Teacher Introduction

Welcome to God's Design® for Chemistry & Ecology

God's Design for Chemistry & Ecology is a series that has been designed for use in teaching chemistry and ecology to elementary and middle school students. It is divided into three books: *Properties of Matter*, *Properties of Atoms and Molecules*, and *Properties of Ecosystems.* Each book has 35 lessons including a final project that ties all of the lessons together.

In addition to the lessons, special features in each book include biographical information on interesting people as well as fun facts to make the subject more fun.

Although this is a complete curriculum, the information included here is just a beginning, so please feel free to add to each lesson as you see fit. A resource guide is included in the appendices to help you find additional information and resources. A list of supplies needed is included at the beginning of each lesson, while a master list of all supplies needed for the entire series can be found in the appendices.

Answer keys for all review questions, worksheets, quizzes, and the final exam are included here. Reproducible student worksheets and tests may be found on the supplementary CD-Rom for easy printing. Please contact Answers in Genesis if you wish to purchase a printed version of all the student materials, or go to www.AnswersBookstore.com.

If you wish to get through the Chemistry & Ecology series in one year, you should plan on covering approximately three lessons per week. The time required for each lesson varies depending on how much additional information you want to include, but you can plan on about 45 minutes per lesson.

If you wish to cover the material in more depth, you may add additional information and take a longer period of time to cover all the material or you could choose to do only one or two of the books in the series as a unit study.

Why Teach Chemistry & Ecology?

Maybe you hate science or you just hate teaching it. Maybe you love science but don't quite know how to teach it to your children. Maybe science just doesn't seem as important as some of those other subjects you need to teach. Maybe you need a little motivation. If any of these descriptions fits you, then please consider the following.

It is not uncommon to question the need to teach your kids hands-on science in elementary school. We could argue that the knowledge gained in science will be needed later in life in order for your children to be more productive and well-rounded adults. We could argue that teaching your children science also teaches them logical and inductive thinking and reasoning skills, which are tools they will need to be more successful. We could argue that science is a necessity in this technological world in which we live. While all of these arguments are true, not one of them is the real reason that we should teach our children science. The most important reason to teach science in elementary school is to give your children an understanding that God is our Creator, and the Bible can be trusted. Teaching science from a creation perspective is one of the best ways to reinforce your children's faith in God and to help them counter the evolutionary propaganda they face every day.

God is the Master Creator of everything. His handiwork is all around us. Our Great Creator put in place all of the laws of physics, biology, and chemistry. These laws were put here for us to see His wisdom and power. In science, we see the hand of God at work more than in any other subject. Romans 1:20 says, "For since the creation of the world His invisible attributes are clearly seen, being understood by the things that are made, even His eternal power and Godhead, so that they [men] are without excuse." We need to help our children see God as Creator of the world around them so they will be able to recognize God and follow Him.

The study of chemistry helps us understand and appreciate the amazing way everything God created works together. The study of atoms and molecules and how different substances react with each other reveals an amazing design, even at the smallest level of life. Understanding the carbon, nitrogen, and water cycles helps our children see that God has a plan to keep everything working together. Learning about ecosystems reveals God's genius in nature.

It's fun to teach chemistry and ecology! It's interesting too. The elements of chemistry are all around us. Children naturally like to combine things to see what will happen. You just need to direct their curiosity.

Finally, teaching chemistry is easy. You won't have to try to find strange materials for experiments or do dangerous things to learn about chemistry. Chemistry is as close as your kitchen or your own body, and ecosystems are just outside your door.

How Do I Teach Science?

In order to teach any subject, you need to understand that people learn in different ways. Most people, and children in particular, have a dominant or preferred learning style in which they absorb and retain information more easily.

If a student's dominant style is:

Auditory He needs not only to hear the information but he needs to hear himself say it. This child needs oral presentation as well as oral drill and repetition.
Visual She needs things she can see. This child responds well to flashcards, pictures, charts, models, etc.
Kinesthetic He needs active participation. This child remembers best through games, hands-on activities, experiments, and field trips.

Also, some people are more relational while others are more analytical. The relational student needs to know why this subject is important and how it will affect him personally. The analytical student, however, wants just the facts.

