

A

LIGHT & SOUND WAVES, BIOLOGICAL FEATURES, SPACE SYSTEMS, & ENGINEERING DESIGN

SCIENCE INSTRUCTOR'S GUIDE



FUN FACT

The intestines in an adult are 25 ft long! That's as tall as a house.





Thank you for downloading this sample of Sonlight's Science A Instructor's Guide (what we affectionately refer to as an IG). In order to give you a full perspective on our Instructor's Guides, this sample will include parts from every section that is included in the full IG.

Here's a quick overview of what you'll find in this sample.

- A Quick Start Guide **START HERE**
- A 3-week Schedule
- Activity Sheets and Parent Answer Keys
- A Weekly Subject List

SONLIGHT'S "SECRET" COMES DOWN TO THIS:

We believe most children respond more positively to great literature than they do to textbooks. To properly use this sample to teach your student, you will need the books that are scheduled in it. We include all the books you will need when you purchase a package from sonlight.com.

Curriculum experts develop each IG to ensure that you have everything you need for your homeschool day. Every IG offers a customizable homeschool schedule, complete lesson plans, pertinent activities, and thoughtful questions to aid your students' comprehension. It includes handy teaching tips and pointers so you can homeschool with confidence all year long.

If you need any help using or customizing our IGs, please reach out to our experienced homeschool advisors at sonlight.com/advisors.

We hope you enjoy using this sample. For even more information about Sonlight's IGs, please visit: sonlight.com/ig. It would be our pleasure to serve you as you begin your homeschool journey. If you like what you see in this sample, visit sonlight.com/science to order your Science package.

Blessings!

Sarita Holzmann,
Co-founder and president
of Sonlight Curriculum

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Science (5-Day)

Light and Sound Waves, Biological Features, Space Systems, and Engineering Design

by The Sonlight Team

*“The heavens declare the glory of God; the skies
proclaim the work of his hands.”*

Psalm 19:1 (NIV)

Sonlight Curriculum®“Light and Sound Waves, Biological Features, Space Systems, and Engineering Design” (5-Day) Instructor’s Guide and Notes, Twenty-Second Edition

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“Do to others what you would have them do to you”
(Matthew 7:12).

“The worker is worth his keep” (Matthew 10:10).

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NOTE TO PURCHASER

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INSTRUCTOR'S GUIDES SCIENCE

Special features of Sonlight's Science Instructor's Guides:

1 COMPLETE, READY-TO-USE LESSON PLANS

All your science books and experiments are fully scheduled for the entire year. The IG provides the framework for what books to read and when, what experiments to do and what videos to watch. No need to create your own lesson plans!

2 DETAILED TEACHING NOTES

Notes explain each assignment and activity, point out fun facts about your reading, include question prompts, explanations, hands-on activities (beyond the experiments), and additional notes to enhance the reading and reinforce what your students are learning.

3 ORGANIZATIONAL TOOLS TO HELP YOU PLAN AHEAD

See at a glance the supplies you need for experiments this week and the following week. Know what supplies you'll find in the Sonlight Science Kits, and which household items you'll want to have ready.

4 WEEKLY ASSIGNMENTS AND ENGAGING ACTIVITIES

Simple, engaging experiments coordinate with your weekly reading. NEW: In levels K-C, these weekly experiments tie *directly* to that week's reading material for an even more linear progression from reading to doing. Experiments provide hands-on learning and reinforce and apply the concepts studied in the days previous so you can see your child's developing mastery of particular science concepts.

Most of the experiments can be done with common household items, but to minimize

Level K: Science
Days 5-8: Date: _____ to _____

Week 2				
Date:	Day 5	Day 6	Day 7	Day 8
Ants	pp. 10-13	pp. 14-15	pp. 16-17	
Activity Sheet Questions	#1-3	#4	#5-6	
Discover & Do Science: Kindergarten Experiments				Experiment #2 How Do Ants Walk?
Do Together		Growing Up		
Supplies	Kindergarten Supplies Kit: clay (enough to make three quarter-sized pieces), 2 pipe cleaners. You Provide: scissors that can cut pipe cleaners, ruler (optional).			
Shopping/Planning List	For next week: 1 cup of warm water, 1 tsp sugar, a small clear plastic bottle with a narrow mouth.			
Additional Subjects:				

Ants pp. 14-15
The natural world is very violent. It can be distressing to imagine defending yourself or being hurt by attackers. Now may be a good time to introduce personal safety and remind

You are probably already familiar with the idea that caterpillars spin cocoons so they can turn into butterflies, but many ants do too! What stages of development have you gone through? (e.g. growing inside your mommy, baby, toddler, and now in school!)

pp. 10-11
Do you own a globe? If not, you can also use a ball, such as a basketball or soccer ball, to demonstrate the concept of day and night. All you need is a globe or ball and a flashlight. The flashlight, naturally, represents the Sun. Shine the flashlight on one side of the globe or ball. The part of the world facing the light is experiencing day, while the other areas are experiencing night. But the world rotates, so as it turns, day turns to night on one part of the globe, while night turns to day in other areas. [p. 10]

pp. 12-13
The book refers to the northern and southern hemispheres but does not explain the concepts of western and eastern hemispheres. You might want to show your children a world map, noting the northern and southern hemispheres, as divided by the equator, while also pointing out the western hemisphere (North and South America and the Pacific and Atlantic Oceans) and the eastern hemisphere (Europe, Africa, Asia, Australia). [p. 13]

pp. 14-15
Occasionally, you'll notice short experiment suggestions such as "Make a rainbow" on page 15. Please consider these activities as optional.

Activity Sheet Questions
#1-2
Note to Mom or Dad: Find each week's Activity Sheets immediately after the notes and answer the questions assigned on the schedule page. Each Activity Sheet has a corresponding Answer Key page at the end of each week's notes.

- 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

challenge your children. Feel free to let your children do those activities 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.

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 #ASG1).

Occasionally we assign a "Cut-Out" activity. Please find these separate sheets in Section 3.

Discover & Do Level K DVD
"Before you Begin" Tracks #1-3
We produced this fun and educational video so you and your children could watch "Professor Ike" perform each of the assigned experiments from *The Usborne Book of Science Activities, Vol. 2*. 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 which works best. We hope this video makes your science experiments more enjoyable and more educational.

If your experiments don't happen exactly as you see in the video, it's OK! Watch the Outtakes in the Bonus section of the DVD and see how things didn't always happen perfectly for us, either.

Note: Please navigate your *Discover & Do Level K DVD* by using the DVD menu on your screen.

Science Activities, Volume 2
"Air All Around" pp. 2-3
If you remember school science experiments as boring demonstrations without making much of a point, it's time for you and your children to try *The Usborne Book of Science Activities, Vol. 2*. Packed with simple activities and experi-

prep time, we've created a Science Supplies Kit that includes many of the supplies you need to conduct each experiment. No planning necessary and minimal prep time!

Your children will relish the discoveries they make throughout the year. And you'll love that they are actively exploring STEM (Science, Technology, Engineering, Math) concepts, and making their learning stick.

Instructor's Guides K-J also include:

5 INTERACTIVE ACTIVITY SHEETS

Your Activity Sheets—with hundreds of activities, illustrations, charts, and pictures—help your children remember what they've learned. A variety of activity options coordinate with your students' science studies and draw on a range of skills and interests.

Activities progress with your children's abilities: from cutouts, matching, circle-the-answer, and dictation, to fill-in puzzles and sequencing analysis.

