

# Setting Up a Science-Friendly Environment

The look and layout of a classroom can help or hinder a successful science program. Placement and appearance of displays, furniture, and supplies are a big part of implementing any science plan. A science-friendly classroom should be inviting and interesting, yet function on a practical level. Consider how you can best use the space for explorations as well as storage, keeping in mind traffic patterns and access to materials. The Science Companion developers believe that the science-friendly classroom encourages accessibility of all things scientific, all day long. This article discusses a few ideas to help you nurture a science-friendly environment—creating a Science Center, gathering science exploration materials, and making science-focused displays.

As you design and set up your classroom, create a setting that can be easily used for collaborative work. Children will often work in groups or pairs for their science investigations. You can facilitate collaboration by having the children sit at tables or at grouped desks. Consider how children move about the room and their need to have different space for various activities. For example, often children need to record their observations in their science notebooks; at other times they need to have close access to many different materials. Make sure children have the space to do the work expected of them.



Teach children the rules or guidelines for using the various areas in your classroom. Shared space and personal space need different behaviors. Some activities may require an “indoor” voice, or even absolute quiet, while other activities may accommodate louder speaking.

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## You'll Find Inside:

- Creating a Science Center
- Gathering Required Science Materials
- Using Displays

# Creating a Science Center

In terms of the actual appearance of your room, it doesn't really matter if you're a "Joe Clean" or a "Jane Pack Rat." What is important is that science is openly available and easily accessible for you and your children. In each unit's teacher lesson manual,

you'll find specific ideas for each unit that you can use to emphasize the topic you're teaching in the curriculum. As you go through the lesson manuals, consider where you can execute these ideas based on your classroom setup.

## Designating an Area in Your Classroom

It's easy to make science a part of your daily routine if you create an engaging and organized place in your classroom where science supplies are stored and, more importantly, where active science takes place at any time. A Science Center is an open invitation for children to explore with curiosity and wonder. Science Centers offer many opportunities to study or experiment further. They can act as an organizing area for ongoing projects and a station for children to share their scientific discoveries, including abstract ideas or concrete examples. Whether in a corner, next to a wall, or simply on a desk partitioned off from the rest of the room, the Science Center area needs to be a place of permanence, where things can be displayed and stored, and where items can be used or checked out. When planning the area, remember to:

- Set up a place for living organisms and their homes, including plants, terrariums, and aquariums. Children should have plenty of opportunities to observe and care for plants and animals that live in the classroom.
- Allow room for pictures, books, observation tools, collections of objects to study (rocks, seeds, shells, etc.), and activity setups related to lessons.
- Let the children help plan and maintain the area.

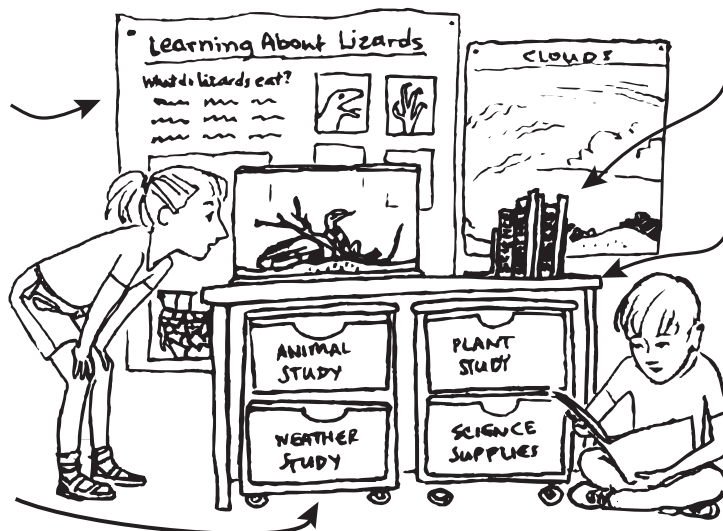
Make sure you have plenty of science books on a variety of subjects available in your classroom; display science books in the Science Center, as well as in your classroom library. A list of suggested books related to each unit's main topics is included in the teacher lesson manual. Also check the Science Companion web site at [www.sciencecompanion.com](http://www.sciencecompanion.com) for a comprehensive list and synopsis of all the related books. Ask your school or local librarian to help locate books relevant to the science content you are teaching.

