Instructor's Guide Quick Start

The BookShark™ Instructor's Guide (IG) is designed to make your educational experience as easy as possible. We have carefully organized the materials to help you and your students get the most out of the subjects covered. If you need help reading your schedule, see "How to Use the Schedule" in **Section Four**.

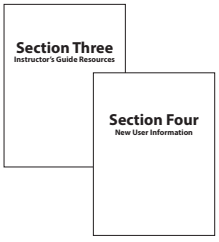
This IG includes a 36-week schedule, notes, assignments, readings, and other educational activities. For specific organizational tips, topics and skills addressed, and other suggestions for the parent/teacher, see **Section Three**. Here are some helpful features that you can expect from your IG.

Easy to use
Everything you need is located right after the schedule each week. If a note appears about a concept in a book, it's easy to find it right after the schedule based on the day the relevant reading is scheduled.

4-Day Schedule
Designed to save one day a week for music lessons, sports, field trips, co-ops, or other extra-curricular activities.

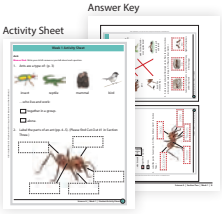
Notes
When relevant, you'll find notes about specific books to help you know why we've selected a particular resource and what we hope your children will learn from reading it. Keep an eye on these notes to also provide you with insights on more difficult concepts or content. **Notes** in pink indicate information a parent or teacher should read before beginning the lesson.


Note: What are the two kinds of poisonous lizards? The book only lists one – the Gila monster (*Heloderma suspectum*) native to the southwestern United States. The other kind is known as a beaded lizard (*Heloderma horridum*) and is found in Mexico and Guatemala. [p. 35]



Instructor's Guide Resources and **New User Information**
Don't forget to familiarize yourself with some of the great helps in **Section Three** and **Section Four** so you'll know what's there and can turn to it when needed.

Activity Sheets and **Answer Keys**
Activity Sheets follow each week's notes and are customized for each lesson to emphasize important points in fun ways. They are designed with different skills and interests in mind. You may want to file them in a separate binder for your student's use. Corresponding Answer Keys have been included within your weekly Notes.



How to Use the Schedule

More notes with important information about specific books.

The N symbol provides you with a heads-up about difficult content. We tell you what to expect and often suggest how to talk about it with your kids.

4-Day Schedule:

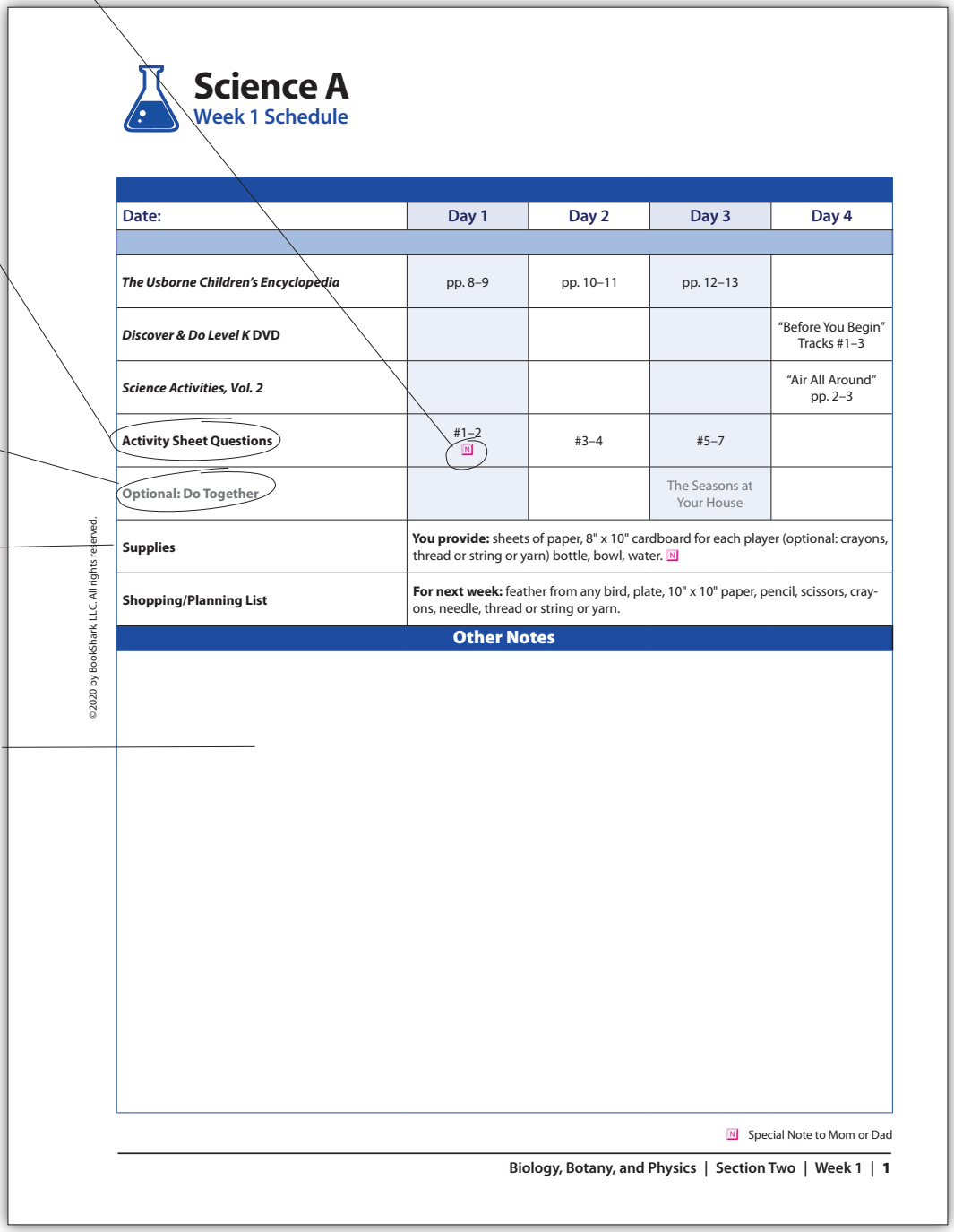
This entire schedule is for a 4-Day program. Designed to save one day a week for music lessons, sports, field trips, co-ops and other activities.

