

# Science That's Easy to Plan, Easy to Teach, and Easy to Love

HOME  
SCIENCE  
TOOLS®



# Welcome!



As one homeschooling parent to another, we know doing science at home can be hard. But with nearly 30 years of experience as homeschoolers and working with homeschoolers, the crew at Home Science Tools is here to share expert (and easy) tips to help you make science not only doable, but enjoyable!

Use this guide for help with where to start, how to plan a year of homeschool science, and how to teach in a way both you and your kids will love.



## Select a Science Curriculum – or Not!

### Which Science Curriculum is Right for You?

You might have a “tried & true” curriculum you love, or you might still be searching for the best fit for your family. You may even prefer to create your own mix of books and hands-on activities.

The most important thing to keep in mind when choosing a curriculum is that it should be the right fit for your family. Choosing to homeschool means that you’re choosing the freedom to make changes to support your child’s learning style.

Another important aspect to choosing a science curriculum is considering what kind of hands-on learning is included, if any. Our award-winning Science Unlocked curriculum is a great hands-on alternative to traditional textbooks. The detailed teaching guide and schedule eliminates prep work for you. Everything you need to complete the labs, plus engaging student workbooks that teach in-depth lessons, are included!

---

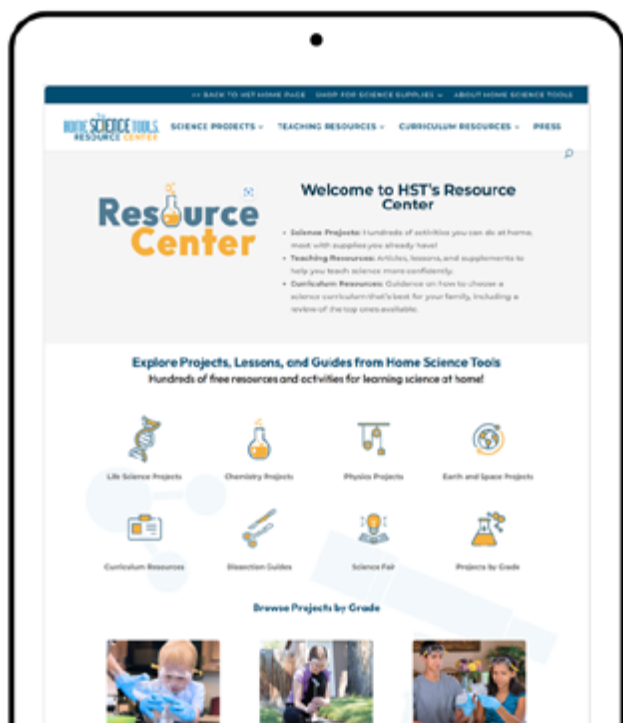
This handy guide walks you through how to plan a year of homeschool science, and how to teach in a way both you and your kids will love.

---

# How to Teach Without a Science Curriculum

Especially for elementary grades, you might prefer not to use a curriculum at all. Rather than purchasing traditional textbooks, spend your science budget on lab materials and simply do hands-on projects with your kids each week! Pick a theme like “reactions” or “plants” or “planets” and pick a few experiments to try, using Pinterest to search for ideas or checking out our [free science resources](#) to browse projects by topic or age.

Use the free printables at the end of this guide to help yourself plan out your year of science.



## How to Teach with a Hands-On Approach

Yes, it's important for kids to memorize facts. But what really makes a topic stick are the hands-on, visual moments. Science is an ideal subject for making learning come alive in this way.

Doing simple science projects with your kids doesn't need to take a lot of specialized knowledge or expertise. Science is about discovery, and there's nothing wrong with discovering along with your kids rather than having all the answers beforehand. You'll develop confidence along the way, so don't hesitate!

---

Teach Life Science, Physical Science, Earth & Space Science, and Chemistry for at least a year each during your child's K-6 education to set them up for high school success.



# What is Hands-On Science?

Hands-on science means that rather than tell your kids about a science concept, they get to “do” science themselves. Hands-on science engages kids by inviting them to ask questions and form their own conclusions. It includes a healthy balance of projects and experiments. Students get to be active participants in their learning. By handling real materials, and solving problems that come up, kids understand science concepts better.

**Added bonus: they get to practice real-life skills like logical reasoning and careful measuring!**





It will take you about 10-15 minutes at the beginning of each week to plan your next science lesson.





## The Scientific Method & How to Learn with Your Kids

When you do hands-on projects, re-search the “whys” together. If something doesn’t work, have your kids help you think of all the variables that might have made things go awry, and if you have time, do the experiment again and control those variables. This way of teaching science actually takes less time to prepare! You can have a clear idea of what the topic of the lesson should be, and even an objective or goal in mind, but the way you get there could have twists and turns. Be willing to discover science with your kids.

