Quick Start Guide

Science Instructor's Guide: Levels K–6

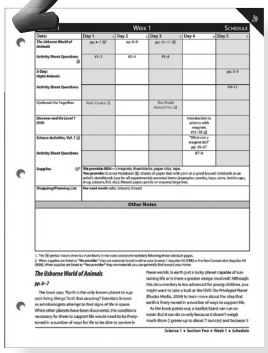
1 Get to Know Your Instructor's Guide

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.

2 Plan Your Schedule

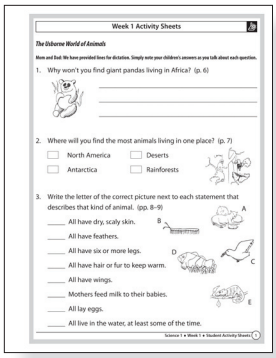


The weekly schedules help you plan. You can follow them closely, reorganize them, or merely use them as a springboard for your own plans. Please know you DO NOT have to do everything scheduled in your IG. Find a rhythm that works for you.

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

3 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.



4 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 4—Weekly Subject List

5-Day

Week	Subject
1	early Americana/electricity/inventions/wheels
2	early Americana/electricity/inventions/bicycles/catseyes
3	early Americana/electricity/inventions/transportation/flight
4	early Americana/electricity/inventions/gliders/planes/parachutes
5	early Americana/electricity/magnetism/inventions/aircraft/chocolate
6	electricity/magnetism/inventions/gum/chips
7	electricity/magnetism/inventions/dishwasher/vacuum cleaner
8	electricity/magnetism/inventions/microwave oven/toilet
9	electricity/magnetism/inventions/light bulb/lighting
10	electricity/magnetism/Alexander Graham Bell/telephone/phonograph
11	electrons/protons/neutrons/periodic table/electricity/inventions/audio recording/television
12	energy particles/atoms/particle accelerators/elements/X-rays/forensic science/molecules/liquids/solids/gases electricity/inventions/math machines/computers/communication devices
13	crystals/chemical compounds/energy particles/dark matter/water/electricity/inventions/jeans/zipper
14	metals/plastics/carbon/silicon/electricity/inventions/Velcro/nitrous oxide/chloroform
15	biomimicry/energy/nuclear power/alternative energy/physics/forces/electricity/inventions/lenses/eye glasses /bandages
16	gravity/black holes/Albert Einstein/time/pressure/sound vibrations/electricity/inventions/X-rays/paper
17	sound/heat energy/low temperatures/electrical current/electricity/inventions/books/moveable type/ballpoint pens
18	electrical charges/static electricity/lightning/Tesla coil/neurons/pacemakers/central nervous system /magnetism/electromagnetism/electricity/inventions/sticky notes/Braile
19	electromagnetic spectrum/microwaves/X-rays/light/lasers/color/electricity/inventions/writing tools/underwater inventions
20	optical illusions/light/shadows/magnetism/inventions/piano/camera
21	light/bending light/refraction/lenses/magnetism/everyday inventions/strange inventions
22	color/prisms/spectrum/light/dispersion/filters/magnetism/energy/potential energy
23	computers/Internet/World Wide Web/artificial intelligence/robotics/magnetism/kinds of energy/hot and cold
24	nanotechnology/genetics/DNA/cells/cloning/cybernetics/magnetism/energy/conduction/convection/ combustion
25	microscopes (optical/electron)/using a microscope/viewing paper, print, fibers, and fabrics/magnetism /explosions/fossil fuels
26	microscopes/archaeology/forensic science/viewing/hair/cells/magnetism/engines /food as fuel
27	microscopes/nucleus/DNA/genes/bacteria/viruses/medicine/vaccines/surgery/plant cells/plant food /magnetism/wasting energy/using energy
28	microscopes/plant reproduction/pollen/water plants/fungi/food science/insects/microscopic life/magnetism /Sun/extreme temperatures

29 microscopes/pests/insects/sand and rocks/ microfossils/ crystals/magnetism/Sun/energy cycle

30 microscopes/atoms/chain reactions/solar energy

31 buying a microscope/microscope equipment/advanced microscope techniques/magnetism/astronomy /universe/geothermal energy/wind and water power

32 space/solar system/sun/eclipses/Mercury/Venus/magnetism/biopower/electrical energy

33 Earth/Moon/Mars/Jupiter/Saturn/Uranus/magnetism/electricity/electric power/oil/coal/producers and consumers

34 Neptune/Pluto/asteroids/comets/meteors/ exploring space/famous astronauts/satellites and galaxies /magnetism/energy underground (power cables, pipes)/future energy

35 Milky Way galaxy/birth of stars/life of stars/variable stars/constellations/describing stars/magnetism/energy facts and figures/energy timeline

36 maps of the stars/constellations/home astronomy/star photographs/telescopes/astronomy facts/map of the moon/magnetism

Science 4 — Week 1 — Schedule

Date:	Day 1 [1]	Day 2 [2]	Day 3 [3]	Day 4 [4]	Day 5 [5]
Diary of an Early American Boy	Author's Note, chaps. 1–2	pp. 12–19 (end before journal entry)	pp. 19–24		
Activity Sheet Questions [N][1]	#1–6	#7	#8–9		
5-Day: ***The Story of Inventions***					pp. 6–9 [N]
Activity Sheet Questions [N][1]					#10–15
Optional: Do Together		A Journal of Their Own [N][1]		Building Bridges [N]	
***Discover & Do Level 4* DVD** [N]				Science with Electricity Introduction, #11	
TOPS #32: Electricity				#1	
Supplies [N]	**We provide: NSK** — masking tape; **4SK** — aluminum foil, D-cell batteries, flashlight bulbs. **You provide:** scissors, pencil.				
Shopping/Planning List	**For next week:** foil ribbon from #1.				