Find the **Activity Sheets** for students directly after the Notes. Students should complete only the questions assigned.

We schedule **optional assignments** to be used if desired.

Find all the supplies needed for <u>this</u> week as well as the supplies needed for <u>next</u> week here.

Additional space for writing extra assignments, activities, or notes.



Science A
Week 1 Schedule

Date:	Day 1	Day 2	Day 3	Day 4
The Usborne Children's Encyclopedia	pp. 8–9	pp. 10–11	pp. 12–13	
***Discover & Do Level K* DVD**				"Before You Begin" Tracks #1–3
Science Activities, Vol. 2				"Air All Around" pp. 2–3
Activity Sheet Questions	#1–2 N	#3–4	#5–7	
Optional: Do Together			The Seasons at Your House	
Supplies	**You provide:** sheets of paper, 8" x 10" cardboard for each player (optional: crayons, thread or string or yarn) bottle, bowl, water. N			
Shopping/Planning List	**For next week:** feather from any bird, plate, 10" x 10" paper, pencil, scissors, crayons, needle, thread or string or yarn.			

Other Notes

N Special Note to Mom or Dad

Biology, Botany, and Physics | Section Two | Week 1 | 1

Science E
Week 1 Schedule

Date:	Day 1	Day 2	Day 3	Day 4	Day 5
Usborne Illustrated Elementary Science Dictionary	pp. 84–85				
Energy		pp. 4–7	pp. 8–11		
Activity Sheet Questions	#1–3 N	#4–8	#9–14		
Optional: Do Together			Ready, Set, Energy in Motion!		
Usborne Illustrated Elementary Science Dictionary				pp. 110–112	
BookShark Science E Experiments Book				#1 Can You See the Energy in a Chemical Reaction?	
Supplies	**We provide (4SK):** large balloon **Paper Packet:** Can You See the Energy in a Chemical Reaction? Experiment Sheet **You provide:** funnel, 1 Tablespoon baking soda, 16oz disposable water bottle, ¼ cup vinegar N				
Shopping/Planning List	**For next week:** small shoe box, bread pan, or an opaque plastic box, water, food coloring, several cups of flour or sand, scissors				

Other Notes

N Special Note to Teachers

Notes
Week 1

Day 1

Usborne Illustrated Elementary Science Dictionary | pp. 84–85

Activity Sheet Questions | #1–3

Note: Find each week's Activity Sheets immediately after the notes and have your students 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.

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

We have provided a variety of activities to interest and challenge your students. Feel free to let your students do those activities that they enjoy and simply talk through others.

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

Remember: This program is designed for you to use to meet your students' needs. It is not meant to use you!

Suggestion: Your Activity Sheets might work more easily in a small binder for your students 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 #4SB1).

