# **Quick Start Guide**

Science Instructor's Guide: Levels K-6

### Get to Know Your Instructor's Guide

Your Instructor's Guide (IG) gives you the structure and flexibility to teach your children with confidence.

In your Science IG, you'll find detailed Notes that explain how to conduct experiments and discuss the concepts they address. The supply lists on the Schedule pages help you plan ahead for experiments. We also include a handy chart that shows which subjects you'll study and when, so you can plan field trips or other extracurricular opportunities.

Before you dive into your new Sonlight materials, familiarize yourself with your IG. Remember that you are in control of your homeschool; the wealth of information in your IG is here to help you. Only you can decide the right pace for your family. Your IG is a tool to make your life easier as you shape your children's education.

### 🔊 Plan Your Schedule

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The weekly schedules help you plan. You can follow them closely, reorganize them, or merely use them as a springboard for your own plans. Please know you DO NOT have to do everything scheduled in your IG. Find a rhythm that

works for you.

Find activity ideas and thoughtprovoking Notes for scheduled assignments directly behind your Schedule pages. Use these Notes to spark discussions with your children.

moves quickly. Because of this unique ability, these lizards	about? What do they not have an interest in? Do they have
have actually gottan the nickname Jesus Roards, referring	any ideas for fun activities they could do that relate to
to Jesus and his miracle of walking on water (Matthew 14.	what they're learning about?
25-31, John 6:16-215. By the way, after about 15 feet of	Make a list of their thoughts and ideas. Then let them
running on water, a basilisk sinks and starts to swim, mak-	pick one to do today. In this way, you will let them know
ing it more of a Pater licerd than a Jusius licerd.	that their opinion is important. Oxideen who feel they
an Mult	have an important, active role in detarmining what they
pp. ne-11	learn about will be more engaged in their studies. Have
What does the book mean when it says, 'Only animals	fun and treasure these times together.
with well-developed wings can By?? Do some animals have poorly developed wings? If so, which animals do the	Day 3: The World Around You
authors of the book have in mind? Oo they think that if	Today, spend some time outside with your children. It's
an ostrich or penguin had "well-developed wings" these	always fun to 'do school' outside. Your children will enjoy
Rightless birds could fly? Maybe they should have just	the change of pace and so will you!
written, 'Not all animals with wings can fly."	As they begin their study of the wonderful world of an
The origins of fight is a pensistent problem for non-	multi, so an a tour around your yard and/or neighborhos
thetatic macromodulization, who not only have to mailain	What another do they see! Do you have any "hery" and
Right as being the result of an undirected process despite	mais rearby, such as dogs, cats, does, saccoors, squirrels,
its annuant contribute but also must exclain it for the	hadness, etc.? What about leathered blands? Know many
iso sottles high memory's batul and insorts Goen	different types of high ran your children west? One's far
all of the further personals for Bole to succeed it seems	out shout the casese counter! I as your children fied an
a shade it the classe that it came advect in from different	monotoles of monotol basis motilies and/or amphibiant?
block of assessib without any cost of bitellinest descriptor	What do not a children entrop should the assess they
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	minute many fird they are say primely first different?
Activity Sheets	Rant Swam? Revit
Your Activity Sheets might work more easily in a small	As you begin this year's science studies together, be o
binder for your children to keep and use as assigned. If	the tackout for ways to reinforce what your children reac
you have more than one child using this program, extra	about. Nearly every day, you will likely run across oppor-
sets of the Activity Sheets may be purchased for each child	tunities to docuts something your children see in the
Den (171)	'real' world and connect it to something that they've real
	about in their books. When you homeschool your chil-
Ontional: Do Tonother	dren, learning can-and often does-occur any time an
optimizer of regeneric	anywhere. So be prepared and make the most of these
Day 1:Kidt' Choice	moments when they present themselves. You never kno
Each week throughout Science 1, we will provide ideas	on beautions because and halo assesses his one a children'
for fun activities to do with your children. In general, we	an important wators and responses it in post chapter.
will try to make the activities actually "active" performing	HERDS.
additional research on a particular topic, playing a game, getting outside, or some other type of "hands on" activity	Discover & Do Level 1 DVD
that seeks to apply what your children have been learning	We produced this fun and educational OVD so you and
in a meaningful way.	your children could eatch "Professor Justin" perform auc
Take our ideas for what they are-more suggestions-	of the assigned experiments from Science Activities, Vol.
and don't feel endeved to them. If your children don't	7. We recommend you gather your supplies, watch the
want to do a particular activity or have a different, better	OVD to see what to do, and then try each of these simple
idea he all means dischours and on with theirs!	exercisem young
Put this attitude into oractice today by actively listening	Or, if you prefer, you can do the experimental an your
biogram a biology the theory and add on their standard and of	case and then work the PEP is one how it haved out o
homenets there most? What do they want to have more	access New state whet he say and state in her and state
and a beautiful and the set of a set of the set	

### **Organize Your Activity Sheets**

In addition to the hands-on experiments scheduled throughout your program, your children can use the included Activity Sheets to interact with the science concepts they're learning. Find a complete answer key for these Activity Sheets after each week's schedule. Some parents

choose to place the Activity Sheets in a separate binder so children may work on them independently when assigned. If you think you might reuse your Science IG in a few years with a younger child, we recommend you purchase an extra set of Activity Sheets when you buy the IG. That way, you'll still have matching Activity Sheets even



after we update the IG you're using.

### **Start Your Science Journey**

Ready? Set? Go! Your Science IG lets you to teach well from the very first day. As you progress, adapt the curriculum to meet your needs. Need to go faster or slower? Need to use more/less than what we offer? Sonlight puts you in control of your homeschool journey and enables you to customize your children's educational experience. Our goal is to make your job easier, help you overcome obstacles, and protect your family's interests. Please contact us if we can help. Visit us at www.sonlight.com/help or call (303) 730-6292.

# Subjects in Science Levels K-6

Sonlight's unique and innovative science program will capture your children's imagination and encourage them to discover the wonders of God's world. Intriguing, full-color books and stories will bring science to life. Over the years, Sonlight children will focus on several primary fields of study:

- Biology/Nature: Children explore God's living world through biology, botany, animals and anatomy.
- Technology: Children develop an understanding of machines, inventions and modern technology.
- Physical Sciences: Children conduct experiments and discover truths as they study chemistry and physics.
- Earth and Space: Children chart new territory in oceanography, meteorology, archaeology and astronomy.
- Health and Medicine: Children delve into the world of anatomy, physiology, nutrition and medicine.