6 COMPLETE ANSWER KEYS

Separate Answer Keys mirror your Student Activity sheets for easy grading. No need to test—you have ongoing, reliable insight into your children's comprehension. 🌟



“Celebrating our last day of school by looking at all the books we read and learned from! **We love the instructor's guide and all the books!! 100% happy with Sonlight!!**” Jennie W of Puryear, TN. Pictured: Aidan (9, Level D), and Abigail (11, Level F).

Science A: Week 1 Activity Sheet

4. **Challenge:** Make the statement true. (Please find Cut-Out #1 in the Appendix.) (p. 10)

The Sun rises in the and sets in the .

5. Can you name the four seasons? (p. 12)


1) _____ 2) _____

3) _____ 4) _____

6. Use the map to help you answer. (Please find Cut-Out #2) (p. 13)


North America

When it is summer in:



...it is winter in:

7. During which two seasons does the Earth tilt toward or away from the Sun? Circle them. (p. 13)



winter spring summer fall

Week 1 Activity Sheet | 5-Day | Biology, Botany, and Physics

5

children would be able to have fun with this activity, as your children learn more about how the seasons change in your particular area. When they're done, proudly display their work of art on the refrigerator or a wall where everyone can see it.

Science A: Week 1 Activity Sheet

4. **Challenge:** Make the statement true. (Please find Cut-Out #1 in the Appendix.) (p. 10)

The Sun rises in the and sets in the .

5. Can you name the four seasons? (p. 12)


1) 2)

3) 4)

6. Use the map to help you answer. (Please find Cut-Out #2) (p. 13)

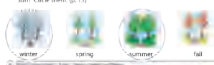
North America

When it is summer in:



...it is winter in:

7. During which two seasons does the Earth tilt toward or away from the Sun? Circle them. (p. 13)



winter spring summer fall

Biology, Botany and Physics | 5-Day | Section Two | Week 1 | 3

6

TRY BEFORE YOU BUY!
Get a three-week sample of any Sonlight Instructor's Guide—FREE!



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In Science A, you will learn about light and sound waves, biological features, space systems, and engineering.

Sonlight Science programs include introductory studies in a range of experimental sciences. The main point of all the reading, activities, and (if you choose) experiments is to introduce your children to the scientific method and the joy of discovery.

We want children to be *introduced* to a lot of different subjects, *intrigued* by the concepts and ideas, and *enticed* to come back to the same themes again in the future. And so, you will find we follow a spiral pattern of education, touching on certain topics repeatedly this year and again in future years.

This way the basic *vocabulary* of science becomes ingrained not only in short-term, but also long-term memory. “Oh, yeah. I vaguely remember hearing about pistils and stamens earlier this year,” a child may say—late in the program. When the child studies biology again in future programs, the names and concepts will be vague, but recognizable, as the child gains deeper understanding. Please don’t expect mastery of the vocabulary at this age. That will come in time.

We want our children to *remember* what they have learned because they can’t help it; because they want to. We don’t want them merely to *memorize* what they are supposed to learn so they can pass a test.

As you do the experiments and demonstrate care in reading and following directions, recording data, and such, your children learn to follow your lead. An attitude of success—“Sure. We can do this!”—rubs off as well. These cannot be taught simply by reading books; they have to be modeled.

My Downloads

Find extra schedule pages, new user information (how to use a Sonlight guide) and further helpful information specific to the guide you have purchased from Sonlight on our website: www.sonlight.com. Go to Your Account and select the Downloads section to find all of the downloads for your guide.

Two science-related issues require some special attention. The first has to do with evolution, while the second relates to the age of the Earth.

Evolution

Some of the book selections in our science programs contain material supportive of evolution. Why do we include these books? First, we include them because the majority of the content in these resources is of high quality, offering visually and intellectually appealing material. Second, we don’t take an isolationist approach to knowledge. The subject of evolution is not something we want to teach children to avoid or put down without adequate understanding. Third, as the dominant perspective in contemporary science, evolution deserves mention and attention, even from those who disagree with its arguments. With that said, we do our best to provide balanced perspectives in relation to any potentially divisive content such as evolution.

When it comes to evolution, there are a few important points to keep in mind. In particular, differences between *macroevolution* and *microevolution* are crucial. These terms are sometimes used to clarify what is meant by evolution. *Macroevolutionists* accept evolution as the overarching explanation for all life, believing that evolution is responsible for significant changes in life forms such as a land-based mammal changing into an oceangoing mammal or dinosaurs allegedly evolving into birds. These supposed evolutionary changes are big, hence the term *macro*, meaning something very large in scale, is used in reference to this kind of evolution.

Microevolution, however, refers to small changes within different kinds of life. This approach grants the reality of changes within kinds such as birds or dogs. Obviously, there are many kinds and sizes of birds and dogs, but despite the variations, these creatures remain birds and dogs. As a result, someone can adhere to *microevolution* without embracing all the beliefs of *macroevolutionists*, who tend to accept the basic underlying principles of Darwinian evolution.

Religious objections to evolution tend to stem from the accusation that *macroevolution* leaves God out of the picture, instead leaving the entire process of the emergence and development of life to chance and time. Of course, this means that evolution is undirected by any sort of intelligence, while Christianity, for instance, believes in the reality of the existence of God as Creator. In other words, one approach to evolution is based on a worldview known as *naturalism*, while another is based on *theism*.

Naturalism here does not refer to enjoying nature, as in being a naturalist, but in a worldview that denies the existence of anything beyond the material world. In other words, anything supernatural, such as the existence of God, is rejected by naturalists.

Theistic evolutionists accept the existence of God, but view Him as being active in the process of evolution. Christian theistic evolutionists may appeal to Scripture supporting God's active involvement in His creation (such as 1 Corinthians 8:6, Hebrews 1:3, etc.). In areas where a naturalist sees random processes and events, the theistic evolutionist argues that God is actively involved in directing matters.

Theism accepts that there is more to reality than the material world. There is a supernatural world and God exists as a personal being, active in His creation. By definition, naturalism excludes God. Christian theists who reject macroevolution and theistic evolution argue that God is Creator and Designer, having made all life without resorting to any macroevolutionary processes.

Scientific objections to *macroevolution* include, for instance, allegations that the fossil record lacks transitional forms, that genetic mutations are commonly harmful not helpful, and claims that life shows signs of intelligent design.

One goal we have at Sonlight is to present fair and balanced perspectives on issues, including science and evolution. As a result, some of the materials we choose to utilize will at times present evolutionary points of view, while other selections will not. As the parent, we encourage you to provide guidance for your children on these topics. In our assessment, it's better for your children to have some exposure to controversial topics at home, with intelligent and caring guidance, rather than have them be surprised by ideas they will eventually encounter anyway.

The Age of the Earth

Another issue that will come up in the course of studying science has to do with questions about the age of the Earth. Secular books in some of our science programs will at times refer to "millions" or "billions" of years. For Christians who hold to a young Earth perspective, believing the Earth may only be several thousand years old rather than billions, such phrases pose a problem.

We suggest two solutions. First, whenever you encounter "millions" or "billions" in a science book, feel free to rephrase the sentences in question with phrases such as "a long time," "a very long time," or variations of this phrasing. Second, you may wish to state that although the book uses millions and billions of years, there are other perspectives on the age of the Earth and the age of the universe.