### Hooray for Science Centers!

- *Science Centers extend the lesson activities.*
- *They make science available to children of all ability levels.*
- *Science Centers make great discussion areas.*
- *They encourage involvement from anyone at anytime.*

Display space such as a bulletin board, free standing 3-sectioned board, or sandwich board

Easy-access, labeled storage area



Related science topic-specific books

Desk or flat surface for writing, experimenting, and displaying items

# Creating a Science Center

## Incorporating Science Into Other Areas in Your Classroom

To extend science into your classroom create “mini” areas of science exposure throughout your room. For example, your reading corner might have a special collection of books on relevant science topics. Your bulletin board might share science information with the weekly lunch menu. Store the science notebooks and any science-based

class books the children make in a writing area. The science word banks may be hung next to the reading vocabulary word banks. Display children’s nature collections in an area designated for sharing. Exploratory materials could be put in labeled boxes for children to use at their desks.

## Strategies for Using the Science Center

There are a number of ways you can have children use a Science Center. Since the Science Center stores much of the science content in your classroom, you can use it as a place to send groups to conduct the explorations described in lessons, and as a spot for children to initiate their own explorations. If your Science Center isn’t big enough for children to work in, children can take materials from the Science Center to a nearby table, floor, desk, or other workspace for further exploration.

### Place of Instruction

Try starting your science instruction in the Science Center and then rotate children in and out for the activities. For example, conduct the introductory discussion with the full class in the Science Center. You might also explain the main hands-on activity or the exploration. Then have a subset of children stay and work through the activity while you work in the regular classroom with a different group that needs guidance in another area or subject. Rotate the children after the first group completes the activity and is ready to move on to something else. You can also rotate groups through an activity in the Science Center over the course of several days. Rotation is an especially effective strategy when you have volunteers who want to work directly with children in small groups.

### Returning for Further Work

Consider sending groups or pairs to the Science Center during other center rotation times, and encourage the children to revisit the materials and ideas that were introduced during science lessons. Often the children learn more by returning to

play with an idea, rather than being expected to plumb its depths at their first exposure. Make labeled boxes of exploratory materials available for children to examine at their desks or on the floor.

### Free Time

Allow individuals or pairs of children to use the Science Center during a free time or choice time, so they can explore what they’re most interested in. Activities at the center should be self-directed. The Science Companion curriculum suggests Science Center activities for independent exploration and concept reinforcement throughout each unit.



**"Wow, look at this great science area! It reminds me of the Discovery Channel!"**

**- A young scientist**

# Creating a Science Center

## Class Job

You might create a class job called Science Center helper. The designated helper could assist those that need help while you're busy with other children. Depending on the experience or age of the helper, they could also act as the Science Center monitor by restocking supplies, demonstrating how to use tools, and cleaning up.

While a school science room is a great gift and going to the "lab" can be a big motivator for children, it's still important that science is available

in their homerooms. Their exposure to science shouldn't be relegated to the school science room. If you have a school science lab, use this room to facilitate and share science with your entire school and support the ongoing science in your classroom.

Don't stop here! Encourage children to set up mini science centers at home, perhaps in their rooms. Your community may have a science center or science museum that you can visit and utilize. Science is truly everywhere.

## Examples of Science Center Unit Details

The teacher lesson manual for each Science Companion unit includes an introductory section to the Science Center that describes general ideas and tips for setting up, maintaining, and using your center to enhance the unit. In addition, most lessons contain specific suggestions for activities that might take place in the Science Center to further develop the lesson's big ideas. The following example is part of the unit information taken from the Sound Unit. There are many other Science Center details found in each teacher lesson manual, including more information about inviting exploration and keeping records in your Science Center.

### Science Center Displays

- Have children make and decorate a "Sound Exploration Station" sign to hang in the Science Center.
- Post the list of sound related terms, or sound word bank that the class begins in Lesson 1. Encourage children to add to the list as they come up with more ideas and to refer to it when they are writing about sound.
- Post children's questions about sound, as well as samples of children's work.
- Encourage interested children to make posters that show and tell the central concept of this unit: sounds are made by vibrations. For example they might want to write the words "sound" and "vibration" in wavy lines, to convey movement.
- Display non-fiction books about sound for children to peruse.