Supplies

Note: When supplies are listed as **"We provide:"** they are materials found in your Science E Supplies Kit **(4SK)**. When supplies are listed as **"You provide:"** they are materials you can generally find around your home.

Day 2

Energy | pp. 4–7

The energy measurement unit called Joule is named after James Prescott Joule (1818–89), an important English physicist. Joule was tutored at home until he was 15. [p. 7]

Activity Sheet Questions | #4–8

Day 3

Energy | pp. 8–11

The normal human body temperature is listed in the book as 98.4 degrees Fahrenheit. Depending on different methods of reading normal human body temperature, this number varies slightly from region to region. In the United States the number is generally given as 98.6 degrees Fahrenheit. [p. 11]

Activity Sheet Questions | #9–14

Optional: Do Together | Ready, Set, Energy in Motion!

Take a little time today to watch some of the many fun examples of chain reactions found in demonstrations online. Use the search terms "chain reaction cobra weave" or "cobra weave engineering" to find some excellent examples of chain reactions. Purdue University has an excellent 2:42 video from a junior Mechanical Engineering student that can be found with the search "Purdue engineering finite element analysis of stick bombs." (A few different terms studied this year are referenced.) If your students are inspired by what they see, jumbo popsicle sticks are the only supply needed to have a living room full of fun at home. A search for "instructions for cobra weave" and some adult supervision to help with the very specific weaving instructions is all that is needed. One BookShark student invested hour after hour, for months, building cobra weaves around his house—only limited by the number of jumbo-size popsicle sticks his parents produced! Hours and hours of fun and learning! As you enjoy the videos, watch for vocabulary from your reading. You might hear mention of kinetic energy or potential energy. Please use caution and your own discretion as you look at different internet sites. We highly recommend that you look before allowing your student to do the search with you or on their own. We hope you find this helpful!

Day 4

Usborne Illustrated Elementary Science Dictionary | pp. 110–112

BookShark Science E Experiments Book | #1 Can You See the Energy in a Chemical Reaction? ■

Week 1 Activity Sheet

Illustrated Elementary Science Dictionary

1. Next to each type of energy, name an example of where you could find that energy. (pp. 84–85)

Chemical potential energy: *(a log of wood in a campfire, batteries, fuel, coal, oil, etc.)*

Kinetic energy: *(anything that is moving, like skiers, moving cars, falling rocks, etc.)*

Gravitational potential energy: *(anything that is higher above the ground, like a book on a bookshelf, rocks on top of a mountain, a skydiver, etc.)*

2. What is the difference between renewable and non-renewable sources of energy? (p. 85)

(renewable sources of energy can be used over and over, so it will not run out. Non-renewable sources of energy can be used up)

3. For each form of renewable energy, state one way that energy can be generated or collected. (p. 85)

Hydroelectric power: *(can be generated through dams)*

Solar power: *(can be collected from solar panels)*

Geothermal power: *(can generate steam which can be used to turn turbines)*

Biomass power: *(can come from burning trees, but trees must be replanted afterwards)*

Wind power: *(can be harnessed by wind turbines)*

Energy

4. Fill in the blanks to complete the basic law of energy. (p. 4)

We cannot *(create)* or *(destroy)* energy, we can only *(change)* it from one form to another.

5. Check the statements that are true about energy. (pp. 4–5)

- [x] Energy is essential to make all things happen.
- [x] The world contains a lot of unused energy.
- [ ] Energy is visible.
- [x] Energy is recycled from one form to another.

Week 1 Activity Sheet

6. Circle the picture of the rock with the most potential energy. (p. 6)

7. Match each example to the type of potential energy each depicts. (pp. 6–7)

Boy on the "up" end of a see-saw

Lightning bugs

An atom's nucleus

Feet shuffled on carpet

Rubber band ready to shoot

Chemical potential energy

Mechanical potential energy

Electrical potential energy

Positional potential energy

Nuclear potential energy

Week 1 Activity Sheet

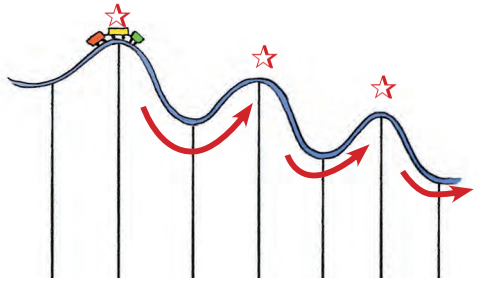
8. **Challenge!** Why does a book on the top shelf of a bookcase have more potential energy than a book on the bottom shelf? (**Hint:** What does the book have the potential to do?) (p. 6)

