
  - Not all children will want to share their reflections in a group.
  - Conversations with you during or after a child has created documentation gives you the chance to explore with a child on his or her own terms.

- **Displaying documentation**
  - Post on bulletin boards, poster board, or a tri-fold board.
  - Create a "save it" shelf, where children keep their creations, or a class album full of photos, children's drawings, and children's words.
    Example: Use a post-it note or index card to write a caption using what children have to say about a shadow they traced.

- **Including parents in reflection**
  - Consider inviting parents to come and observe as children talk about their creations.
    Example: You might invite parents to come and observe as children put on a shadow play and then have children teach parents how to make different shadow animals.

Your Experiences

- What types of documentation have you found most effective for helping children to reflect?
- How would you compare guiding group reflection and reflecting with children individually? Any success stories to share?

More Resources

For more information on documentation and reflection
There are additional Teaching Strategy PDFs on the PEEP Web site along with instructional videos. These illustrate documentation and reflection related to the other PEEP science units: Color, Water, Plants, Ramps, and Sound.

For more videos and information on other topics
In addition, the Web site offers Teaching Strategies and videos on other professional development topics: Learning Environments, Individualized Instruction, and Science Talk.

© 2014 WGBH Educational Foundation. All rights reserved. *Peep and the Big Wide World* and the *Peep* characters and related indicia are trademarks of WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission. "Peep," "Quack," "Chirp," "Tom" and "Nellie" were originally created by Kai Pindal for the National Film Board of Canada productions *The Peep Show*, © National Film Board of Canada, 1962, and *Peep and the Big Wide World*, © National Film Board of Canada, 1988. *Peep and the Big Wide World* ® is produced by WGBH and 9 Story Entertainment in association with TVOntario. Major funding for *Peep and the Big Wide World* is provided by the National Science Foundation. This material is based upon work supported by the National Science Foundation under Grant No. 1222607. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Teaching Strategies

Individualized Instruction

What Is Individualized Instruction?

- It's a way of teaching that takes into account each child's unique characteristics, including age, developmental stage, interests, and learning styles.
- With an awareness of children's differences, an educator can plan learning centers and activities, offer instructions or explanations, and encourage children to express their ideas and experiences in a way that's effective and appropriate.

Why is individualized instruction important?

- Responding to children's varied needs, experiences, and interests is critical to teaching.
- Science is well suited to individualized instruction because it offers children the chance to explore in hands-on ways at their own level.
- By carefully observing children, educators can plan a wide variety of activities that address a range of skills and learning goals.
- Recognizing children's unique learning abilities, interests, strengths, and challenges will increase their engagement, help them to think and learn, and make them feel valued and competent. Children who are recognized in this way are more likely to persist in questioning and problem solving.

Teaching Strategy: Planning for Children of Different Ages and Developmental Stages

Why is planning for children of different ages and developmental stages an effective teaching strategy?

- Preschool classrooms may have children who have recently transitioned from toddlers to those who are ready for kindergarten in the same room. It can be a challenge to offer group activities that work for children at widely different developmental stages.

- Even among children of similar ages, not all mature at the same rate. Children who are close in age can be quite different in terms of development. Attention span and interest level will affect their ability to focus.

- We are all different learners with different needs. Young children are just learning how to be students. It's important to make sure their earliest learning moments are positive and as customized for them as we can make them. Every learner has their current level of ability and then a level where he/she can be comfortably pushed. It is your job as a teacher to find that zone for students and help them get to *their* next level.

Some ways to take age and development into account:

Note: The following uses "older children" and "younger children" as a very basic description of ability, not necessarily age. There will be the occasional three-year-old who can accomplish tasks at the "older child" level and an almost five-year-old who may fit the "younger child" description better. You know your group and what their level of development is.

- **Explain the same concept in different ways.**
  - For some children, a simple explanation will be sufficient. For other children, you will need to ask many questions to gauge their understanding.
  - Even children who quickly grasped the concept can benefit from hearing different explanations and watching demonstrations.
  - You can encourage peer-to-peer learning—having children explain concepts to each other.
  - The more ways you explore an idea with children, the more likely they will be able to understand and remember it.

- **Adjust the materials.** During science explorations, children need to be "hands-on," regardless of their current stage of motor skills development. **Example:** Younger children may not have the necessary coordination to turn on flashlights and focus them on objects to make shadows. Instead, have younger children move in front of a light source to see if they can make their shadows do different things like grow big and then little.

