



# ELEMENTARY LAB-BASED PHYSICAL SCIENCE

WEEK-BY-WEEK GUIDE  
BEST HOMESCHOOL RESOURCES

## YEAR AT A GLANCE

UNIT I Matter	UNIT II Chemical Reactions	UNIT III Water & Solutions	UNIT IV Forces & Energy	UNIT V Electricity & Magnets	UNIT VI Sound & Light
Week 1–8	Week 9–13	Week 14–19	Week 20–24	Week 25–30	Week 31–34

## OVERVIEW

This guide lays out a plan for a year-long, lab-based Elementary School study of Physical Science.

## WHAT YOU NEED

- *Awesome Science Experiments for Kids* by Crystal Chatterton. All recommended labs come from this book.
- *Materials*. Many of the materials that you'll use are common household items; see the unit-by-unit [Materials Lists](#) at the end of the document.
- *Optional*: Picture book recommendations can be found across the [Best Homeschool Resources \(BHR\)](#) pages.

## HOW TO PLAN

This guide is designed to be flexible:

- Complete all six units in any order for one year of integrated Physical Science.
- If you plan to study Chemistry and Physics over two years, focus on Units I–III for Chemistry and Units IV–VI for Physics. If you're studying only Chemistry this year, consider supplementing with an 8-week study of Atoms & Molecules using Ellen McHenry's *Elements*.
- If you follow a Unit Study or Child-Led approach, choose only those units that appeal to you.

## HOW TO USE

- Before beginning a unit, assemble the required lab materials (see [Materials Lists](#) below), then browse the linked [BHR](#) pages to identify picture books or other materials that you plan to purchase or borrow.
- Each week, complete 1–3 labs. Follow the [BHR](#) link for a collection of videos, online simulations, and picture books that provide a deeper understanding of the scientific principles exemplified in the labs.
- Keeping track: Your record-keeping can be as simple as printing out the schedule and checking off content as it has been completed. You may also wish to keep a list of the [BHR](#) resources that you've used.
- The topics of study align with a rigorous Elementary School Physical Science course. See the [BHR Science Sequence](#) for more information on the topics covered and tips for teaching the material.

## WEEK-BY-WEEK GUIDE

UNIT	WEEK	TOPIC	LABS	BHR LINKS
<b>I – MATTER</b>	1–2	States of Matter	<ul style="list-style-type: none"> <li>• Ice cream in a bag</li> <li>• Icy art</li> <li>• Fishing for ice</li> <li>• Disappearing ice</li> </ul>	<a href="#">Matter   States of Matter</a> <i>Picture book, TED-Ed videos, and a PhET simulation connecting states of matter to the motion of atoms and molecules.</i>
	3	Density	<ul style="list-style-type: none"> <li>• Sink or float</li> <li>• Fruit boats</li> </ul>	<a href="#">Matter   Density</a> <i>PhET simulations on density and buoyancy.</i>
	4	Conservation of Mass	<ul style="list-style-type: none"> <li>• Popcorn math</li> </ul>	<a href="#">Matter   Conservation of Mass</a> <i>TED-Ed video.</i>
	5	Nucleation	<ul style="list-style-type: none"> <li>• Dancing raisins</li> <li>• Soda geyser eruption</li> </ul>	N/A
	6–8	Air & Gases	<ul style="list-style-type: none"> <li>• Balloon in a bottle</li> <li>• Tea bag hot air balloon</li> <li>• Fluffy soap</li> <li>• Levitating ping pong ball</li> <li>• Paper cone fliers</li> <li>• Straw plane</li> <li>• Paper airplane</li> </ul>	<a href="#">Air &amp; Gases   General Resources</a> <i>TED-Ed video and PhET simulations.</i> <a href="#">Meteorology   Atmosphere</a> <i>Picture book and video.</i>
<b>II – CHEMICAL REACTIONS</b>	9	Introduction to Reactions	<ul style="list-style-type: none"> <li>• Yeast balloon</li> </ul>	<a href="#">Chemical Reactions   General Resources</a> <i>TED-Ed videos, Beautiful Chemistry videos, and a PhET simulation illustrating the relationship between reactants and products.</i>
	10–11	Acid-Base Chemistry	<ul style="list-style-type: none"> <li>• Fizzy rocket</li> <li>• Exploding baggie</li> <li>• Fire extinguisher</li> <li>• Lava lamp</li> <li>• Naked egg</li> </ul>	<a href="#">Chemical Reactions   Acids &amp; Bases</a> <i>TED-Ed video and a PhET simulation where kids can test the pH of different substances and determine whether they are acids or bases.</i>
	12	Reduction-Oxidation	<ul style="list-style-type: none"> <li>• Does it rust?</li> </ul>	<a href="#">Chemical Reactions   Reduction &amp; Oxidation</a> <i>Beautiful Chemistry videos depicting different kinds of reduction-oxidation reactions.</i>
	13	Catalysis	<ul style="list-style-type: none"> <li>• Foam explosion</li> </ul>	<a href="#">Chemical Reactions   Catalysis</a> <i>TED-Ed video.</i>