If your children ask why there is disagreement on the age of the Earth and/or universe, you can explain that not everyone interprets the data in the same way. In addition, not everyone employs the same research methods or believes in the same data. Young Earth creationists, for example, include their interpretation of the Bible as a primary source of data. Those who hold to an old Earth view tend either to ignore the Bible (if they are non-Christian) or interpret the biblical creation account in such a way that allows for an old Earth without diminishing essential Christian doctrine. The Bible, from this old Earth perspective, may be a supplementary witness regarding the question of the age of the Earth, but traditional interpretations of it in reference to the age of the Earth need to remain open to reinterpretation.

You may also wish to add, "We aren't sure about how old the Earth is, but I happen to believe ..." then state your position on the matter.

Our goal here is not to present a definitive position on the age of the Earth or to present nuanced arguments for each side in the debate, but to leave it to you, as parent, to discuss with your children as you see fit.

Discussion and disagreement about the age of the Earth leads to another important point: is a particular view of the age of the Earth an essential Christian doctrine? Sometimes nonessential beliefs can lead to problems with essential beliefs, so this point needs to be approached carefully and thoughtfully. In general, however, we do well to follow the maxim, "In essentials unity, in nonessentials liberty, and in all things charity." In other words, we should foster Christian unity on essentials, rather than division about nonessentials.

Student Activity Sheets

After each week's notes you will find Activity Sheets to reinforce what you are teaching and engage your student. Each Activity Sheet lists the week it is used at the top of the page. The questions coordinate with what you are reading and each activity is assigned on the schedule page.

It is not necessary to complete every activity provided. These are merely suggestions and you, as the teacher, can determine which are best suited for your children. You will find a variety of activities included in the Activity Sheets that are designed to draw on different skills and interests. Please feel free to assist your children by doing the hard work of handwriting the answers.

We have also included corresponding Instructions and Answer Key pages for all activities. You may want to file the Activity Sheets in a separate binder for your student's use.

Note: If you might reuse your Instructor's Guide and Student Activity Sheets in the future (for a younger child, for instance), we strongly suggest that you purchase an extra set of Activity Sheets when you buy the Instructor's Guide. That way, when we update our Instructor's Guides you will have matching Activity Sheets when you need them. Please contact us if you are looking for Activity Sheets from the past.

Helpful Hints for Using the Cut-Out Sheets

We hope that the Cut-Out sheets included in Section 3 will be a wonderful resource for you and your children. They should provide your student with another avenue for demonstrating comprehension, even though they have not yet mastered the written language. Some of the questions on the Activity Sheets ask the student to write simple words (usually terms they are studying in the material at the time). Whenever this occurs, we have structured the sheet to already include the word in dashed letters. We suggest your children practice forming letters to produce a word that grow familiarity with science concepts while minimizing the work involved. More importantly, these

exercises also allow your children to practice their writing skills in a very practical way. By integrating handwriting and science skills, your children will begin to see how two separate subjects are related and how each is important to the other.

So why the dashed letters? This relates to an educational concept called “scaffolding.” When you “scaffold” knowledge, you give them a little information that they didn’t have before to get them to a higher level of comprehension than they might have been able to achieve on their own. For example: students are asked to label the four stages of a butterfly’s life. It would be very difficult for children to recognize the “pupa” stage, think of the word “pupa,” remember that the letters p-u-p-a spell “pupa,” and then get their pencil to actually write p-u-p-a without transforming a “p” to a “b” or a “q” in the process!

With the dashed letters, students are provided with the correct letters in the correct order, and as they trace them, they are helping to memorize how to form the letters correctly in the future. Be sure to talk with your children as they trace to help them read the word and recognize it as something you’ve been talking about—not just tracing.

Fifth-Day Assignments

Because our goal for the 5-Day program is to provide high-interest and enjoyable titles, we choose to not include Activity Sheet questions. simply read the scheduled pages and enjoy!

A Few Other Helpful Hints

1. Write or color first, then cut out. Small pieces of paper are hard to work with, even if your children have fully developed fine motor skills. Eliminate some frustration for your children (and mess for you!) by cutting out pieces last.
2. Assist with cutting! Always be sure to help your children with scissors. Safety scissors with the rounded tips are best (especially for younger children), but they can still cause damage to items you’d rather not cut, or even to children themselves. Cut with care as a pair! **Also:** a few of the pieces may be small or require a little fancier scissor-work. We recommend that an adult cut out these pieces (to save frustrating your children), or share the cutting project—give your children some to do (larger, more basic pieces) while you work on the harder ones.
3. Resist the temptation to do it all! No matter how prepared you’d like to be for a day of teaching, don’t think that you need to cut things out ahead of time. Your children will love to help! Not only will they achieve a sense of accomplishment when they have finished, but they are also learning a valuable life skill while developing their fine motor skills.

A Practical Suggestion

The experiments suggested in your books are basic ideas. Try them; improve them! If you figure something out that works better than the instructions in your book, please tell us! Some experiments work every time, some may take several tries. Even the most famous scientists have had to try the same (or similar) experiments over and over. If an experiment does not work the first time, please try again.

Supplementary Websites

We know that there are times throughout our curriculum when we simply cannot cover all the material on a given subject. In these instances we will provide Internet search instructions for you to find more information. Please use caution and your own discretion as you look at different sites. We highly recommend that you as the parent and teacher look before allowing your student to do the search with you or on their own. We hope you find this helpful!

Corrections and Suggestions

Since we at Sonlight Curriculum are constantly working to improve our product development, we would love it if we could get you to help us with this process.

Whenever you find an error anywhere in one of our Instructor’s Guides, please check our updates page for the latest information at www.sonlight.com/curriculum-updates. Report new information by sending a short e-mail to: IGcorrections@sonlight.com. It would be helpful if the subject line of your email indicated where the problem is. For instance, “Science A schedule pages” or “Introduction to World History, Part 1 Study Guide.”

If, while going through our curriculum, you think of any way we could improve our product, please e-mail your suggestions to: IGsuggestions@sonlight.com. If you know of a different book we should use, if you think we should read a book we assign at a different point in the year, or if you have any other ideas, please let us know.

Summary

We hope that you enjoy your adventure this year and that it helps you learn more about the world we live in. If we can be of any assistance, please do not hesitate to e-mail us at main@sonlight.com, call us at (303) 730-6292, or better yet, join our Sonlight Connections Community (sonlight.com/connections), where you can chat with others who are going through this same program. You can ask questions, learn new ideas, share with others what you have learned, problem-solve, or just talk. Happy exploring! ■

Section Two

Schedule, Notes, and Activity Sheets

Level A: Science

Days 1–5: Date: _____ to _____

Week Overview																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36

Week 1					
Date:	Day 1	Day 2	Day 3	Day 4	Day 5
The Usborne Children's Encyclopedia	pp. 8–9	pp. 10–11	pp. 12–13		
Activity Sheet Questions	#1–2	#3–4	#5–7		
Discover & Do: 1st Grade Science Experiments				#1: What Makes Day, Night, and the Seasons?	
Hooray for Inventors					pp. 6–7
Do Together			The Seasons at Your House		
Supplies	We Provide (1SK): 3" Styrofoam ball, wooden skewer, rubber band, thumbtack, flashlight You Provide: sandwich-sized clear plastic bag, twist tie, lamp, permanent marker				
Shopping/Planning List	For Next Week: room that can be darkened, white paper, drinking glass, plate or shallow dish, table, measuring cup or small pitcher, water, camera (optional), colored pencils or crayons, pencil				
Additional Subjects:					

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Children's Encyclopedia

Day **1** pp. 8–9

Let your children know how amazing it is that so many things have to work just right in order for our world to support life. For example, if we were too close to the Sun, our world would be too hot to support life. If we were too far, it would be too cold. Isn't it amazing what God has done in His creation? He's made things just right to support life on Earth.

