

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

Tips for Leading Activities

Ready to lead science activities with kids? Here are some tips to help you get started.

1 Before the Activity

- Try the activity** before doing it with kids! Then you will know what to expect. You can modify the materials or instructions for your setting and anticipate where kids will need help.
- Collect all materials**, including additional supplies for activity extensions. Give yourself plenty of time to gather materials that may be hard to collect (like empty soda bottles). Consider sending home a flier to enlist help from families.
- Divide materials** into the correct amounts for each group and place each group's materials in a designated space or box that is out of the children's reach.
- Think about your kids** and their individual needs. What do they already know about the activity? What can you do to help them learn?
- Think of questions to ask** kids during the activity. Questions can help them uncover what they know, overcome obstacles, or connect the activity to the real world. For sample questions, see the "Doing What Scientists Do" handout in the ZOOMsci Training.
- Review the Science Scoop and become familiar with the concepts.** Your role is to help kids explore. By knowing the basics, you'll be able to help them do that. Look in the Resources section of the ZOOMsci Training for books and Web sites with science content information.
- Prepare an extension activity.** Choose a related activity that can be used for kids who finish early or in case the original activity does not go smoothly.



Invite a Scientist or Engineer to Visit

Did you know that scientists and engineers make great guests? Invite one to share his or her professional experiences with kids and help with an activity. For more information on setting up a visit, go to Make Real-World Connections in the Resources section of the ZOOMsci Training.

2 Introducing the Activity

- ❑ **Tell kids that they will be thinking like scientists and engineers** during the activity. Validate that the explorations they are about to begin are similar to those that scientists and engineers engage in.
- ❑ **Give clear directions and show the materials.** Some activities need simple introductions. For others, it's helpful to show kids the materials they'll be using and list activity steps on a chalkboard or chart paper. You can also read activity sheet instructions together as a group.
- ❑ **Form small groups of 2 to 4 kids** (choose the groups for them). That way they can help each other. Point out that scientists and engineers work in groups every day.
- ❑ **Avoid presenting activities as team-against-team competitions.** Some kids feel threatened or stressed out by competitions. If you think your group would enjoy a competition, take time to acknowledge the strengths of different approaches and solutions.
- ❑ **Set safety rules.** See the Safety Rules box at right for suggestions.
- ❑ **Distribute materials when you are ready for work to begin.** Once materials are in kids' hands, they'll stop listening to instructions! Hand out materials only when you are ready for them to begin working.



Safety Rules

- Read all the directions before you start.
- Ask for help when using sharp tools, like scissors or a knife.
- Do activities only on approved surfaces, like on a table instead of a rug.
- If an activity is messy, cover your workspace with newspaper or work outside.
- Do not eat or drink while experimenting.
- Wash your hands after experimenting.

3 During the Activity

- ❑ **Remind kids to make predictions** about what they think will happen in the activity, and why.
- ❑ **Walk around and ask children to describe what they're doing.** Young people are sensitive about having the "right" answer, so emphasize the value of brainstorming and exploration, rather than right and wrong. Point out that scientists and engineers often learn from mistakes.
- ❑ **Encourage kids to change one variable at a time.** This will help them understand what worked and why.
- ❑ **If a group seems stuck, ask questions** to put them back on track, rather than telling them what to do. For ideas, see the "Doing What Scientists Do" handout in the ZOOMsci Training.
- ❑ **Encourage kids to share good ideas, ask questions, and collaborate.** This is what scientists and engineers do!
- ❑ **Have extension activities on hand** to keep all kids occupied. Be sure to have extra materials to support further exploration.

3 After the Activity

- ❑ **Share results and provide time for reflection.** Discuss the data kids collected and how it compares with their predictions. Encourage children to ask questions and learn from each other.
- ❑ **Connect the activity to the real world.** For example, an activity where kids build structures from toothpicks and gumdrops shows how triangles are better than squares for bearing weight. Bring in pictures of structures that show how triangles are used in construction. Also ask kids to think of examples.
- ❑ **Praise kids for thinking like scientists and engineers!** Ask them to raise their hands if they learned something about the natural world, made a prediction, changed a variable, asked questions, or tested their ideas. Then explain that scientists and engineers think in much the same way.
- ❑ **Encourage kids to take activities home** and share them with their families. This will help reinforce what they have learned during the activity.
- ❑ **Help kids explore new questions.** If kids have raised questions that you'd like to help them answer, head to the Resources section of the ZOOMsci Training for a list of books and Web sites that can help.