(a book on the top shelf could fall further and harder to the ground than a book on the lower shelf, so therefore it has more potential energy)

9. Objects that are moving or doing something have _____ energy. (p. 8)

kinetic **potential**

10. Draw stars to show where the roller coaster has potential energy, and arrows to show where it has kinetic energy. (p. 8)



Week 1 Activity Sheet

11. Use the words in the box to label each kind of kinetic energy. You may use some words more than once. (pp. 8–9)

Thermal	Electrical	Light	Sound	Movement

(Light)

(Movement)

(Electrical)

(Sound)

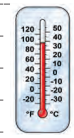
(Thermal)

(Challenge!)

(Light and thermal)

12. Why should we not consider "hot" and "cold" opposites? (**Hint:** At what temperature is it scientifically "cold"?) (p. 10)

(because "hot" and "cold" are terms that we apply in reference to something. So the temperature of a hot summer day is "hot" on Earth because most of the other days during the year have a lower temperature. However, the same temperature, compared to daily temperatures on the Sun will look very, very "cold")



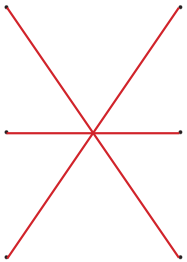
Week 1 Activity Sheet

13. Label each object either **hot**, **warm**, or **cold** and match it to the correct sample of its molecules' movements. (p. 10)

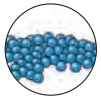
_____

_____

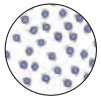
_____



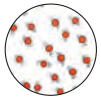
Molecules move slowly.



Molecules move very quickly.



Molecules move around some.



14. Choose the best answer. Temperature is a measure of… (p. 11)

- ☐ the number of electrons in something
- ☐ the number of atoms in something
- ☐ how cold it is
- ☒ how fast atoms are moving in something

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Week 1 Activity Sheet

Illustrated Elementary Science Dictionary

1. Next to each type of energy, name an example of where you could find that energy. (pp. 84–85)

Chemical potential energy: _____

_____

Kinetic energy: _____

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Gravitational potential energy: _____

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3. For each form of renewable energy, state one way that energy can be generated or collected. (p. 85)

Hydroelectric power: _____

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Geothermal power: _____

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Wind power: _____

Energy

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We cannot _____ or _____ energy, we can only

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5. Check the statements that are true about energy. (pp. 4–5)

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- ☐ Energy is visible.
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Week 1 Activity Sheet

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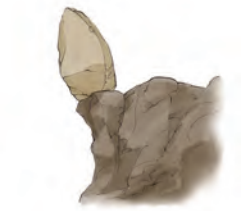

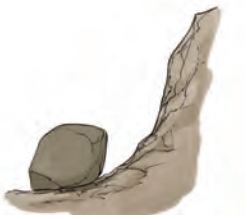

7. Match each example to the type of potential energy each depicts. (pp. 6–7)

Boy on the "up" end of a see-saw

Lightning bugs

An atom's nucleus

Feet shuffled on carpet

Rubber band ready to shoot

- Chemical potential energy
- Mechanical potential energy
- Electrical potential energy
- Positional potential energy
- Nuclear potential energy

Week 1 Activity Sheet

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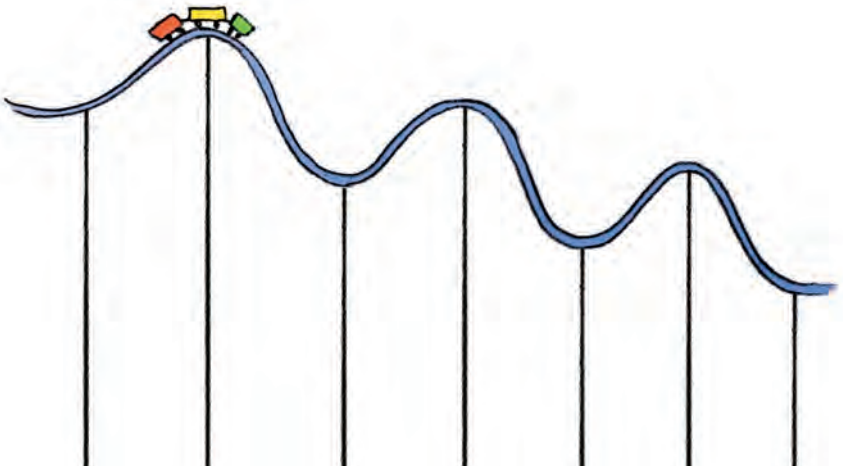

Week 1 Activity Sheet

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Thermal	Electrical	Light	Sound	Movement

_____

_____

_____

_____

_____

(Challenge!)