The book mentions continents, but doesn't list them. The seven continents are North America, South America, Europe, Asia, Africa, Australia, and Antarctica. Find a map at the back of the book on page 286–287 and show your children the continents. [p. 8]

Notice the "Internet links" box at the top of the page. It is not necessary to visit all these links as part of your reading, but if you'd like to, just follow the link listed in the book for supplemental online material.

The book mentions what the Earth is made of, but doesn't properly label the layers: The outer layer is called the crust; next there is the mantle; then in the center is the core. One idea to help your children visualize the layers of the Earth is to compare the Earth to an egg. The shell is the crust, the white part is the mantle, and the yolk is the core. For a hands-on visual, hard-boil an egg and talk about each part. To see the "mantle" and the "core," you'll need to peel away the "crust" first, but then cut the egg in half lengthwise for a nice cross-section of the "Earth"! Of course, the Earth is not shaped exactly like an egg, but neither is it perfectly round (there are flatter parts on the top and bottom). [p. 9]

On the picture of the earth from space there is text that is difficult to read. It says, “Blue Seas and Oceans”. [p. 8]

The different parts of the earth have specific names. The middle of the earth that is made of solid metal is called the inner core. The part that has hot, soft metal is called the outer core. The hot, sticky rock that moves is called the mantle, while the outside that is made up of solid rock is called the crust. [p. 9]

Please forgive the grammar error on the first line of the section about the atmosphere. It should read, “a large blanket”, not, “an large blanket”. [p. 9]

Day
2

pp. 10–11

Do you own a globe? If not, you can also use a ball, such as a basketball or soccer ball, to demonstrate the concept of day and night. All you need is a globe or ball and a flashlight. The flashlight represents the Sun. Shine the flashlight on one side of the globe or ball. The part of the world facing the light is experiencing day, while the other areas are experiencing night. But the world rotates, so as it turns, day turns to night on one part of the globe, while night turns to day in other areas. [p. 10]

The path that the earth takes as it travels around the sun is called its orbit. [p. 10]

Day
3

pp. 12–13

The book refers to the northern and southern hemispheres but does not explain the concepts of western and eastern hemispheres. You might want to show your children a world map, noting the northern and southern hemispheres, as divided by the equator, while also pointing out the western hemisphere (North and South America and the Pacific and Atlantic Oceans) and the eastern hemisphere (Europe, Africa, Asia, Australia). [p. 13]

Under the section, “What Makes The Seasons Happen?”, the paragraphs explain the earth pointing toward the sun, away from the sun, and getting “more hot sunlight” when the earth is facing the sun. This description may be a bit misleading. The little descriptions on the diagram below this section talk about “direct sunlight”. This is a more accurate description. Direct sunlight means that the light from the sun is concentrated on a smaller area. Likewise, heat, which is one component of sunlight, is also focused on a smaller area. On the other hand, indirect sunlight is spread out over a larger area, and therefore the heat is also spread out. [p. 13]

Activity Sheet Questions

Day
1

#1–2

Note to Mom or Dad: Find each week’s Activity Sheets immediately after the notes and answer the questions assigned on the schedule page. Each Activity Sheet has a corresponding Answer Key page at the end of each week’s notes.

- 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.
- Any question marked **Challenge:** will be just that—a challenge for your children. While we believe the material covered in the challenge questions is worthwhile for your children to know, it may not be specifically explained in their reading assignment. As always, if you think any question is too difficult for your children, please feel free to skip.

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 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.

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 #ASG1).

Occasionally we assign a “Cut-Out” activity. Please find these separate sheets in Section 3.

Discover & Do: 1st Grade Experiments

Day
4

#1: What Makes, Day, Night, and the Seasons?

Note: Save the Earth model you make in this experiment. It will be used again. The laser pointer in the supply kit has a flashlight function. Press the second button twice.

Hooray for Inventors

Day
5

pp. 6–7

The book *Hooray for Inventors* contains a lot of overview material about many different inventions and then goes into detail on a few of those inventions. It is a comic style book with lots of side dialogue listed in the margins and frames. We recommend taking time to research any inventions that catch the attention of your students. There may be instances where you may find that the information in the book is limited. In this case, further research will help guide you to examples of people who have invented something before the person mentioned in the book invented it. We do not want these side stories to inhibit your enjoyment of reading this book.

“Signore” is the Italian word for “mister”. [p. 6]

The invention of the helicopter has a debated history. The book shows Leonardo da Vinci’s sketch of what he called an Aerial Screw—a man-powered helicopter, though this was not the first concept of a flying craft. The book also mentions Henrich Focke as the man who invented the first helicopter. However, many others before Focke who designed and flew a flying craft. Although Focke’s invention was the first helicopter that was actually useful, it is not the same as the true first helicopter. You can do more research on your own by using your favorite search engine to look up the term “Helicopter”. You will want to find a page that does a good job of explaining the history of the concept of a helicopter. [p. 7]

The invention of the hang glider is also a bit confusing. Da Vinci was not the first to think of a human gliding on a winged craft; rather, the Chinese reportedly first created a kite that could carry a human. And while the British inventor Sir George Cayley may have designed and created a hang glider, his design was not the first hang glider for practical use. To do more research on hang gliders, use your favorite search engine to look up the term, “Hang Glider”. [p. 7]

Optional: Do Together

Day
3

The Seasons at Your House

Using a large piece of poster board, draw a line down the middle in each direction so as to divide it into four equal parts. Label the upper left corner “Spring,” the upper right corner “Summer,” the lower left corner “Fall,” and the lower right corner “Winter.” Now ask your children to use crayons, markers, paint, colored pencils, etc. to draw a picture of what each of the seasons looks like where you live. As they draw, discuss the seasons and what’s different about each one. Ask them to think about how a stranger who just flew in from halfway around the world would be able to tell what season it is at any particular time. What clues would they find? Have fun with this activity, as your children learn more about how the seasons change in your particular area. When they’re done, proudly display their work of art on the refrigerator or a wall where everyone can see it.

Supplies

Day
All

You Provide

Note to Mom or Dad: When supplies are listed as “**We provide:**,” they are materials found in your course-specific (1SK) Supplies Kit. When supplies are listed as “**You provide:**,” they are materials you can generally find around your home. ■



The Usborne Children's Encyclopedia

Mom or Dad: Write your child's answer as you talk about each question.

1. How many continents does the earth have? Count them. (p. 8)



On which continent do you live? _____

2. Why is a day 24 hours long?

(Put an X next to the correct answer.) (p. 8)



because that's how long it takes for the earth to spin once on its axis

because that's how long it takes for the earth to travel around the sun

3. **Discuss with Mom or Dad:** Why is it daytime on only one side of the earth at a time? (p. 10)

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4. **Challenge:** Make the statement true. (Circle the correct answer.) (p. 10)

The sun rises in the East or West and sets in the East or West.