If you are trying to teach more than one student, you will probably have to deal with more than one learning style. Therefore, you need to present your lessons in several different ways so that each student can grasp and retain the information.

Grades 3–8

Each lesson should be completed by all upper elementary and junior high students. This is the main part of the lesson containing a reading section, a hands-on activity that reinforces the ideas in the reading section (blue box), and a review section that provides review questions and application questions (red box).

Grades 6–8

For middle school/junior high age students, we provide a "Challenge" section that contains more challenging material as well as additional activities and projects for older students (green box).

We suggest a threefold approach to each lesson:

Introduce the topic

We give a brief description of the facts. Frequently you will want to add more information than the essentials given in this book. In addition to reading this section aloud, you may wish to do one or more of the following:

- Read a related book with your students.
- Write things down to help your visual students.
- Give some history of the subject. We provide some historical sketches to help you, but you may want to add more.
- Ask questions to get your students thinking about the subject.

Make observations and do experiments

- Hands-on projects are suggested for each lesson. This section of each lesson may require help from the teacher.
- Have your students perform the activity by themselves whenever possible.

Review

- The "What did we learn?" section has review questions.
- The "Taking it further" section encourages students to
  - Draw conclusions
  - Make applications of what was learned
  - Add extended information to what was covered in the lesson
- The "FUN FACT" section adds fun or interesting information.

By teaching all three parts of the lesson, you will be presenting the material in a way that all learning styles can both relate to and remember.

Also, this approach relates directly to the scientific method and will help your students think more scientifically. The *scientific method* is just a way to examine a subject logically and learn from it. Briefly, the steps of the scientific method are:

1. Learn about a topic.
2. Ask a question.
3. Make a hypothesis (a good guess).
4. Design an experiment to test your hypothesis.
5. Observe the experiment and collect data.
6. Draw conclusions. (Does the data support your hypothesis?)

Note: It's okay to have a "wrong hypothesis." That's how we learn. Be sure to help your students understand why they sometimes get a different result than expected.

Our lessons will help your students begin to approach problems in a logical, scientific way.

How Do I Teach Creation vs. Evolution?

We are constantly bombarded by evolutionary ideas about the earth in books, movies, museums, and even commercials. These raise many questions: Is a living being just a collection of chemicals? Did life begin as a random combination of chemicals? Can life be recreated in a laboratory? What does the chemical evidence tell us about the earth? The Bible answers these questions, and this book accepts the historical accuracy of the Bible as written. We believe this is the only way we can teach our children to trust that everything God says is true.

There are five common views of the origins of life and the age of the earth:

Historical biblical account	Progressive creation	Gap theory	Theistic evolution	Naturalistic evolution
Each day of creation in Genesis is a normal day of about 24 hours in length, in which God created everything that exists. The earth is only thousands of years old, as determined by the genealogies in the Bible.	The idea that God created various creatures to replace other creatures that died out over millions of years. Each of the days in Genesis represents a long period of time (day-age view) and the earth is billions of years old.	The idea that there was a long, long time between what happened in Genesis 1:1 and what happened in Genesis 1:2. During this time, the "fossil record" was supposed to have formed, and millions of years of earth history supposedly passed.	The idea that God used the process of evolution over millions of years (involving struggle and death) to bring about what we see today.	The view that there is no God and evolution of all life forms happened by purely naturalistic processes over billions of years. Ken Ham et al., *The Answers Book*, (El Cajon: Master Books, 2000), 33–76.

Any theory that tries to combine the evolutionary time frame with creation presupposes that death entered the world before Adam sinned, which contradicts what God has said in His Word. The view that the earth (and its "fossil record") is hundreds of millions of years old damages the gospel message. God's completed creation was "very good" at the end of the sixth day (Genesis 1:31). Death entered this perfect paradise *after* Adam disobeyed God's command. It was the punishment for Adam's sin (Genesis 2:16–17; 3:19; Romans 5:12–19). Thorns appeared when God cursed the ground because of Adam's sin (Genesis 3:18).