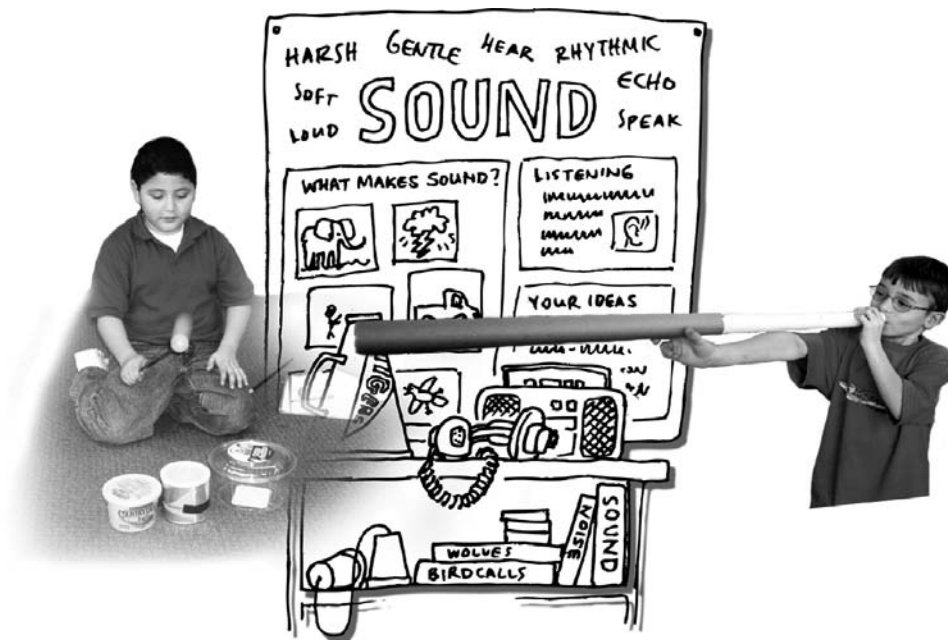
### Science Center Activities

- Explore ways to generate sounds using a variety of everyday objects.
- Play "Name that Sound" or "Guess the Vibration" while experimenting with different noisemakers.
- Continue work on their instruments.





# Gathering Required Science Materials



Hands-on science requires exploration materials. Invaluable learning tools though they are, they can be expensive, and difficult to maintain and organize. To alleviate potential frustration and save time, store items in a way that makes it possible for you and the children to readily find them and return them to where they belong. Label and categorize storage areas and containers to help you maintain your inventory and ensure quick accessibility. Train the children in necessary and simple routines of setup and cleanup to maintain supplies in a clean and tidy manner.

When preparing lesson activities, you may at first feel like a chef who works half a day preparing an elaborate meal, only to watch it be gobbled down in half an hour. With clear organization and practice, you can get your activity preparation down so that you feel more like a short order cook who can prepare a quick, yet hearty, repast. The key is to have essential items close at hand as you plan a lesson or activity.



# Gathering Required Science Materials



Some of the most necessary materials are provided in the Science Companion ExploraGear™ included with each unit. The ExploraGear includes items that may be hard

for you to find on your own, yet are indispensable to the lessons.

Each lesson is designed to use the fewest, simplest, least expensive materials possible. Within a unit, try to use the same materials as often as possible. This is a perfect opportunity to incorporate the ideas of “reuse” and “recycle” when you encourage children to bring in many of the listed supplies. Beyond the general classroom supplies such as paper, tape, string, glue, etc, some lessons require you to provide fresh or perishable items such as fruits, vegetables, or flowers. To help you plan for acquiring materials, a list of all of the non-ExploraGear supplies that are needed for each unit is listed in the back of the teacher lesson manual. It might prove timely to start collecting some supplies before beginning the unit.



Enlist parents and support staff, if available, to help you collect necessary supplies. If you have difficulty getting materials, discuss purchases and expenses with your principal or district administrator in charge of science.