5. Can you name the four seasons? (p. 12)

1) _____ 2) _____

3) _____ 4) _____

6. Use the map to help you answer. (Please find Cut-Out #1) (p. 13)



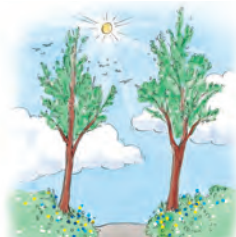
When it is summer in:

... it is winter in:

7. During which two seasons does the earth tilt toward or away from the sun? Circle them. (p. 13)



winter



spring



summer



fall

Level A: Science

Days 6–10: Date: _____ to _____

Week Overview																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36

Week 2

Date:	Day 6	Day 7	Day 8	Day 9	Day 10
The Usborne Children's Encyclopedia	pp. 14–15	pp. 16–17	pp. 18–19		
Activity Sheet Questions	#1–3	#4–5	#6–7		
Discover & Do: 1st Grade Science Experiments				#2: What Causes Rainbows?	
Hooray for Inventors					pp. 10–11
Do Together			Rock Star & Fossil Fun		
Supplies	We Provide (15K): flashlight, small mirror You Provide: room that can be darkened, white paper, drinking glass, plate or shallow dish, table, measuring cup or small pitcher, water, camera (optional), colored pencils or crayons, pencil				
Shopping/Planning List	For Next Week: an additional flashlight for each partner, pencil, scissors, bowl or container to hold strips of paper to draw from				
Additional Subjects:					

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Children's Encyclopedia

Day **6** pp. 14–15

Occasionally, you'll notice short experiment suggestions such as "Make a rainbow" on page 15. Please consider these activities as optional.

When the book describes wind at the top of page 15, it gives three examples with corresponding names for different strengths of wind. The third example uses the term "hurricane" as the strongest type of wind, when in actuality a hurricane is a type of storm with very strong winds. Additionally, the second example uses the term "gale". Gale is a nautical term that describes a strong, sustained wind over maritime areas, like the sea. Wind over land may not technically be a gale, but could still have the same wind strength. [p. 15]

To explain how a rainbow forms, explain to your children that light is made up of a lot of colors. Specifically, the colors are red, orange, yellow, green, blue, indigo, and violet. When light passes through the water, it is broken up into the colors seen in a rainbow.

Day **7** pp. 16–17

The photograph at the bottom of page 16 shows a hurricane. Earth is not the only planet to have storms. Jupiter, for example, has many huge storms, such as the Great Red Spot. If you look at images of Jupiter, the spot looks like part of the planet, but is actually an enormous storm that has been occurring for many years.

People disagree on the amount of time it takes to form fossils. Some claim this process must take millions of years, as noted in the book, while others believe fossil formation could happen much faster. For example, when the Roman city of Pompeii was covered by a volcano eruption in 79 A.D., scientists discovered “fossils” of people and dogs that formed at that instant. For our note on addressing the age of the Earth and “millions of years” issues, see the note on “Evolution and the Age of the Earth” in the Introduction.

At the bottom right corner of page 19, the book explains that the Colorado River formed the Grand Canyon by wearing the rock away (erosion) over millions of years. Again, this is an area of disagreement, with some agreeing with this conclusion and others believing the formation of the Grand Canyon could have taken place rapidly, possibly as a result of the biblical flood. One thing is certain—the Grand Canyon is amazing!

Please note that when this book discusses dating for things like rocks and fossils, it assumes an old earth perspective that is in line with most scientific schools of thought. Refer to Section 1 of this guide for more information about dating methods.

The section that talks about the hot, sticky, fiery rocks refers to magma when it is inside the earth. Once the magma reaches the surface of the earth, it is called lava. Both magma and lava are essentially the same thing, but the name is determined by its location (i.e., inside the earth versus on the surface). When the authors use the word “sticky”, they are describing that the rock is so hot that it has melted into a liquid form. [p. 18]

Hooray for Inventors

The story here implies that there were not any books before the invention of the printing press. This is not true. People knew how to make books, but because the books were hand-made, they were usually only found in libraries. The process was simply too slow and costly for people to buy their own books. [p. 10]

Optional: Do Together

Have your children ever wanted to be a rock stars? Well, now they can be one! A star at collecting and analyzing rocks, that is. Grab a pad of paper, something to write with, perhaps some colored pencils, a magnifying glass, and a jackhammer. OK, forget the jackhammer, but grab the rest of the stuff and head outside to collect some rocks. Look around your house and your neighborhood. How many different types of rocks can you and your children find? After they collect several samples of different types of rocks, make notes about each one. What your children see? What do the rocks feel like? Do they have similar or different smells? What sounds do the rocks make when your children drop them? Have your children draw a picture of each of the rock samples. When they're done, have them show off their work to another family member and discuss the discoveries with them.

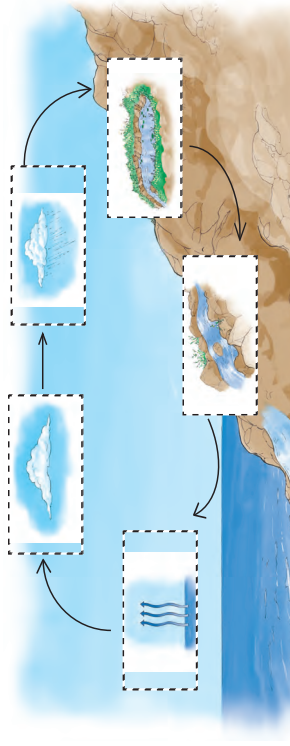
Help your children create their own fossil. First, make some fossil dough. You'll need: ½-cup cornstarch, 1 cup baking soda, and ½-cup cold water. Put the ingredients in a saucepan and stir over medium heat for four minutes until the mixture thickens to look like moist mashed potatoes. Then place the mixture on a plate and cover with a damp cloth until cool. Knead it like dough, and then shape it into 1-inch balls. Provide each student with a square of wax paper. For the remainder of this activity, you will need: wax paper, materials to make an imprint (leaves, acorns, shells, etc.), and possibly some paints. Give your children a 1-inch ball of fossil dough. On the wax paper, press the dough ball into a disc the size of a half-dollar. Then use a leaf, acorn, shell, etc. to make an imprint in the dough. Set the future fossil aside to dry and repeat the steps to make additional fossils. When the fossils are dry, let your children paint them or decorate them. ■

Science A: Week 2 Activity Sheet



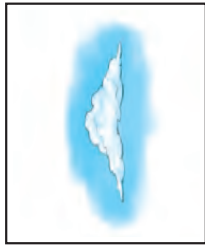
The Usborne Children's Encyclopedia

- Describe the water cycle. (Please find Cut-Out #2.)
Then add arrows to show which way the water moves. (p. 14)



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- Draw a picture to record the weather each day this week. (pp. 14–15)

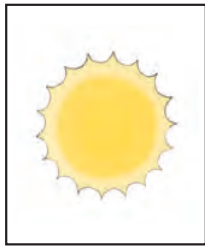


Day 1

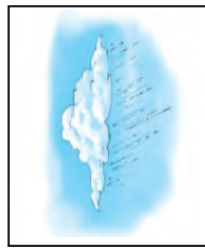
(Possible Answers)



