

Sense of Wonder Science

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What is “Sense of Wonder” Science?



“A child’s world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood...”



...[I wish that] each child in the world be [given] a sense of wonder so indestructible that it would last throughout life”



Rachel Carson, 1956
The Sense of Wonder



What is Science?

- Science is the **process** of getting additional information so that you can be more confident in your explanations.
- Science is also the **information** that people have gained throughout history as they have engaged in the process of science.



What does “Sense of Wonder” Science look like?





Physicists and Four-year olds

- Are curious about the natural world
- Ask questions and seek answers to their questions
- Learn through trial and error
- Are most motivated when they have some control over their learning
- Shouldn't be allowed to pick out their own clothes

More Physicists and Four-year olds

- Have difficulty keeping their shoes tied
- Don't have personal hygiene as a priority
- Have been known to throw tantrums
- Will wear the same clothes every day

During Sense of Wonder Science, children:

- **Engage in hands-on explorations with real materials**
- **Describe objects and events both orally**
- **Talk enthusiastically with adults and other children about their observations**

During Sense of Wonder Science, children:

- **Use newly-acquired words as they share their insights with others**
- **Count and measure things in simple, but effective and meaningful ways**
- **Ask questions about what they observe**
- **Display increasing eagerness to learn and experience more**

Apple Activity - 1

- Form groups of about 3-5.
- Each group gets an apple, plastic knife, hand lens, marking pen, and chart paper.
- List as many observations as you can in 5 minutes, *using all your senses*.
- All Group members please contribute.



The Apple Activity

- Real apple
- Model of an apple
- Picture of an apple
- Drawing of an apple
- The word “apple”



“Sense of Wonder” Science is hands-on and uses real materials in student explorations

Ready?



Imagine you’re a snail

- How do you feel?
- How do you move?
- What do you need?
- What can you do?
- What do you like?



Getting Familiar

- Each table has their own set of materials.
- Feel free to work independently or to collaborate with others
- Make observations about your animal’s appearance and behavior – What does it look like? What does it do?



Now that you are familiar with your snail, use these questions and challenges to guide further exploration. Be sure to record your observations.

FINDING OUT ABOUT SNAILS

For each of the following questions about snails, predict what you believe will be true before you make your observations. Just as any good scientist would, keep an accurate record of your observations and any questions that you think of. The information you record in your notes today may be very helpful at another time! You can use the back of this sheet to record your observations and science writings.

Does your snail have teeth?	Can your snail sense temperature?
Will your snail eat paper?	Does your snail prefer to be hot or cold?
Will your snail eat plants?	How does your snail move?
Will your snail eat oats?	Can your snail walk across sandpaper?
Will your snail eat a leaf?	Can your snail walk a tightrope?
Is your snail sensitive to touch?	Does your snail make noise?
Can your snail crawl?	Do snails communicate?
Does your snail know the difference between up and down?	Can you train your snail to do something?

Write at least 2 more questions about other things you would like to know about snails, their bodies, and the way they behave.

1
2
3
4

NOW STUDY YOUR SNAIL AND FIND OUT!!!

Adapted from
"A Hand Train on Science: Encouraging a Sense of Wonder" edited by William Byrd, NSTA Press and
"A Hand Train on Life Science: Encouraging a Sense of Wonder" by William Trexler, NSTA Press.

Now, imagine you're a snail

- How do you feel?
- How do you move?
- What do you need?
- What can you do?
- What do you like?



LEARNING ABOUT SNAILS

- What's the most interesting thing you learned about snails today?
- What observation(s) surprised you most?
- If you try this activity with young children, how will it be different from what we did today?



Our Beliefs about Science with Young Children



Doing science comes naturally to young children.



Exploration is more important than right or wrong answers.



Children learn best when they have their own science materials to explore.



Peer modeling, lively interaction, and conversation are essential parts of science for young children.



Early childhood teachers & parents should act as facilitators of learning.



A primary role of the early childhood teacher is to provide an appropriate learning environment and opportunities for children to explore, represent, and share their discoveries. Teachers should emphasize student thinking – giving students a chance to figure things out, rather than telling students information.



Four tips for doing Sense of Wonder Science

- Whenever possible, provide real materials for students to investigate.
- Focus on science skills, not science knowledge.
- Emphasize student thinking and use questioning to encourage thinking.
- Use science to promote language development.



Whenever possible, provide real materials for students to investigate.

- Realia provide:
 - Concrete experiences for students,
 - Rich and authentic contexts for student learning, and
 - Opportunities for more meaningful content learning and language development.



Focus on science skills, not science knowledge.

- Science skills are the processes and abilities necessary to do science (i.e., explore the natural world).
- They include skills such as: observing, comparing, and predicting.
- These skills encourage:
 - Critical thinking
 - Language development



Early Science Practices*

- Observing & describing
- Asking questions
- Making predictions
- Developing & using models
- Planning & carrying out investigations
- Using math & computational thinking
- Documenting, analyzing, & interpreting data
- Constructing explanations based on evidence
- Obtaining, evaluating, & communicating information

*adapted from the Early Learning Initiative



Emphasize student thinking and use questioning to encourage thinking.

- Questions should:
 - Follow children's interests or leads.
 - Be a genuine and natural part of a conversation about science.
 - Be accompanied by sufficient wait-time.
 - Emphasize students' explanations over students' answers.



Examples of "Facilitating" Questions

- "How would you describe it?"
- "What does it look/feel/smell/taste/sound like?"
- "How are these two animals different?"
- "What is the same about all these plants?"
- "How could you make your shadow longer?"
- "Can you think of another way?"
- "What could we do to find out?"
- "Why do you think that?"
- "What evidence do you have?"



Use science to promote language development.

- Realia provide opportunities for more meaningful content learning and language development.
- Science skills (e.g., observing, comparing, and predicting) encourage language development.
- Open-ended questions promote oral-language development.



A Closing Quotation from Rachel Carson's, *A Sense of Wonder*:

"If facts are the seeds that later produce knowledge and wisdom, then the emotions are the fertile soil in which the seed must grow. The years of early childhood are the time to prepare the soil."



Thank You!

Additional information about the project and upcoming professional development opportunities at:
sci4kids.org

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