_____

12. Why should we not consider "hot" and "cold" opposites? (**Hint:** At what temperature is it scientifically "cold"?) (p. 10)

_____

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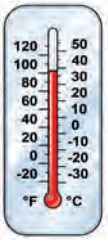

Week 1 Activity Sheet

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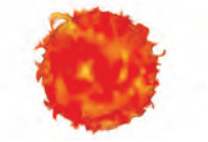
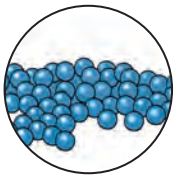
_____

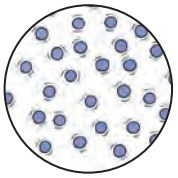


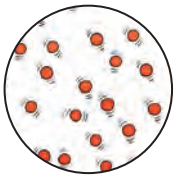
_____

_____

- Molecules move slowly.
- Molecules move very quickly.
- Molecules move around some.







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- ☐ the number of electrons in something
- ☐ the number of atoms in something
- ☐ how cold it is
- ☐ how fast atoms are moving in something

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Science E
Week 2 Schedule

Date:	Day 1	Day 2	Day 3	Day 4	Day 5
Energy	pp. 12–15	pp. 16–19	pp. 20–23		
Activity Sheet Questions	#1–7	#8–11	#12–15		
Optional: Do Together		Matches			
Usborne Illustrated Elementary Science Dictionary				pp. 113–115	
BookShark Science E Experiments Book				#2 Where do We Get Energy? N	
Supplies	**We provide (4SK):** large balloon, wooden skewer **Paper Packet:** Where Do We Get Energy? Experiment Sheet, Renewable and Non-Renewable Resource Cards **You provide:** small shoe box, bread pan, or an opaque plastic box, water, food coloring, several cups of flour or sand, scissors				
Shopping/Planning List	**For next week:** 3 dominoes (rectangular wooden blocks, or other small objects to act as "bowling pins"), small ball (or other rolling object like a toy car), marker or pen, shallow plastic container, flour (enough to create a 1-2 inch layer in the container), measuring tape, ruler, spatula, spare paper or newspaper, video camera (optional)				

Other Notes

N Special Note to Teachers

Notes
Week 2

Day 1

Energy | pp. 12–15

The statement about coffee and ice cream is slightly misleading. While it's true that coffee and ice cream left at room temperature will cool and melt respectively, ice cream that is left in a freezer will remain frozen and coffee in a coffee pot will maintain its temperature if heated. The changes in coffee and ice cream have to do, mainly, with temperature influencing atoms as explained on page 10.

The book states that sunlight "travels through our world." It's more accurate to say that sunlight travels through our world's atmosphere—a point the book agrees with—or "throughout" our world. At any rate, the phrasing used is a bit awkward. [p. 12]

The concept of "heat death" may cause your students some concern. When will the Sun experience this heat death? Some scientists think the Sun could last 5 billion years or so. Note that this estimate is based on several assumptions on the part of scientists such as their estimate of the current age of the Sun, the amount of energy left in the Sun to power it, and so forth. [p. 13]

Activity Sheet Questions | #1–7

Day 2

Energy | pp. 16–19

To properly follow the explanation of fireworks, start at the bottom of the section on page 17 and work your way up. [p. 16]

The book suggests that "most" fossil fuels "will be gone by the end of this century." This is a highly speculative statement. The answer to how long coal, oil, and gas will last depends on several factors including knowledge of how much of these resources are left in the world (we're not sure), how much we will use over a given time, and at what rate. Keep these points in mind as you review the chart at the bottom of page 19, too—these are guesses, not absolute dates. Of course, it's true that we have access to a limited supply of these resources and, as such, should use them wisely. [pp. 18–19]

Activity Sheet Questions | #8–11

Optional: Do Together | Matches

Fire safety is an important skill to learn! Grab some matches, candles, and a container of water (just in case!). If you don't have matches, you can still go over fire safety using a lighter. Start out by discussing what to do if something catches fire (that isn't supposed to). There are various ways to stop it—water, stomping with a shoe, or a fire extinguisher. Then, begin talking through the process of striking a match with your students. Where do they hold the match? How do they hold the matchbook? Once the match is lit, show them how to keep the match tilted upward so the fire doesn't burn their fingers, and then light the candles. What are your students' favorite way to put out the match? Blowing on it? Shaking it out by flicking their wrist? Dropping it in water? As you enjoy your lit candles, review the parts of a candle from your book.

If you're able, take this activity one step further and make a campfire together, making sure to follow safety guidelines and local fire restrictions. When making the campfire, note that the match must heat the paper or kindling enough to catch fire at 451 degrees Fahrenheit, then the paper must heat the wood to 570 degrees for it to catch on fire!

Day 3

Energy | pp. 20–23

Activity Sheet Questions | #12–15

Day 4

Usborne Illustrated Elementary Science Dictionary | pp. 113–115

BookShark Science E Experiments Book | #2 Where do We Get Energy?

Note: Please complete Part 1: Steps 1-6 beforehand to set up the experiment for your students. ■

Week 2 Activity Sheet

Energy

1. Match to describe how heat energy travels. (p. 12)

Convection	Heat travels through the air or even empty space.
Radiation	Atoms in a hot object jiggle the atoms in a cold object touching it, which gives energy to the cold object's atoms, which makes the cold object heat up.
Conduction	Heat spreads throughout liquids and gases in a swirling, circular motion.

2. Where does all energy on Earth end up? (p. 12) *(in the atmosphere as waste heat)*

3. Name the three things the kinetic energy of a moving car becomes when it crashes. (pp. 12–13)

1) *(makes the car's body crumple)*
2) *(makes the sound of the crash)*
3) *(some ends up as heat)*

4. Label the three ingredients that need to be present for a fire to burn. (p. 14)

1) *(heat)*
2) *(oxygen)*
3) *(fuel)*

What happens if you take away one of the three ingredients?

(the fire will go out)

5. Use the words in the box to complete the following. (p. 14)

Carbon	**Oxygen**	**Hydrogen**	**Combustion**	**Energy**

When a fire burns, a chemical reaction called *(combustion)* causes *(hydrogen)* and *(carbon)* atoms in the fuel to combine with *(oxygen)* in the air. The molecules break up and release the *(energy)* in the fuel.

Week 2 Activity Sheet

6. What causes a match to light? (p. 14)

Fuel **Friction** **Wood** **Light**

Explain how. *(friction between the match head and the box creates heat, which ignites the chemicals on the end of the match stick, which catch the wood of the stick on fire)*

7. How does a candle's flame stay lit when it doesn't seem to reach down the wick to the fuel of the wax? Check one. (p. 15)

- [x] Capillary action draws the wax up the wick to the bottom of the flame where it burns.
- [ ] The wax does not burn, it slowly melts down the candle and the wick is the fuel.

8. What happens to a star when it starts to run out of energy? (p. 16)

(a star collapses on itself in a huge explosion called a supernova)

9. Name the four kinds of energy a firework releases when it explodes. (p. 17)

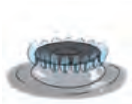
(Light) *(Sound)*
(Heat) *(Motion)*

10. Check all true statements about explosions. (pp. 16–17)

- [x] Explosions can be useful.
- [x] Explosions release energy quickly.
- [x] Explosions occur when two or more elements react.
- [ ] Explosions always include fire.

Week 2 Activity Sheet

11. Name the three types of fossil fuels. (p. 18)



(Gas) *(Oil)* *(Coal)*

12. What two things do we use the Earth's energy on the most? (p. 20)

(Industry) *(Transportation)*

13. Why must rockets carry oxygen tanks along with their fuel tanks when they travel to space? (p. 21)

(because fuel needs oxygen in order for combustion to take place, and there is no oxygen in space)

14. Circle the correct words to complete the following. (p. 22)

Food stores **potential** **kinetic** energy in the form of **pressure** **chemicals**.

The amount of energy stored in the foods we eat is measured in **grams** **calories**.

Challenge! How can knowing how many calories are in a particular type of food help us stay healthy?

(because we can better eat as many calories as we need for the activities we do, and not consume more than we need, which can cause us to gain weight)

15. Which energy source does your body use for… (p. 22)

Glucose stored in muscles	Body fat

…jumping jacks? *(Glucose stored in muscles)*

…canoeing all morning down a river? *(Body fat)*

…sprinting? *(Glucose stored in muscles)*

…running to first base? *(Glucose stored in muscles)*

…swimming a mile? *(Body fat)*

Week 2 Activity Sheet

Energy

1. Match to describe how heat energy travels. (p. 12)

Convection	•	• Heat travels through the air or even empty space.
Radiation	•	• Atoms in a hot object jiggle the atoms in a cold object touching it, which gives energy to the cold object's atoms, which makes the cold object heat up.
Conduction	•	• Heat spreads throughout liquids and gases in a swirling, circular motion.