The first animal death occurred when God killed at least one animal, shedding its blood, to make clothes for Adam and Eve (Genesis 3:21). If the earth's "fossil record" (filled with death, disease, and thorns) formed over millions of years before Adam appeared (and before he sinned), then death no longer would be the penalty for sin. Death, the "last enemy" (1 Corinthians 15:26), diseases (such as cancer), and thorns would instead be part of the original creation that God labeled "very good." No, it is clear that the "fossil record" formed sometime *after* Adam sinned—not many millions of years before. Most fossils were formed as a result of the worldwide Genesis Flood.

When viewed from a biblical perspective, the scientific evidence clearly supports a recent creation by God, and not naturalistic evolution and millions of years. The volume of evidence supporting the biblical creation account is substantial and cannot be adequately covered in this book. If you would like more information on this topic, please see the resource guide in the appendices. To help get you started, just a few examples of evidence supporting biblical creation are given below:

Evolutionary Myth: Life evolved from non-life when chemicals randomly combined together to produce amino acids and then proteins that produced living cells.

The Truth: The chemical requirements for DNA and proteins to line up just right to create life could not have happened through purely natural processes. The process of converting DNA information into proteins requires at least 75 different protein molecules. But each and every one of these 75 proteins must be synthesized in the first place by the process in which they themselves are involved. How could the process begin without the presence of all the necessary proteins? Could all 75 proteins have arisen by chance in just the right place at just the right time? Dr. Gary Parker says this is like the chicken and the egg problem. The obvious conclusion is that both the DNA and proteins must have been functional from the beginning, otherwise life could not exist. The best explanation for the existence of these proteins and DNA is that God created them.

See Gary Parker, *Creation: Facts of Life* (Green Forest, Arkansas: Master Books, 2006), 20–43.

Evolutionary Myth: Stanley Miller created life in a test tube, thus demonstrating that the early earth had the conditions necessary for life to begin.

The Truth: Although Miller was able to create amino acids from raw chemicals in his famous experiment, he did not create anything close to life or even the ingredients of life. There are four main problems with Miller's experiment. First, he left out oxygen because he knew that oxygen corrodes and destroys amino acids very quickly. However, rocks found in every layer of the earth indicate that oxygen has always been a part of the earth's atmosphere. Second, Miller included ammonia gas and methane gas. Ammonia gas would not have been present in any large quantities because it would have been dissolved in the oceans. And there is no indication in any of the rock layers that methane has ever been a part of the earth's atmosphere. Third, Miller used a spark of electricity to cause the amino acids to form, simulating lightning. However, this spark more quickly destroyed the amino acids than built them up, so to keep the amino acids from being destroyed, Miller used specially designed equipment to siphon off the amino acids before they could be destroyed. This is not what would have happened in nature. And finally, although Miller did produce amino acids, they were not the kinds of amino acids that are needed for life as we know it. Most of the acids were ones that actually break down proteins, not build them up.

See Ken Ham, et al., *War of the Worldviews* (Green Forest, Arkansas: Master Books, 2006), 15–24. See also www.answersingenesis.org/go/origin.

Evolutionary Myth: Living creatures are just a collection of chemicals.

The Truth: It is true that cells are made of specific chemicals. However, a dead animal is made of the same chemicals as it was when it was living, but it cannot become alive again. What makes the chemicals into a living creature is the result of the organization of the substances, not just the substances themselves. Dr. Parker again uses an example. An airplane is made up of millions of non-flying parts; however, it can fly because of the design and organization of those parts. Similarly, plants and animals are alive because God created the chemicals in a specific way for them to be able to live. A collection of all the right parts is not life.

Evolutionary Myth: Chemical evidence points to an earth that is billions of years old.

The Truth: Much of the chemical evidence actually points to a young earth. For example, radioactive decay in the earth's crust produces helium atoms that rise to the surface and enter the atmosphere. Assuming that the rate of helium production has always been constant (an evolutionary assumption), the maximum age for the atmosphere could only be 2 million years.[1] This is much younger than the 4+ billion years claimed by evolutionists. And there are many ideas that could explain the presence of helium that would indicate a much younger age than 2 million years. Similarly, salt accumulates in the ocean over time. Evolutionists claim that life evolved in a salty ocean 3–4 billion years ago. If this were true and the salt has continued to accumulate over billions of years, the ocean would be too salty for anything to live in by now. Using the most conservative possible values (those that would give the oldest possible age for the oceans), scientists have calculated that the ocean must be less than 62 million years. That number is based on the assumption that nothing has affected the rate at which the salt is accumulating. However, the Genesis Flood would have drastically altered the amount of salt in the ocean, dissolving much sodium from land rocks.[2] Thus, the chemical evidence does not support an earth that is billions of years old.