Other Notes

1. The [N] symbol means there is a note immediately following the schedule.

5-Day: *The Story of Inventions*

p. 6

"Prehistoric" refers to a time before written records and, as such, does not necessarily imply support of "cave men" in a macroevolutionary sense.

Do animals invent? The book offers the example of chimpanzee's tool-using abilities, but this is a far cry from inventing something like a television, cell phone, or the printing press! Using a rock to break open nuts is hardly an invention. Made in God's image, human beings are intelligent and creative, possessing a level of ingenuity that far exceeds anything in the animal world.

My Inventions Book

Rather than completing the Activity Sheet Questions we have provided for this book this year, you may prefer to have your children create a new page each week to add to their own *My Inventions Book*. Create a form for them to fill out after you finish the assigned reading to record information about one of the inventions you read about. The form may include the following:

(Use the name of the invention as the page's title)
Name of the Inventor:
What he or she invented:
Date:

What need was the inventor trying to meet with this invention? (For example, when Josephine Cochran invented the mechanical dishwasher, it was because she was tired of doing dishes by hand! Remember: "Necessity is the mother of invention.")

Brief synopsis of the invention story:
When did the invention become popular?

You may want to work with them to complete this form the first few weeks, but before long they'll feel confident answering the information on their own.

Activity Sheets

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.

Please don't expect your children to write the answers until they gain considerable proficiency at handwriting. 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 # 4TS1).

Occasionally we assign a "cut-out" activity. These are separate sheets you will find in the back of this guide. If you like, color the sheets first, then cut them out and attach them to the worksheet.

Discover & Do Level 4 DVD

We produced this fun and educational video so you and your children could watch "Professor Justin" perform each of the assigned experiments from the *TOPS* science activity books. We recommend you gather your supplies, watch the DVD to see what to do, and then try each of these simple experiments yourself.

Or, if you prefer, you can do the experiment(s) on your own and then watch the DVD to see how it turned out on screen. You may want to mix and match to find out what works best. We hope this video makes your science experiments more enjoyable and more educational.

Note to Mom or Dad: Please navigate your *Discover & Do Level 4 DVD* by using the DVD menu on your screen.

Optional: Do Together

Day 2: A Journal of Their Own

Help your children get into the spirit of reading *Diary of an Early American Boy* by encouraging them to start their own journal today. If they are excited about the idea, feel free to take a trip to the store to pick out a unique journal, special paper, and/or pens/pencils to use just for journaling.

Challenge them to think about what types of things about their daily existence might intrigue young readers 50 or 100 years from now. What would they find fascinating? What would they want to know more about? Use these discussions as starting points for journaling.

Urge your children to include their own illustrations, just like Noah Blake does in his journal. Can they bring their journal entries to life like Noah does? Let them spend as much time as they want working on this activity. The extra writing practice is just a bonus that you can "slip" by them if they're having fun!

Day 4: Building Bridges

This week, your children read about building a new bridge across Red Man Brook. What did they think of the process described? Could they imagine helping out with such a huge project? Why or why not?

If at all possible, take a field trip to view a local bridge up close. It could be a long suspension bridge across a river or a bay, or a simple one-lane country bridge across a mostly-dry creek bed. Size and type doesn't matter a bit. Just try to find a bridge structure of some type (a walking bridge in a local park would work fine, too).