- **Offer independence—or more support.**
  - **More independence.** Some children may finish an activity quickly. Have additional materials and extension activities ready.
    Example: If a child easily outlines an object's shadow, challenge him to move the object in different ways to see if he can make the shadow change shape and size. Ask him to outline each new shadow that his object makes.
  - **More support.** Some children may need more guidance and thrive on the support you give them.
    Example: If a child does not yet understand what a shadow is, ask another child to stand up and move around while the group points out her shadow.

- **Plan different social groupings.** The way you group children during activities can enhance individualized learning.
  - **Pair children so that an older child mentors a younger one.** Younger children will be inspired to push their abilities when they see older children in action. Older children will develop language skills and social skills (and a sense of pride) as they explain things to a younger partner. They may also learn how to share and compromise.
    Example: Consider pairing an older child and a younger child to make shadows together. The older child can instruct the younger child on how to move their body to create different shadow shapes.
  - **Working with groups of the same age is also important.** There will be some activities that you'll only want to do with older children and some that will work best with a younger crowd. To ensure that this happens, you might set aside a time each week for same-age peers to collaborate.
  - **Offer whole-group activities for mixed ages.** Most science activities easily work for all ages and give children the chance to collaborate. These activities also help children learn from one another, develop patience, and appreciate others' perspectives.
    Example: Try going on a shadow walk as a group, during which children try to find their own shadows as well as other interesting shadow shapes. Children can make their own discoveries and also work together, sharing shadow tips and pointing out each other's shadows.
  - **One-on-one attention.** Find opportunities throughout the day to check in with individual children to gain insight into their abilities, strengths, and weaknesses. Connect with students who may be having difficulty with an activity or trouble interacting with other children—your attention can make all the difference.

Your Experiences

- What are some of the differences you notice among the children in your classroom?
- How have you adapted activities to meet the needs of children who are at different levels of development? What have been your greatest successes? What has been a struggle?
- What are some ways you make learning experiences engaging for all students in your classroom?

Teaching Strategy: Planning for Children with Different Interests and Learning Styles

How does planning for children with different interests and learning styles benefit your teaching?

- When children are given opportunities to follow their own interests and learn in their own ways, their engagement and sense of personal investment in the learning deepens.
- An educator's awareness of children's passions, motivations, temperament, strengths, and weaknesses can significantly affect how a child learns and grows.

Some ways to address children's different interests and learning styles:

- **Get to know each child.** Engage with children to learn their interests, strengths, and weaknesses. The best way to do this is to observe children in action.
  - **Keep an observation journal** on hand. Dedicate a page to each child in your group. Take notes on what children like, what they already know, and what you hope to teach them more about. Make notes about children who work well together and observe how children play and interact. Use these insights to inform your teaching.
    Example: If you notice that a certain child loves animals, you might plan an activity in which the group creates animal shadows using cut paper and their own hands. You might challenge them to make a dog, a bird, and a rabbit.

- **Identify learning styles.**
  - **Most children have particular styles of learning they respond to best;** they may gravitate toward visual, auditory, or kinesthetic learning. Over time, you will become familiar with whether children prefer to learn by hearing, looking, moving, or a combination of these sensory aptitudes.
  - **Address learning styles** in your instructions by explaining, demonstrating, and, if appropriate, letting children try the activity or participate in the demonstration in a hands-on way.
  - **Offering visual, auditory, and kinesthetic experiences** doesn't just benefit the child who prefers to listen, look, or move. Research shows that the more ways an idea is presented, the more likely children are to understand and retain the idea.
    Example: All learning styles can be addressed no matter what the science topic. An auditory learner, for example, may need lots of opportunities to talk about what they are doing with shadows, and might like to hear their own words and thoughts read back to them. Visual learners might like to trace a friend's shadow and then add in details that the shadow did not capture. Kinesthetic learners will need lots of opportunities to move and might enjoy a game of shadow tag or discovering ways to grow and shrink shadows by moving both objects and light sources.

- **Offer Choices.** One effective way to address the unique needs and interests of each child in your program is to devote your learning centers to different aspects of learning.
  Example: For example, in one center children can experiment with flashlights and objects to create shadows. In another center, they might have fun moving their own bodies in front of a fixed light source. In another, you might set up a challenge like, "How can you make the smallest shadow?" and encourage children to trace the shadows they create.