Kids 101

Understanding how kids learn and socialize can be helpful as you lead science activities. The chart below outlines general trends for 8- to 11-year-olds. Remember—you know your kids best. Feel free to make adaptations based on their skills and needs.

Thinking & Learning Skills	What It Means for You
Can perform simple experiments and record and analyze data	A simple experiment involves making a prediction, testing the prediction, and reporting results. This is commonly called “Guess, Test, and Tell.” Remind kids to use these same steps as they do activities.
Can use measurement tools and collect data	Provide tools for kids to measure and collect data, such as rulers, stopwatches, and data recording charts.
Are beginning to identify variables (factors that can contribute to change)	Help kids identify an activity’s variables by brainstorming together. As kids work, remind them to change one variable at a time. This will help them recognize how that variable alone affects the results.
Often interpret results to favor their prediction	Most children want to be right and are uncomfortable if their predictions don’t match their results. Some might try to change their predictions OR interpret the data to support their predictions. If the results are different from kids’ predictions, encourage them to recognize what this information tells them and what they have learned. Avoid wording that suggests their predictions are “wrong.”
Can recognize that there may be more than one answer	When sharing results, help kids notice that many solutions are possible.
Can focus on a hands-on activity for 45 minutes	Plan additional challenges in case a child finishes early. If kids lose interest, ask questions that will engage them again.
Are beginning to grasp abstract concepts, but still benefit when concepts are explained in concrete terms	Whenever possible, help kids to visualize or experience science concepts. For example, help them understand the concept of friction by having them rub their hands together.
Social/Emotional Skills	What It Means for You
Work well in groups, but can develop cliques easily	Assign and rotate groups so that cliques don’t form. Assign roles if needed, such as record keeper, materials manager, and results reporter. In coed groups, boys tend to dominate hands-on exploration while girls hang back. Form same-sex groups so that girls have an equal opportunity to explore.
Are increasingly more aware of themselves, more self-conscious	Emphasize the value of individual children by recognizing the skills and unique traits each brings. Create a safe learning environment by discouraging teasing.
May be reluctant to share their thoughts in a large group setting	Provide small group experiences (2 to 4 kids per group) so that children feel less intimidated.
Can see the world from another person’s perspective	Provide small bios about scientists and engineers so that kids can imagine themselves in these roles.

Working with Younger and Older Children

ZOOM activities are designed for kids ages 8 to 11, but with a few adaptations, younger and older kids will enjoy them too. Here are some tips to keep in mind.

Younger children:

- **May not be able to manipulate objects easily.** Try the activity yourself ahead of time to determine whether you'll need to help younger kids with certain steps or materials.
- **May be less likely to share with others.** Be sure to bring extra materials so kids can work individually.
- **May have difficulty understanding abstract ideas** and cause-and-effect relationships. Be sure to provide concrete examples whenever possible. For instance, the term "load" is hard for young children to understand. Put books on their outstretched arms so they can feel the tension and strain that a load creates.
- **Learn best by copying others.** Young children gain substantial knowledge by copying others' behavior and actions. As you introduce an activity, remember to show kids each step so they can copy your demonstration.
- **Believe everyone learns and thinks the way they do.** Encourage an exchange of ideas and applaud different ways of thinking.

Older children:

- **May finish an activity sooner.** Have plenty of additional activities, materials, and challenges on hand.
- **Are better able to conceptualize abstract concepts.** While this age group has an easier time understanding abstract concepts, it's always helpful to provide concrete examples.
- **Are likely to challenge rules, routines, and authority.** Sound like adolescence? Yes, it's true. Kids this age will get more out of learning from each other and exploring for themselves than they will if an adult tells them the information. Provide opportunities for kids to test out their ideas and to explore on their own.



Have Fun!

Let children mess around with things as they investigate. It's important that they get experience exploring ideas and learning from their mistakes. It's NOT important that kids do everything correctly the first time and build, for example, the perfect glass xylophone. Process is more important than product.