

Make science easier to teach and exciting to learn.

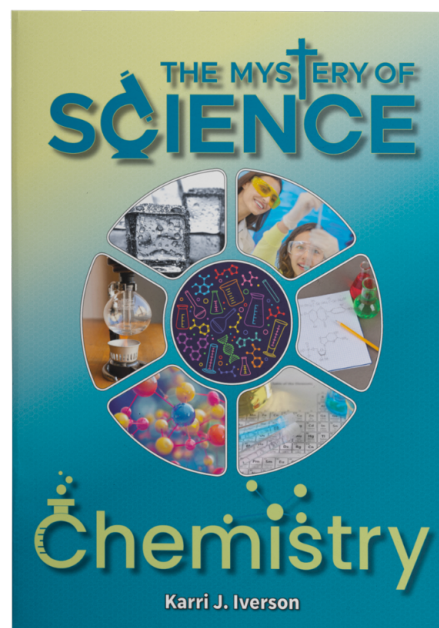
Open-and-go science curriculum for Christian homeschool families with students in grades 4 through 8.

Science should not take over your week. You want your children to learn well without spending every evening preparing the next lesson.

CHEMISTRY / LESSON 6

Elementary Elements

Explore the building blocks of matter and the order behind the periodic table. Read both samples together and see how they fit your family.



Easy for you.

A clear plan for your homeschool week.

Fascinating for them.

Colorful lessons that invite discovery.

Grounded in truth.

Science through a biblical worldview.

Explore the Chemistry Curriculum

Includes selected Student Reader and Lab Manual pages; this is not the full curriculum.

Free lesson preview | Share this complete sample PDF with another homeschool family.

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LESSON 6

ELEMENTARY ELEMENTS

Goal: To identify elements as the purest form of matter and understand their organization on the periodic table.

Gold! Pure gold! Imagine the excitement in a prospector's voice as he finds gold—especially pure gold. When scientists think of a substance that is pure, they are usually thinking of an element.

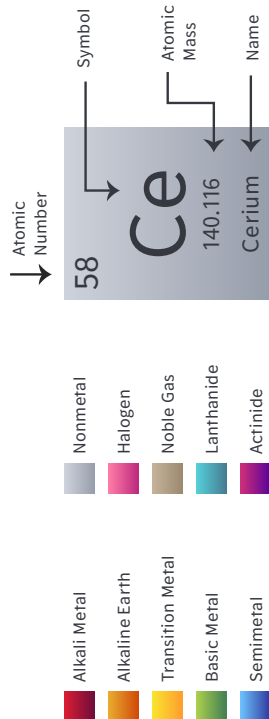
Remember, everything you see and touch is matter. Matter can be made entirely of one kind of material or of different materials combined. An **element** is the purest form of matter that exists. Gold, sodium, and carbon are all elements. Each of these examples is made of only one kind of atom; gold has only gold atoms, sodium has only sodium atoms, and so on. All the known elements in the universe are organized by their physical properties in the **periodic table of the elements**. This table contains very important information that we will study throughout the next several lessons.



Most jewelry worn every day is not pure gold; instead, it has other metals added to it.

