

How and Why God Created “Things”



The Study of Chemistry



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Why and How God Created “Things”

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INTRODUCTION

In physiology, you studied how and why God created your body. You learned that our bodies are composed of trillions of cells which act on their own, performing the assigned tasks given to them by the Creator.

You also learned that cells are actually self-contained kingdoms. Cells contain many different substances which perform their assigned duties for the benefit of the cell, which benefits the whole body.

In chemistry, you will be learning about tasks and assignments that the Creator has given the elements in what scientists call *non-living matter*. Scientists study how the elements work together in non-living matter, and they call these interactive relationships *compounds*.

The study of these compounds of chemistry is unique because it focuses more on HOW the various elements react with each other, rather than WHY they do. Each time this manual is studied, the "why's" will become clearer to you. And you will discover how incredibly intelligent the components of these compounds are as they work together in harmony.

Memorizing The Thirty Basic Elements

To help facilitate the study of chemistry, scientists have attempted to assign a name to each individual element. There are THIRTY basic elements which are most often used and referred to in the study of chemistry. Even though there are more than a hundred elements altogether, and even though more are being discovered all the time, these basic thirty and the more common ones, and those that will be used in this guidebook. Memorizing these 30 elements will give you a basic understanding without becoming too overwhelmed with the principles of chemistry.

You will also want to memorize the ten main divisions of this book. Having these general subjects in your mind will help you "get the over-all picture" of chemistry before you begin your in-depth discovery of the many exciting intricacies of the elements.

In addition, you are encouraged to do *research projects* on each of the vocabulary words listed in the ten main sections. Write about each vocabulary word; define them, understand them, and illustrate them. Since elements are nearly invisible, sometimes you will need to use your imagination with your illustrations, but you can refer to various reference books such as encyclopedias, as well as the internet, to do your research. Each year, the vocabulary words in each section can be researched more thoroughly.

At the back of this book is a list of excellent resources that will help you in your research. To get the answers for "why" things were created, you will want to search in religious books (including the article in the appendix "Who Was This Jesus – Creator of the Universe?") as well as your personal scriptures, which contain the Creator's own explanations. Now let's get started!

A Step-by-Step Procedure on How to Write Your Science Book

I. PREPARATION

a. Use a 3-ring binder.

- 1) The binder should have a clear slip-in pocket on the front.
- 2) You will need to have lined paper and plain paper placed inside (about 50 sheets of each kind)

b. Design a cover that illustrates the subject you are studying.

- 1) Make your cover colorful and artistic. You can use colored pencils, markers, or crayons. You could also use colored paper.
- 2) Write the title of your book as well as your full name somewhere on the cover design.
- 3) Slip the completed cover inside the front outside pocket.

c. Find references about your subject—books, encyclopedias, the internet.

- 1) The books should have lots of pictures as well as good information (don't forget library books).
- 2) Keep track of the names of each of the books and the internet links that you use.
- 3) A page called a "bibliography" lists all your references, to give your research credibility. Write the word "Bibliography" at the top of one page. Neatly write the title and the author of each of the books you use, as well as the internet links and web pages. Keep the bibliography in the inside pocket of your notebook, because you will probably be using many different sources during the year, and you can add them to the bibliography list.

d. Use the Kimber Academy science book as your guide.

- 1) First, read and study the introductory material.
- 2) Second, do the work pages in the introductory material and place them inside your notebook.
- 3) Third, do at least 3 of the suggested Learning Exercises from the introductory material.
- 4) *Fourth*, begin your research on all of the vocabulary words, following these SEVEN steps for each vocabulary word:
 - a) WRITE the vocabulary word at the top of a new page (lined paper). Watch your spelling!
 - b) DEFINE the vocabulary word, writing the definition below the word *using your best cursive writing*.
 - c) DESCRIBE the vocabulary word in a paragraph or two, explaining what the vocabulary word is. You will use your references to research this information. Again, be careful to spell each word correctly and write the paragraph accurately.
 - d) SEARCH THE SCRIPTURES for this word or its related category and

write down at least *one* scripture where it is mentioned. Write the whole verse plus the reference-in cursive.

Note: If no scripture was found, write, "I could find no scripture about this vocabulary word."