You might be thinking, “Okay, hands-on science could be fun, but what’s this scientific method? That sounds complicated!” Don’t be intimidated. The scientific method is simply a way of organizing a project in four steps. It provides structure to the messy fun of hands-on science! The scientific method guides students through a science project, with the goal that they’ll discover something new. This is a framework for a great science lesson! The chart on the next page explains the four steps to make it easy to follow.

Remember, all lab work is a learning process, so even if things don’t turn out exactly like you expected, it can still be a valuable experience! Kids will learn to check measurements, evaluate information, and problem-solve.

# 4 Step Scientific Method

## Ask a Question:

1

What do you want to know about the world around you? Make observations. Decide what your question should be.

Example: why does it feel cooler in the shade than the sun? Is it actually cooler? Why?



End with new knowledge gained through testing



## Come to a Conclusion

4

Decide whether your hypothesis was right or wrong. What were the results of your experiment? Can you tell why it happened that way? Explain your results.

Example: the ice did melt faster in the sun - this shows that the temperature is cooler in the shade.

## Form a Hypothesis:

2

What do you think will happen when you try an experiment to answer your question? Write down your prediction, because what actually happens may surprise you!

Example hypothesis: ice will melt faster in the sun than in the shade.

## Conduct an Experiment:

3

Set up an experiment to see if your hypothesis is right or wrong. Make sure your experiment results are accurate - try it twice! Record your results.

Example: put two glasses filled with ice outside - one in the shade and one in the sun.



Repeat Steps 3 & 4 as needed.



# Hands-On Science

## Experiments to Wow Your Kids

---

**Creating an exciting science experience doesn't have to be complicated or require extensive planning. You can just dive right in, regardless of whether you've got a science curriculum handy.**

Once you get in the rhythm of it, you'll hear a lot less **“do we have to?”** and a lot more **“can we please do more?”**

---

**“My daughter thrives on hands-on experiences.”**

- Karen P.

---



# Quick Crystals in a Jar

It can take several days to grow crystals, but with this super-easy recipe grow an entire cup filled with crystals in just a few hours!



## What You Need:

- ☐ Beaker, cup, or small bowl
- ☐ Epsom salt
- ☐ Food coloring

## What You Do:

1. Combine  $\frac{1}{2}$  cup of Epsom salts and  $\frac{1}{2}$  cup of very hot tap water in your beaker, stirring for at least 1 minute. You've created a saturated solution, meaning no more salt can dissolve in the water. Note: Some undissolved salt will be at the bottom of the beaker.
2. Add 2-3 drops of food coloring to make the crystals colored, then put the beaker in the refrigerator for a few hours.
3. Check your beaker to find it full of Epsom salt crystals! Pour off the remaining solution to examine them.

## What Happened:

Epsom salt is another name for the chemical magnesium sulfate. The temperature of the water determines how much magnesium sulfate it can hold. It should dissolve more when the water is hotter.

Cooling the solution rapidly encourages fast crystal growth because there is less room for the dissolved salt in the cooler, more dense solution. As the solution cools, the magnesium sulfate atoms run into each other and join together in a crystal structure. Crystals grown this way are generally small, thin, and numerous.

# Colorful Chromatography

Create your own chromatogram and find out if black is actually black.



## What You Need:

- Beaker or cup
- Binder clip
- Black washable marker
- Filter paper or coffee filter
- Pencil
- Water

## What You Do:

1. Cut a piece of filter paper into rectangular strips approximately  $\frac{1}{2}$ " x 3-4"
2. Draw a pencil line across the narrow end of the strip approximately 1 cm from the bottom.
3. Use your black marker to draw one small dot on your pencil line.
4. Clip your paper strip to your pencil. Set the pencil across the top of the beaker or just. Adjust the paper strip until it hangs down the inside of the beaker.
5. Carefully, pour water into the beaker until it touches the bottom of the paper strip. Water will begin to travel up the paper. Note: Do not pour enough water to touch the marker spot.
6. When the water nears the top of the paper, carefully remove the strip from the beaker and let it dry on a plate or hanging in an empty cup.
7. Observe the series of colors – this is called a chromatogram!

## What Happened:

Chromatography is one of the simplest techniques for separating the individual components of a mixture. In chemistry, a mixture is a combination of substances that can be separated because they are not chemically bonded.

As the water travels up the paper strip, it dissolves the ink and pulls it up the paper too. The black ink is a mixture of several different pigments, or coloring agents. Some of the pigments dissolve in water easier and are pulled farther up the paper. Others are more attracted to the paper and move more slowly.