PERIODIC TABLE

1 H Hydrogen 1.008	2 He Helium 4.002602	3 Li Lithium 6.94	4 Be Beryllium 9.0121831	5 B Boron 10.81	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998403163	10 Ne Neon 20.1797	11 Na Sodium 22.98976928	12 Mg Magnesium 24.304	13 Al Aluminum 26.9815385	14 Si Silicon 28.085	15 P Phosphorus 30.973761998	16 S Sulfur 32.06	17 Cl Chlorine 35.45	18 Ar Argon 39.948	19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955908	22 Ti Titanium 47.867	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938044	26 Fe Iron 55.845	27 Co Cobalt 58.933194	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.630	33 As Arsenic 74.921595	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798	37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90584	40 Zr Zirconium 91.224	41 Nb Niobium 92.90637	42 Mo Molybdenum 95.95	43 Tc Technetium 98	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.750	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.293	55 Cs Cesium 132.90545196	56 Ba Barium 137.327	57 La Lanthanum 138.90547	58 Ce Cerium 140.116	59 Pr Praseodymium 140.90766	60 Nd Neodymium 144.242	61 Pm Promethium 145	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92535	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93033	68 Er Erbium 167.259	69 Tm Thulium 168.93422	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.9668	72 Hf Hafnium 178.49	73 Ta Tantalum 180.94788	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.227	78 Pt Platinum 195.084	79 Au Gold 196.966569	80 Hg Mercury 200.592	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98040	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222	87 Fr Francium 223	88 Ra Radium 226	89 Ac Actinium 227	90 Th Thorium 232.0377	91 Pa Protactinium 231.03688	92 U Uranium 238.02891	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 251	99 Es Einsteinium 252	100 Fm Fermium 257	101 Md Mendelevium 258	102 No Nobelium 259	103 Lr Lawrencium 260	104 Rf Rutherfordium 261	105 Db Dubnium 268	106 Sg Seaborgium 269	107 Bh Bohrium 270	108 Hs Hassium 277	109 Mt Meitnerium 278	110 Ds Darmstadtium 281	111 Rg Roentgenium 282	112 Cn Copernicium 285	113 Nh Nihonium 286	114 Fl Flerovium 289	115 Mc Moscovium 289	116 Lv Livermorium 293	117 Ts Tennessine 294	118 Og Oganesson 294
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57 La Lanthanum 138.90547	58 Ce Cerium 140.116	59 Pr Praseodymium 140.90766	60 Nd Neodymium 144.242	61 Pm Promethium 145	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92535	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93033	68 Er Erbium 167.259	69 Tm Thulium 168.93422	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.9668
89 Ac Actinium 227	90 Th Thorium 232.0377	91 Pa Protactinium 231.03688	92 U Uranium 238.02891	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 251	99 Es Einsteinium 252	100 Fm Fermium 257	101 Md Mendelevium 258	102 No Nobelium 259	103 Lr Lawrencium 260

Lanthanide Series

Actinide Series

LESSON 6

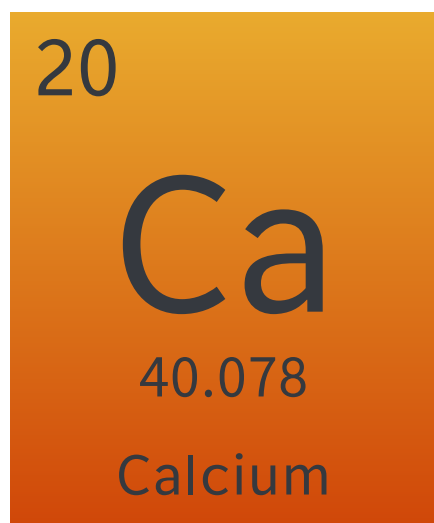
There are 3 ways to categorize how elements exist. First, scientists have discovered about 92 elements that exist naturally in creation. Second, there are several more that occur in very small amounts, so scientists disagree about whether those can be labeled as naturally occurring. That brings the number to 98. Third, about 20 elements have been manufactured in a laboratory. Even the ones made in the lab are made from elements that already existed—just changed somewhat.

As elements were discovered, scientists named them based on who discovered them, their properties, and or the place where they were originally found. Chemists usually write element names in an abbreviated form called a **symbol** that uses 1 or 2 letters of the alphabet. Some are easy to remember, such as O for oxygen, N for nitrogen, H for hydrogen, Ca for calcium, I for iodine, S for sulfur, and Al for aluminum. Some symbols come from the Latin name for the element, such as Au (*aurum*) for gold and Ag (*argentum*)

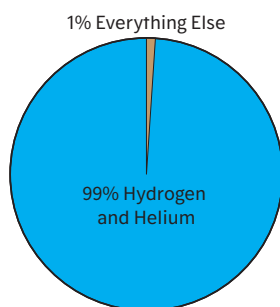
for silver. Does *argentum* sound like any other word you may have heard? The name *Argentina*, which is the country known as the land of silver, is derived from this word.