Here are some other methods for securing science materials:

- Encourage funding within your district for more valuable durable supplies (dissecting microscopes, mini-refrigerators, or video and digital cameras) that can be shared across classrooms or schools, rather than funding for inexpensive consumable items like plastic cups or containers.
- Find out if other schools in your district are storing expensive, unused equipment like microscopes, aquarium tanks, and balances. They may be happy to lend such items to you.
- Purchase grade level science books (fiction, nonfiction, and reference) out of the reading budget rather than the science budget. Your school librarian might be able to purchase specific science titles through the library budget. Extra funding for language arts or reading programs may exist in your school, especially for early grades.
- Use mathematics supplies already in your classroom. Measurement tools and containers for supplies and collections may be available through your mathematics program budget.
- Use other supplies already in your classroom. Parents are often willing to donate used items such as old measuring cups, jars with lids, magazines, or small plastic containers.
- Seek donations from community members and local businesses. Supplies available through businesses can include boxes, unused office supplies, reusable containers, and expired display items.
- If available, consider applying for small grants given to teachers by your parent teacher organization for specific projects. Think about requesting funds for building your Science Center, purchasing an aquarium, creating an outdoor “native plant area,” etc.

# Using Displays

Successful displays set a tone and instruct at the same time. They're decorative, motivational, and reflect what's happening in your classroom and school. Science-focused displays extend science throughout the day and let others know what your class is doing at a glance. They can be big or small, permanent or changing. These displays are yours and your students' to design and enhance.

Display science related materials on your walls, in the school's hallways, and in your Science Center. Science provides a rich variety of topics to share. You may choose to create displays that exhibit children's work, behave as interactive learning areas, provide supplementary information, or any combination of these.

Many teachers let the children plan and create bulletin boards. This method helps build children's ownership of the displayed work.

Because science is active and full of process, you may want to create a display that documents the progression of a lesson or cluster of lessons. Using photographs, sketches, and brainstorming charts shows the work as it develops. Documentation helps parents, administrators, and children reflect about science in the classroom. Look through the following suggestions and think of ways that you might use children's work beyond a gallery style exhibit.

**"My wall outside my classroom is a source of interest to parents, teachers, administrators and students."**

*Mary Cortez—Science Companion teacher*

## Children's Work Displays

Displaying children's work is a form of visual publication. Children are often motivated by the opportunity to publicly share quality work. Parents, school staff, and children enjoy seeing work exhibited. Displays also provide a method for overall assessment of the completed work, allowing you to see all of the children's work at once. You might decide to build a bulletin board with children's work as you summarize a topic during the reflective discussion time of the lesson. Perhaps you'll use Family Link activities in the display. Involve your class in building the display and using it to teach and review concepts.