- e) DRAW a picture of the vocabulary word on a piece of plain paper.
- f) COLOR your drawing, and LABEL it (labels can be printed).
- g) DO all the work pages in the Kimber Academy science book contained in each section and include them in your own book. (Make copies if you wish.)

II. CHOOSE at least THREE of the Learning Exercises suggested in each section, and do them in your book, with your class, or at home.

III. SECTION TWO- Answer the Question "WHY?"

- a. This is the most important part of your science book. Let the Spirit guide you as you write this section. To answer the question of why Heavenly Father created the science subject you are studying, you will need to use the scriptures to find the answers.
- b. For Chemistry, look up words in the Topical Guide such as: rock, rust, creation, earth, world, water, air, fire, heat, intelligence, element, matter, etc.
- c. Conclude this section of your science book with your personal testimony of "How and Why God Created Things."
- d. Do the "Review to Check Your Knowledge." Once you have completed the questions and illustrations in the review, place these review pages in the back of your science book.

IV. COMPLETING YOUR SCIENCE BOOK

- a. Assemble all your pages, placing them in order according to the list of vocabulary words in the Kimber Academy science book.
- b. Take out all unused paper from your 3-ring binder.
- c. Make sure the illustrations of each particular vocabulary word are placed immediately after each written page. Illustrations can be placed in sheet protectors if you wish.
- d. If desired, number each page and make a table of contents. This is optional.
- e. Place the bibliography in the back of your book.
- f. Double-check to make sure your book is in order.

Now you have a great and wonderful personal teaching tool to use for your own children some day!

The Ten Divisions of Chemistry

#1--Properties of Matter

#2--Physics of Matter

#3--Classes of Matter

4--State of Solids

5--State of Liquids

6--State of Gases

7--Combinations of Matter

8--Chemistry in the Atmosphere

9--The Study of Light

#10--The Study of Energy

The Ten Divisions of Chemistry and Their 33 Vocabulary Words

#1—Properties of Matter.....	Elements Mass Odor Color
#2--Physics of Matter.....	Molecule Kinetic Inertia Potential Gravity
3--Classes of Matter.....	Solid Liquid Gas
4—State of Solids	Organic Metallic
5--State of Solids.....	Temperature Volume Evaporation

Ten Divisions of Chemistry and Vocabulary Words- Cont'd

6—State of Gases.....	Density Pressure Distillation Condensation
7--Combinations of Matter.....	Solvent Solution Concentrate Compound Mixture
8—Chemistry in the Atmosphere.....	Troposphere Stratosphere Ionosphere
9—The Study of Light.....	Solar Light Waves
10—The Study of Energy.....	Magnetism Power

*The Ten Divisions of Chemistry
the 33 Vocabulary Words
and Related Characteristics*

#1—Properties of Matter.....Elements

Atomic Radius

Ionization Energy

Electron Affinity

Electronegativity

Metallic Character

Mass

Weight

Dimensions

Volume

Density

Penetrability

Elasticity

Odor

Color

#2--Physics of Matter..... Molecule

Kinetic

Inertia

Potential

Gravity

3--Classes of Matter..... Solid

Liquid

Gas

4—State of Solids	Organic <i>Carbon</i> Metallic <i>Vitreous</i> <i>Crystalline</i> <i>Alkali</i> <i>Alloy</i> <i>Fusion</i>
5--State of Solids.....	Temperature <i>Fahrenheit</i> <i>Centigrade</i> Volume <i>Shape</i> <i>Weight</i> Evaporation <i>Surface Tension</i>
6—State of Gases.....	Density Pressure Distillation Condensation
7--Combinations of Matter.....	Solvent <i>Electrolyte</i> <i>Dissolve</i> Solution Concentrate Compound Mixture

- 8—Chemistry in the Atmosphere..... Troposphere
Air
Weather
Altitude
Humidity
Combustion
 Stratosphere
Ozone Layer
 Ionosphere
Aurora borealis
Radiation
- 9—The Study of Light..... Solar
Sun
Light-year
Candle power
Shadow
 Light Waves
 Reflection
 Refraction
 Concave
 Convex
 Electromagnetic Waves
- 10—The Study of Energy..... Magnetism
 Negative
 Positive
 Power
 Friction
 Wind
 Water
 Atomic
 Nuclear