Day 3



Day 2

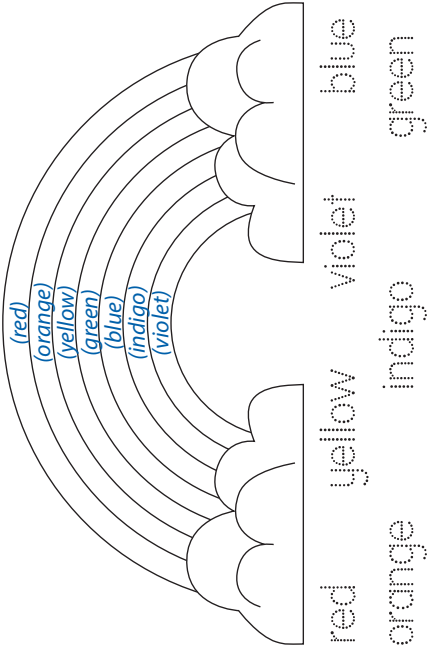


Day 4



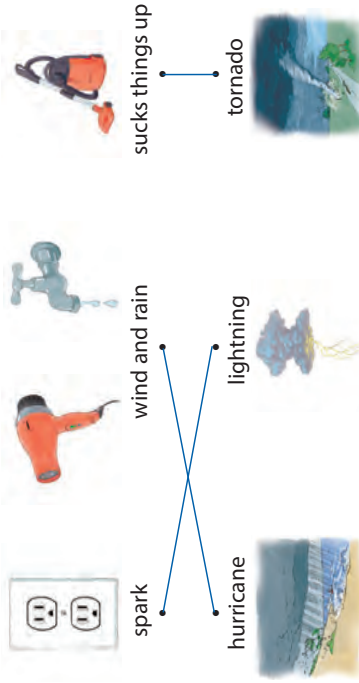
Science A: Week 2 Activity Sheet

- Label and color the correct colors on the rainbow. (p. 15)



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- Draw lines to match each storm feature to the picture that shows what each is like. (p. 16)





5. Why do floods happen? Talk through these causes with your children. (p. 17)



(too much rain falls in a short time)

(undersea volcanoes or earthquakes send huge waves to shore)



(ice and snow melt when the ground is too frozen to absorb it)



(monsoon winds bring heavy rain from the ocean)



6. How are the two types of rock formed? (p. 18)

Sedimentary: *(layers of sediment build up slowly and get*



squeezed together to become rock)

Igneous:

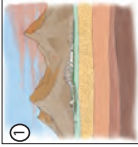


(hot sticky rock pours out of a volcano. when it

hardens, it becomes igneous rock)

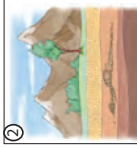


7. How do fossils form? Use the pictures to help you describe the process to Mom or Dad. (p. 19)



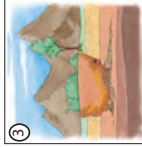
(Possible: The soft parts of dead animals rot away, but the

bones may sink into the mud and get covered with sediment.



After time passes, the mud hardens into rock but keeps the

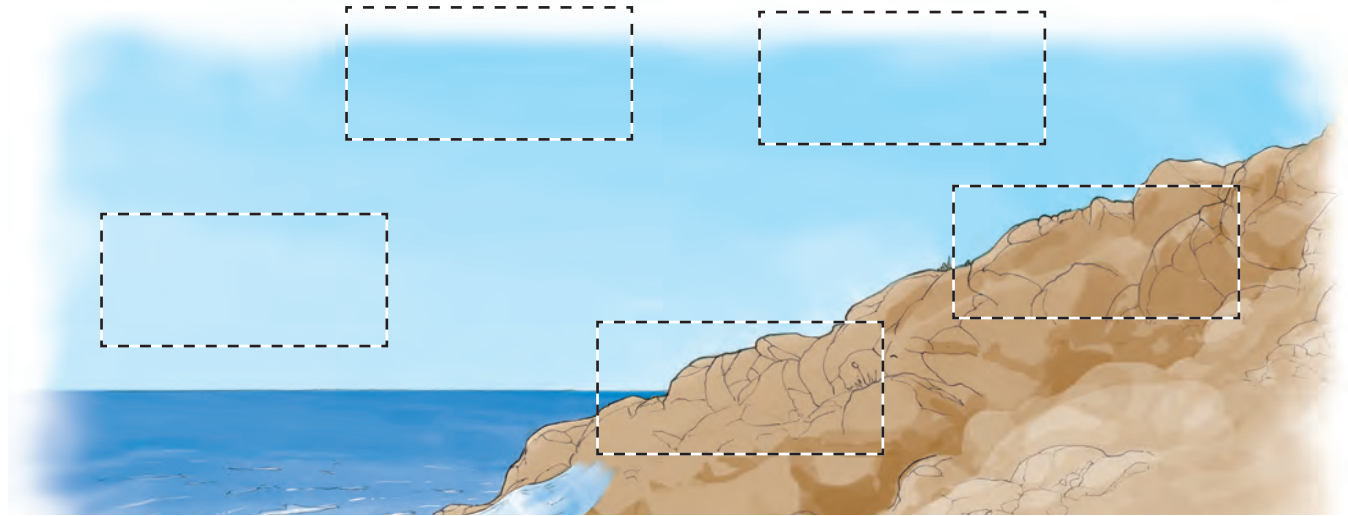
shape of the animal bones.)





The Usborne Children's Encyclopedia

1. Describe the water cycle. (Please find Cut-Out #2.)
Then add arrows to show which way the water moves. (p. 14)



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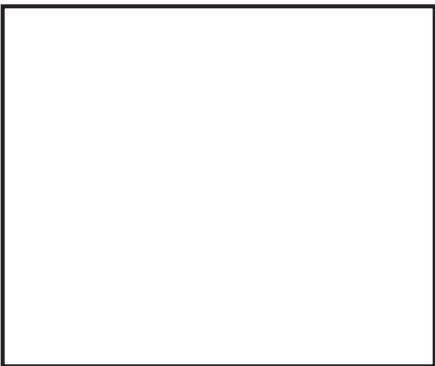
2. Draw a picture to record the weather each day this week. (pp. 14–15)



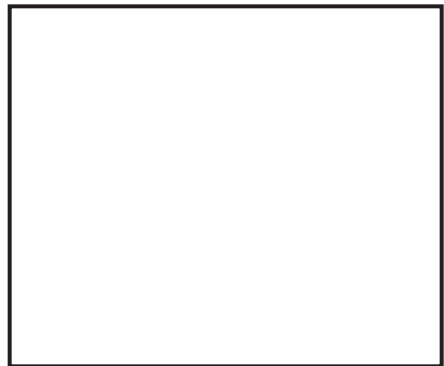
Day 1



Day 2



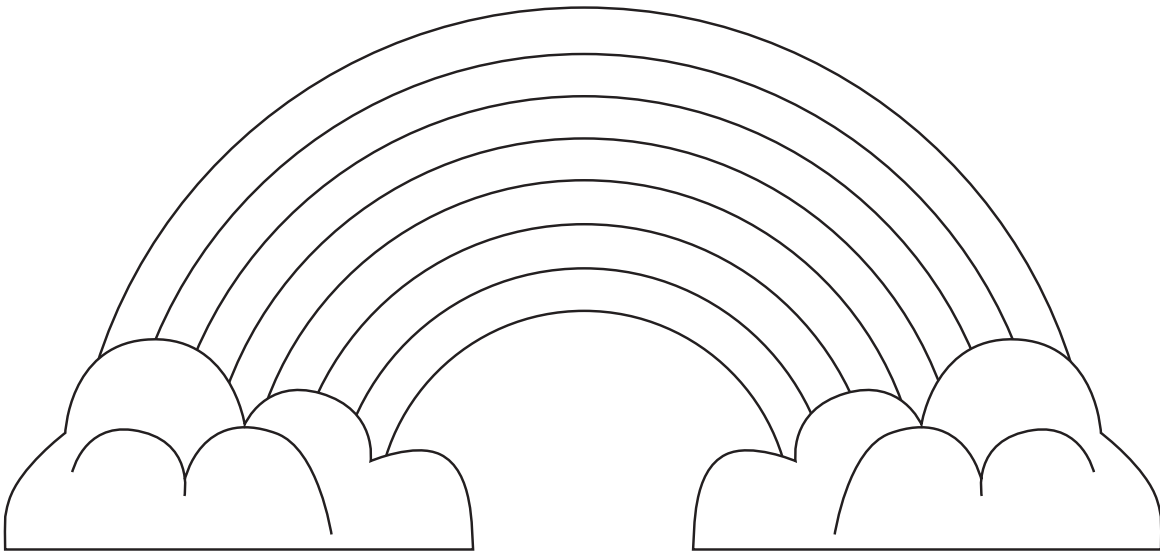
Day 3



Day 4



3. Label and color the correct colors on the rainbow. (p. 15)



red yellow violet blue
orange indigo green

4. Draw lines to match each storm feature to the picture that shows what each is like. (p. 16)



spark



wind and rain

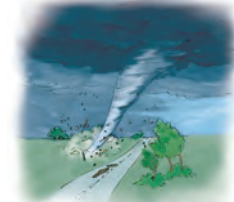
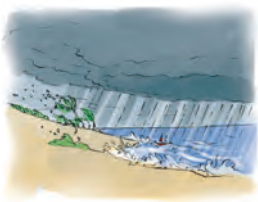


sucks things up

hurricane

lightning

tornado



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5. Why do floods happen? Talk through these causes with your children.
(p. 17)

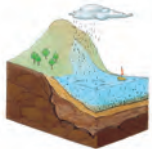






6. How are the two types of rock formed? (p. 18)

Sedimentary: _____

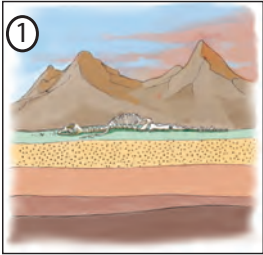


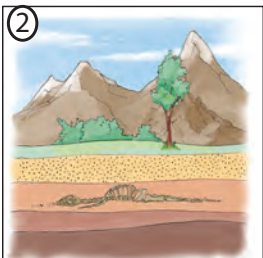
Igneous: _____

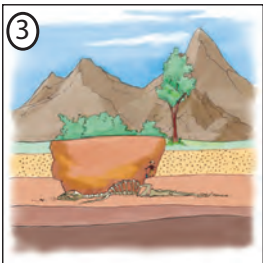




7. How do fossils form? Use the pictures to help you describe the process to Mom or Dad. (p. 19)







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Level A: Science

Days 11–15: **Date:** _____ **to** _____

Week Overview																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36

Week 3

Date:	Day 11	Day 12	Day 13	Day 14	Day 15
The Usborne Children's Encyclopedia	pp. 20–21	pp. 22–23	pp. 24–25		
Activity Sheet Questions	#1–2	#3–5	#6–8		
Discover & Do: 1st Grade Science Experiments				#3: Can I Send a Message with a Light?	
Hooray for Inventors					pp. 12–13
Do Together	My Fault	Volcano Eruption			
Supplies	We Provide (1SK): flashlight You Provide: an additional flashlight for each partner, pencil, scissors, bowl or container to hold strips of paper to draw from				
Shopping/Planning List	For Next Week: measuring tape, single location outside where you can use the sidewalk chalk, pencil, alarm (optional), Earth model made earlier this year (Styrofoam ball, skewer, rubber band, thumbtack)				
Additional Subjects:					

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Children's Encyclopedia

Day 11 pp. 20–21

Earthquakes can be scary. Is this the way God intended the world to be? Let your children know that the Bible tells us that the world isn't the way it was originally created. After the Fall, the world changed from being completely good as God intended. In the New Testament the Apostle Paul wrote, "We know that the whole creation has been groaning" (Romans 8:22, NIV). But someday, God will restore His wonderful creation so there will no longer be terrible earthquakes.

To expand your knowledge of earthquakes, you may want to research the different types of earthquakes. Some earthquakes produce waves like you might expect to feel in the ocean, and others that are more like a shaking movement.

Day 12 pp. 22–23

The largest volcano on Earth is Mauna Loa, which makes up about half the island of Hawaii. The name of the volcano means "long mountain." The largest volcano in the solar system is Olympus Mons on Mars. It is about sixteen miles high. The book makes no mention of the famous volcano eruption of Pompeii, which erupted in 79 A.D. You can learn more about this eruption in *Pompeii ... Buried Alive!* by Edith Kunhardt.

Note: Not all people accept that the world is millions of years old.

As you discuss the path from the river to the ocean, number 6 in the book may sound a bit confusing. At the end of a river, it is true that rivers typically get wider, but it is also true that the outer edge of the bend of a river at the end of its course is typically deeper. [p. 25]

Optional: Do Together

Do you live in an area prone to earthquakes? When was the last time an earthquake occurred in your area? As you talk about these questions, discuss earthquake preparedness with your children. Do they know what to do in case of an earthquake?

If you're in the mood for a really messy experiment (and, really, who isn't?), then this volcano simulation is for you! Here's what you'll need: an aluminum pie tin (or paper plate), newspaper, baking soda (3–4 tablespoons), vinegar ($\frac{1}{2}$ -cup), liquid dishwashing detergent, a small plastic bottle (a soda bottle will work fine), modeling clay (or any type of clay—use our recipe provided below or check the Internet for homemade clay recipes), a funnel, measuring spoons and cups, and food coloring. Put the bottle on the pie plate (or paper plate). Using the clay, make a volcano around the bottle. Leave the area around the top of the bottle open and don't get any clay inside the bottle. Feel free to decorate the volcano any way you'd like. Using the funnel (make sure it's dry), put 3–4 tablespoons of baking soda into the bottle. Then add a few drops of liquid dishwashing detergent and about a half-cup of water. Put a few drops of food coloring into a half-cup of vinegar. Using the funnel, pour the vinegar mixture into the bottle. Quickly remove the funnel, as the volcano will erupt immediately! When the vinegar reacts with the baking soda, carbon dioxide gas is formed and the bubbles push the "lava" out of the "volcano." Be prepared for a mess! This is one of those experiments best done outside. Have fun!

Recipe for clay: mix 1 cup salt, 2 cups flour; slowly add 1 cup of water. Knead seven to ten minutes. ■



The Usborne Children's Encyclopedia

1. What causes an earthquake? (p. 20)

- Huge animals make the ground shake.
- When trees fall, it causes the earth to shake violently.
- Huge rocks deep under the earth slip and push against each other, which causes the ground above to shake.

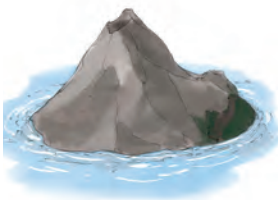


2. Why are tsunamis (or giant waves) dangerous? (p. 21)

- Because they are like a bad earthquake.
- Because if the enormous wave reaches the shore, it will cause a lot of damage.



3. A tall and steep volcano forms because ... (p. 22)



4. A flatter volcano forms when ... (p. 22)



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5. Label the activity of each volcano below. (Please find Cut-Out #3.)
(p. 23)



[Dashed rectangular box for labeling]

[Dashed rectangular box for labeling]



[Dashed rectangular box for labeling]

[Dashed rectangular box for labeling]



[Dashed rectangular box for labeling]

[Dashed rectangular box for labeling]

6. The place where a river begins and gathers lots of its water is called its _____ (p. 24)



7. Circle the correct answers to complete the sentence. When a river goes over a waterfall, the water travels very **fast** **slow** , and when the river begins to loop through meanders, it travels **fast** **slow** . (pp. 24-25)



8. How does a waterfall form? (p. 25) _____

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Section Three

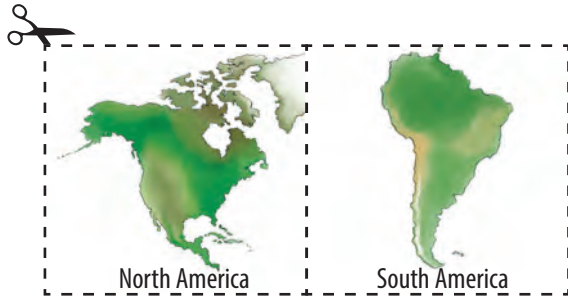
Appendices

Appendix 1: Science A—Weekly Subject List

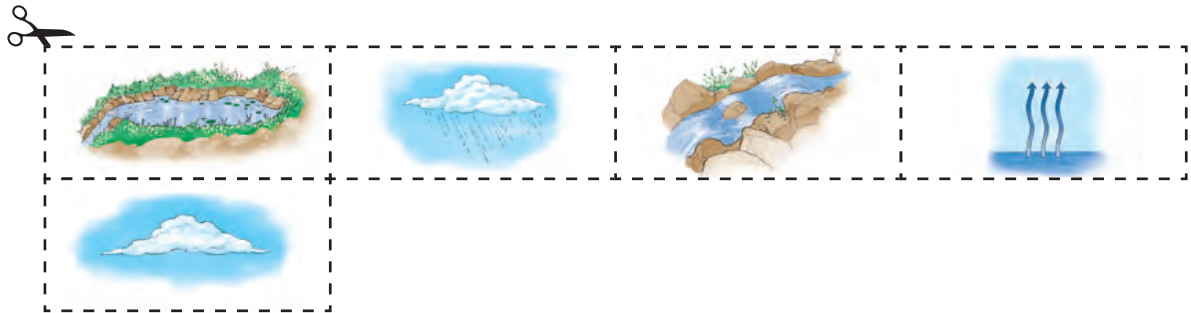
Week	Subject
1	our planet; day and night; seasons
2	weather, rain, wind snow; storms & floods; rocks & fossils
3	earthquakes; volcanoes; rivers
4	mountains; deserts; grasslands
5	rainforest; seas & oceans; waves
6	currents/tides; coasts; poles, iceberg, icy world
7	caves, caverns; coal, oil, wind, water, solar; pollution, damage, extinct
8	global warming/solutions; living things characteristics; cells
9	Pasteur; animal categories
10	mammal characteristics; baby mammals; bird characteristics
11	bird bodies & beaks; nests & chicks; reptile characteristics
12	amphibians; insects/spiders; butterflies / metamorphosis
13	seashore life; fish characteristics; coral reefs
14	sharks/whales; dolphins; deep sea
15	plant types; how plants grow; trees, leaves/fungi
16	body, organs, blood, skin; bones & muscles; digestion
17	brain & senses; babies - how and birth; health, eat, clean, fit, sleep, doctors
18	illness; germs;
19	germ invasion; body fights back; allergies
20	how illness spreads; accidents; go to doctor
21	where you live; health: eat, clean, careful, feelings; what is science
22	what scientists do; atoms & molecules; solids, liquids, gases
23	how materials change; energy; forces
24	hot & cold; gravity; floating
25	friction; magnets; light & color
26	light
27	sound
28	sound electricity; space;
29	space shuttle; spacesuits/gear; life in space
30	satellites & probes; solar system; moon
31	sun; Mercury & Venus; Mars
32	Jupiter & Saturn; Uranus & Neptune; Pluto & beyond
33	space pieces; galaxies; night sky
34	Engineering
35	machines; robots; building big
36	helping people; help planet; create culture



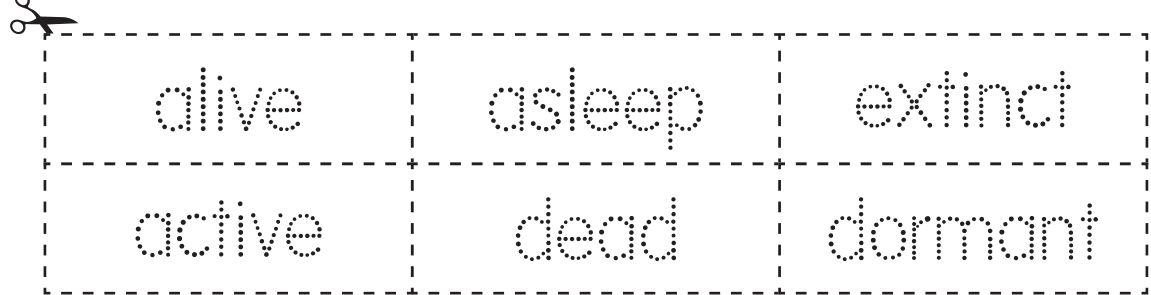
Cut-Out #1



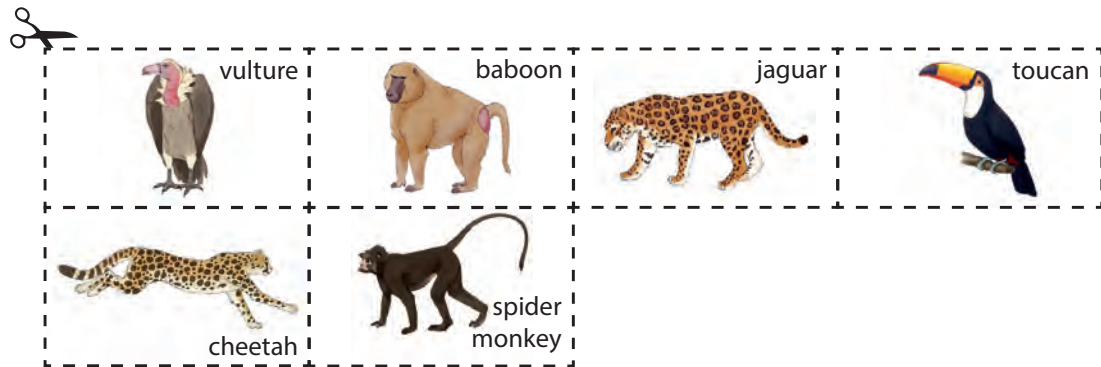
Cut-Out #2



Cut-Out #3



Cut-Out #4



Cut-Out #5



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2021-2022 CATALOG



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AGES → LEVELS ↓

LEVEL	3	4	5	6	7	8	9	10	11	12	13	14	15
PRESCHOOL		Explored Fairy Tales, & Fun											
PRE-K		Exploring God's World											
LEVEL K		Exploring American History / Language Arts K											
LEVEL A			Intro to the World: Cultures / Language Arts 1										
LEVEL B				Light & Sound Waves, Biological Features, Space Systems, & Engineering									
LEVEL C					Intro to World History 1 of 2 / Language Arts 2								
LEVEL B+C						Water, Ecosystems, Earth Systems, and Engineering Design							
LEVEL D							Intro to World History 2 of 2 / Language Arts 3						
LEVEL E								Intro to American History 1 of 2 / Language Arts 4					
LEVEL D+E									Forces and Interactions, Life Systems and Cycles, Weather & Climate, and Engineering Design				
LEVEL F										Intro to World History, Condensed / Language Arts 5			
LEVEL G											Intro to American History 2 of 2 / Language Arts 6		
LEVEL H												Eastern Hemispheres / Language Arts 7	
LEVEL W													Health, Medicine, & Human Anatomy
LEVEL J													

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