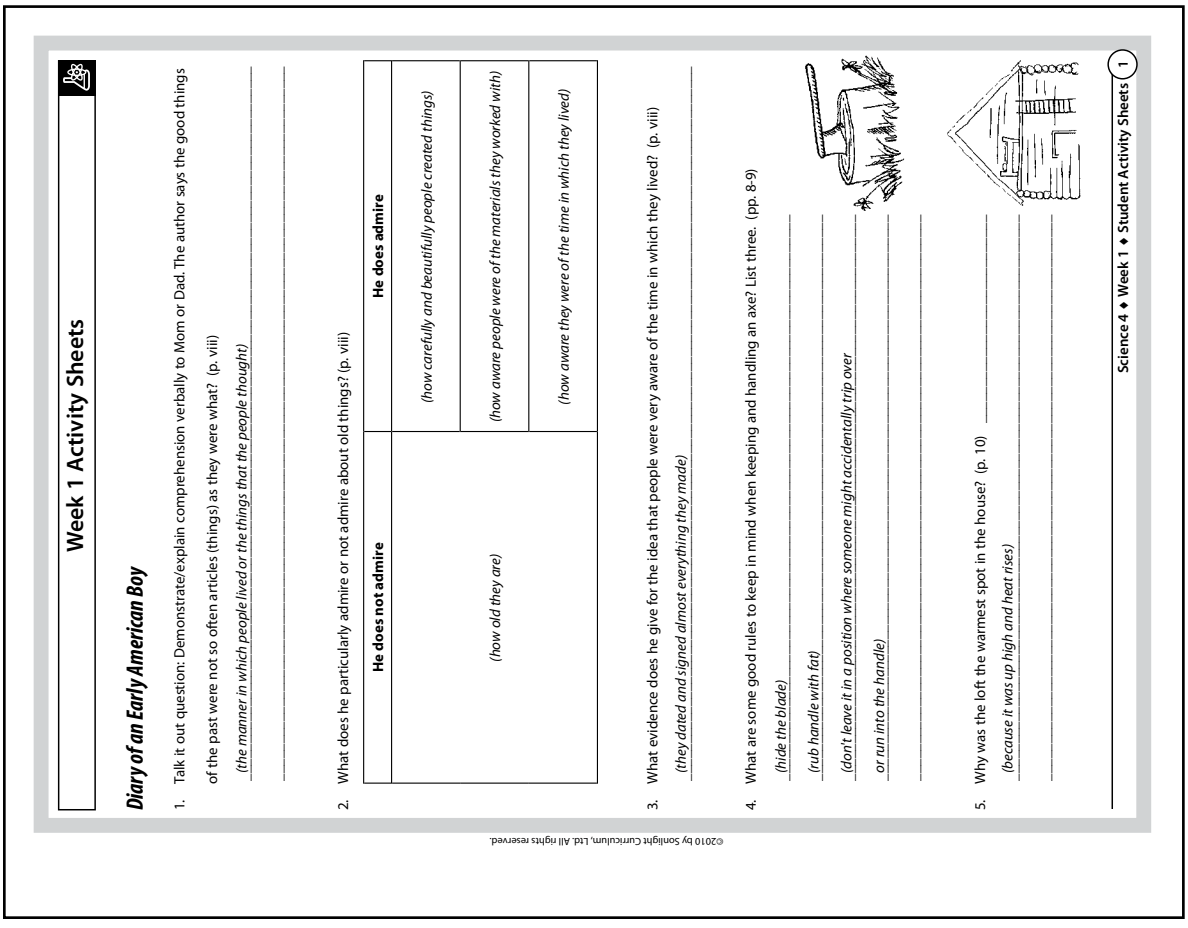
If possible, take the time to travel back and forth across the bridge. Is it possible to walk across on foot? Can you walk under or around it? How close can you get to examine it in depth? Can your children point out any similar features to the bridge Noah Blake described in his journal? How are they similar? What major differences do they see?

Have fun with this activity, and use it as an opportunity to bring their reading assignments to life in a unique way.

Encourage curiosity and discussion. Feel free to go off on a tangent, if your children's interests lead down a new and interesting path.

Supplies

When supplies are listed as "We provide:" they are materials found in either your Science 4 Supplies Kit (4SK) or the Non-Consumable Supplies Kit (NSK). When supplies are listed as "You provide:", they are materials you can generally find around your home. When supplies are listed as *Light & Color*, they are materials that are included with your *Light & Color* book. ■



Week 1 Activity Sheets

Diary of an Early American Boy

1. Talk it out question: Demonstrate/explain comprehension verbally to Mom or Dad. The author says the good things of the past were not so often articles (things) as they were what? (p. viii)
   (the manner in which people lived or the things that the people thought)
   _____
   _____

2. What does he particularly admire or not admire about old things? (p. viii)

He does not admire	He does admire
(how old they are)	*(how carefully and beautifully people created things)*
	(how aware people were of the materials they worked with)
	(how aware they were of the time in which they lived)

3. What evidence does he give for the idea that people were very aware of the time in which they lived? (p. viii)
   (they dated and signed almost everything they made)
   _____

4. What are some good rules to keep in mind when keeping and handling an axe? List three. (pp. 8-9)
   (hide the blade)
   _____
   (rub handle with fat)
   _____
   (don't leave it in a position where someone might accidentally trip over
   or run into the handle)
   _____
   _____

5. Why was the loft the warmest spot in the house? (p. 10) _____
   (because it was up high and heat rises)
   _____
   _____

Science 4 ♦ Week 1 ♦ Student Activity Sheets 1

Week 1 Activity Sheets

6. Can you name at least five different kinds of ladders the pioneers used in their cabins? Draw a picture of one example. (p. 11)

(split-pole)

(barn-beam [wood pegs] ladder)

(notched log stair)

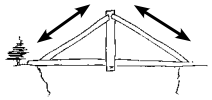
(folding)

(ladder plank) *(extra steps—holes cut into a plank)*

7. What was a "stone-boat"? (p. 17) *(a toboggan-like sled used to slide stones over grassy areas)*

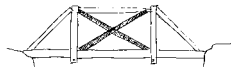
8. How do compression pieces hold up the king post? Draw arrows on the bridge below to show the direction(s) in which they push. (p. 24)

(as gravity pulls on the compression pieces, they push together on the king post and hold it in place)



9. What is the difference between a queen post truss and a king post truss? Draw a queen post truss in the space provided. (p. 23)

(a queen post truss is basically two king post trusses put together for a longer bridge)



The Story of Inventions

5-Day

10. Why is it good for an inventor to get a patent? (p. 7)

(Because a patent makes the invention belong to the inventor by law. It also means that no one else can copy the invention.)