Periodic Table of the Elements

Atomic Number	Symbol	Name	Atomic Mass
1	H	Hydrogen	1.008
2	He	Helium	4.003
3	Li	Lithium	6.941
4	Be	Beryllium	9.012
5	B	Boron	10.811
6	C	Carbon	12.011
7	N	Nitrogen	14.007
8	O	Oxygen	15.999
9	F	Fluorine	18.998
10	Ne	Neon	20.180
11	Na	Sodium	22.990
12	Mg	Magnesium	24.305
13	Al	Aluminum	26.982
14	Si	Silicon	28.086
15	P	Phosphorus	30.974
16	S	Sulfur	32.066
17	Cl	Chlorine	35.453
18	Ar	Argon	39.948
19	K	Potassium	39.098
20	Ca	Calcium	40.078
21	Sc	Scandium	44.956
22	Ti	Titanium	47.88
23	V	Vanadium	50.942
24	Cr	Chromium	51.996
25	Mn	Manganese	54.938
26	Fe	Iron	55.845
27	Co	Cobalt	58.933
28	Ni	Nickel	58.693
29	Cu	Copper	63.546
30	Zn	Zinc	65.38
31	Ga	Gallium	69.723
32	Ge	Germanium	72.631
33	As	Arsenic	74.922
34	Se	Selenium	78.971
35	Br	Bromine	79.904
36	Kr	Krypton	84.798
37	Rb	Rubidium	85.468
38	Sr	Strontium	87.62
39	Y	Yttrium	88.906
40	Zr	Zirconium	91.224
41	Nb	Niobium	92.906
42	Mo	Molybdenum	95.95
43	Tc	Technetium	98.907
44	Ru	Ruthenium	101.07
45	Rh	Rhodium	102.906
46	Pd	Palladium	106.42
47	Ag	Silver	107.868
48	Cd	Cadmium	112.414
49	In	Indium	114.818
50	Sn	Tin	118.711
51	Sb	Antimony	121.760
52	Te	Tellurium	127.6
53	I	Iodine	126.904
54	Xe	Xenon	131.294
55	Cs	Cesium	132.905
56	Ba	Barium	137.328
57-71	Lanthanide Series		
57	La	Lanthanum	138.905
58	Ce	Cerium	140.116
59	Pr	Praseodymium	140.908
60	Nd	Neodymium	144.243
61	Pm	Promethium	144.913
62	Sm	Samarium	150.36
63	Eu	Europium	151.964
64	Gd	Gadolinium	157.25
65	Tb	Terbium	158.925
66	Dy	Dysprosium	162.500
67	Ho	Holmium	164.930
68	Er	Erbium	167.259
69	Tm	Thulium	168.934
70	Yb	Ytterbium	173.055
71	Lu	Lutetium	174.967
72	Hf	Hafnium	178.49
73	Ta	Tantalum	180.948
74	W	Tungsten	183.85
75	Re	Rhenium	186.207
76	Os	Osmium	190.23
77	Ir	Iridium	192.22
78	Pt	Platinum	195.08
79	Au	Gold	196.967
80	Hg	Mercury	200.59
81	Tl	Thallium	204.383
82	Pb	Lead	207.2
83	Bi	Bismuth	208.980
84	Po	Polonium	[209]
85	At	Astatine	[209]
86	Rn	Radon	222.018
87	Fr	Francium	223.020
88	Ra	Radium	226.025
89-103	Actinide Series		
89	Ac	Actinium	227.028
90	Th	Thorium	232.038
91	Pa	Protactinium	231.036
92	U	Uranium	238.029
93	Np	Neptunium	237.048
94	Pu	Plutonium	244.064
95	Am	Americium	243.061
96	Cm	Curium	247.070
97	Bk	Berkelium	247.070
98	Cf	Californium	251.080
99	Es	Einsteinium	[254]
100	Fm	Fermium	257.095
101	Md	Mendelevium	258.1
102	No	Nobelium	259.101
103	Lr	Lawrencium	[262]
104	Rf	Rutherfordium	[261]
105	Db	Dubnium	[262]
106	Sg	Seaborgium	[266]
107	Bh	Bohrium	[264]
108	Hs	Hassium	[269]
109	Mt	Meitnerium	[268]
110	Ds	Darmstadtium	[278]
111	Rg	Roentgenium	[280]
112	Cn	Copernicium	[285]
113	Nh	Nihonium	[286]
114	Fl	Flerovium	[289]
115	Mc	Moscovium	[289]
116	Lv	Livermorium	[293]
117	Ts	Tennessee	[294]
118	Og	Oganesson	[294]

THE TWO COMPONENTS OF ALL MATTER

Chemistry of the Universe--Its Two Components

All things are made up of two major components: SPIRIT MATTER and TEMPORAL MATTER.