# Science 6—Weekly Subject List

# 5-Day

### Week Subject

- 1 origin of life/spontaneous generation/cohesion/adhesion/technology
- 2 acquired characteristics/natural selection/mutations/cohesion/adhesion/technology
- 3 whale origins/odds/similarities (homology)/cohesion/adhesion/
- 4 similarities (homology)/fossil record/Darwin/cohesion/adhesion/technology
- 5 fossil record (invertebrate/fish/bats)/cohesion/adhesion/technology
- 6 fossil record (pinnipeds/flying reptiles/dinosaurs/cohesion/adhesion/technology
- 7 fossil record (whales)/cohesion/adhesion/technology
- 8 fossil record (birds/archaeopteryx)/cohesion/adhesion/technology
- 9 fossil record (birds/feathered dinosaurs)/cohesion/adhesion/technology
- 10 fossil record (birds/feathered dinosaurs/flowering plants)/DNA formation/cohesion/adhesion/technology
- 11 protein formation/amino acid formation/evolution controversy/cohesion/adhesion/technology
- 12 biology/living things (commonalities)/cells/making food/photosynthesis/cohesion/adhesion/technology
- 13 animals and feeding/herbivores/carnivores/digestion/energy/respiration/circulation/cohesion/adhesion /technology
- 14 plant transport systems/homeostasis/waste disposal/skeletal system/locomotion/senses/coordination/cohesion /adhesion/technology
- 15 plant and animal reproduction/life cycles/growth/genetics and heredity/cohesion/adhesion/technology
- 16 taxonomy/plant kingdom/animal kingdom/ecology/using a microscope/cohesion/adhesion/technology
- 17 physics/energy/light energy/light and vision/cohesion/adhesion/technology
- 18 reflection/refraction/color/heat energy/cohesion/adhesion/technology
- 19 heat energy/sound/music/mechanics/cohesion/adhesion/technology
- 20 liquids/movement/Newton's laws/speed/acceleration/gravity/cohesion/adhesion/technology
- 21 machines/electricity/magnetism/cohesion/adhesion/technology
- 22 magnetism/electric motors/loudspeakers/electromagnetic spectrum/analysis/technology
- 23 physics words/laws and equations/chemistry/chemicals/atoms/analysis/technology
- 24 particles/solids/liquids/gases/physical changes/chemical reactions/analysis/technology
- 25 patterns in chemistry/periodic table/explaining chemical reactions/compounds/analysis/technology
- 26 covalent compounds/valencies/reactions/catalysts/analysis/technology
- 27 metallic reactions/acids/bases/salts/organic chemistry/analysis/technology
- 28 organic families (alkanes/isomers/alkenes/polymers/alkynes/cyclic hydrocarbons)/organic compounds/splitting compounds/analysis/technology
- 29 identifying substances/formulae/equations/experiments/chemistry words/analysis/being a naturalist /experimenting with plants
- 30 elements/reactivity series/geology/Earth/space/seasons/day and night/inside the Earth/Earth's crust/analysis /flowers/trees/small animals/
- 31 rocks/minerals/fossils/Earth's resources/Earth's energy/volcanoes/natural hot water/earthquakes/analysis/life cycles/ponds/rivers/birds

- 32 earthquakes/earthquake safety/tsunamis/atmosphere/air and ocean currents/natural cycles/climate change /world climates/rainforests/analysis/tracking mammals/ecosystems/woodlands
- 33 tropical grasslands/monsoons/deserts/Mediterranean climates/temperate climates/polar regions/mountains /changing climates/weather/analysis/seashores/city ecosystem
- 34 water and clouds/thunderstorms/windstorms/floods/droughts/cold/heat/strange weather/forecasting/plant life/animal life/analysis/observing strange weather/forecasting/plant life/animal life/analysis/observing
- 35 ecosystems/population/farming/farming methods/soil/weathering/erosion/analysis/nature collections /recording wildlife/nature photography
- 36 rivers/river erosion/ground water/glaciers/coasts/seas and oceans/reference information/analysis/naturalist technology/ecology/nature careers

1. The N symbol means there is a note found either at the bottom of the schedule page or in the notes section immediately following these schedule pages.

2. When supplies are listed as "We provide:" they are materials found in either your Science 6 Supplies Kit (65K) or the Non-Consumable Supplies Kit (NSK). When supplies are listed as "You provide:" they are materials you can generally find around your home.

# **Evolution: The Grand Experiment**

### p. iii

Why is it that the author considers asking questions courageous? Maybe it's because some people don't question things and just go along with what everyone else seems to believe. When it comes to questioning ideas, history is full of courageous thinkers and scientists who went against the trends and beliefs of their day. Instead of being rewarded for their questioning, they were often persecuted even though they turned out to be right. It takes courage to ask questions, especially when those questions challenge generally accepted ideas such as macroevolution.

### p. v

You may find it helpful to re-read our note in the Introduction regarding evolution issues.

### pp. 2–3

The concept of the Big Bang is not an exclusively evolutionary idea. Some Christians accept the Big Bang as a scientific explanation for the origin of the universe, but give credit to God for causing it in the first place. The "third view" noted on page two is that of theistic evolution (see

our note in the Introduction). Another way to express two different positions on origins is as an undirected process or an intelligently directed process.

Like many artists, Michelangelo falls into the error of depicting God the Father as an old man, having a physical body. This has resulted in the common misconception of God as an elderly man with a beard, leading some to view Him as a sort of kindly grandfatherly figure or even a stern taskmaster. This is more akin to Greek mythology views of the god Zeus.

But biblically speaking, God the Father is spirit, while God the Son (Christ) has a physical body. See, for instance, John 4:24, 8:46, Luke 24:39, 1 Timothy 6:15-16. Passages that appear to indicate God has a physical body are figurative or *anthropomorphic*, meaning that they attribute physical qualities to God for the purposes of helping us understand Him in terms we can relate to. As a result, the "hand" of God is said to be at work (Job 19:21, Ecclesiastes 2:24, etc.), God is said to have a "finger," etc. (Exodus 8:19, 31:18; Deuteronomy 9:10).

However, as Bible scholars are quick to point out, passages need to be interpreted in context in order to properly understand them. As a result, the fact that Psalm 91:4 says of God, "He will cover you with his feathers, and under his wings you will find refuge," does not mean God is a chicken. In short, we need to be careful not to interpret figurative language literally or literal language figuratively. This, of course, does not mean that we are free to spiritualize the Bible as we wish, making it say or not say whatever we want. But it does mean that we need to seek to understand the context as well as the original intention of the author and its application to us. It also means we need to interpret individual passages in light of their immediate context as well as their context in the whole of biblical teaching.

While it may not seem like a big deal to view God the Father as having a physical body, in reality such an idea can lead to a number of theological errors regarding God's nature. If, for instance, God the Father has a physical body, then He is limited because He cannot be omnipresent (present everywhere at once). Also, viewing God as an old man, as depicted by Michelangelo and other artists, may lead to further errors regarding God's nature. We may begin to think He is a kindly old grandfather willing to let us get by with a lot, morally speaking, or that He is a stern old man, eager to punish us for even the most minor infraction. Consequently, we need to be careful in how God is depicted in art. This is probably one of the reasons God gave the commandment, "You shall not make for yourself an idol in the form of anything in heaven above or on the earth beneath or in the waters below" (Exodus 20:4). It's unlikely that anyone will view the artwork of Michelangelo as a literal idol, but it is possible for art to communicate inaccurate ideas about God and His nature.

### pp. 4–5

Are polls useful in determining truth? Not really. Centuries ago if a poll was taken regarding whether or not the Sun revolved around the Earth, the vast majority of people would have given the scientifically incorrect answer of geocentrism. In logic, appealing to the majority is considered a fallacy or error in thinking because the majority is not always right. Still, polls are useful in some ways, such as gauging popular opinion on various issues. We just need to be careful not to put too much weight on them. Whether or not macroevolution is true or false, for instance, does not depend upon polls, but on the evidence (or lack of it).