# Using Displays

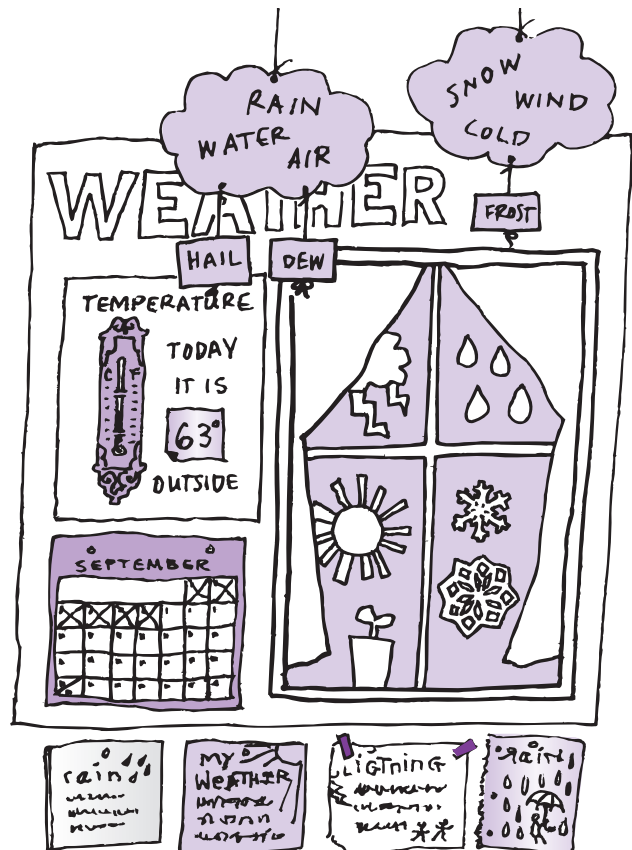
## Informational Display Boards



Any effective informational display in primary grades should be simple and clear. Some ideas for this type of display include posting lists, reminder notes, or a question or riddle of the day. Make sure that any directions placed on informational displays are appropriate for the reading level of the majority of children in your class. When possible, use graphics or pictures to clarify.

## Interactive Learning Displays

An interactive display invites children to read and investigate topics in a hands-on way. There are many forms of interactive learning displays. For example, the Weather Unit requires that a calendar be displayed year-round. Every day children interact with the calendar, making it a learning tool as well as a display. This is a good opportunity to build visual displays around the calendar and the Weather Unit. Whenever possible, post interactive learning displays in or near your Science Center to encourage children to refer to and use them frequently during their science explorations.





## Using Space Other Than Walls

If you're hesitant about board displays because of a lack of wall space, don't limit yourself to walls. Any flat surface can work. Purchase strips of cork and stick them to lockers, brick walls, or cupboards. Staple the top of the display item to the cork and let it hang down. If you have display items such as charts or posters that you might reuse, you could use Velcro strips on the item and the display area. This makes removal and storage quick and easy.



Often you can modify display items to use on freestanding, three-section exhibit boards, flip charts, or hanging banners. If a large rectangular wall is not available, think about displaying children's work around doorframes, on windows, on lockers, or cupboard doors. If your ceiling is high, try stringing a low-level clothesline across the room and use clothespins to attach display pieces. (These also work great for drying art projects!)

Three-dimensional displays can be a problem if you only use tabletops or specially designed display cabinets. But if you use hooks, pockets, temporary shelves, and mobiles, you can utilize spaces that you might not have thought about before. Perhaps you'll use something like a freestanding coat tree or an umbrella. Think creatively about layout and consider the space around you.

## Other Classroom Postings

Displays may be simple postings that promote thinking about, reading about, and writing about science. Try using the following types of postings.

### Questions to Ponder

Use a series of questions to help children organize their thoughts for verbal or written responses. Post them where children will easily and frequently see them.

"I wonder...?"

"Why do you think it happens?"

"What would happen if...?"

"I used to think \_\_\_\_\_, but now I think \_\_\_\_\_."

"The important thing about \_\_\_\_\_ is that it's \_\_\_\_\_."

"I think \_\_\_\_\_ happened because of \_\_\_\_\_ and \_\_\_\_\_."

"I am \_\_\_\_\_."

"I saw...I heard...I smelled...I tasted...I felt..."

# Using Displays

## Word Banks and Other Word Ideas

Regularly post various kinds of teacher- or child-created word banks. Word banks can be made on banners or posters, or written on the board or on cards. Use words that come up during each lesson or unit. Stick tape on the backs of the words so you can move them into categories or statements, or so you can quickly change the words. Sometimes it's helpful to have pockets or hanging envelopes to store words on cards for later use. You can extend this idea into "word mobiles" and K-W-L charts.



Young writers need access to words they can use in their science writing. For some children, figuring out how to spell words can slow them down and make them lose the thread of their idea. When children write, they may ask, "How do I spell this?" Use your discretion as to when and if you will allow incorrect or invented spelling. If the room is rich in scientific print, suggest that children find the correct spelling on their own or with the help of a peer. Word walls not only provide "spelling" clues, but more importantly provide a resource of ideas that can be incorporated into children's writing. As they become more confident and independent, their writing skills will develop alongside their science thinking skills.