UNIT	WEEK	TOPIC	LABS	BHR LINKS
III – WATER & SOLUTIONS	14–15	Polarity	<ul style="list-style-type: none"> <li>• Rainbow rain</li> <li>• How do arctic animals stay warm?</li> <li>• What dissolves in water?</li> <li>• Oil and watercolor-resistant painting</li> </ul>	<a href="#">Water &amp; Solutions   Properties of Water</a> <i>TED-Ed videos.</i>
	16	Cohesion & Adhesion	<ul style="list-style-type: none"> <li>• Walking rainbow</li> <li>• Penny dome</li> </ul>	<a href="#">Water &amp; Solutions   Properties of Water</a> <i>TED-Ed videos.</i>
	17	Surface Tension	<ul style="list-style-type: none"> <li>• Magic milk</li> <li>• Scattered pepper</li> </ul>	<a href="#">Water &amp; Solutions   Properties of Water</a> <i>TED-Ed videos.</i>
	18	Crystallization	<ul style="list-style-type: none"> <li>• Crystal garden</li> </ul>	<a href="#">Water &amp; Solutions   Solution &amp; Crystallization</a> <i>PhET simulation.</i>
	19	Mixtures & Separations	<ul style="list-style-type: none"> <li>• Cornstarch quicksand</li> <li>• Marker chromatography</li> <li>• Candy rainbow</li> </ul>	<a href="#">Water &amp; Solutions   Mixtures &amp; Separations</a> <i>TED-Ed videos.</i>
IV – FORCES & ENERGY	20–22	Forces & Energy	<ul style="list-style-type: none"> <li>• Wind-powered car</li> <li>• Windmill challenge</li> <li>• Balloon-powered car</li> <li>• Paddleboat</li> <li>• Zipline challenge</li> <li>• Spinning top</li> <li>• Spin art</li> <li>• Falling orange</li> <li>• Craft stick</li> <li>• Heavy as a piece of paper</li> </ul>	<a href="#">Forces &amp; Energy   General Resources</a> <i>Picture books, TED-Ed videos, PhET simulations, and Eureka! video lessons.</i>
	23	Simple Machines	<ul style="list-style-type: none"> <li>• Pulley system</li> </ul>	<a href="#">Forces &amp; Energy   Simple Machines</a> <i>Picture books, TED-Ed videos, and Eureka! video lessons.</i>
	24	Heat	<ul style="list-style-type: none"> <li>• How quickly does it cool?</li> </ul>	<a href="#">Forces &amp; Energy   Heat</a> <i>Beautiful Chemistry videos, PhET simulations, and Eureka! video lessons.</i>



UNIT	WEEK	TOPIC	LABS	BHR LINKS
V - ELECTRICITY & MAGNETS	25-26	Electricity	<ul style="list-style-type: none"> <li>• Conductivity experiment</li> <li>• Paper circuit art</li> <li>• Penny flashlight</li> <li>• Lemon power!</li> </ul>	<a href="#">Electricity &amp; Magnets   Electricity</a> <i>Picture books, electricity kits, TED-Ed videos, and PhET simulations.</i>
	27	Static Electricity	<ul style="list-style-type: none"> <li>• Magic spoon</li> <li>• Flying birds</li> <li>• Bending water</li> </ul>	<a href="#">Electricity &amp; Magnets   Static Electricity</a> <i>TED-Ed videos and PhET simulations.</i>
	28-30	Magnets	<ul style="list-style-type: none"> <li>• Floating compass</li> <li>• Iron for breakfast</li> <li>• Make an electromagnet</li> <li>• Magnet-powered car</li> <li>• Magnetic puppets</li> <li>• Magnetic pendulum</li> <li>• Magnet painting</li> </ul>	<a href="#">Electricity &amp; Magnets   Magnets</a> <i>Picture book and a PhET simulation.</i>
VI - SOUND & LIGHT	31-32	Sound & Waves	<ul style="list-style-type: none"> <li>• Sound waves</li> <li>• String telephone</li> <li>• Dancing paper</li> <li>• Water glass xylophone</li> <li>• Pan flute</li> </ul>	<a href="#">Sound &amp; Light   Waves</a> <i>PhET simulations that illuminate the properties of waves.</i> <a href="#">Sound &amp; Light   Sound</a> <i>Picture book.</i>
	33-34	Light & Color	<ul style="list-style-type: none"> <li>• Right or left</li> <li>• Sky and sunset jar</li> <li>• Laser maze</li> <li>• Rainbow coloring</li> </ul>	<a href="#">Sound &amp; Light   Light &amp; Color</a> <i>Picture books, videos, and PhET simulations.</i>