Have you ever thought about these two components? What are they? In the New Testament, Paul told the Corinthians: "...for the things which are seen are temporal; but the things which are not seen are eternal [spiritual]." (2 Cor. 4:18)

In other scriptures, we read how God is constantly organizing, re-organizing and sometimes disorganizing spirit matter and temporal matter. This is the pattern of *everything that exists*.

The best example of how God organized elements is in Genesis Chapter 1, where it is recorded that He created the sun, the moon, the earth, and everything on it. The first book of John also talks about the "Word" being in the beginning with God who organized the heavens and the earth..

The scriptures also contain many times when God reorganized elements. For example:

- In Exodus 14:13-31 you can read how the elements in water were commanded, and they obeyed.
- Jesus also reorganized water in the New Testament. Read John 2:1-11.
- Do you remember the prophet Elijah? He commanded the atmosphere to dry up for "years" to cause a terrible famine in the land. You can read what happened in 1 Kings 17:1-7.
- Do you think it is possible for wet stones to be consumed by fire? You can read about this miraculous occurrence in 1 Kings, Chapter 18, verses 21-39.
- Many people wish they had more time, and that a special day would last a little longer. But to lengthen out the day, the earth would have to stop turning. Is that possible? It appears that God allowed the prophet Joshua to command the earth to do just that! Read Joshua 10:12-14.

God is constantly disorganizing elements, too. He will often cause earthquakes, floods, famine, tornadoes, pestilences and other "natural disasters" as reminders to His children on earth that He is in charge of ALL the elements.

Have you ever wondered how God's prophets could command the elements and have them obey? If elements obey God, does it not seem reasonable that they have some kind of intelligence? How else could water, mountains, fire, the sun and moon "obey" when God and His prophets commanded them? It's something to think about.

You may be interested in reading the article in the Appendix called "Building Blocks of the Universe."

COMPONENT #1

SPIRIT MATTER

Spirit Matter exists, but it cannot be seen by the natural eye.

Spirit matter exists in a different dimension than we now live, yet it is an integral part of everything we come in contact with on earth. As Paul said, we cannot see it. We have, however, already discovered some components of spirit matter:

- It was organized by God (see Ecclesiastes 12:7)
- It recognizes God's command (see Psalms 148:4-5)
- It is willing to obey God's command (see Matthew 26:41)
- It acts on God's command (see Genesis 1:2 &3)

The following suggested activities will help you discover more about spirit matter.

Suggested Ideas for Learning More About Spirit Matter

1. Spirit matter cannot be seen by man's natural eyes, but it can often be felt. There are also scientific components on the earth which cannot be seen--but which can be felt. Air is one example of this, as is gravity. Make a list of other components of matter in science which can be felt but not seen. Choose one from your list and do a research report about it.
2. Chemical energy is another force that cannot be seen by the natural eye but can definitely be felt. Energy is felt as a chemical change. In our bodies, different chemical energies cause us to have what we call "emotions" -- such as happiness, sadness, anger, pain, excitement, fear or joy. In your notebook, describe what happens to your body, as well as your perception of the world around you, when you "feel" some of these invisible chemical reactions inside you--(choose at least two).
3. Read the following scriptures. Then summarize in outline form your discoveries about spirit matter.
John 1.:1-4 and verse 14.
Jeremiah 1:5.
Job 32:8
Genesis 2:4-5
4. In today's world, God is often ignored. It seems that many people set themselves up to be "gods" over their own destinies, the destinies of others, and even the destiny of nature. God has something to say to us about this philosophy. From the Bible, read and ponder Job 36:5-16 and 26-33 and also Job Chapter 37. Then write a paragraph or two explaining

what all this has to do with the spiritual functions of matter in *chemistry*.

