

## Seven Steps to Thinking Like a Scientist

Whether your child is playing on a slide or tracking a plant's growth, make science a part of her daily life. The key is using these seven steps — observe, compare, sort and organize, predict, experiment, evaluate, and apply. Include them in activities you do together or plan special experiments to build inquiry skills and nurture scientific thinking.

☐ **Observe:** Look for opportunities to point out scientific phenomena all around you! Study flowers growing in the garden or test which objects float or sink in the bathtub. Encourage your child to use her senses to explain observations (How does it look? smell? feel? taste? sound?).

### Tips

- ☛ When possible, measure what you observe such as the speed, size, or weight of an object.
- ☛ Try observing the item at different locations (outdoors and indoors) and from different perspectives (close up and far away).

☐ **Compare:** Help your child verbalize similarities/differences between the objects or situations you're observing. Have him describe changes that occur from one stage of your experiment to the next.

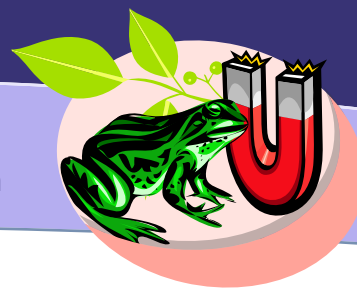
### Tips

- ☛ Compare familiar objects or situations. (Does the rock feel like anything you have in your bedroom?)
- ☛ As scientific observation becomes part of your everyday activities, encourage your child to compare what he sees now to things he has examined before. (How do the leaves on this tomato plant compare to the leaves we saw last week on the sunflowers?)

☐ **Sort and Organize:** Explain that the things you observe can be sorted by color, shape, or other traits. Ask your child to group things that have similar qualities. Each object can belong to several categories.

### Tips

- ☛ Help her create a chart, graph, or drawing that shows the subjects sorted into categories. This can help her notice comparisons she might have missed before.
- ☛ Prepare your child to make predictions by focusing on similarities or differences that will affect the experiment you are planning. For instance, if you're studying whether objects will float or sink, discuss how the weight of different items may affect their ability to float.



☐ **Predict:** Using the knowledge he's gained your child can ask questions and predict answers or outcomes to experiments. He can learn to make generalizations from his predictions. For example, if he predicts light will shine through fern leaves but not rubber plant leaves, he may generalize that the sun won't shine through thick leaves.

**Tips**

- ☛ Practice making predictions by asking open-ended questions every day. (What might happen if we leave crayons by the heater? Where did the puddle water go?)
- ☛ Ask your child to explain why he thinks a certain outcomes will occur. If he says that he "just knows," help him understand the causes by asking relevant questions.

☐ **Experiment:** Allow your child to test her predictions and ask for her input. (Where can we put the plant to see if it will grow without sunshine?) Then give her plenty of time and provide appropriate, easy-to-handle tools so she can explore what happens.

**Tips**

- ☛ For experiments that continue for several hours or days, set up the materials in a place where she can check their progress on her own.
- ☛ Make pictures, books, a computer, and other resources available so she can explore related information.

☐ **Evaluate:** When the experiment is over, ask your child to explain what happened. In addition to describing the results, ask why he thinks it turned out that way. Then help him create a graph, drawing, chart, or book that represents the conclusion of the experiment.

**Tips**

- ☛ Model scientific language throughout the study so your child has the words to explain that his smaller puddle "evaporated" or that "gravity" acted on the ball as it fell.
- ☛ Pose questions to help him identify what affected the outcome (Which places were not good for growing plants? What was different about the closet?). Ask how the results might have turned out if you did something differently.

☐ **Apply:** Broaden your child's understanding of the scientific principles by looking at other situations that are affected by the same principles.

**Tips**

- ☛ Repeat the experiment with slight changes to the conditions. (Plants did not grow well in the closet. They did grow in the sunlight. What if we put a lamp in the closet?) Make predictions before testing the conditions.
- ☛ If your child is interested in the topic, continue exploring it. Read books about plants or other subjects you observed; suggest that she create a picture story based on the experiment; make a math game out of the study's materials (How much do the healthy leaves weigh?).

Encourage your child to explore her world have fun with science every day!