Week 1 Activity Sheets

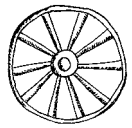
11. Do you think people should continue to invent things? Why or why not? (pp. 6-7)

(Answers will vary. Possible: inventions are the key to progress—they make our modern world possible)

12. Use your imagination and think of one thing that, if it were invented, would make your life easier, more fun, etc. Describe it below and briefly state why you think it should be invented. Then draw a picture of a prototype! (pp. 6-7)

(Answers will vary)

13. Why didn't people need wheels long ago? (p. 8)



(because there were hardly any roads and people lived in places where wheels would be hard to use)

14. Why do you think the wheel we know today took a long time to develop? (pp. 8-9)

(because it took many years of using the current wheel to think of ways to make it better—like adding an axle; using spokes or adding an air tube to cushion the ride)

15. Do you think improvements in some inventions influence or encourage improvements in others? For example, how do you suppose the change from dirt roads to cobblestone roads might have influenced the development of the wheel? (pp. 8-9)

(Possible: when road builders began to use cobblestones to pave roads, the wooden wheels began to give passengers a very bumpy ride, so inventors began to look for a way to improve the wheel to make the ride more smooth)

Week 1 Activity Sheets

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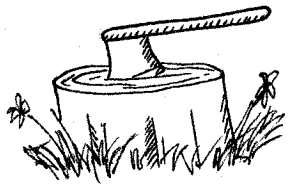

5. Why was the loft the warmest spot in the house? (p. 10) _____

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_____

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_____

_____

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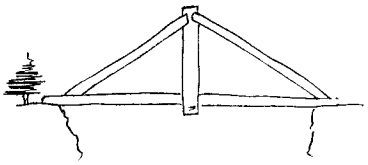

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The Story of Inventions

5-Day

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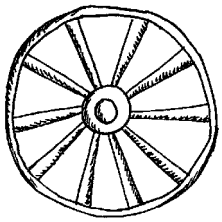

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_____

_____

_____

Date:	Day 1 6	Day 2 7	Day 3 8	Day 4 9	Day 5 10
Diary of an Early American Boy	pp. 25–33	pp. 33–40	pp. 40–49		
Activity Sheet Questions	#1–3	#4–5	#6–9		
5-Day: ***The Story of Inventions***					pp. 10–13
Activity Sheet Questions					#13–16
Optional: Do Together		Woodworking N		Tools of the Trade N	
***Discover & Do Level 4* DVD**				#12, #13	
TOPS #32: Electricity				#2–3	
Activity Sheet Questions				#10–12	
Supplies	**We provide: 4SK** — D-cell batteries, flashlight bulbs. **You provide:** foil ribbon from #1.				
Shopping/Planning List	**For next week:** foil ribbon from #1.				

Other Notes

Optional: Do Together

Day 2: Woodworking

What did your children think of Noah's journal entries this week? Have they ever created anything out of wood with their bare hands? Today, give them that opportunity.

Find a suitable woodworking project that you're all comfortable with. It could be as simple as whittling a stick your children find in the back yard. What could your children make out of a stick? Let their imaginations run wild. Help them envision a project and then work side-by-side with them to complete it.

Or, if you prefer, feel free to pick up a fun project at a local craft store. There are lots of options out there: model cars and trains made out of wood, homemade crafts for various holidays, pioneer pencils, etc. Use the time together to discuss *Diary of an Early American Boy*. Do your children enjoy pretending to be like Noah Blake? What do they like/dislike about the process of woodworking? Why? If they take an interest in doing some project in particular, use it as a good source for a follow-up activity!