[1] Dr. Don DeYoung, *Thousands…not billions* (Green Forest, Arkansas: Master Books, 2005). See also www.answersingenesis.org/go/helium.
[2] John D. Morris, Ph.D., *The Young Earth* (Green Forest, Arkansas: Master Books, 2007), 83–87. See also www.answersingenesis.org/creation/v21/i1/seas.asp.

Despite the claims of many scientists, if you examine the evidence objectively, it is obvious that evolution and millions of years have not been proven. You can be confident that if you teach that what the Bible says is true, you won't go wrong. Instill in your student a confidence in the truth of the Bible in all areas. If scientific thought seems to contradict the Bible, realize that scientists often make mistakes, but God does not lie. At one time scientists believed that the earth was the center of the universe, that living things could spring from non-living things, and that blood-letting was good for the body. All of these were believed to be scientific facts but have since been disproved, but the Word of God remains true. If we use modern "science" to interpret the Bible, what will happen to our faith in God's Word when scientists change their theories yet again?

Integrating the Seven C's into Your Curriculum

Throughout the *God's Design® for Science* series you will see icons that represent the Seven C's of History. The Seven C's is a framework in which all of history, and the future to come, can be placed. As we go through our daily routines we may not understand how the details of life connect with the truth that we find in the Bible. This is also the case for students. When discussing the importance of the Bible you may find yourself telling students that the Bible is relevant in everyday activities. But how do we help the younger generation see that? The Seven C's are intended to help.

The Seven C's can be used to develop a biblical worldview in students, young or old. Much more than entertaining stories and religious teachings, the Bible has real connections to our everyday life. It may be hard, at first, to see how many connections there are, but with practice, the daily

Properties of Atoms & Molecules

Unit 1

Atoms & Molecules

LESSON 1

Introduction to Chemistry

The study of matter and molecules

Supply list

Drinking glass Baking soda Vinegar

Supplies for Challenge: 2-liter bottle of diet soda Mentos® candies Toothpick Tape Piece of paper

What did we learn?

- What is matter? **Anything that has mass and takes up space.**
- Does air have mass? **Yes. It may seem like there is nothing there, but even though air is very light, it still has mass. The air contains molecules that take up space.**
- What do chemists study? **The way matter reacts with other matter and the environment.**

Taking it further

- Would you expect to see the same reaction each time you combine baking soda and vinegar? **Yes, because God designed certain laws for matter to follow, so we would expect it to react the same way each time.**

LESSON 2

Atoms

Basic building blocks

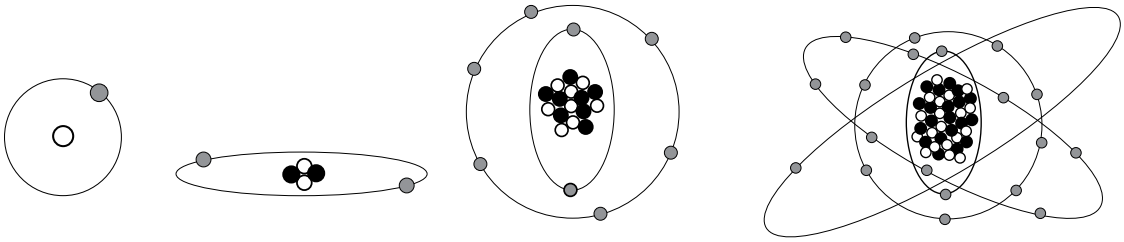
Supply list

Copy of "Atomic Models" worksheet Colored pencils

Supplies for Challenge: Copy of "Energy Levels" worksheet

Atomic Models worksheet

- Color the protons in each atom red (white), the neutrons blue (black), and the electrons gray.



Hydrogen **Helium** **Oxygen** **Potassium**

What did we learn?