There is one element that makes up most of the matter in the universe. Can you guess which one it is? (It is not gold!) About 75% of all matter in the universe has hydrogen in it, including our bodies, plants, water, and even Earth's crust. The second most common element is helium (He), which is found in more places than just balloons. Helium makes up about 24% of matter and is found under Earth's crust. This means that the rest of the elements are much less common and make up only about 1% of matter.

It is not just on Earth that these elements are found but throughout the universe. Elements are in our atmosphere and on other planets.



Ca is the symbol for calcium. C is used for carbon.



Hydrogen and helium make up the majority of elements on Earth and in the universe.

The Mystery of Science: Chemistry

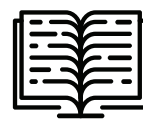
Matter on Mars or in stars comes from the same elements as matter on Earth. Jupiter is made up mainly of hydrogen and helium. Uranus, which is also known as an ice giant, has massive amounts of frozen water, which is made of hydrogen and oxygen. God created these unique building blocks that make up all matter in our universe.



Jupiter is a planet made mostly of hydrogen and helium. If you managed to visit, you would find no ground to walk on.

Just like an element is pure, the way elements combine can be pure. A **pure substance** is made of only one element; its composition is the same throughout. Nitrogen gas is a good example; it's made of only one element—nitrogen. Just like our example earlier, pure gold has nothing else mixed with it.

All matter in the universe is made up of these elements. Our God is a god of order and design, so it's no surprise that He created the smallest parts of everything with order and design as well!



VOCABULARY

element
periodic table of the elements
symbol
pure substance



SCRIPTURE MEMORY

Colossians 1:16: "For by Him all things were created, both in the heavens and on earth, visible and invisible, whether thrones, or dominions, or rulers, or authorities—all things have been created through Him and for Him."

LESSON 6

Nitrogen
14.007

P
Phosphorus
30.974

As
Arsenic
74.922

Sb
Antimony
121.76

Bi
Bismuth
208.98

Mc
Moscovium
288.10

16

34

52

T
Tellurium
127.6

84

Po
Polonium
209

116

32

CREATION CORNER

SILVER

Did you know that nothing rhymes with the word *silver*? There are also scientific things that make silver a unique metal on the periodic table. It is very lustrous and malleable, which means that it can easily be bent into beautiful jewelry and tableware. Silver was one of the first metals to be discovered and the first metal to be used in currency; the United States minted the silver dollar in 1794. It is a better conductor of electricity than gold and copper. But perhaps the most interesting fact about silver is its germ-fighting qualities. A cup or spoon made of silver can kill microbes, fungi, or viruses. The phrase “born with a silver spoon in his mouth” usually refers to a baby born into a wealthy family; however, many people also think it can refer to the health of a baby because of the silver in the spoon. The ancient Greeks used it for stomach pain or to heal wounds. Now silver can be used to purify water or be made into an antiseptic. Even more fascinating is that bacteria don’t become resistant to silver like they do with antibiotics.



