

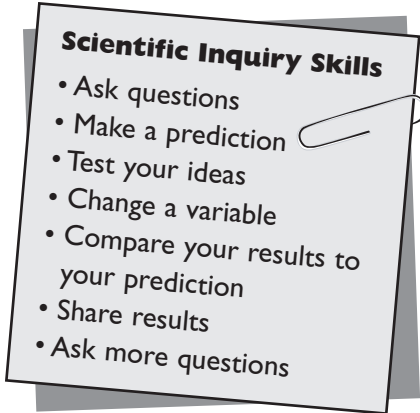
Find the ZOOMsci Training online in the Parents and Educators section at pbskids.org/zoom

Doing What Scientists Do

What comes to mind when you hear the word *science*? If you imagine someone wearing a white coat and testing a mysterious substance in a lab, you're not alone! But not all science takes place in a lab. Science is simply the process by which we discover how the world works.

In some ways, scientists are like detectives, piecing together clues to learn about how things work in the natural world. Scientists gather information in a certain way. They ask questions, make observations and predictions, test ideas, change variables, analyze data, and share results. These skills are part of the process of exploration that we call *scientific inquiry*.

When kids try science activities, they use many of the same skills that scientists use. What's your role? Help kids explore and discover. Create an environment that encourages exploration by valuing the process of brainstorming and trying ideas, rather than right and wrong answers. Guide investigations by asking kids questions (see the chart on the next page). Encourage children to work together, rather than compete. Discuss the science concepts, and if kids ask you questions, help them seek answers by looking in books, surfing the Web, or experimenting further. And, after you've completed an activity, encourage kids to share their discoveries with each other and at ZOOM's Web site at pbskids.org/zoom.



Scientific Inquiry Skills

- Ask questions
- Make a prediction
- Test your ideas
- Change a variable
- Compare your results to your prediction
- Share results
- Ask more questions



Encourage Kids to Ask Questions

Isidor I. Rabi, a Nobel Prize-winning physicist, was once asked why he became a scientist. He attributed it to his mother.

“My mother made me a scientist without ever intending to. Every other Jewish mother in Brooklyn would ask her child after school, ‘So? Did you learn anything today?’ But not my mother. She always asked me a different question. ‘Izzy,’ she would say, ‘did you ask a good question today?’ That difference—asking good questions—made me become a scientist!”

(U.S. Department of Education, “Helping Your Child Learn Science,” August 1991. Retrieved November 3, 2003 from the World Wide Web: <http://www.ed.gov/pubs/parents/Science/index.html>)

Guide Science Explorations with Questions

To help a child ...	Ask ...
Make a prediction	“What would happen if...?”
Make observations	“What is this ...?” “What does it do?” “How would you describe that?” “How can you tell?”
Change one variable (a factor that can contribute to change)	“How can we find out if this is what is happening?” “What would happen if you changed only this?”
Stay focused on the activity	“What do you need to do to try out the activity?” “How does your idea solve the challenge?”
Answer his/her own questions	“I don’t know, so how can we find out?” “How can you find a way to ...?”
Learn from mistakes	“What happened?” “Why do you think this happened?” “What did you learn when it did that?” “How could you change it?”
Problem-solve or try another approach	“Can you find a way to ...?” “Is there another way to look at this?” “Why do you think this is happening?”
Explain his/her thinking	“How did you come up with this idea?” “What do you want to have happen?”
Make connections to the real world	“What does this remind you of?” “What are other examples where this happens?”
Share results	“What did you find out?” “Can you show me how this works?” “How did you come up with that idea?”
Assess what he/she has learned	“What did you learn that you didn’t know before?” “If you could do this again, what would you change?”
Experiment further	“What other questions do you have?” “What else would you like to learn?”

(Adapted from Harlen, Wynne, (ed.), *Taking the Plunge: How to Teach Primary Science More Effectively*. Oxford, England: Heinemann Educational Publishers, 1985. Also from Girl Scouts of the USA, “Putting Girls at the Center in Math, Science and Technology.” Retrieved February 26, 2003 from the World Wide Web: <http://www.girlscouts.org/adults/mathscience.html>)