### pp. 8–9

Technically speaking "theories on the origin of life" such as macroevolution are not "fairy tales" as Dr. Gish states. In fact, Christians are often accused by atheists of believing in "fairy tales." Using such terminology does not help the debate. Most macroevolutionists believe they are justified in holding their position based on the scientific evidence as they interpret it.

Dr. Padian's remarks referring to those who reject macroevolution as "blind or three days dead" is a form of *ad hominem* argumentation. *Ad hominem* is from the Latin meaning "against the man." This is when a personal attack is made against someone. But attacking someone's character is not the same as reasonably arguing against their ideas. It's really diversion that takes attention away from the actual ideas and instead gets personal and usually mean. Instead of using inflammatory language, the debate about origins should be based on rational interpretation of evidence and ideas. For the Christian, approaching such debates "with gentleness and respect" is a requirement (1 Peter 3:15), not an option.

Intelligent Design proponents are making the case for intelligence being involved in the origins of life based not on religious reasons, but on scientific reasons. They also take issue with a number of apparent deficiencies with macroevolution. You and your children will learn more about Intelligent Design by watching the DVD *lcons of Evolution* (week 4). You may also wish to consider another film, *Expelled: No Intelligence Allowed* (2008), that addresses the ongoing disagreements between macroevoultion and Intelligent Design adherents.

### pp. 12–13

The heading, "Even Scientists Can Be Wrong!" seems obvious, but in Western culture in particular science and scientists are often viewed with a sense of reverence, as though science can make no mistakes. But as the book points out, "even scientists can be wrong." A good scientist realizes that his or her theories must be falsifiable, meaning that if enough reliable and convincing evidence is presented against an idea, then the idea is in need of being abandoned or seriously modified. Is this the case with macroevolution? Some scientists think so.

### p. 22

The popular media often gives the impression that macroevolution is a fact, questioned only by "fundamentalist" religious people or quack scientists with an agenda. However, the issue is not one that is exclusively related to religion or to a handful of scientists. The issue really comes down to an issue of worldviews: naturalism versus supernaturalism. Naturalism is currently the dominant view in science and in universities. What Intelligent Design proponents are attempting to do is create a "wedge" or opening for a hearing of ideas beyond what some have termed *scientism* — the belief that science is the ultimate source of knowledge.

# **Activity Sheet Questions**

Activity Sheets are included after the notes and are assigned on each schedule page. Each Activity Sheet has a corresponding Answer Key page following these schedule pages.

You do not have to do every question on the Activity Sheets. Feel free to adjust and/or omit activities to meet the needs of your children. We cover the same concepts repeatedly throughout the year (and years to come!) to enable students to learn "naturally" through repetition and practice over time.

We have provided a variety of activities to interest and challenge your children. Feel free to let your children do those activities that they enjoy and simply talk through others. We have provided space for you to fill in answers as your children respond verbally, or simply check off the items that you discuss.

**Remember:** this program is designed for you to use to meet your children's needs. It is not meant to use you!

**Suggestion:** your Activity Sheets might work more easily in a small binder for your children to keep and use as assigned. If you have more than one child using this program, extra Activity Sheets can be purchased for each child (Item # 6TS1).

# 5-Day: Cool Stuff 2.0 and How it Works

### p. 12

Note that some text in this book is printed sideways or upside down. This is not a misprint, but the way the book is designed (some pages are viewed best by rotating the book). We're not sure why this is the case in some sections. Maybe it's supposed to make the book extra "cool"?

# **Optional: Do Together**

### Day 1: Listen to Your Children

Each week throughout Science 6, we will provide ideas for fun activities to do with your children. In general, we will try to make the activities actually "active": performing additional research on a particular topic, watching a video, playing a game, getting outside, or some other type of "hands-on" activity that seeks to apply what your children have been learning in a meaningful way.

Take our ideas for what they are — mere suggestions and don't feel burdened by them. If your children don't want to do a particular activity or have a different, better idea, by all means ditch ours and go with theirs!

Put this attitude into practice today by actively listening to your children. As they embark on their studies, what interests them most? What do they want to learn more about? What do they not have an interest in? Do they have any ideas for fun activities they could do that relate to what they're learning about?

Make a list of their thoughts and ideas. Then let them pick one to do today. In this way, you will let them know that their opinion is important. Children who feel they have an important, active role in determining what they learn about will be more engaged in their studies. Have fun and treasure these times together.

### Day 4: Disprove This!

This week, your children learned some important lessons about scientific methodology and how important it is to the scientific process to challenge assumptions and thoroughly test theories. Did they get a kick out of the "wheat + dirty underwear = mice" experiment? What other theories can they think of that didn't turn out to be true? Weren't some scientists once convinced Earth was flat?

Can your children think of any current scientific theories that have yet to be tested sufficiently? What about radiocarbon dating? We always hear about how many millions and/or billions of years old certain fossils and artifacts are. How do we really know that?

Ask your children to do a little Internet research about radiocarbon dating. A cursory search of Wikipedia will reveal that radiocarbon dating is based upon measurement of the radioisotope carbon-14, which apparently has a half-life of 5,730 years. Since this dating technique was developed in 1949, it's reasonable to assume that the halflife of carbon-14 must have been determined from tests that began in approximately 3781 B.C. Ask your children if they have found any records indicating who might have started the carbon-14 testing almost 6,000 years ago. No luck? Hmmm .... Perhaps radiocarbon dating deserves a closer look then.

Brainstorm with your children about how one might go about testing radiocarbon dating more sufficiently. What types of things might need to be done? How long might it take? As part of your brainstorming, do some Internet research about the tests that have been performed on rocks that were formed when Mount St. Helens erupted in 1980. Scientists know that certain areas of rock were formed in 1980 during the eruption, which would make these rocks less than thirty years old. How old do some tests show they are, though? What might this say about the validity of the underlying scientific theories upon which these tests are based?

Enjoy this time with your children and encourage them to question everything they read. Urge them to open their hearts and their minds to the truths the Lord wants to reveal to them through their studies.

# **Supplies**

When supplies are listed as "**We provide:**" they are materials found in either your Science 6 Supplies Kit (**6SK**) or the Non-Consumable Supplies Kit (**NSK**). When supplies are listed as "**You provide:**" they are materials you can generally find around your home.

# **Shipping Restrictions**

Due to strict import regulations, it is illegal to ship biological matter to certain countries (including New Zealand and Australia). If you requested your science supplies to be shipped to a country with such restrictions, we have removed that kit from your order and reduced your charge accordingly.

Week 1 Activity Sheets	<ol> <li>What three main views do people hold regarding how life began? (p. 2)</li> <li>(An all-powerful God created the universe and all forms of life.)</li> </ol>	2) (The universe began billions of years ago as a result of the Big Bang.)	3) (Life evolved but God formed the first living organism and then helped the process along.)	<ol> <li>What do you believe about the origin of life? Briefly state your thoughts below. When you're finished with this book, plan to reread your thoughts to see if your response has changed. (pp. 2–3) (Answers will vary.)</li> </ol>	<ul> <li>3. Challenge! Do you think it's possible to separate creationism from religion? Explain. (p. 9)</li> <li>(Possible: One could make the argument that a "creator" didn't also have to be a god that was workhiped—that perhaps some other behand created the world, though be difficult to articulate the maanificent order and per-</li> </ul>	fect complexity of life to the work of anything short of a god-like entity) 4. Define "spontaneous generation". (p. 12) (The belief that living organisms can come into being rapidly and "spontaneously" over a period of just a few days or weeks.)	<ol> <li>Why was this idea believed for so long? (p. 14) <u>(because to question a scientificidea was thought of as</u> <u>questioning science iself—and there were other experiments that seemed to support</u> <u>the idea also.</u></li> </ol>
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Week 1 Activity Sheets	Cool Stuff 2.0         5-Day         11. What specifically triggers a smoke alarm to go off? (p. 12)	Why does a sensor for this element work well as a smoke detector? [because when things burn, their chemical compounds break down and carbon is released.]	<ol> <li>Briefly describe how smoke detectors work. Use the terms in the box in your answer. (p. 13)         <ul> <li>americium-241</li> <li>ions</li> <li>electric circuit</li> <li>(A radioactive element, americium-241, is housed in a chamber and gives off tiny particles</li> <li>that carry an electric charge. The particles crash into air molecules in the chamber, which</li> </ul> </li> </ol>	Circuit. When the circuit is interrupted, the alarm sounds, in completes an electric circuit. When the circuit is interrupted, the alarm sounds, is circuit. When the circuit is interrupted, the alarm sounds, is a circuit when the circuit is interrupted.	13. Name two ways the Toto Neorest tollet improves sanitation from a regular tollet. (pp. 14–15) (Possible: many features allow for hands-free usage—automatic lid, operate features by remote control bldet means no tollet paper is needed.)	<ul> <li>44. Fow do magnetic rails made a train more encient than ordinary wheelsr (p. to) (because magnetic rails mean that the train floats above the track, so there is no friction to slow down the train.)</li> <li>15. Why must a magnetic floating bed be tethered to the floor? (p. 17)</li> <li>15. Why must a magnetic floating bed be tethered to the floor? (p. 17)</li> <li>16. Why must a magnetic floating bed be tethered to the floor? (p. 17)</li> <li>17. Why must a magnetic floating bed be tethered to the floor? (p. 17)</li> <li>18. Why must a magnetic floating bed be tethered to the floor? (p. 17)</li> <li>19. Why must a magnetic floating bed be tethered to the floor? (p. 17)</li> </ul>	Science 6 + Week 1 + Student Activity Sheets (3)
ivity Sheets	ontaneous generation. Describe the proved. (p. 12–22) cat wheat, Maggots from rotting c, which hatched into maggots, Scum	5-shaped flask kept microorganisms	liness, and microbiology. Do you think the idea of spontaneous ntury? Why or why not? (pp. 17–19) germs in the air that can affect a specimen fit i sin t	010 py Soulight Criticalium, Frg 1	d, how was the door opened for Darwin to present his eneration was disproved, scientists began to accept that all life eve that something other than that life was created by a god. tille originated from non-living matter,)	n? (p. 22) rove spontaneous generation because he could test it. Darwin's in the distant past by an unknown biochemical mechanism can	

# Week 1 Activity Sheets

# **Evolution: The Grand Experiment**

1. What three main views do people hold regarding how life began? (p. 2)

1) \_\_\_\_\_ 2) 3)

2. What do you believe about the origin of life? Briefly state your thoughts below. When you're finished with this book, plan to reread your thoughts to see if your response has changed. (pp. 2–3)

3. Challenge! Do you think it's possible to separate creationism from religion? Explain. (p. 9)

- 4. Define "spontaneous generation". (p. 12)
- 5. Why was this idea believed for so long? (p. 14) \_\_\_\_\_



\_\_\_\_\_

	Week 1 Activity Sheets
6.	Choose one of the three experiments that "proved' spontaneous generation. Describe the experiment and then explain how it was eventually disproved. (p. 12–22)
7.	Consider what our society knows about germs, cleanliness, and microbiology. Do you think the idea of spontaneous generation could have ever been born during this century? Why or why not? (pp. 17–19)
8.	Why did some scientists not want to believe that God created the world? (p. 22)
9.	Challenge! Once spontaneous generation was disproved, how was the door opened for Darwin to present his theory of evolution? (p. 22)
10.	Why is it difficult to disprove Darwin's theory of evolution? (p. 22)

# Week 1 Activity Sheets

# B

# Cool Stuff 2.0

### 5-Day

11. What specifically triggers a smoke alarm to go off? (p. 12)

Why does a sensor for this element work well as a smoke detector?

12. Briefly describe how smoke detectors work. Use the terms in the box in your answer. (p. 13)

americium-241	ions	electric circuit	



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13. Name two ways the Toto Neorest toilet improves sanitation from a regular toilet. (pp. 14–15)

14. How do magnetic rails make a train more efficient than ordinary wheels? (p. 16)

15. Why must a magnetic floating bed be tethered to the floor? (p. 17)



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Science 6		<b>W</b> EEK 2	2		Schedule					
Date:	Day 1 6	Day 2 7	Day 3 8	Day 4 9	Day 5 10					
Evolution: The Grand Experiment	pp. 23–30 N pp. 31–35 N pp. 36–39 N									
Activity Sheet Questions	#1-4	#5–9	#10–13							
5-Day: Cool Stuff 2.0 and How it Works					pp. 18–25					
Activity Sheet Questions	#14-22									
Optional: Do Together	er Acquired A Big Accident M Characteristics M									
TOPS 13: Cohesion/ Adhesion	#2 Heap O' Water									
Supplies	You provide: penny, towel, calculator (optional). (Note to Mom or Dad: We will only list new items needed. You will use previous items from each week repeatedly.)									
Shopping/Planning List	For next week: scis:	sors, watch/clock with	n second hand.							
		Other No	otes							

# **Evolution: The Grand Experiment**

### p. 30

Weisman cut off the tails of a number of mice in order to test the theory of acquired characteristics. But is experimenting on animals in the name of science acceptable? Does the greater good that might come to human beings outweigh the experimentation on animals? Although animals are not made in the image of God as human beings are (Genesis 1:26-27), we do have the responsibility of being good stewards of God's creation. Christian thinker C.S. Lewis, who wrote against cruelty to animals, said that a Christian pursuing experiments on animals who "thinks it right to vivisect" should at least do so "with scrupulous care to avoid the least dram or scruple of unnecessary pain, in a trembling awe at the responsibility which he assumes" ("Vivisection," in *God in the Dock*). What do you and your children think about experimenting on animals in the name of science?

# рр. 32—33

Those who oppose macroevolution generally accept microevolution, which refers to change within kind such as various breeds of dogs or different kinds of birds. But microevolution is a far cry from macroevolution, which posits entirely new and usually very different kinds of animals evolving significantly over lengthy periods of time, such as a land-based mammal evolving into a whale or a dinosaur evolving into a bird.

### pp. 36–37

If God created a perfect world, why are there mutations? Critics of Christianity or even adherents of Christianity who have doubts sometimes ask this or related questions. God made everything "very good" (Genesis 1:31, NIV), but something went very wrong. This is what Christians call the Fall, in reference to human beings rebelling against God by their disobedience (see Genesis 3). The Fall resulted in God's original creation, which was "very good," to now be "not so good." In Romans 8:22, Paul says, "We know that the whole creation has been groaning," suggesting that the Fall had far-reaching consequences not just for human beings, but for all of God's creation. As a result, genetic mutations and supposed sub-optimal designs in nature are explained by the Fall.

Naturalists (or what might be termed non-theistic evolutionists) view mutations as the result of "chance" or "accident." They suppose that the undirected process of natural selection, dependent on mutations, results over time in drastic evolutionary changes (macroevolution). There are a number of problems with relying on mutation as a key mechanism in naturalistic macroevolution, as is pointed out in this chapter.

### p. 39

On "five million years ago" and "100,000 years," see our note in the Introduction.

# **Optional: Do Together**

### **Day 1: Acquired Characteristics**

Today, your children learned that certain acquired characteristics, such as enlarged muscles from exercise, are not passed on from one generation to another. Wouldn't that be great, though, if muscles could be passed down? Well ... maybe if you're Chuck Norris' children .... Anyway! What about other traits, though? It's clear that certain traits are passed along from parents to children. Take some time today to discuss such traits with your children.

What traits do they see that you passed on to them? Eye color? Hair color? Certain facial shapes? Anything else? Use this time to bond with your children and reinforce with them the difference between acquired characteristics that are not passed along and genetic traits that can be passed along. For even more fun, get out some pictures from when you were a baby and let your children compare them to their own baby pictures. What similarities do they see?

### Day 4: A Big Accident

Today, ask your children to think deeply about their bodies and the multiple systems that work together to make life possible. Challenge them to ponder the complexity of the brain and how it works. Urge them to consider how many organs and systems must interact precisely in order for something we take for granted breathing — to occur.

Now ask them to think about these things in the context of what they learned this week. Do they think it's possible that the composition of their bodies could be the result of an infinite number of accidental mutations over the past many millions and billions of years? Why or why not?

What other explanations might exist for our bodies being the way they are today? How might one test these other explanations? These are the questions that are at the heart of the debate over evolution. Concrete answers are not always forthcoming, but the effort to think critically about them is always worth it.

L

	Week 2 Activity Sheets	🖉 Week 2 Activity Sheets
olution: The Grand Ex	periment	5. Natural selection, or "survival of the fittest" is (p. 32)
The modern theory of evc	olution suggests that all forms of life evolved from a single organism. Fill in the sequence	when the most athletic creatures compete with weaker creatures.
of evolution from a single	organism to human beings. (p. 24)	x when weaker varieties of plants or animals are replaced in a population by stronger W版外的教授的 varieties due to their ability to compete for food or withstand environmental changes.
single-cell organis	sm (multicel/ular invertebrate)	when stronger varieties of plants or animals are replaced in a population by weaker varieties due to their ability to compete for food or withstand environmental changes.
(bird)	(land-based reptile) <- (semi-aquatic amphibian)	when Mother Nature chooses the most attractive of a species to reproduce.
		<ol> <li>How did Darwin use the process of natural selection to support his theory of evolution? (p. 32)</li> </ol>
(mammal)	(primate [ape])	(Darwin thought that the process of natural selection would cause the surviving variety of a species to continue
		improving the traits of a species over time and evolve into a whole new species.)
What is the theory of acq.	uired characteristics? Give an example to help you clarify. (p. 24)	
(This theory states that it passed on to following a	an animal acquired a trait auring its interme, trins trait would be enerations. Possible example: If a horse is exercised and arows large	<ol> <li>Is this line of this him alwave true? Give an example from nour book to evolution when natural sedention does not</li> </ol>
mucclos its offening will	hava larga muscles too.)	<ol> <li>is una mic or unimority arways user, ore an example nonity our book to explain why natural section uses not interaction of the section of the s</li></ol>
muscles, its onspring with	nave large muscles too)	support the theory of evolution. (pp. 32–33)//www.wii /wu/y. A log of eccut only unowed in sinduct worg nom a litter to reproduce and by the same taken only allowed the doa with the lonaest hair to reproduce—eventually bred
		a small dog with long hair, but it's still a dog. Gray bears in the arctic didn't survive as well as white bears because their
What has to change in or	der for a trait to be passed on to an animal's offspring? (pp. 26–28)	prey could see them coming too easily—eventually the genes for gray fur were bred out of the population.)
(the animal's DNA.)		
So, how do we know the in traits Ilike tanned skin.	theory of acquired characteristics is false? (p. 28) (we can test to see if a certain change or larger muscles) will after an animal's DNA. If it doen't, we know that trait will horb be passed	8 Low do the limite of visibility reinferre the associated that a stural calertian connectoring on 3.0
on to offsprina. Chanaes	in the body cells of a multicellular animal cannot be passed on to the next generation.)	(Within any particular animal or plant species, there are known limits in size, varieties of
		color, and shape, as well as limits in other characteristics. Therefore, one could notstart
How was the law of disus	e finally proved false? (p. 30)	with an average-size tomato and, after millions of years of natural selection, grow a 900
(A scientist, August Weisr	man, cut the tails off of mice for 20 generations in a row. No matter how many tails he cut off	pound tomato. The size of the tomato is limited.)
the baby mice were alwa	ys born with tails,)	
<b>Challenge!</b> Can you furth	ter back this finding with what you know about DNA? (Again, since a mouse's DNA never	<ol> <li>How do modern scientists think creatures acquire or produce new traits? (p. 35)</li> </ol>
changed even though it	lost a tail, the offspring would still get passed DNA instructions to grow a tail.)	survival of the fittest they just grow what is needed (genetic mutations)
	c cience o + week 2 + student Activity	(b) Student Activity Sneets + week 2 + Science 5

上上的 Week 2 Activity Sheets	<ol> <li>Draw a line to match each type of TV to the scanning method it uses to display the image. (p. 19)</li> <li>SDTV</li> <li>pooresive scanning: the TV receives the whole picture (1,000 lines), stores ft, and then displays it all at once</li> </ol>	HDTV HDTV HDTV HDTV and http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www	<ol> <li>What two tasks does a combination boiler fuffill in a home? (p. 21)</li> <li>(hears water that circulates to hear the house.)</li> <li>(hears water that comes out of the faucet.)</li> </ol>	<ol> <li>Briefly explain why each of the following features of a combination boiler help to make it safe to use. (pp. 20–21) Flue (chimney): Itakes gases, such as poisonous carbon monoxide, away from the burner and releases them outside the building.)</li> <li>Expansion vessel: (allows heated water to expand safely so the pipes don't burst.)</li> </ol>	<ol> <li>Which type of water is heated only as it's needed? (p. 21)</li> <li>(tap water)</li> <li>central heating water</li> <li>20. How are wind turbines able to generate electricity, even in a light breeze? (p. 22)</li> <li>(a georbox inside magnifies the speed of the rotor so the generator spins fast enough to</li> </ol>	generate electricity.) 21. Why are the blades on a wind turbine so long? (p. 23) (so they act like levers and can still rotate even when the	wind is light.) 22. The Fabulous Milk Jug: Come up with a practical use for an empty milk jug. What can it store? Dispense? Cover? Shape? Describe your milk jug "invention" here. (pp. 24–25) (Answers will vary.)	8 Student Activity Sheets + Week 2 + Science 6
Week 2 Activity Sheets	10. List two or three human diseases that are the result of an accidental DNA letter change. (p. 36) (Sickle-cell anemia, Cystic fibrosis, Spina bifida, Hemophila, to name a few.)	11. How much would DNA have to change in order for an organism to grow gills or a wing, if	it clich't have them before? (p. 36) <u>(thousands of letters would have to change in the</u> DNA sequence, and the code would have to be accidentally placed in the correct location in the gene and have the correct letter sequence for it to work.)	<ol> <li>Do you believe complex body systems could evolve as the result of natural selection and a series of random mutations? Be sure to explain why you believe as you do. You may want to continue your answer on a separate piece of paper. (pp. 36–37) (Answers will vary. Require your children to provide a detailed response.)</li> </ol>	<ol> <li>Explain the scientific view of adaptation. (p. 38) (Adaptation implies that an animal's DMA "accidentally mutated" in a beneficial way, making it more capable of surviv- ing the environment or reproducing at a greater rate.)</li> </ol>	How does the public tend to define adaptation? (the animal changed in response to its environment, and did so on purpose—out of necessity.)	<b>Cool Stuff 2.0</b> <b>5-Day</b> 14. For television pictures, the more pixels there are, the better the picture looks. (p. 18)	<ol> <li>Why do HDTV images look so clear? (p. 18) [because the images are made up of so many pixels, the camera can capture much more detail than an ordinary camera.]</li> <li>Science 6          <ul> <li>Science 6              <li>Student Activity Sheets (7)</li> </li></ul> </li> </ol>

# Week 2 Activity Sheets



1. The modern theory of evolution suggests that all forms of life evolved from a single organism. Fill in the sequence



Science 6 Week 2 Student Activity Sheets ( 5

Ľ	Week 2 Activity Sheets
5.	Natural selection, or "survival of the fittest" is (p. 32) when the most athletic creatures compete with weaker creatures.
	when weaker varieties of plants or animals are replaced in a population by stronger varieties due to their ability to compete for food or withstand environmental changes.
	when stronger varieties of plants or animals are replaced in a population by weaker varieties due to their ability to compete for food or withstand environmental changes.
	when Mother Nature chooses the most attractive of a species to reproduce.
6.	How did Darwin use the process of natural selection to support his theory of evolution? (p. 32)
7.	Is this line of thinking always true? Give an example from your book to explain why natural selection does <i>not</i> support the theory of evolution. (pp. 32–33)
8.	How do the limits of variability reinforce the reasoning that natural selection cannot cause evolution? (p. 34)
9.	How do modern scientists think creatures acquire or produce new traits? (p. 35)
	survival of the fittest they just grow what is needed genetic mutations

	Week 2	Activity Sh	eets	<u>L</u>
10. List two or three human diseases th	hat are the resi	ult of an accidental	DNA letter change. (p. 36	6)
11. How much would DNA have to cha it didn't have them before? (p. 36)	nge in order f	or an organism to g	grow gills or a wing, if	and the second sec
12. Do you believe complex body syste mutations? Be sure to explain why of paper. (pp. 36–37)	ems could evo you believe as	lve as the result of you do. You may v	natural selection and a se vant to continue your ans	ries of random wer on a separate pie
13. Explain the scientific view of adapta	ation. (p. 38)			
How does the public tend to define	adaptation?			
<b>Cool Stuff 2.0</b> 5-Day				
<ol> <li>For television pictures, the the better the picture looks. (p. 18)</li> </ol>	more	fewer	pixels there are,	L
15. Why do HDTV images look so clear	? (p. 18)			
		S	rience 6 ♦ Week 2 ♦ Stud	lent Activity Sheets (

	ĝ3		Week 2	Activ	vity Sheets		
16.	Draw a line to	match each typ	be of TV to the scanr	ning met	hod it uses to display the i	mage. (p. 19)	
	SDTV	•		•	progressive scanning: the (1,000 lines), stores it, and	TV receives the whole then displays it all at	e picture once
	HDTV	•		•	interlaced scanning: the T then a little bit later scan	<sup>™</sup> scans 300 lines at a s the 300 lines in betw	time and een
17.	What two tasl	ks does a combir	nation boiler fulfill i	n a home	e? (p. 21)		
	2)					\	
18.	Briefly explair Flue (chimney	n why each of the y):	e following features	of a con	nbination boiler help to ma	ake it safe to use. (pp.	20–21)
	Expansion ve	ssel:					
19.	Which type of	f water is heated	l only as it's needed	? (p. 21)	tap water	central heating	g water
20.	How are wind	l turbines able to	o generate electricit	y, even il	n a light breeze? (p. 22)		
21.	Why are the b	plades on a wind	turbine so long? (p	o. 23) _			
22.	The Fabulous Shape? Descri	Milk Jug: Come ibe your milk jug	up with a practical g "invention" here.(	use for a (pp. 24–2	n empty milk jug. What ca	n it store? Dispense? C	over?
8)	Student Activ	ity Sheets ♦ We	ek 2 ♦ Science 6				