2. Where does all energy on Earth end up? (p. 12) _____

3. Name the three things the kinetic energy of a moving car becomes when it crashes. (pp. 12–13)

1) _____

2) _____

3) _____

4. Label the three ingredients that need to be present for a fire to burn. (p. 14)

1) _____

2) _____

3) _____

What happens if you take away one of the three ingredients?

_____

5. Use the words in the box to complete the following. (p. 14)

Carbon	Oxygen	Hydrogen	Combustion	Energy

When a fire burns, a chemical reaction called _____ causes _____ and _____ atoms in the fuel to combine with _____ in the air. The molecules break up and release the _____ in the fuel.

Week 2 Activity Sheet

6. What causes a match to light? (p. 14)

Fuel **Friction** **Wood** **Light**

Explain how. _____

_____

7. How does a candle's flame stay lit when it doesn't seem to reach down the wick to the fuel of the wax? Check one. (p. 15)

- ☐ Capillary action draws the wax up the wick to the bottom of the flame where it burns.
- ☐ The wax does not burn, it slowly melts down the candle and the wick is the fuel.

8. What happens to a star when it starts to run out of energy? (p. 16)

_____

_____

9. Name the four kinds of energy a firework releases when it explodes. (p. 17)

_____ _____

_____ _____

10. Check all true statements about explosions. (pp. 16–17)

- ☐ Explosions can be useful.
- ☐ Explosions release energy quickly.
- ☐ Explosions occur when two or more elements react.
- ☐ Explosions always include fire.

Week 2 Activity Sheet

11. Name the three types of fossil fuels. (p. 18)



_____ _____ _____

12. What two things do we use the Earth's energy on the most? (p. 20)

_____ _____

13. Why must rockets carry oxygen tanks along with their fuel tanks when they travel to space? (p. 21)

_____

_____

14. Circle the correct words to complete the following. (p. 22)

Food stores **potential** **kinetic** energy in the form of **pressure** **chemicals**.

The amount of energy stored in the foods we eat is measured in **grams** **calories**.

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_____

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Glucose stored in muscles	**Body fat**

…jumping jacks? _____

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…swimming a mile? _____

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Science E
Week 3 Schedule

Date:	Day 1	Day 2	Day 3	Day 4	Day 5
Energy	pp. 24–27	pp. 28–30	pp. 31–35		
Activity Sheet Questions	#1–5	#6–8	#9–12		
Optional: Do Together	Lightbulb Focus				
Usborne Illustrated Elementary Science Dictionary				pp. 116–117	
BookShark Science E Experiments Book				#3 How Does Speed Change Energy?	
Supplies	**We provide (4SK):** marble, toothpick, masking tape **Paper Packet:** How Does Speed Change Energy? Experiment Sheet **You provide:** 3 dominoes (rectangular wooden blocks, or other small objects to act as "bowling pins"), small ball (or other rolling object like a toy car), marker or pen, shallow plastic container, flour (enough to create a 1-2 inch layer in the container), measuring tape, ruler, spatula, spare paper or newspaper, video camera (optional)				
Shopping/Planning List	**For next week:** 2 toilet paper rolls, scissors, large and small books, an open wall or doors at least 3 feet wide, various craft materials such as cardstock, felt, thumbtacks, clay, pipe cleaners, etc., painter's tape (optional)				

Other Notes

Special Note to Teachers

Notes
Week 3

Day 1

Energy | pp. 24–27

Page 25 mentions the different types of lightbulbs in the "City Waste" section. Which type of bulbs do you have in your home? President George W. Bush signed into law a piece of legislation that specifically relates to lightbulbs. The goal set by Congress in 2007 was to save energy used by lightbulbs. President Barack Obama's administration made additional rules that applied higher energy-efficiency requirements to certain lightbulbs. Incandescent bulbs were set to be phased out by January 1, 2020. Under the administration of President Donald Trump, the Obama-era lightbulb standards were not kept in place, so the January 1st deadline was not met.

Activity Sheet Questions | #1–5

Optional: Do Together | Lightbulb Focus

With the availability of types of light bulbs changing, which do you prefer? Indandescent? Fluorescent? LED? Have you experienced lower electricity bills after changing lightbulbs? Have you noticed the higher prices for bulbs? Do the bulbs you use last longer, or do they burn out frequently? If they don't last longer, what are some solutions? In the meantime, talk about habits around the house. Is everyone aware of the lights that are on at any given time? Do they all need to be in use? Is it a healthy habit to turn off lights when leaving a room? Make a trip to a store and browse the lightbulb section to identify the different types available. Read the boxes and determine which bulbs are more or less energy efficient.