- What is an atom? **The smallest part of matter that cannot be broken down by ordinary chemical means.**
- What are the three parts of an atom? **Protons, neutrons, and electrons**
- What electrical charge does each part of the atom have? **Protons are positive, neutrons are neutral, and electrons are negative.**
- What is the nucleus of an atom? **The dense center of the atom consisting of protons and neutrons.**
- What part of the atom determines what type of atom it is? **The number of protons in the nucleus determines what kind of atom it is.**
- What is a valence electron? **An electron in the outermost energy level for that atom.**

Taking it further

- Why is it necessary to use a model to show what an atom is like? **Atoms are too small to see and are very complex, so a model is useful for understanding what an atom is like.**
- On your worksheet, you colored neutrons blue and protons red. Are neutrons actually blue and protons actually red in a real atom? **No, the colors used in a model are just to help us visualize the parts. They do not really represent the actual colors.**

Challenge: Energy Levels worksheet

Element	Energy levels	Electrons in level 1	Electrons in level 2	Electrons in level 3	Electrons in level 4	Electrons in level 5	Electrons in level 6
He Helium	**1**	**1**					
Be Beryllium	**2**	**2**	**2**				
Al Aluminum	**3**	**2**	**8**	**3**			
Cl Chlorine	**3**	**2**	**8**	**7**			
Fe Iron	**4**	**2**	**8**	**14**	**2**		
Kr Krypton	**4**	**2**	**8**	**18**	**8**		
Ag Silver	**5**	**2**	**8**	**18**	**18**	**1**	
Au Gold	**6**	**2**	**8**	**18**	**32**	**18**	**1**

LESSON 3

Atomic Mass

How big is an atom?

Supply list

Copy of "Learning About Atoms" worksheet

Supplies for Challenge: Copy of "Understanding Atoms" worksheet

Learning About Atoms worksheet

Element	Atomic number	Atomic mass	# of of protons	# of electrons	# of neutrons
Hydrogen	1	1	**1**	**1**	**0**
Helium	2	4	**2**	**2**	**2**
Oxygen	8	16	**8**	**8**	**8**
Fluorine	9	19	**9**	**9**	**10**
Chromium	24	52	**24**	**24**	**28**

What did we learn?

- What are the three particles that make up an atom? **Proton, electron, and neutron.**
- What is the atomic number of an atom? **The number of protons in the nucleus.**
- What is the atomic mass of an atom? **The sum of the protons and neutrons in the nucleus of the atom.**
- How can you determine the number of electrons, protons, and neutrons in an atom if you are given the atomic number and atomic mass? **The number of protons is the same as the atomic number. The number of electrons is equal to the number of protons. The number of neutrons is equal to the atomic mass minus the number of protons.**

Taking it further

- What does a hydrogen atom become if it loses its electron? **A proton.**
- Why are electrons ignored when calculating an element's mass? **The mass of an electron is so small compared to the mass of a proton or neutron that it does not make a significant difference.**

Challenge: Understanding Atoms worksheet

Element	Symbol	Atomic number	Atomic mass	# of protons	# of electrons	Most common # of neutrons
Hydrogen	**H**	**1**	**1.008**	**1**	**1**	**0**
Oxygen	**O**	**8**	**16**	**8**	**8**	**8**
Boron	**B**	**5**	**10.81**	**5**	**5**	**6**
Gold	**Au**	**79**	**197**	**79**	**79**	**118**
Silver	**Ag**	**47**	**107.9**	**47**	**47**	**61**
Uranium	**U**	**92**	**238**	**92**	**92**	**146**

Potassium	**K**	**19**	**39.1**	**19**	**19**	**20**
Chlorine	**Cl**	**17**	**35.45**	**17**	**17**	**18**
Neon	**Ne**	**10**	**20.18**	**10**	**10**	**10**
Einsteinium	**Es**	**99**	**252**	**99**	**99**	**153**

LESSON 4

Molecules

Putting atoms together

Supply list

Copy of "What Am I?" worksheet

Supplies for Challenge: Copy of "Molecule Puzzle Pieces" Scissors

What Am I? worksheet

Next to each of the substances below, write whether it is an element, a diatomic molecule or a compound. Review these terms in the lesson if you need to.

Gold (Au): **Element**

Oxygen (O_2): **Diatomic molecule**

Silver (Ag): **Element**

Ammonia (NH_3): **Compound**

Nitrogen (N_2): **Diatomic molecule**

Salt (NaCl): **Compound**

What did we learn?

- What is a molecule? **Two or more atoms chemically connected or bonded together.**
- What is a diatomic molecule? **A molecule with two of the same type of atoms connected together.**
- What is a compound? **A molecule made from two or more different kinds of atoms.**

Taking it further

- What is the most important factor in determining if two atoms will bond with each other? **The number of valence electrons each atom has**.
- Table salt is a compound formed from sodium and chlorine. Would you expect sodium atoms and chlorine atoms to taste salty? Why or why not? **No, because when molecules are formed, the resulting compound is a new substance with its own characteristics, completely different from those of the original elements.**

Master Supply List

The following table lists all the supplies used for *God's Design for Chemistry & Ecology* activities. You will need to look up the individual lessons in the student book to obtain the specific details for the individual activities (such as quantity, color, etc.). The letter *c* denotes that the lesson number refers to the challenge activity. Common supplies such as colored pencils, construction paper, markers, scissors, tape, etc., are not listed.

Supplies needed (see lessons for details)	Atoms/Molecules	Matter	Ecosystems
3-ring binder			2
Alka-Seltzer	17c, 20c		
Alum (in spice section)		28	
Ammonia (clear)	23, 23c		
Antacid tablets or liquid	23, 24		
Bag (produce)			19
Baking soda	1, 12c, 17, 23	6c, 10, 17, 20, 22c, 24c, 25, 29, 34	
Balloon (helium-filled, optional)		9c	
Balloons (latex)	30, 33	2, 6c, 15, 35	
Banana	26c		
Battery (6-volt)		17	
Battery (9-volt)	12c		
Bean seeds		18c	
Bible	35		
Block (wooden)		12	
Borax	31c, 32c		
Bottle (plastic ½-gallon or 1-liter)		15c, 20	
Box (small)		3, 7	18 , 23
Bread	28	30, 33c	
Cabbage (red/purple)	21		
Cake mix		23c	
Candle	9, 10, 17	20, 35	
Charcoal briquettes		28	
Cinnamon		25	
Club soda		25	
Coffee filter		19	
Copper sulfate (available at swimming pool supply store)	32c		
Corn syrup		25	
Cornstarch	31c	34	
Cotton balls		28	18, 21

Supplies needed (see lessons for details)	Atoms/Molecules	Matter	Ecosystems
Cups (clear)	17c	3, 9, 22, 22c, 24, 26c, 28	15, 16
Cups (foam)	20c		
Cups (paper)	12c	5, 6	
Diaper (disposable)	34		
Dish soap	10c, 23, 34	13, 15c, 24c	
Dividers (folder)			2
Dry ice	10		
Earthworms			2
Eggs	7, 20	23, 23c, 27	
Epsom salt	15, 32c		
Eraser		8c	
Eyedropper	34		15, 27
Field guide to flowering plants			8
Flashlight with battery	6		
Flour		30, 33	
Food coloring	34	25	12, 15
Funnel		19	
Garlic powder	28		
Gelatin	25c		
Geode (optional)	15		
Ginger ale	28		
Glitter	32		
Gloves (leather and cotton)	10		18
Gloves (rubber)			30
Goggles		28	14
Golf ball		8	
Grass and other plants	27		6, 8, 8c, 21, 23, 27, 31
Hammer		28	14
Hand lotion		13	
Hand mirror		11	
Hole punch		5	
Honey		12, 13	
Hydrogen peroxide	19		
Ice			18
Ice tray		11	
Iodine		30, 34	
Jar (with lid)	17, 20, 22c, 29	11c, 17, 20, 21	2, 6, 27, 32
Jigsaw puzzle		16	