What colors do you see on your chromatogram? Was the black marker really black?

The three primary colors, red, yellow, and blue, are used when mixing dyes or paints. Try running a chromatography test again with non-primary-color markers like purple, brown, and orange to see what hidden colors are really there!

[WATCH VIDEO](#)

# Homemade Lava Lamp

Make your own (temporary) lava lamp with household materials.



## What You Need:

- ❑ Alka-Seltzer tablets
- ❑ Clear empty water bottle
- ❑ Food coloring
- ❑ Vegetable oil, cooking oil, or baby oil
- ❑ Water

## What You Do:

1. Fill your flask  $\frac{3}{4}$  full of vegetable oil.
2. Fill the rest of the flask with water, leaving a little space at the top.
3. Observe as the oil floats above the water, then add a few drops of food coloring. Food coloring is usually water-based, so it will also sink and color the water at the bottom of your flask.
4. Break an Alka-Seltzer tablet into a few small pieces and drop them into the flask one at a time.
5. Watch your lava lamp erupt into activity! Add more Alka-Seltzer as the chemical reaction slows down.

## What Happened:

Lava lamps work based on two different scientific principles: density and polarity.

Density measures how compact a

substance is, or how much of it fits into a certain amount of space. The scientific equation is density = mass/volume).

As you observed, the water is more dense than oil and, therefore, sunk to the bottom of the beaker. The hotter a liquid is, the less dense it can become. Polarity is the quality of having two oppositely charged poles. Water molecules are “polar” because they have a lopsided electrical charge that attracts other atoms. The end of the molecule with the two hydrogen atoms is positively charged. The other end with the oxygen is negatively charged. Just like a magnet, the positive end of the water molecule will connect with the negative end of other molecules. Oil molecules are non-polar, so they don’t have a positive or negative charge. They are not attracted to the water molecules, which is why oil and water don’t mix.

With these concepts in mind, consider your lava lamp. The Alka-Seltzer reacted with the water to produce carbon dioxide gas bubbles that stick to the water droplets. The water/gas combination is less dense than oil, so they ride to the top of the flask. At the top, the gas bubbles pop and escape into the air, causing the more dense water to sink back to the bottom.

[WATCH VIDEO](#)

# Build Your Lab

Science is about exploration! Don't let cost be a limiting factor in exploring the world. Start with what you have, use local resources, and slowly build your stash of science supplies.

## Lab materials

**(if using a curriculum):** you can gather your own materials by looking through each experiment in the book. Make a list of things you have already, things you will need, and things you can do without (some experiments are optional). You can also save time and energy by buying a [curriculum lab kit](#) from Home Science Tools! Or with a Science Unlocked bundle, you'll automatically get everything you need.



**Start a collection of glassware and measuring equipment that is used only for science projects:**

- Jars with leakproof lids can be used in so many ways – as an insect habitat, to make your own compost, to watch an oxidation reaction, or do a color change experiment
- Use plastic containers to safely store bottles of chemicals
- Go to a thrift store or dollar store for measuring spoons and cups to use in your lab
- A kitchen or lab scale will also come in handy
- If teaching high school chemistry, aside from glass jars, you will want a few sturdy beakers and flasks that can be heated over a lab burner

## Lab materials

**(if NOT using a curriculum):** many science projects use household items. You can also start collecting common chemicals and equipment for your home lab. Lots of science kits or supplies can be used for multiple experiments so you get more bang for your buck!



Whatever your method of teaching science, there are a few additional tools that will serve your family well.

---

Anything used for science should NOT also be used in the kitchen



A microscope is also a wonderful homeschool investment. It can be used by grades K-12 and allows up-close examinations of whatever your kids are curious about. You can even make your own microscope slides. If your family isn't ready for a home microscope, use magnifying glasses to enhance your daily explorations.

Home Science Tools also offers convenient curriculum lab kits for popular publishers, saving you time searching for the harder-to-find lab supplies. Our award-winning curriculum, [Science Unlocked](#), is another great option. It's easy to use and includes everything you need to plan and teach science in one box.

# Plan Your Year, One Week at a Time



## Tips on How to Plan a Whole Year of Science

To start planning a year of science, first come up with a big list of science topics. Write down your ideas that are age appropriate and appeal to your kids' interests. Mark the topics you think are most crucial to teach this year. It's better to start with a large list, and then narrow it down as you continue the process.

Are there some topics that would be best taught at a certain time of year? Study insects when they're easy to find in your area – in spring, summer, or early fall. A good time to study trees is at the beginning of the school year, when you can watch the leaves change color.



## Use a Scope and Sequence Worksheet

Print out a copy of the Scope and Sequence worksheet (included in this guide) and use it to plan your year of science, one month at a time.