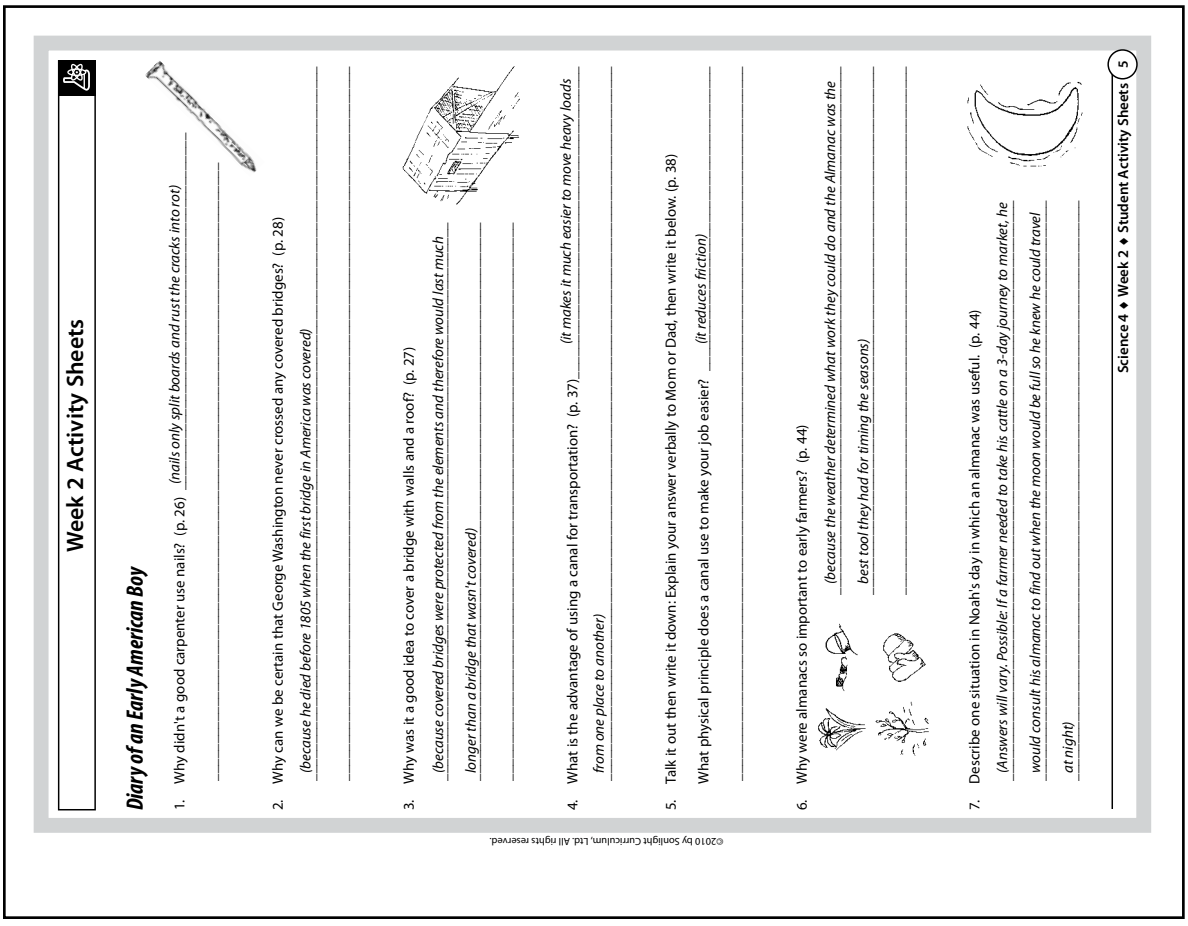
Day 4: Tools of the Trade

The fact that humans make and use tools to make their lives easier sets them apart from other species. What did your children think of the primitive tools that Noah Blake used? How do they think these tools have changed since then?

If possible, take a field trip to a hardware store today to look at some modern tools. What do your children think of the progress that has been made since Noah Blake's time? What do they think Noah would think of some of these tools?

Can they find any tools that haven't changed substantially since Noah's day? A basic saw perhaps? Sure, it might be made of better materials today, but has the basic design changed that much? What do they think?

What tool do they think would most amaze Noah? Why? What types of jobs necessitate some of the tools they see? Were these types of tasks even within Noah's wildest dreams? Why or why not? ■



Week 2 Activity Sheets

Diary of an Early American Boy

1. Why didn't a good carpenter use nails? (p. 26) *(nails only split boards and rust the cracks into rot)*

2. Why can we be certain that George Washington never crossed any covered bridges? (p. 28) *(because he died before 1805 when the first bridge in America was covered)*

3. Why was it a good idea to cover a bridge with walls and a roof? (p. 27) *(because covered bridges were protected from the elements and therefore would last much longer than a bridge that wasn't covered)*

4. What is the advantage of using a canal for transportation? (p. 37) *(it makes it much easier to move heavy loads from one place to another)*

5. Talk it out then write it down: Explain your answer verbally to Mom or Dad, then write it below. (p. 38)
What physical principle does a canal use to make your job easier? *(it reduces friction)*

6. Why were almanacs so important to early farmers? (p. 44)
(because the weather determined what work they could do and the Almanac was the best tool they had for timing the seasons)

7. Describe one situation in Noah's day in which an almanac was useful. (p. 44)
(Answers will vary. Possible: If a farmer needed to take his cattle on a 3-day journey to market, he would consult his almanac to find out when the moon would be full so he knew he could travel at night)

Science 4 ♦ Week 2 ♦ Student Activity Sheets 5

8. Why did early farmers often work at night? (pp. 45-46)

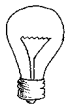
(because they had a lot of work to do and because it was cooler at night)

What did they use for light? *(the moon and stars)*

9. Can you think of another current-day profession that works at night for the same reasons? (pp. 45-46)

(Possible: road construction crews often work through the night because temperatures are cooler and there is usually less traffic)

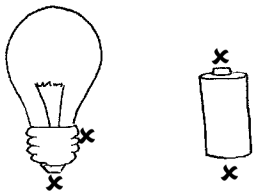
TOPS # 32: Electricity



10. What is a contact point? (Light Bulb Predictions #3) *(a point through which electricity can flow)*

11. How many contact points are needed to light a bulb? (Light Bulb… #3) **1** **2** **3** **4**

12. Draw an "x" showing where each contact point is located.
(Light Bulb Predictions #3)



The Story of Inventions

5-Day

13. Order the improvements to the "celerifere" that eventually made it a modern bicycle. (p. 10-11)

(2) foot levers that turned the back wheel

(3) pedals to turn the front wheel

(1) steering added to the front wheel

(4) pedals and a chain to turn the back wheel

14. Why were bicycles in the 1870s built with a huge front tire? (p. 11)

(because bicycles that had pedals on the front tire went much faster if the wheel attached to the pedals was larger)

15. Name the main problem with a Ordinary bicycle. (p. 11)

(they were very wobbly and caused lots of accidents)