Could Neutrinos be Spirit Matter?

Do you know what a neutrino is? No, it is not a neutron. It's not a proton. It's not an electron. It's not an atom, either. A neutrino is much smaller than an atom! Here is what scientists are saying about neutrinos:

"Neutrinos are really pretty strange particles..." says John Conway, a professor of physics at University of California, Davis. "They're almost nothing at all, because they have almost no mass and no electric charge...They're just little wisps of almost nothing." Ghost particles, they're often called.

But they are one of the universe's essential ingredients, and they've played a role in helping scientists understand some of the most fundamental questions in physics.

For example, if you hold your hand toward the sunlight for one second, about a billion neutrinos from the sun will pass through it, says Dan Hooper, a scientist at Fermi National Accelerator Laboratory and an associate professor of astronomy and astrophysics at the University of Chicago. This is because they're shot out as a byproduct of nuclear fusion from the sun – that's the same process that produces sunlight.

"They're important to our understanding of the kind of processes that go on in the sun, and also an important building block for the blueprint of nature," Hooper said.

<https://www.pbs.org/newshour/science/what-is-a-neutrino-and-why-should-anyone-but-a-particle-physicist-care>

Have you read the article in the Appendix called "Building Blocks of the Universe?" Maybe it's all about how neutrinos act and are acted upon. Maybe neutrinos are "intelligences!"

Suggested Ideas for Learning More about Spirit Matter

1. Research the properties and discoveries of neutrinos. If you can find illustrated evidence of neutrinos, draw it in your chemistry book.
2. Research "dark matter" and write your findings. Can dark matter be illustrated?
3. Research "dark energy." Why is it called "dark?" write your discoveries in your notebook.
4. What is a "quark?" Define a quark and illustrate one if possible. What does it do?

COMPONENT #2

TEMPORAL MATTER

Temporal matter can be defined as something that takes up space and has weight.

As you already know, all matter is made up of tiny atoms. Atoms have actually been analyzed for centuries. Our Father in Heaven, who is Creator of all things, has revealed to scientists the ability to organize, re-organize and even dis-organized atoms. When scientists observe the fantastic power within these atoms, they begin to understand the Greater Power who created them in the first place. Sincere scientists study these little entities called atoms with ever-growing awe that approaches reverence.

Because all temporal matter is made up of atoms, you may want to do the following learning exercises to learn more about them.

Suggested Ideas for Learning More About Temporal Matter

1. In your chemistry notebook draw an atom. Show the nucleus, electron, proton and neutron.
2. Draw the atoms of these chemicals in your notebook: 1) Hydrogen, 2) Helium, 3) Oxygen. Explain how they are different from each other.
3. Research the positive and negative charges of the electrons in atoms. Write your findings.
4. Do a research project on the "splitting" of the atom and illustrate your discoveries.
5. Many scientists and chemists have contributed to the world's knowledge of the workings of matter. Studying the lives of these scientists gives a good background to your own knowledge of how God can "reveal" His scientific truths to man.
 - a. Write a short biography on Robert Boyle. Draw a portrait of him as part of your research. In your report, include all the contributions and discoveries he made in the field of chemistry.
 - b. Do a research report about the Curie family and their discoveries. Sketch a portrait of one of the Curie family in your notebook.
 - c. Do a research report on Lavoisier, who has been called the "father of modern chemistry." Briefly outline his life and list his main contributions to and discoveries in the field of chemistry. Include a sketch of Lavoisier in your notebook.
 - d. Research the life of Albert Einstein and his contributions to science. Explain his formula for how matter and energy are related.

1. Chemists use certain tools to help them analyze and experiments. Find pictures of each of the following tools, draw each, and write its function in your notebook.
 - a. test tube
 - b. litmus paper
 - c. dropper bottles
 - b. centrifuge
 - c. boiling flask
 - d. receiving flask
 - e. thermometer
 - f. Bunsen burner
 - g. graduated cylinders
 - h. beakers
 - i. pipettes
 - j. mortar and pestle
 - k. ring stand
 - l. crucible

2. Do a research project on microscopes, answering these questions:
 - a. Who invented the first microscope?
 - b. When was it invented?
 - c. How did it develop into what we have today?
 - d. How are chemists able to isolate various elements under a microscope?
 - e. What are the different types of microscopes?