# Scope and Sequence

Student: \_\_\_\_\_ Year: \_\_\_\_\_

Month: \_\_\_\_\_

 Science Topic: \_\_\_\_\_

Week 1: \_\_\_\_\_


Week 2: \_\_\_\_\_

Week 2: \_\_\_\_\_

Week 3: \_\_\_\_\_

Week 4: \_\_\_\_\_

Month: \_\_\_\_\_

 Science Topic: \_\_\_\_\_

Week 1: \_\_\_\_\_


Week 2: \_\_\_\_\_

Week 2: \_\_\_\_\_

Week 3: \_\_\_\_\_

Week 4: \_\_\_\_\_

Month: \_\_\_\_\_

 Science Topic: \_\_\_\_\_

Week 1: \_\_\_\_\_

Week 2: \_\_\_\_\_

Week 2: \_\_\_\_\_

Week 3: \_\_\_\_\_

Week 4: \_\_\_\_\_



Here's a sample science lesson showing how you might complete the Weekly Planner. You can keep things simple while still teaching science concepts in a way that inspires your kids!

## Tips for Filling Out Your Weekly Planner

For the LESSON: Fill in the topic you previously wrote down in your Scope and Sequence worksheet. Next, think about how you will teach the lesson. What books or supplies will you need? Will the lesson include hands-on activities or going outdoors? You should also think about how much time the lesson will take. Can you do it in one day or one week? This plan may change throughout the year, but it's important to start with the big picture. While this takes a bit of time up-front, it reduces the time you'll spend during the rest of the school year! Once you have the Scope and Sequence filled out, each week will be easy to plan for.

For the OBJECTIVE, ask yourself: What is my science goal for the week? What do I want to learn? How will I know if the objective was met?

## Simplify With a Weekly Planner

Simplify the planning process by using a Weekly Planner to capture all the information you need to teach a great science lesson in one place. We've included a Weekly Planner worksheet for you in this guide.

It will take you about 10-15 minutes at the beginning of each week to plan your next science lesson.



Month: Jan 14-18



Science Topic: Planets

Branch of Science: Space Science

### OBJECTIVE:

Recite the names of the planets in order, from closest to farthest away from the sun.

### LESSONS:

8 Planets in our Solar System (Jan 17)

1. Look at pictures of each of the planets and read some facts = 15 min (use [www.solarsystem.nasa.gov](http://www.solarsystem.nasa.gov))
2. Have kids write down names of planets in on a sticky note, put them in order, say out loud 3x = 10 min
3. Project: If Mercury (smallest) was the size of a penny how big would Jupiter (biggest) be? Find items in the house to show size of all planets, then put them in order, and recite names 2x - 20 min.

# Weekly Planner

Student: \_\_\_\_\_

Year: \_\_\_\_\_

Month: \_\_\_\_\_



Science Topic: \_\_\_\_\_

LESSONS:

Branch of Science: \_\_\_\_\_

OBJECTIVE:



Science Topic: \_\_\_\_\_

LESSONS:

Branch of Science: \_\_\_\_\_

OBJECTIVE:



Science Topic: \_\_\_\_\_

LESSONS:

Branch of Science: \_\_\_\_\_

OBJECTIVE:



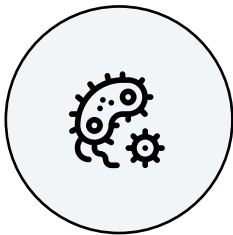
## Cheers to a great year of learning at home!

Now that you know how to research, plan, prepare, and teach homeschool science, there's nothing holding you back. You have the tools you need to be confident in teaching a year of science.

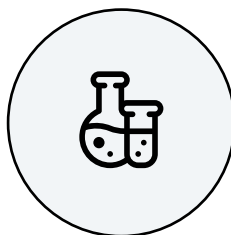
Your kids will learn from you in a hands-on way they will love. If you have any questions or want help choosing the right science curriculum and supplies for the school year, visit us at [home-sciencetools.com](https://www.homesciencetools.com) and chat with our friendly team about what options are right for you.



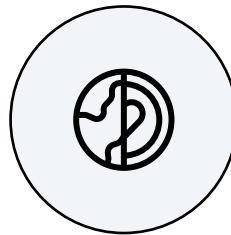
## Shop by Topic:



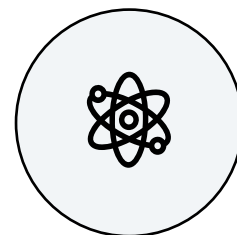
[BIOLOGY](#)



[CHEMISTRY](#)



[EARTH  
SCIENCE](#)



[PHYSICS &  
ENGINEERING](#)