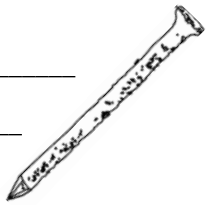
16. Fill in the information below to describe a catseye. (pp. 12-13)

What is it? *(a reflector that sits in the pavement of the road to show drivers where lanes are or where the edge of the road is)*

How does it work? *(glass balls with a reflective backing reflect light from headlights back toward the driver)*

Why was it a good invention? *(because they made roads much safer)*

Diary of an Early American Boy



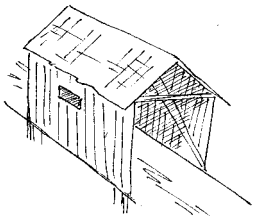
1. Why didn't a good carpenter use nails? (p. 26) _____

   _____

2. Why can we be certain that George Washington never crossed any covered bridges? (p. 28)

   _____

   _____



3. Why was it a good idea to cover a bridge with walls and a roof? (p. 27)

   _____

   _____

   _____

4. What is the advantage of using a canal for transportation? (p. 37)_____

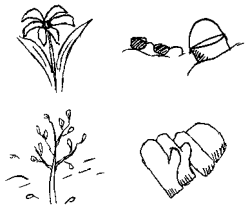
   _____

5. Talk it out then write it down: Explain your answer verbally to Mom or Dad, then write it below. (p. 38)

   What physical principle does a canal use to make your job easier? _____

   _____

6. Why were almanacs so important to early farmers? (p. 44)



   _____

   _____

   _____

7. Describe one situation in Noah's day in which an almanac was useful. (p. 44)

   _____

   _____

   _____

8. Why did early farmers often work at night? (pp. 45-46)

_____

_____

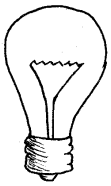
What did they use for light? _____

9. Can you think of another current-day profession that works at night for the same reasons? (pp. 45-46)

_____

_____

TOPS # 32: Electricity



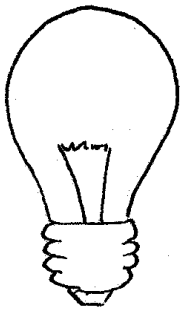
10. What is a contact point? (Light Bulb Predictions #3) _____

_____

11. How many contact points are needed to light a bulb? (Light Bulb… #3) **1** **2** **3** **4**

12. Draw an "x" showing where each contact point is located.

(Light Bulb Predictions #3)



The Story of Inventions

5-Day

13. Order the improvements to the "celerifere" that eventually made it a modern bicycle. (p. 10-11)

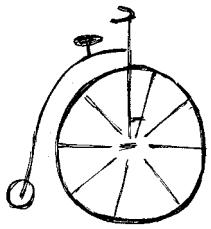
_____ foot levers that turned the back wheel

_____ pedals to turn the front wheel

_____ steering added to the front wheel

_____ pedals and a chain to turn the back wheel

14. Why were bicycles in the 1870s built with a huge front tire? (p. 11)



_____

_____

15. Name the main problem with a Ordinary bicycle. (p. 11)

_____

_____

16. Fill in the information below to describe a catseye. (pp. 12-13)

What is it? _____

_____

How does it work? _____

_____

_____

Why was it a good invention? _____

_____

_____

SCIENCE 4	WEEK 3				SCHEDULE
Date:	**Day 1** 11	**Day 2** 12	**Day 3** 13	**Day 4** 14	**Day 5** 15
Diary of an Early American Boy	pp. 49–55	pp. 56–63	pp. 63–69		
Activity Sheet Questions	#1–3	#4–6	#7–9		
5-Day: ***The Story of Inventions***					pp. 14–17 N
Activity Sheet Questions					#13–16
Optional: Do Together		Time to Journal! N		Hay Rick Ornament N	
***Discover & Do Level 4* DVD**				#14	
TOPS #32: Electricity				#4	
Activity Sheet Questions				#10–13	
Supplies	**We provide: NSK** — paper clips, tape. **4SK** — flashlight bulb, D-cell battery. **You provide:** foil ribbon from #1.				
Shopping/Planning List	**For next week:** foil ribbon from #1.				
Other Notes					

5-Day: *The Story of Inventions*

p. 16

Birds can fly because of several key reasons such as bone structure and feathers. The book uses "design" and "built for flying" to refer to birds. Macroevolutionists claim that birds evolved over long periods of time in order to eventually be able to fly. Others view birds as designed by God. The evolution of flight is a problem for macroevolutionists who deny the existence of God because they need to account for the many factors that go into making a creature fly not only in birds, but in mammals (bats), insects, and reptiles (extinct pterosaurs, for instance).

Optional: Do Together

Day 2: Time to Journal!

Today, encourage your children to write an illustrated journal entry about something exciting that has happened in their lives during the past week or so. Did they meet a new friend? Discover a new hobby? Achieve a great victory in a sport?

Whatever it may be, urge them to memorialize their experience in a journal entry. Make sure they include words of emotion that convey how they felt about the event, as well as describing it in detail. Can they make their journal readers feel the event the way they did?