SCIENCE 6       WEEK 3       SCHEDO         Date:       Day 1       11       Day 2       12       Day 3       13       Day 4       14       Day 5         Evolution: The Grand Experiment       pp. 40–49 N       pp. 50–54 N       pp. 55–59 N       Image: Constraint of the Grand service of the Gra								
Date::Day 1Day 212Day 313Day 414Day 5Evolution: The Grand Experimentpp. 40-49 Npp. 50-54 Npp. 55-59 Npp. 55-59 NImage: Constraint of the constrai	Science 6		WEEK	3		Schedule		
Evolution: The Grand Experiment       pp. 40–49 II       pp. 50–54 II       pp. 55–59 II         Activity Sheet Questions       #1–2       #3       #4–5         5-Day: Cool Stuff 2.0 and How it Works       pp. 26–33 II       pp. 26–33 II         Activity Sheet Questions       Bear-ly Believable III       So Close, Yet So Far III       #6–17         Optional: Do Together       Bear-ly Believable III       So Close, Yet So Far III       #6–17         Supplies       We provide: 65K — plastic cup (jar). You provide: scissors, watch/clock with second hand.       #3 Adhesion	Date:	Day 1 11	Day 2 12	Day 3 13	Day 4 14	Day 5 15		
Activity Sheet Questions       #1-2       #3       #4-5       Image: Cool Stuff 2.0 and How it Works         5-Day: Cool Stuff 2.0 and How it Works       Image: Cool Stuff 2.0 and How it	Evolution: The Grand Experiment	pp. 40–49 🕅	pp. 50–54 N	pp. 55–59 🕅				
5-Day: Cool Stuff 2.0 and How it Works       pp. 26–33 [         Activity Sheet Questions       #6–17         Optional: Do Together       Bear-ly Believable [N]       So Close, Yet So Far [N]         TOPS 13: Cohesion/ Adhesion       #3 Adhesion         Supplies       We provide: 65K — plastic cup (jar). You provide: scissors, watch/clock with second hand.	Activity Sheet Questions	#1–2	#3	#4–5				
Activity Sheet Questions       #6–17         Optional: Do Together       Bear-ly Believable IN       So Close, Yet So Far IN         TOPS 13: Cohesion/ Adhesion       Me provide: 65K — plastic cup (jar). You provide: scissors, watch/clock with second hand.         Other Notes	5-Day: Cool Stuff 2.0 and How it Works					pp. 26–33 N		
Optional: Do Together       Bear-ly Believable       So Close, Yet So Far         TOPS 13: Cohesion/ Adhesion       #3 Adhesion         Supplies       We provide: 6SK — plastic cup (jar). You provide: scissors, watch/clock with second hand.         Other Notes	Activity Sheet Questions					#6–17		
TOPS 13: Cohesion/ Adhesion       #3 Adhesion         Supplies       We provide: 6SK — plastic cup (jar). You provide: scissors, watch/clock with second hand.         Other Notes	Optional: Do Together	Bear-ly Believable ₪			So Close, Yet So Far ℕ			
Supplies       We provide: 6SK — plastic cup (jar).         You provide: scissors, watch/clock with second hand.         Other Notes	TOPS 13: Cohesion/ Adhesion				#3 Adhesion			
Other Notes	Supplies       We provide: 6SK — plastic cup (jar).         You provide:       scissors, watch/clock with second hand.							
	Other Notes							

# **Evolution: The Grand Experiment**

### p. 40

There's no doubt that a blue whale is enormous, but some of the information cited on this page is not particularly well, documented such as endnotes 14 and 15. Although our online research came up with similar figures and illustrations, we could not find reliable sources to confirm the size and weight of a blue whale tongue or the diameter of the blood vessels. This, however, does not detract from the general point of this section – that it is extremely unlikely, if not impossible, for a whale to evolve in the way macroevolutionists suggest.

### **p.** 54

Given the information presented in this chapter, why do you and your children think so many people continue to accept macroevolution as the explanation for the whale? Recall the final paragraph of page 37: "... is it possible that complex body systems could evolve as the result of a series of random mutations and natural selection? Scientists who support evolution say YES, with enough time and chance, nearly anything is possible." So, time and chance can result in complex organisms? After all, here we are, right?

Let's take a brief look at the major presuppositions of non-theistic macroevolutionists: 1) God does not exist; 2) The material world is all that exists. Given these two presuppositions, which result in atheism/naturalism, how is the origin of complex life supposed to be explained? Macroevolution is an attempt to explain such life on the basis of a universe where there is no God and, therefore, no supernatural dimension or intelligence whatsoever. If these presuppositions are accepted it stands to reason that some sort of chance explanation or undirected process must be responsible for complex life, no matter how far-fetched the explanation may seem. But does it make sense?

Making a strong case for the existence of God removes both major presuppositions of non-theistic macroevolutionists, opening the door to the reality of an intelligent designer and creator (God), rather than reliance on an undirected process (chance).

But how do we make a strong case for God? Theologians and philosophers generally categorize arguments for God's existence into four or five primary categories, each with many variations of the basic arguments. These categories include moral arguments (axiological), design arguments (teleological), arguments from the explanation of the origins of the universe (cosmological), arguments from God's being (ontological), and knowledge-based arguments (epistemological). Note that by *argument* we don't mean fighting or yelling at one another, but logical reasoning and philosophical argumentation.

While some of the terminology of these arguments may seem daunting, some are fairly basic to grasp and present, at least in their simpler forms. For instance, one form of the moral argument claims that if moral law exists, there must be a moral lawgiver (God). One form of a design argument claims that if we can detect design in the universe, there must be a grand designer (God). A form of the cosmological argument claims that everything that has a beginning has a cause. If the universe had a beginning, then it, too, must have had a cause. From there it reasons that the most likely cause of the universe is an intelligent, transcendent being (God). Ontological and epistemological arguments for God are more complex to present in brief and are usually debated more among academics than in popular arguments for God. Note that none of these arguments results in an immediate connection to Christianity, but they are stepping stones that can be integrated into a larger case for the Christian worldview.

For more information on these and other arguments, see resources such as 20 Compelling Evidences That God Exists by Kenneth Boa and Robert Bowman, Jr. (RiverOak), Handbook of Christian Apologetics by Peter Kreeft and Ronald Tacelli (InterVarsity Press), and No Doubt About It by Winfried Corduan (B&H).

### p. 56

The idea that similarities in animals supports evolution is sometimes referred to as *homology*. You and your children will learn more about homology by watching track 9 of the DVD *lcons of Evolution* (week 4).

On "10 to 20 billion years ago," "4 billion years ago," "650 million years ago," "225 million years ago," and "150 million years ago," see our note in the Introduction.

# 5-Day: Cool Stuff 2.0 and How it Works

### p. 30

The book says of self-service checkout counters, "Checkouts like this are cost-effective for stores because they save the wages of checkout operators." In other words, automatic checkout services replace actual people in the stores. Is this a good idea? In the early 19th century, machinery began replacing factory workers in England. Some of the workers didn't like this and decided to destroy the machines. These workers became known as Luddites, possibly named after a man named Ned Ludd who took part in the destruction. Today, people who are against technology or extremely opposed to it are sometimes referred to as Luddites.

# **Optional: Do Together**

### Day 1: Bear-ly Believable

What do your children think of Darwin's supposition that North American black bears might have evolved over time into something as enormous as the blue whale? Today, challenge them to pretend that they are scientists during Darwin's time. How might they have responded to Darwin's thoughts?

Urge them to get artistic in their critique. Bears evolving into whales would have obviously involved numerous interim steps along the way. What might some of these interim creatures have looked like?

Let your children have fun exploring their creative side. Allow them to draw, paint, etc. what they think some of the creatures that would've had to have existed between bears and whales might have looked like. Urge them to give them names and place them in whatever natural habitat they might have inhabited. What does this simple exercise tell them about the limits of some of Darwin's ideas when pushed to their logical ends?

### Day 4: So Close, Yet So Far

Reinforce what your children learned this week about how some scientists believe similarities in animals are evidence for Darwin's theory of evolution. What do your children think? Are similarities among animals proof of evolution? Or do they simply reveal a predetermined bias in the eye of the beholder?

Have them consider the shark and the dolphin. Scientists can point out many similarities between the two, including their size and shape, presence of a dorsal fin, etc. Challenge your children to come up with an equally compelling list of differences between the two. (Hint: Sharks are fish and dolphins are mammals!)

Based upon the similarities that scientists might point out and their own list of differences, what do your children think about sharks and dolphins? Did they evolve from a common ancestor with a dorsal fin? Why or why not?

Aution: The Grand Ex Describe two or three cha hyena, evolved into a whe hyed oyou suppose som (Answers will vary. Possib	<b>periment</b> ince mutations that would need to occur to support the theory that a land animal, like a
Describe two or three cha hyena, evolved into a wha hy do you suppose som (Answers will vory. Possib	ance mutations that would need to occur to support the theory that a land animal, like a
hyena, evolved into a wha Why do you suppose som (Answers will vary, Possib	
Why do you suppose som	ale. (pp. 40–49) (Arswers will varv. Can choose from development of a doral fin. bonv tail to a
Why do you suppose som Answes will vary. Possib	cartilaginous fluke, teeth to a baleen filter, body hair to blubber, movement of
Why do you suppose som Answers will vary. Possib	nostrils, front legs to pectoral fins, increase in size from 150 lbs to 360,000 l
Why do you suppose som (Answers will vary. Possib	external ear changes, and disappearance of back legs.)
(Answers will vary. Possib	.e scientists still think a whale evolved from a land mammal? (pp. 40-49)
	vle: both fiyenas and whales are mammals; perhaps they have similarities in their DMA.)
<b>Challenge!</b> How would kr	nowing the genetic codes for a hyena and a whale help us to better
estimate the chance of a h	hyena evolving into a whale? (p. 54)
(because once you know	the genetic codes of a whale and a hyena, you would be able to see I how a see I have a see
exactly which DNA letters	s would need to change in order to turn one into the other, which
would make the calculat	ions of chance much more accurate.)
Why do some scientists bu	elieve that "similarities" between animals help to prove the theory of evolution? (p. 56)
(because if two or more a	animals evolved from the same ancestor, then they are closely related and inherited similar bo
features.)	
Why don't similarities alw.	ays work as evidence for evolution? Describe one instance where even though two anim
are similar, there is other $\epsilon$	evidence that they are not related. (p. 58)
(even though two animal	ls may be physically similar, their DNA proves that they are not related; for example, pandas
and Red Pandas both hav	ve an extra thumb, a V-shaped jaws and similar teeth and skulls. Yet DNA evidence shows the
panda belongs to the bec	ar family and the red panda is related to raccoons.)
	Science 6 + Week 3 + Student Activity Sheets (

🖄 Week 3 Activity Sheets	Week 3 Activity Sheets
Cool Stuff 2.0       5-Day       6. How is bioplastic better than older types of plastic? (p. 26)   (because some older types of plastic? (p. 26)	<ol> <li>How do self-scanning checkout stations benefit the grocery store? (p. 30) (they are cheaper for stores to operate because they don't have to pay as many store clerks.)</li> <li>How do you think some store clerks feel about them? (some may not like them because they mean that the grocery store will have fewer ich practions contribute.)</li> </ol>
500 years to biodegrade, and bioplastic can biodegrade in as little as three months.)	accurate the second sec
<ol> <li>How does constarch help bioplastics break down? (p. 26) (the constarch absorbs water and expands, which causes the plastic to break apart so bacteria can digest it into harmless organic substances.)</li> </ol>	(barcodes help a clerk ring up a customer's purchases quickly because the barcode tells the computer the correct price information for the item, and the barcodes also help managers keep track of store inventory, and will let them know when they need to restock a particular 5, 2, 4, 9, 9, item.)
<ol> <li>How does bioplastic start breaking down, even though it is still on the shelf in the grocery store? (p. 26)         <ul> <li>(aince there is always water in the atmosphere, the cornstarch can start swelling and breaking down the plastic, even</li></ul></li></ol>	14. Challengei Do you think smart carts help a grocery store sell more product? Why or why not? (p. 31)         (Possible: Probably—the computeris reminding you to buy items you usually buy you may not have been planning to buy on that week; and alers you to items you may not have been planning to buy on that week; and alers you to items you may not have perchased at all that are on safe)
<ol> <li>Name three benefits of growing plants with hydroponics. (p. 28)</li> <li>(plants can spend more of their energy growing food because they don't need to grow an extensive not system.)</li> <li>(nutrients in the water can be precisely controlled to produce a greater crop yield</li> </ol>	<ol> <li>How does regular shampoo clean hair? (p. 3.2)</li> <li>How does regular shampoo clean hair? (p. 3.2)</li> <li>(The soop in the shampoo breaks down grease and dirt into small pieces that wash away when you rinse the shampoo away with water.)</li> </ol>
and healthier plants.)  3) [since there is no soli, there is no bacteria or weeds, which means the plants are disease resistant.)  10. Why is it possible to grow plants without soli? (p. 29) [because the soil's main purpose is to provide nutrients for the	16. Why does your hair get dirty? (p. 33) (glands around the hair follicles produce seburn, which serves to waterproof and protect your hair. However, this oil traps dust and dirt particles in the air that eventually build up and make your hair greasy and dirty.)
plant. If the water the plants take in is rich in the necessary nutrients, then soil is no longer needed) 11. True or False? Aeroponics is growing plants in nutrient-rich air instead of water. If false, correct the statement	17. How does dry shampoo work? (p. 33) (the flakes of dry shampoo attach firmly to the patches of natural grease in your hair and form dumps that wont fit through the teeth of a comb. Simply comb away the clumps for cleaner hair.)
10) Student Activity Sheets + Week 3 + Science 6	Science 6 + Week 3 + Student Activity Sheets (11)

# Week 3 Activity Sheets



# **Evolution: The Grand Experiment**

1. Describe two or three chance mutations that would need to occur to support the theory that a land animal, like a

hyena, evolved into a whale. (pp. 40-49)



- 2. Why do you suppose some scientists still think a whale evolved from a land mammal? (pp. 40–49)
- 3. Challenge! How would knowing the genetic codes for a hyena and a whale help us to better

estimate the chance of a hyena evolving into a whale? (p. 54)



- 4. Why do some scientists believe that "similarities" between animals help to prove the theory of evolution? (p. 56)
- 5. Why don't similarities always work as evidence for evolution? Describe one instance where even though two animals are similar, there is other evidence that they are not related. (p. 58)

# Week 3 Activity Sheets

# Cool Stuff 2.0

### 5-Day

- 6. How is bioplastic better than older types of plastic? (p. 26)
- 7. How does cornstarch help bioplastics break down? (p. 26)



8. How does bioplastic start breaking down, even though it is still on the shelf in the grocery store? (p. 26)

9.	Name three benefits of growing plants with hydroponics. (p. 28) 1)	-
	2)	
	3)	
10.	Why is it possible to grow plants without soil? (p. 29)	
11.	True or False? Aeroponics is growing plants in nutrient-rich air instead of water. Tr	ue False
$\frown$	If false, correct the statement:	
10)	Student Activity Sheets ♦ Week 3 ♦ Science 6	

# Week 3 Activity Sheets

12. How do self-scanning checkout stations benefit the grocery store? (p. 30) How do you think some store clerks feel about them? 13. How item do barcodes help both clerks and store managers? (p. 31) 14. Challenge! Do you think smart carts help a grocery store sell more product? Why or why not? (p. 31) \_\_\_\_\_ 15. How does regular shampoo clean hair? (p. 32) 16. Why does your hair get dirty? (p. 33) 17. How does dry shampoo work? (p. 33) \_\_\_\_\_