Activity Pages

*You can use these pages to do the activities,
or you can copy them for your notebook,
or you can create your own.*

Draw a basic atom in the box below.

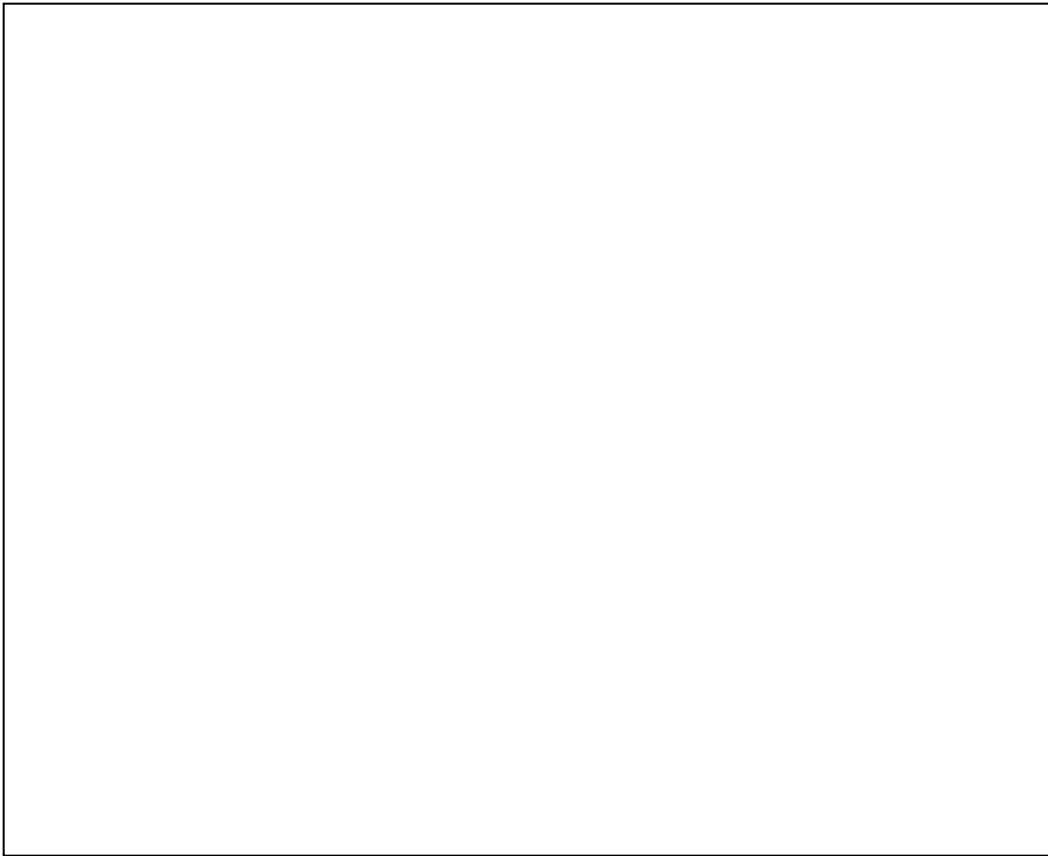
Label each main part:

nucleus

electron

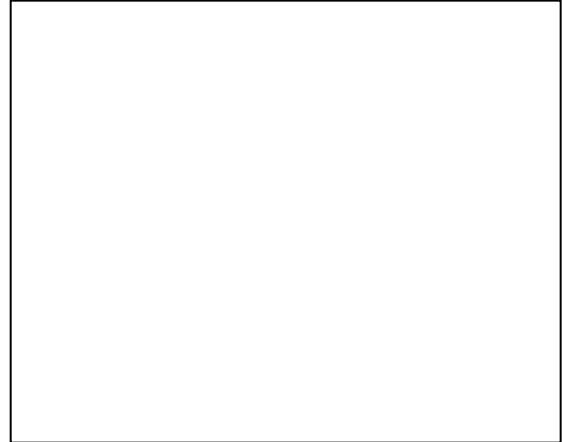
proton

neutron



Draw each of the atoms below and write your observations about their differences.

Hydrogen Atom:



Helium Atom:



Oxygen Atom:

