

What is Science? (Grades 6-8)

We hear a lot of talk about science in the news lately, but what is it? What is the scientific method? Should we *always* trust scientists? Please watch the video and then complete the following activities. Let's start with a definition:

“Science is the search for truth, the effort to understand the world.”

Linus Pauling (2-time Nobel Prize-winner) 1958, Dodd Mead, NY

Do you think this definition is accurate? Why or why not?

The Scientific Method (simplified)

Scientists use a three-step process when they conduct research. Read the steps below and determine the correct order. Write the correct number in the boxes next to each step.

- Accept, refine, alter, expand or reject hypothesis: based upon the test results, scientists and inventors accept, reject or change their hypothesis. It often takes several attempts to obtain the results the scientists want to achieve. This is especially true for creating new things.
- Develop hypothesis (idea): scientists develop an idea (hypothesis) to test. This could be something simple like confirming the presence of air or something really complicated like designing a new rocket.
- Test hypothesis by gathering data or experimenting: scientists test hypothesis by gathering information. This can be done by researching what others have discovered or conducting experiments. If we were building a new type of rocket, this step could include launching it.

Scientific terms

Scientists use certain terms to describe different aspects of science. How many terms can you find in the word search below?

W L F H E M N Y K J A W H Q V H M
N L W S X X P D C J T O I B T K Y
Q A O I F J W J M Q O B G W U Q B
G N G G D A E P Q F P Y S G B Z Q
M O O O L H J I S P M B V H S S E
S I W A Z F O S S I L S W P B H X
I T B I O S K Z I M I U A I F I P
S A I T I L X N K S B J C B C R E
E V R V Y D I S P R O C E S S X R
H R S X D L W Q I I X Y V U L F I
T E U I A N A A B A R M J I O T M
O S H L T E C H N O L O G Y Y M E
P B R B L Q B Z E Q W F H K Y H N
Y O H M R S Q H Y Z Q K J C A R T
H V G G M C T O O T A O X J U E A
V H I S T O R I C A L O U M G Q K
Y K R P V V N U A A E X N V N C J

Find the following terms:

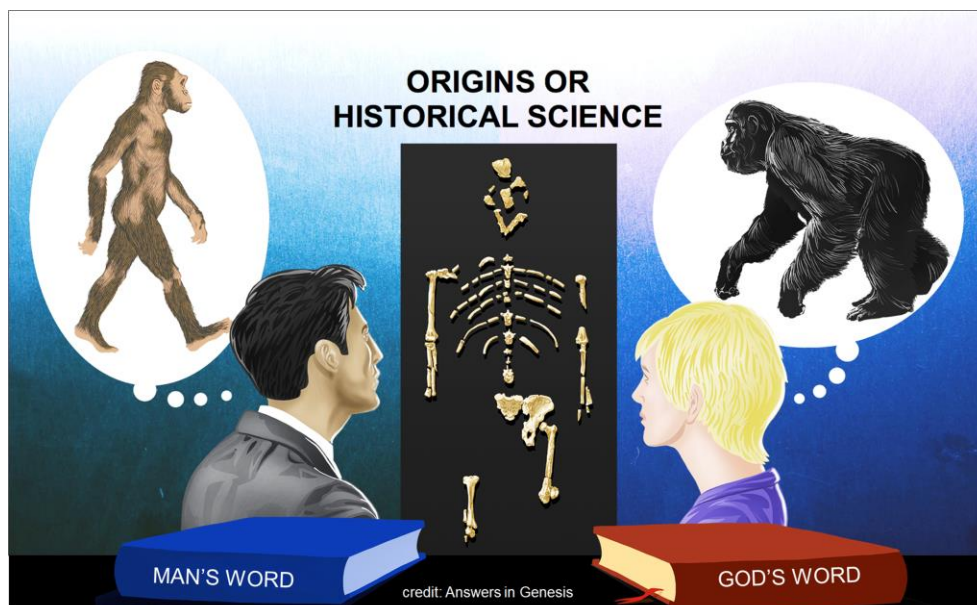
experiment fossils historical hypothesis law
observational process technology theory

Two types of science

Did you know that there are two types of science? The first type is **observational science**. Have you ever conducted an experiment in class or at home? That is observational science!

Observational science deals with the present—things that we can test. Scientists and inventors use testable, repeatable experiments to develop all kinds of cool things like smart phones, computers, medical equipment, cars, airplanes and spaceships.

The second type of science is **historical science**. This type of science deals with things that happened in the distant past. For example, scientists find fossils (the remains of something that lived long ago) and then develop ideas about the creatures that made them. The main problem with historical science is that we are not able to fully test many of the ideas. No one (except God) was there when these fossils were made. That is why scientists can look at the exact same fossils and come up with totally different ideas (see below).



Historical science can be very subjective. The worldview of the scientists has a big impact on how they interpret fossils like this one. For example, some secular scientists believe that ape men were real creatures (they were not).

The important thing to remember is that all science is not the same:

- Observational science uses testable, repeatable experiments to test and refine ideas.
- Historical science is often very subjective and many ideas are not testable because we cannot recreate many things that happened long ago.

Should we ALWAYS trust scientists?

Public school textbooks often feature scientists and say that we should trust them. Should we ALWAYS trust scientists? No, we should not. During the video we talked about some reasons why. Please choose the correct answers to the questions below.

1. Reasons we should not always trust scientists include:
 - a. Scientists are people and make mistakes
 - b. Some scientists do not believe in God
 - c. Some scientists are paid by organizations that are anti-God
 - d. All of the above

2. Scientific research and the published results are influenced by:
 - a. Peer pressure
 - b. Pride
 - c. The worldview of the scientists
 - d. Politics
 - e. Source of the funding
 - f. All of the above

During the video we covered four examples of mistakes made by secular scientists. How many can you remember? Please write your answers below.

1. _____
2. _____
3. _____
4. _____

The Bible says: “The fear of the Lord is the beginning of knowledge...” (Proverbs 1). We should always use God’s Word to test what people tell us! Luke commended the Berean Jews for testing what the Apostle Paul told them:

“Now the Berean Jews were of more noble character than those in Thessalonica, for they received the message with great eagerness and examined the Scriptures every day to see if what Paul said was true.” Acts 17:11

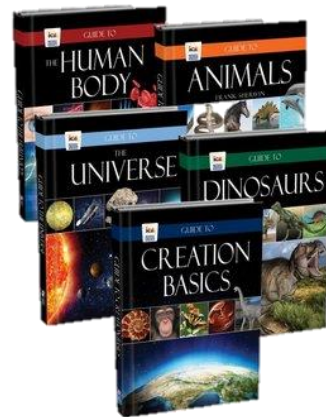
What about miracles?

Aren't miracles unscientific? Since miracles cannot be replicated through repeatable experiments, they are outside of the realm of science. However, that does not mean miracles do not happen! Since God created the universe and the laws of science, He is not bound by them. Occasionally God steps in and does miracles. Some examples:

- God created the universe and everything in it in just six days (Genesis chapter 1)
- God unleashed Ten Plagues upon Egypt (Exodus 7:14 to Exodus 12:30)
- God parted the Red Sea so that Moses and the Israelites could escape from the Egyptians (Exodus 14: 15-31)
- Jesus walked on water (Mathew 14: 22-34)
- Jesus healed people who were blind, deaf and unable to walk (John 9:1, Matthew 9:27, Luke 5:17)
- Jesus calmed a storm in the Sea of Galilee (Mark 4: 35-41)
- Jesus used a boy's lunch to feed over 5,000 people (Mathew 14: 13-21)
- Jesus rose from the dead after being crucified (Mathew 28, Mark 16, Luke 24, John 20)

Recommend resources

If you want to learn more about science (and I really hope you do!), here are some great books that were written by Bible-believing scientists at the Institute for Creation Research (ICR). You can purchase these books at: <https://store.icr.org/pack-science-for-kids-full-set.html>



Just for fun

Complete the Mentos Geyser experiment on the next page



*“For in six days the Lord made the heavens and the earth, the sea, and all that is in them, but he rested on the seventh day.”
Exodus 20:11*

Mentos Geyser Experiment

Please note: this experiment is going to make a huge mess and needs to be done outside!

What you will need:

- Three or four 2-liter bottles of soda (cola and diet cola work well)
- 3-4 packs of Mentos mint-flavored candy (fruit-flavored Mentos do not seem to work as well)
- Extreme Geyser Tube (see picture)
- Paper towels and a source of water for cleaning up



This reusable geyser kit may be purchased at Amazon for around \$10. It comes with three different nozzle caps and one roll of Mentos.

What to do:

Develop hypothesis

1. Look at the three different nozzle caps and create a hypothesis. What spray patterns do think each nozzle cap will create? Which cap will produce the highest eruption? Which cap do you think will produce the widest eruption? Write down your predications. It's time to test your ideas.

Test the hypothesis

2. Place one of the 2-liter soda bottles down on a flat and stable surface. **Make sure that there is at least 12 feet of clearance above the bottle.**
3. Unscrew the cap of the soda bottle. Screw the Extreme Geyser Tube onto the bottle.
4. Make sure that the red trigger mechanism on the geyser tube is in the closed position so that the candy will not fall into the soda bottle.
5. Place up to 7 Mentos mints into the geyser tube (hint: make sure they are flat). Make sure the trigger mechanism stays closed during this step or you're going to get sprayed!
6. Choose a nozzle cap and screw it onto the geyser tube.
7. When you are ready to launch, open the trigger mechanism and quickly move away from the soda bottle. After about one second, the soda geyser should erupt.
8. Record the results (video using a smart phone and/or write down your observations).
9. Repeat steps 2-8 for the remaining nozzle caps. Use a new bottle of soda for each test.
10. Clean up. Be sure to thoroughly wash out and dry the geyser tube and nozzle caps before putting them away. Please recycle the soda bottles.

Accept, refine, alter, expand or reject hypothesis:

11. Review the results of your tests and compare them to your original hypothesis. How did you do?