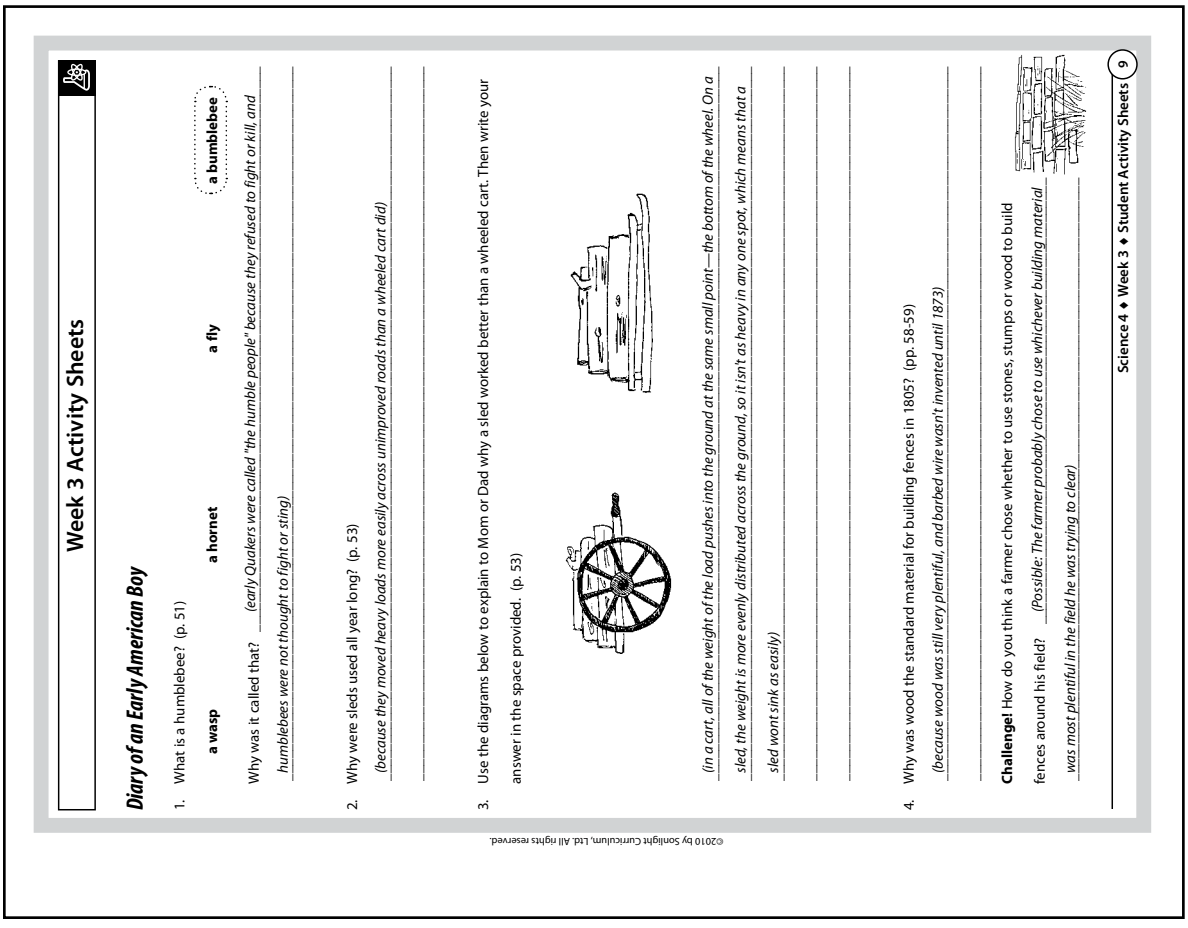
Adding a detailed illustration — just like Noah Blake does so often — can help convey their message more powerfully. Make sure they take their time and really work to capture the moment that's stuck in their minds. Be very excited about what a great job they do!

Day 4: Hay Rick Ornament

Today, let your children come up with an idea for and make their very own homemade hay rick ornament. What would they like to make? An animal? A symbol of some kind? What would they want to say about their pile of hay (if they had one)? Why?

Alternatively, let them make an ornament or decoration to place around your house. Do they enjoy creating things? Why or why not? What purposes do they see in art? Can there by a higher purpose in something that seems purely for decoration? If so, what?

Use this time together to discuss the nature of beauty and art. Why do we humans crave beauty and enjoy art? Why do we seek to decorate things? Why do we look beyond the pure utilitarian function of items to see more? Have fun and let your children have free reign with their creative sides! ■



Week 3 Activity Sheets

Diary of an Early American Boy

1. What is a humblebee? (p. 51)

   a wasp **a hornet** **a fly** **a bumblebee**

   Why was it called that? *(early Quakers were called "the humble people" because they refused to fight or kill, and humblebees were not thought to fight or sting)*

2. Why were sleds used all year long? (p. 53)

   (because they moved heavy loads more easily across unimproved roads than a wheeled cart did)

3. Use the diagrams below to explain to Mom or Dad why a sled worked better than a wheeled cart. Then write your answer in the space provided. (p. 53)

   (in a cart, all of the weight of the load pushes into the ground at the same small point—the bottom of the wheel. On a sled, the weight is more evenly distributed across the ground, so it isn't as heavy in any one spot, which means that a sled wont sink as easily)

4. Why was wood the standard material for building fences in 1805? (pp. 58-59)

   (because wood was still very plentiful, and barbed wire wasn't invented until 1873)