Your Experiences

- What strategies do you have for getting to know individual children in your classroom? What's an example of an observation about a child that's informed your planning and teaching?
- Are you always able to tell if a child prefers to learn through listening, looking, or moving? What would you say is your own preferred way of learning?
- What are some challenges you have faced when trying to offer many choices to the children in your classroom?
- What are some unique activities that have come out of children's interests?

More Resources

For more information on individualized instruction
There are additional Teaching Strategy PDFs on the PEEP Web site along with instructional videos. These illustrate individualized instruction related to the other PEEP science units: Color, Water, Plants, Ramps, and Sound.

For more videos and information on other topics
In addition, the Web site offers Teaching Strategies and videos on other professional development topics: Learning Environments, Documentation and Reflection, and Science Talk.

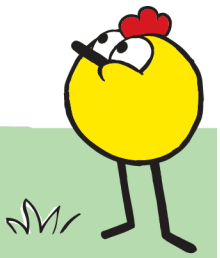
© 2014 WGBH Educational Foundation. All rights reserved. *Peep and the Big Wide World* and the *Peep* characters and related indicia are trademarks of WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission. "Peep," "Quack," "Chirp," "Tom" and "Nellie" were originally created by Kai Pindal for the National Film Board of Canada productions *The Peep Show*, © National Film Board of Canada, 1962, and *Peep and the Big Wide World*, © National Film Board of Canada, 1988. *Peep and the Big Wide World* ® is produced by WGBH and 9 Story Entertainment in association with TVOntario. Major funding for *Peep and the Big Wide World* is provided by the National Science Foundation. This material is based upon work supported by the National Science Foundation under Grant No. 1222607. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Homework Assignment

- Use the online PEEP Shadows curriculum to choose **one guided activity** to do with children OR set up **one learning center** for children to explore freely: www.peepandthebigwideworld.com/educators
- As children explore, document their investigation using drawings, pictures, or charts. Write down the children's observations as they do the activity.
- Use the documentation to create a poster, photo album, scrapbook, or other form of visual display that records the children's experiences with the activity or learning center.
- At the next session, everyone will share their visual displays and discuss what they learned.

Be prepared to answer these questions:

1. Which learning center or guided activity did you choose to set up? Why? What appealed to you about it?
2. How did you incorporate the teaching strategies—those from Learning Centers or from Science Talk?
3. What was the most satisfying part of leading the guided activity or setting up your learning center? What was challenging?



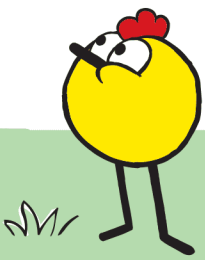
© 2014 WGBH Educational Foundation. All rights reserved. *Peep and the Big Wide World* and the *Peep* characters and related indicia are trademarks of WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission. "Peep," "Quack," "Chirp," "Tom" and "Nellie" were originally created by Kai Pindal for the National Film Board of Canada productions *The Peep Show*, © National Film Board of Canada, 1962, and *Peep and the Big Wide World*, © National Film Board of Canada, 1988. *Peep and the Big Wide World* ® is produced by WGBH and 9 Story Entertainment in association with TVOntario. Major funding for *Peep and the Big Wide World* is provided by the National Science Foundation. This material is based upon work supported by the National Science Foundation under Grant No. 1222607. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Training Evaluation

Thanks for your participation. Please share your impressions below.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Did the presenter identify learning goals at the beginning of the training?					
Were the learning goals met?					
Did the training meet your needs and expectations?					
Was there time for discussion and questions and answers?					
Was the presenter knowledgeable?					
Was the training organized and easy to follow?					
Will you be able to apply what you learned?					

What was most helpful about this training? Why was it helpful?



© 2014 WGBH Educational Foundation. All rights reserved. *Peep and the Big Wide World* and the *Peep* characters and related indicia are trademarks of WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission. "Peep," "Quack," "Chirp," "Tom" and "Nellie" were originally created by Kai Pindal for the National Film Board of Canada productions *The Peep Show*, © National Film Board of Canada, 1962, and *Peep and the Big Wide World*, © National Film Board of Canada, 1988. *Peep and the Big Wide World* ® is produced by WGBH and 9 Story Entertainment in association with TVOntario. Major funding for *Peep and the Big Wide World* is provided by the National Science Foundation. This material is based upon work supported by the National Science Foundation under Grant No. 1222607. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.