# MATERIALS LISTS

## UNIT I. MATTER

Kitchen Items	Food & Drink	Arts & Crafts	Around the House / Other
Kitchen scale	Water	Pencils	Tape measure
Thermometer	Ice	Paper	Blow dryer
Large mixing bowls	Salt	Card stock	Ruler
Small bowls	Sugar	Construction paper	Matches
Knife	Vanilla	Scissors	Toothpicks
Measuring cups	Vegetable oil	Tape	Coins
Measuring spoons	Baking soda	String or yarn	Balloons
Mug	Cornstarch	Liquid watercolors	Bar of Ivory soap
Glass plate	Flour	Paintbrushes	Bars of other soap brands
Microwave-safe plate	Eggs	Feathers, pom poms, etc.	Glass bottle w/ narrow neck
Clear cups or glass jars	Milk		Dry ice
Oven mitts	Assorted fruits		Ping pong balls
Trivet	Raisins		
Small zip-top bags	Tea bag with string		
Gallon zip-top bags	Clear soda		
Spoon	2L bottle diet soda		
Cone-shaped paper cups	Microwave popcorn		
Bendable drinking straws	Mentos candies		

## UNIT II. CHEMICAL REACTIONS

Kitchen Items	Food & Drink	Arts & Crafts	Around the House / Other
Large mixing bowls	Water	Scissors	Matches
Measuring cups	Sugar		Balloons
Measuring spoons	Vegetable oil		Toilet paper
Small zip-top bags	Baking soda		Small candle or tea light
Clear cups or glass jars	Eggs		Pins, tacks, paper clips, etc.
16-ounce bottle	Dry yeast		Glass bottle w/ narrow neck
Liquid dish soap	White vinegar		6% hydrogen peroxide
Baking dish or sheet	Food coloring		Alka-Seltzer tablets
Funnel	Mini M&M in pop-top tube		
Small paper cups			



### UNIT III. WATER & SOLUTIONS

Kitchen Items	Food & Drink	Arts & Crafts	Around the House / Other
Clear cups or glass jars	Water	White card stock	Pennies
Measuring cups	Food coloring	Paintbrushes	Binder clips
Measuring spoons	Shortening	Liquid watercolors	Mineral oil
Spoons	Sugar	Small pom poms	Plastic pipettes
Baking sheets	Salt	Washable markers	Epsom salt
Paper towels	Black pepper	Craft sticks	
Plates (white)	Vegetable oil		
Liquid dish soap	Flour		
Large mixing bowl	Milk		
Slotted spoon, colander, etc.	Cornstarch		
Coffee filters	Skittles candy		

### UNIT IV. FORCES & ENERGY

Kitchen Items	Food & Drink	Arts & Crafts	Around the House / Other
Shallow plastic container	Orange	Scissors	Blow dryer or fan
Coffee stirrer	Ice	Tape	Tape measure
Salad spinner	Water	Construction paper	Hole punch
Coffee filters		Jumbo craft sticks	Paperclips
Paper towels		Wooden skewers	Cardboard
Plastic pitcher		Feathers	Ruler
Clear cups or glass jars		Pipe cleaners	Balloons
Thermometers (2)		String	Plastic bottle caps
Kitchen scale		Hot glue gun & glue sticks	Duct tape
Drinking straws		Pencils	Rubber bands
Small paper cups		Tempera paint	Empty sewing bobbins
Empty plastic milk jug		Pom-poms	Masking tape
Used paper towel rolls		Yarn	Coins
		Markers	Toothpicks
			Toy cars
			Postcard
			Large rock
			Dry ice



## UNIT V. ELECTRICITY & MAGNETS

Kitchen Items	Food & Drink	Arts & Crafts	Around the House / Other
Clear cups or glass jars	Salt	Scissors	AA battery holder w/ wires
Paper towels	Vinegar	Card stock	AA batteries
Measuring spoons & cups	Pepper	Tape	Alligator clip wires (5)
Small bowl	Lemons	Tissue paper	LEDs (5 mm); one red
Plastic spoons	Iron-fortified cereal	Markers	Metal objects (pins, etc.)
Dishcloth	Water	Wool cloth	Cardboard box
Knife		String	3V coin cell battery
Shallow plastic container		Paper	Cardboard
Mixing bowl		Tempera paint	Pennies (after 1982)
Quart-sized zip-top bag			Sandpaper
Broom			Electrical tape
			Balloons
			Plastic comb
			Zinc-galvanized nails
			Bar magnet
			Insulated copper wire
			Iron nail (3–6" long)
			Wire stripper
			D batteries
			Toy car
			Magnetic wand
			Copper tape, ¼ inch, double-sided, conductive

## UNIT VI. SOUND & LIGHT

Kitchen Items	Food & Drink	Arts & Crafts	Around the House / Other
Metal spoons	Water	String or yarn	Ruler
Clean, empty tin cans (2)	Food coloring	Scissors	Sandpaper
Plastic wrap	Milk	Tape	Nail
Clear cups or glass jars (8)		Tissue paper	Hammer
Measuring cups & spoons		Pencils	Fishing line
Drinking straws		Paper	Paper clips
		Markers	Speaker (laptop, TV)
		Colored pencils	Flashlight
			Small mirrors (3)
			Binder clips (6)
			Laser pointer
			Protractor
			Prism