   Challenge! How do you think a farmer chose whether to use stones, stumps or wood to build fences around his field? *(Possible: The farmer probably chose to use whichever building material was most plentiful in the field he was trying to clear)*

Science 4 ♦ Week 3 ♦ Student Activity Sheets 9

Week 3 Activity Sheets

5. Answer the following questions to describe how the wheelbarrow was invented. (p. 58)

What was a handbarrow? *(a stretcher-like device that allowed two men to carry a load between them)*

How was a sledgebarrow better than a hand barrow? *(one person could slide a load on two runners which was easier than carrying it)*

Why do you think a wheel was eventually added in place of the runners? *(Possible: because the wheel made it easier to move the load)*

6. Name two reasons why having a standard length for fence rails was helpful. (p. 60)

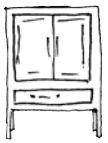
1) *(you could count fence rails to measure land; two rails were the legal width of a road; you could use a rail as a giant*

2) *ruler to measure out more land, etc.)*

7. Why were hay-ricks so carefully constructed? (p. 64)

(to withstand the elements—to not blow away in the wind and to shed away rain so the hay wouldn't rot)

8. Why did carpenters use many kind of wood in a single piece of furniture? (p. 68)



(because the different types of wood could work against each other in dry and damp weather, and would help the furniture to stay together and not break)

9. Which would last longer — one of today's cars or a wagon from Noah's time? (p. 69)

(a wagon)

Why? *(because items were so well made back then, and a wagon was specially designed to weather the elements)*

Week 3 Activity Sheets

TOPS # 32: Electricity

Fill in the blanks with the correct answer, then find the word in the puzzle. (Series Means in a Row #4)

circuit	opposition	series	current

10. A *(series)* combines multiple power sources to add strength to the job.

11. *(Opposition)* is when the electrons are flowing in opposite directions.

12. A *(circuit)* is the flow of electrons.

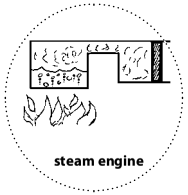
13. A *(current)* is moving electricity.

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

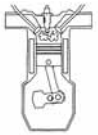
The Story of Inventions

5-Day

14. Which came first? (pp. 14-15)



steam engine



internal combustion engine

15. Why didn't steam engines work well for cars? (p. 15)

(because they were big and bulky—too big for smaller vehicles)

16. Why can't we fly with simple feathered wings like birds? (p. 16)

(because our bodies aren't built like a bird's—our muscles aren't strong enough to produce powerful enough flapping, and our bones aren't hollow—which makes our bodies heavy)

Week 3 Activity Sheets

17. Where was the first hot air balloon's source of power? (p. 17)

- ☐ hanging below the balloon
- ☐ above the balloon
- ☐ from a very long power cord
- ☒ in a huge fire on the ground

Why do you think this made the first flight risky? *(Possible: without an on-board source of power, the balloon was probably harder to control)*

Diary of an Early American Boy

1. What is a humblebee? (p. 51)

   a wasp **a hornet** **a fly** **a bumblebee**

   Why was it called that? _____

   _____

2. Why were sleds used all year long? (p. 53)

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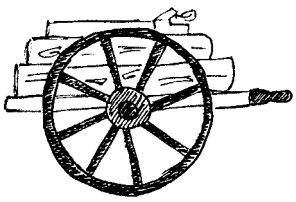
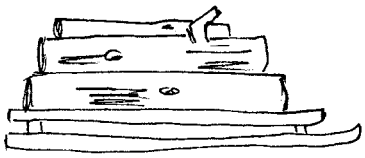




   _____

   _____

   _____

   _____

   _____

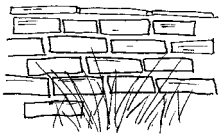
4. Why was wood the standard material for building fences in 1805? (pp. 58-59)

   _____

   _____

   Challenge! How do you think a farmer chose whether to use stones, stumps or wood to build fences around his field? _____

   _____



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   _____

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   _____

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   _____

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   2) _____

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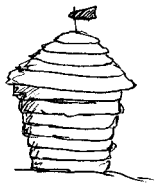

   _____

   _____

   _____

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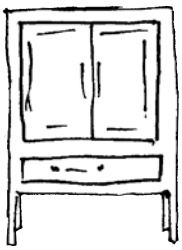

   _____

   _____

   _____

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   _____

   Why? _____

   _____

   _____

TOPS # 32: Electricity

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

The Story of Inventions

5-Day

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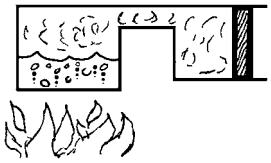
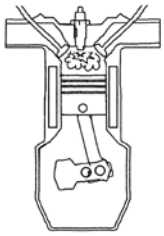


steam engine



internal combustion engine

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_____

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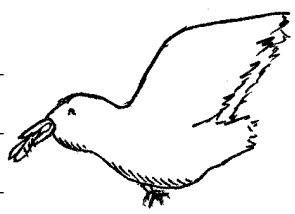
_____

_____

_____



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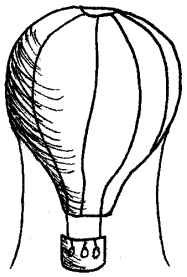

Why do you think this made the first flight risky? _____

_____