The Mystery of Science: Chemistry

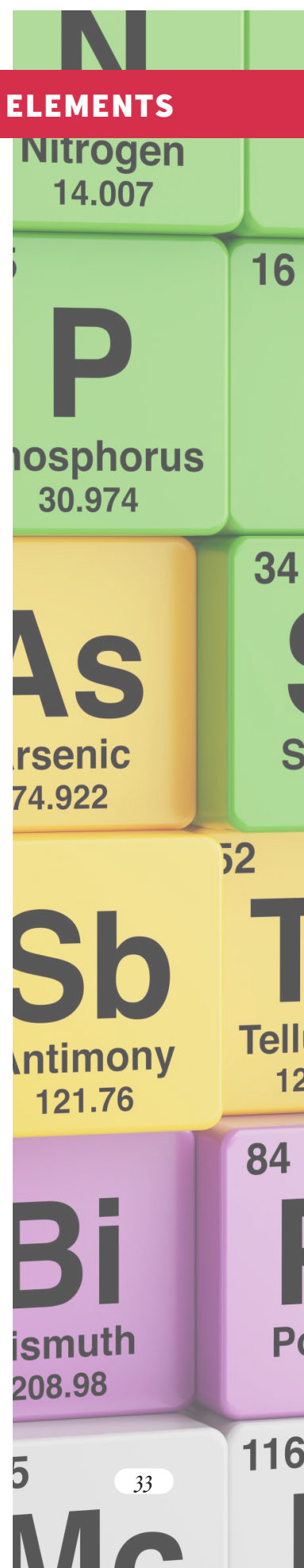
MEET THE CHEMIST

STEPHANIE KWOLEK (1923–2014)

When you see a police officer on duty, you will usually notice that he is wearing a bulletproof vest to protect his torso from life-threatening weapons. That body armor is made from Kevlar, a material developed by American chemist Stephanie Kwolek. Kwolek grew up studying nature with her father and learning sewing with her mother. She was an avid reader and found it very easy to memorize information. As a chemist, she worked at a DuPont research laboratory, developing a compound called poly-paraphenylene terephthalamide. Although Kwolek was originally trying to find a material to make tires stronger, her studies demonstrated that the stiff material had incredible strength—enough to stop a bullet. It is stronger than steel and doesn't rust. In addition to the Kevlar that makes bulletproof vests, the compound is used in helmets, tires, ropes, cables, and space equipment. Kwolek won numerous awards for her research, including induction into the National Inventors Hall of Fame. More importantly, her invention has saved thousands of lives.



Unit 2: Elements, Atoms, and the Periodic Table



See the lesson come together.

The Mystery of Science: Chemistry

Lab Manual - Lesson 6

Elementary Elements

The following pages show the matching Lab Manual lesson. Use this preview alongside the Student Reader pages to see how the weekly plan, activities, and reviews fit together.

Prefer a printed Lab Manual?

Choose the Reader-and-Manual set, or add a Printed Lab Manual separately. The Student Reader also includes access to the printable digital Lab Manual.

[Explore the Chemistry Curriculum](#)

Lesson 6: Elementary Elements

Goal: To identify elements as the purest form of matter and understand their organization on the periodic table.

Materials Needed

- ☐ 3 x 5 lined index cards
- ☐ rubber band

Suggested Daily Guide

Day 1:

- Read through the “Define It” and “Write It” questions.
- Read the lesson in your *Student Reader*.
- Work on Scripture memory.

Day 2:

- Read through the lesson again.
- Write the definitions or say them out loud.
- Complete the “Write It” section.
- Work on Scripture memory.

Day 3:

- Complete the “Apply It” section.
- Work on Scripture memory.
- Record the chemist’s information in Appendix B.

Day 4:

- Complete the “Research It” section.
- Work on Scripture memory.
- Complete the “Review It” section.

Scripture Memory

Colossians 1:16: “For by Him all things were created, both in the heavens and on earth, visible and invisible, whether thrones, or dominions, or rulers, or authorities—all things have been created through Him and for Him.”

Student Notes

Define It

1. element: _____

2. periodic table of the elements: _____

3. symbol: _____

4. pure substance: _____

Write It

1. When matter is made of one or more of the same kind of atoms, it is called a _____.
2. Some symbols come from an element's _____ name.
3. There are about _____ naturally occurring elements.
4. An element is the purest form of _____ that exists.
5. _____ made each of the naturally occurring elements.

Apply It

Making Element Cards

You have already read about 6 elements on the periodic table in your Creation Corners, and you will be learning about more as we progress. By recording information about elements on index cards, you can expand your knowledge of chemistry and develop a database about each element. By the time you finish this chemistry course, you'll have made an element card for each Creation Corner.

Materials Needed

- ☐ 3 x 5 lined index cards
- ☐ rubber band

Instructions

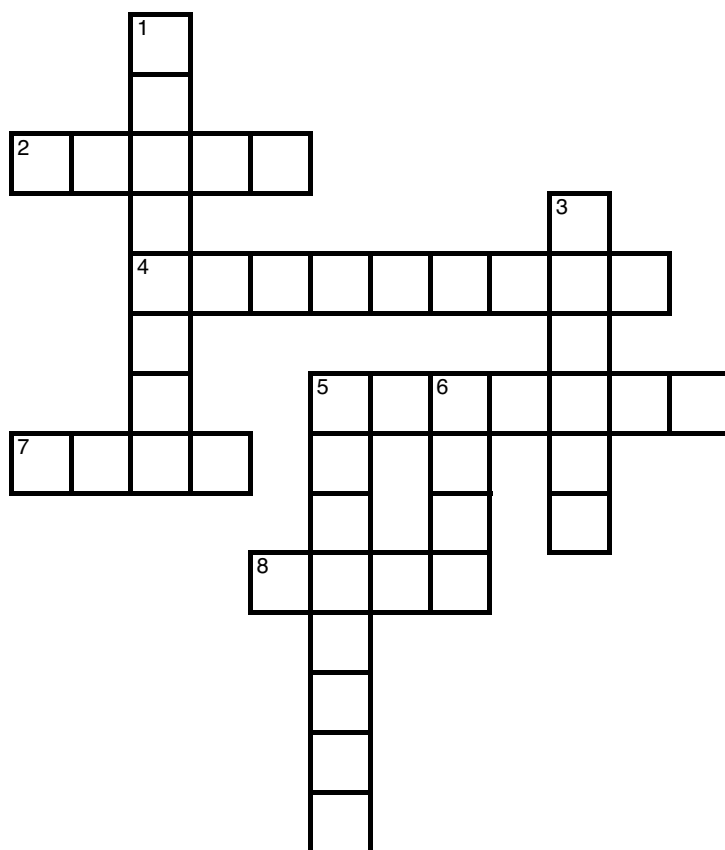
1. Prepare element cards for each element we have covered in the Creation Corners for lessons 1–6.
2. On the unlined side of an index card, write the name of the element at the top. Use the periodic table in Appendix B to find the symbol for that element and write it in the center of the card in large letters. Toward the bottom of the card, record the atomic number and atomic mass, which we will be studying later.
3. On the back of each card, write down the element's physical and chemical properties and interesting facts.
4. If you've also learned something about an element from another book or source, write that information on your card as well.
5. Store your cards in a card box or bind them with a rubber band. Keep them handy as you read the lessons and update them when you learn new information about an element.

Research It

Astronauts fly into space on special missions to collect information and study the stars and planets. How many astronauts do you think are chemists? You might be surprised. *With parental guidance*, you can use the internet to search for the words *astronaut* and *chemist* to find out more.

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Review It



Across

2. Symbol Rn
4. Last on periodic table
5. Symbol Ca
7. Atomic number 30
8. Symbol Au

Down

1. First on periodic table
3. Atomic number 11
5. A type of bleach
6. Symbol Pb

Less time preparing. More time discovering.

If this lesson sparked curiosity, keep it growing. The full Chemistry course gives you a plan to follow so science can become a regular part of your homeschool week.

Continue with Chemistry

32 colorful lessons to keep discovery going. The Student Reader includes access to the printable digital Lab Manual.

The Lab Manual organizes your weekly plan, activities, and reviews. A Printed Lab Manual is available separately or as part of the set.

1 Choose your course

Choose Chemistry for your next science course.

2 Follow the plan

Use the weekly guide and gather lab materials.

3 Discover together

Help your child explore God's creation.

Explore the Chemistry Curriculum

Printable Lab Manual access included with the Reader. Printed manual optional.
Experiment supplies not included.

Still deciding? Keep learning with Karri.

Join Teaching the Curiosities of Creation for practical ideas each month to teach science with more confidence, curiosity, and less preparation.

Get monthly teaching ideas at themysteryofscience.com

Created by Karri Iverson, homeschool mom of five and science educator.