CODES IN SCIENCE **LESSON 1 CHEMISTRY**

MATTER: WATER

Ready Answer

Lesson #: Vol 1 Lesson 1a - **Level 2**
MATTER: Water
Devotion 1: Genesis 1:1-3 In the Beginning, God…



Detective Challenge:
Searching for "what happened and how?" almost always ends with a "who done it?" Whose fingerprints, DNA, or motives give them away? Science is a cause/effect investigation. In most instances, the effect is what can be observed

1) **EFFECT**: What happened?
2) **CAUSE**: Who or what caused it?

Answer these questions above. How can we know #2, Who or what caused our "beginnings?"

INSTRUCTIONS:
1. Complete Lab Explorations Level 1
2. Challenge – Review and/or complete Level 3
3. Apply what you learn in the lab

FOUNDATIONS

GENESIS 1:1-2[1]*In the beginning, God created the heavens and the earth.* [2]*And the earth was without form, and void; darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters.*

Detectives investigate. They search for evidence and they analyze what they find. This process is called science or forensic science. Our challenge is to use a similar method to explore creation.

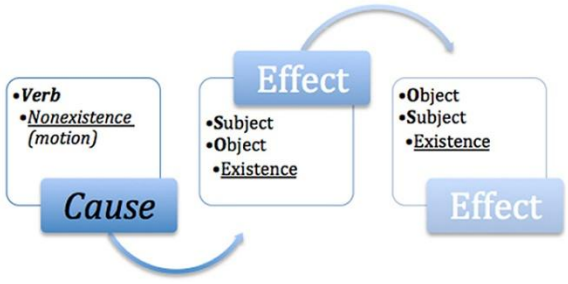
Science tells us, our world had a beginning! But what it doesn't tell us is, "Who *done* it?" We can examine loads of evidence from creation, but we can't observe the "event" of creation or WHO was the cause because it happened in the past.

The Bible tells us WHO created the heavens and the earth in verse 1. In verse 2-3, the Bible tells us HOW! It also describes the scene the way a detective would. If you were a detective and you had an eyewitness who could tell you – WHO did it and HOW – your investigation would be finished.

Science attempts to answers all these questions about creation without using the eyewitness account (the Bible). Scientists guess/theorize what happened: HOW was it done? WHAT CAUSED it? What EFFECTS left evidence behind? The EVIDENCE for a creation event is the universe itself (nature/the universe).

The **Law of Causality** says, "Every effect has a cause." The universe HAS A CAUSE (it wasn't here in the beginning).

So, is there evidence for God? This is the goal of your mission – know the evidence and choose "WHO" done it? As a Christian, you have an additional resource, the Bible.



APOLOGETICS

2 COR 10:5 We demolish arguments and every pretense that sets itself up against the knowledge of God, and we take captive every thought to make it obedient to Christ.



Science Codes

1. Memorize the Law of Causality.
2. Practice SEEKING OUT – finding resources & knowledge – to analyze evidence.
3. Experiment/test the ideas, reasoning, or hypotheses you or others make to discover ANSWERS.

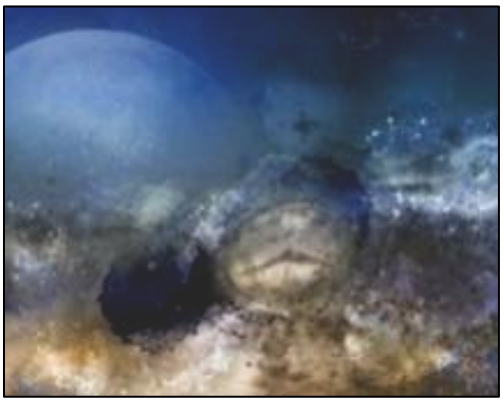
Apologetics is a reasoned defense or explanation of the Christian faith. It's based on the Latin word *apologia* – a word used to describe a legal defense like an accused person would need in court. 1 Peter 3:15 tells us to always be ready to give an answer for our faith. Often, we'll need

1. **CREATED:** Verse 1 is considered an introduction to the 6-days of Creation – the topic sentence which summarizes the "rest of the story." The verb, created, indicates action/energy was used. The Hebrew word "bara" meaning a NEW CREATION suggests it never existed before or it was created "out of nothing."
Look up the Latin expression *ex nihilo* & define:

_____ _____ _____

2. **FORMLESS:** Based on verses 1 & 2, would you assume that the earth was destroyed and recreated, or that verse 2 is simply telling us how God formed the earth?

3. **MOVED UPON:** Truth and insights were wrapped in these 2 verses. Science reveals 2 primary essentials are needed to build any substance. These are form and energy. Without them, there is only emptiness – a void. Is it coincidence that both are included in these verses? Y / N



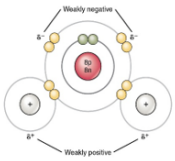
Science is a CAUSE/EFFECT investigation, but only God can tell us **why** water exists or **how** it was created. The same is true for all MATTER. What caused it to exist IN THE BEGINNING is completely unknown to science even though science explores CAUSE/EFFECT relationships!

Why is it important to THANK God for Creation?
Doing science should lead us to give thanks to God for our ability to think, explore, and know. We "ought-to" THANK HIM for both our ability to reason and for all the resources He made for us! When we accept the false IDEA that nature could create itself, we fail to PRAISE our LORD for the work of His hands.

If you conduct an investigation, then accuse the wrong person of a crime, the wrong person will be punished. That's not justice. The opposite is true too. If you give credit for something good to the wrong person, that person is rewarded for something they did not do and someone else is robbed of their reward. Again, that's not justice. We should never "rob" God of the praise He is due by thinking nature does anything entirely by itself. People and animals have amazing abilities, incredible design, and unimaginable complexity. These fine-tuned, don't just happen!

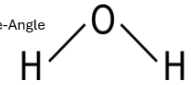
MATTER – What was created?

ATOMIC STRUCTURES USED IN CHEMISTRY (WATER)
Find Examples of These in Your Lab



1. **Structural Formulas** - 2-D atom drawings, shells, electrons and bonding (note **2 electrons** complete the inner shell, **8 electrons** fill the outer shell)
Both oxygen & hydrogen have filled their outer shells.

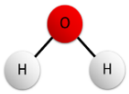
2. **Skeletal Formulas** (Line-Angle Formula) - the standard in organic chemistry.



3. Lewis **Structures** H : O : H - Dots and Element Symbols

Lewis structure

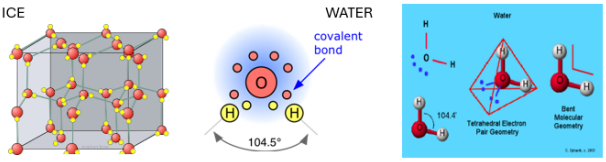
4. **Ball & Stick Models** – 3-D models use spheres for atoms, sticks for bonds





5. **Space-Filling Models** – Fused spheres (no space)

6. **Perspective Drawings** – specialized 2-D models with projections/perspectives



These Photos by Unknown Author is licensed under CC BY-SA

Illustration #1

A water molecule is a pure substance made of 2 elements (a compound), hydrogen and oxygen. To illustrate molecular bonds, we often use atomic structure drawings (left). To review:

1. **ELEMENTS:** What two elements make water?
_____& _____

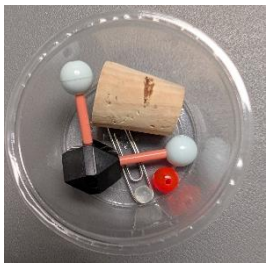
2. **MOLECULES**: How is a molecule different than a single atom?

3. Define a **COMPOUND:**

DRAW the STRUCTURAL FORM of a water molecule with the outer shell of electrons sharing 2 added electrons. Use a separate paper as needed.

LAB Supplies

USE these supplies to complete the following activities or conduct simple experiments.



Bonds are the positive & negative attractions that hold atoms together. Just as magnets have poles, atomic structures have polarity. The water molecule itself has polarity.

1. Based on the atomic structure models shown above, find a ball and stick model of a water molecule. Tear it apart and answer/draw the following:

HYDROGEN	OXYGEN	BONDS
1. What color is the H atom?	1. What color is the O atom?	1. How are the peach-color rods like a magnet?
2. Draw the H atom	2. Draw an O atom	2. What is the angle? _____°
3. How many H's?	3. How many O's?	3. How many bonds?