## K-W-L Charts

K-W-L charts clarify the knowledge base of the class, direct your activities, and summarize learning with lists or descriptions. These charts include:

**K** – What the children already **Know**

**W** – What the children **Want** to know

**L** – What the children have **Learned**

To make a K-W-L chart, divide a large sheet of paper into three columns, one for each category. In a preliminary discussion, record the children's ideas about the topic (what they already **know**). In the second column, list the things they say they **want** to learn about the topic. Return to the chart periodically during the unit. Are there any things in the **Know** column the class has since discovered aren't accurate? Are there any questions to add to the **Want**-to-know column? Are some questions in the **Want**-to-know column answered? List any new things the class understands in the **Learned** column.

As the K-W-L chart grows, the information on it becomes a word bank for children's science writing. Put it in a place where everyone has access to it. At the end of a unit, take a look at the whole chart. Have the children reflect on how much they have discovered about the topic during their time of study.

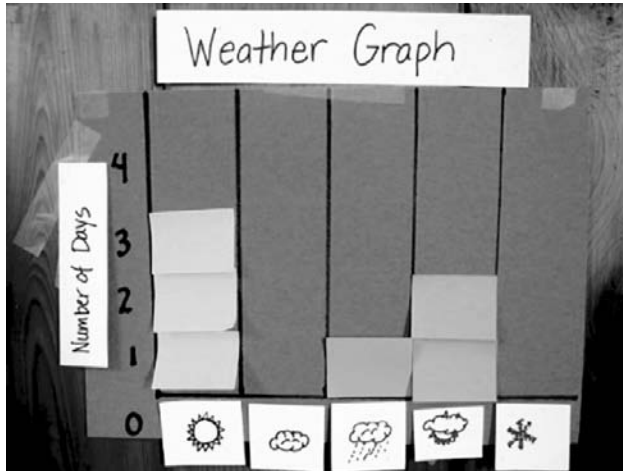
If you're working with older children or in a classroom of advanced children, the chart may also include:

**P** – What the children **Predict**

## Class Graphs

Class graphs make great displays and encourage children to revisit a topic. Graphs can be big or small, and can be created by small groups or an entire class. Many science topics lend themselves to graphing. Bar graphs and line graphs are especially easy for young children to use to compare data. Working with data is an important part of what scientists do. Children, too, should collect and synthesize data.

# Using Displays

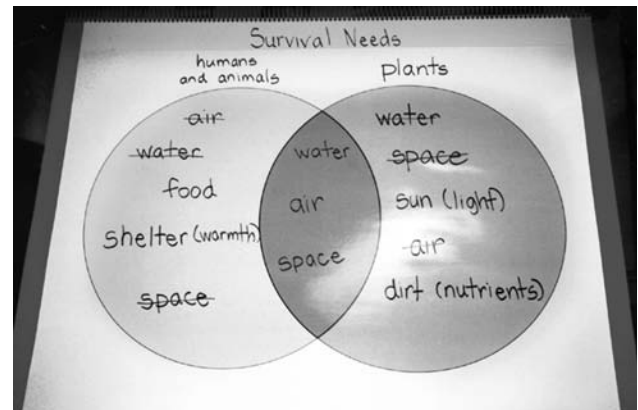


**Bar Graphs**—These graphs are useful for comparing counts or measures of things. For example, a monthly bar graph showing the numbers of days of different kinds of weather (e.g., sunny, rainy) clearly compares the frequencies of the weather types. If children track the weather every day for several months or seasons, they can then compare the weather to other parts of the year and learn about weather patterns and climate for where they live. Comparisons such as, “There were more rainy days than any other,” or observations of relative frequency such as, “It was sunny on three days, and snowy on one; that means there were two more sunny days than snowy ones,” can eventually lead children to make inferences such as, “February was a really rainy month!”

**Line Graphs**—Line graphs are useful for measuring changes over time, such as the growth of a plant, or daily high and low temperatures. Line graphs help children easily notice changes such as the pattern of a plant growing or the earth warming and cooling with the seasons.

## Other Postings

Venn diagrams, flow charts, outlines, and other visual organizers help children revisit topics and summarize information when discussions are over. Be sure to post these when you can. Also, any science drawings, paintings, collages, and writings by the children make excellent discussion pieces. Letters from local scientists or feedback from science-savvy visitors are often of group interest. Individual and group works are both appropriate.



# Notes

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