Supplies needed (see lessons for details)	Atoms/Molecules	Matter	Ecosystems
Leaves			20, 21
Lemon juice	19, 22, 24	10, 23, 25, 32	
Life Savers candies (roll)		22, 31c	
Magnifying glass			1, 5, 14
Marbles	25c	8c, 9c	
Margarine	8, 28	1, 33	
Marshmallows (mini, colored)	11, 12, 13		
Matches	9, 10, 17		
Mentos candies	1c		
Meter stick/metric ruler		1, 3, 4, 5, 7	1, 8
Microscope and slides (optional)		3c	27
Milk (not skim)	22, 34	21c, 26, 31, 33	
Milk jug (1-gallon)		15	
Modeling clay	15c, 17	9, 9c	13, 30c
Molasses		2	
Mustard (dry)		23	
Newspaper			8, 21, 30, 30c
Oats			2
Oil (olive)	12c		
Oil (spray)		33	
Oil (vegetable)	8	9,13, 23, 24c, 30, 34	
Orange juice		19, 25	
Page protectors/sheet protectors			8, 30c
Paint			21
Paper bag (brown)		30	
Paper clips	22c	4, 5, 8	
Paper towels	34		
Paprika		23	
Peanut butter	8	30	
Pennies	22c	5, 8	
Perfume		14c	
pH testing paper (optional)			27
Photos of animals			18, 25
Pineapple juice (fresh, not frozen)	25c		
Pinecones	32c		
Ping-pong ball		8	
Plant food	27		
Plaster of Paris	15c		
Plastic bottles (empty 2-liter)		2, 6c, 18c, 28	
Plastic zipper bags	26c, 34	22, 26, 28, 33c	14, 20

Supplies needed (see lessons for details)	Atoms/Molecules	Matter	Ecosystems
Plate (ceramic)	9		
Polymer clay (Femo, Sculpey, etc.)	16		
Popcorn		9	
Potassium salt (in spice section)	32c	22c, 24c	
Potato	19		
Potato or tortilla chips		30	
Pots and pans			12, 27
Potting soil		18c	6
Powdered sugar		34	
Pudding mix (instant)		31	
Rocks		12, 28	14
Rolling pin		22	
Rubber band	30	5	
Rubbing alcohol	29	9, 34	
Safety goggles			14
Salt	12c, 15, 22c, 24, 32c	10, 22c, 23, 24c, 26, 26c, 27, 33	15, 16
Sand		28	2, 14
Scale (bathroom)			30
Scale (gram)		6c	
Seashells			14
Silver object (tarnished)	14		
Silver polish/tarnish remover	14		
Soft drink (canned, diet & regular)		24, 25c	
Soft drink (lemon lime)	22		
Soft drink (diet 2-liter bottle)	1c		
Soil		28	2, 6
Spices (ginger root, mint leaves, cinnamon sticks, allsp ice, cloves, peppermint oil, almond extract, etc.)	29, 29c	25	
Spoon (metal)		1, 8c, 12	
Spoon (wooden)		1	
Spray bottles			31
Starch (liquid)	34		
Steel wool without soap	10c, 20		
Stopwatch	17c, 20c	1, 3, 26c	
Straw	33	27	
String	33	5, 18c	1
Sugar	12c	2, 21, 22c, 24c, 25, 26, 33	
Sugar cubes		6	

Supplies needed (see lessons for details)	Atoms/Molecules	Matter	Ecosystems
Sunscreen lotion			30c
Swabs	24		
Tagboard/card stock/poster board			7c, 8, 20c, 25, 32c
Tape (electrical or duct)	6, 33		
Tape (masking)		2, 3, 5	
Tape measure (cloth)		2, 15c	
Telescope (optional)		3c	
Tennis ball		3, 7c, 14	
Test tubes	10c		
Thermometer	20	2, 3, 26c	16, 32
Tissue paper or quilt batting			18
Toothpaste (with fluoride)	7, 23		
Toothpicks	1c, 11, 12, 13		
Vanilla extract		21, 25, 26	
Vinegar	1, 7, 17, 20, 22, 23c, 25c	6c, 20, 21c,23, 34	31
Water (distilled)	12c, 23c		27
Whipped cream (spray can)		21	
Whipping cream (liquid)		21	
Wire (copper)	6, 12c	17	
World atlas			1c, 7, 17
Yeast	26c	2, 33	