Day 2

Energy | pp. 28–30

Scientists studied the survival of emperor penguins in Antarctica's subzero temperatures and found that the birds are insulated from heat loss by keeping their plumage colder than the surrounding air. Researchers were able to determine this by using thermographic imaging technology which show that while the outer surface of their plumage is colder, their bodies are warmer than the surrounding air. It's amazing to see how creatures cope with extremes and survive! [p. 28]

Activity Sheet Questions | #6–8

Day 3

Energy | pp. 31–35

Activity Sheet Questions | #9–12

Day 4

Usborne Illustrated Elementary Science Dictionary | pp. 116–117

BookShark Science E Experiments Book | #3 How Does Speed Change Energy? ■

Week 3 Activity Sheet

Energy

1. Why is a car less efficient than a bicycle? (p. 24) *(because a bicycle uses about 90% of the energy our bodies put into it, and cars waste a lot of energy as noise and heat)*

2. Why does wearing warm clothing in cold weather help your body conserve energy? (p. 24)

(because warm clothing helps your body stay warm—and much of the energy you gain from eating meals is lost as heat)

3. **Critical Thinking:** Circle one. Most energy is wasted as **heat** **light** . (pp. 24–25)

4. Why do we feel hungry after swimming or exercising? (p. 26) *(because exercise makes our bodies use up a lot of its stored energy, and we need to eat to replenish it)*

5. What does your body use energy for while you sleep? (p. 27) *(your brain, heart, lungs, and internal organs keep working to keep your body alive)*

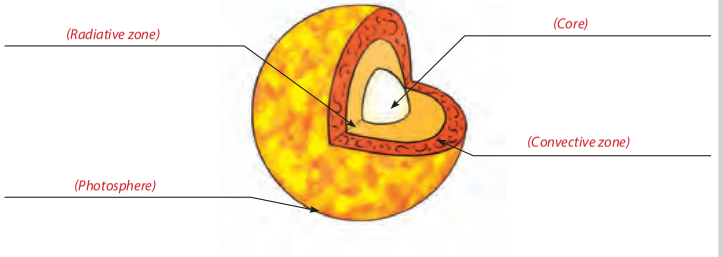
6. How do plants and animals deal with extreme hot and cold weather? Check all that are true. (pp. 28–29)

- [x] Plants face the sun to gain maximum sunlight.
- [x] Penguins huddle together to store heat.
- [x] Some animals hibernate during cold winters.
- [ ] Some animals migrate to cold regions in the day and warm regions at night.
- [x] Some animals sleep during the hot daytime and come out at night.
- [x] Camels store water in their humps.
- [x] Some plants store moisture in thick, fleshy, wax-coated leaves.

Week 3 Activity Sheet

7. Use the words in the box to label the zones inside the Sun. (p. 30)

Photosphere	Core	Radiative zone	Convective zone



8. **True** or **False**? The light we see from the Sun also carries heat with it. (p. 30) **True** **False**

Explain: *(heat travels to us from the Sun in other forms of radiation that are invisible)*

9. Match the term to the solar feature listed. (p. 31)

Solar flare

Solar prominence

Magnetic arms that stick out from the sun and if they erupt, they send highly energized particles hurtling into space.

A huge magnetic explosion that produces a massive burst of electromagnetic radiation.

Week 3 Activity Sheet

10. State whether each item below passes along energy, uses energy up, or both. Then briefly state how on the line below. (p. 31)

Plants… **pass energy along** **use energy up**

(use photosynthesis to turn sunlight into stored chemical energy that can turn into food or fuel)

Oil rig… **pass energy along** **use energy up**

(brings fossil fuels to the surface to provide fuel for other things)

Cars… **pass energy along** **use energy up**

(turn the stored energy in gasoline to kinetic energy and heat)

11. Name the eight methods of generating electricity described on these pages. Draw a star next to the methods that are the most efficient (they do not waste heat energy). (pp. 32–34)

- ★ *(Wind turbines)*
- ★ *(Solar panels)*
- ★ *(Hydroelectric dams)*
- *(Power plants)*
- *(Nuclear power plants)*
- ★ *(Wave walls)*
- ★ *(Geothermal power plants)*
- ★ *(Tidal barrages)*

12. Which of the following examples uses most of the world's energy? (p. 34)

Cooking food

Vehicles & transportation

Cities

Electrical appliances

Week 3 Activity Sheet

Energy

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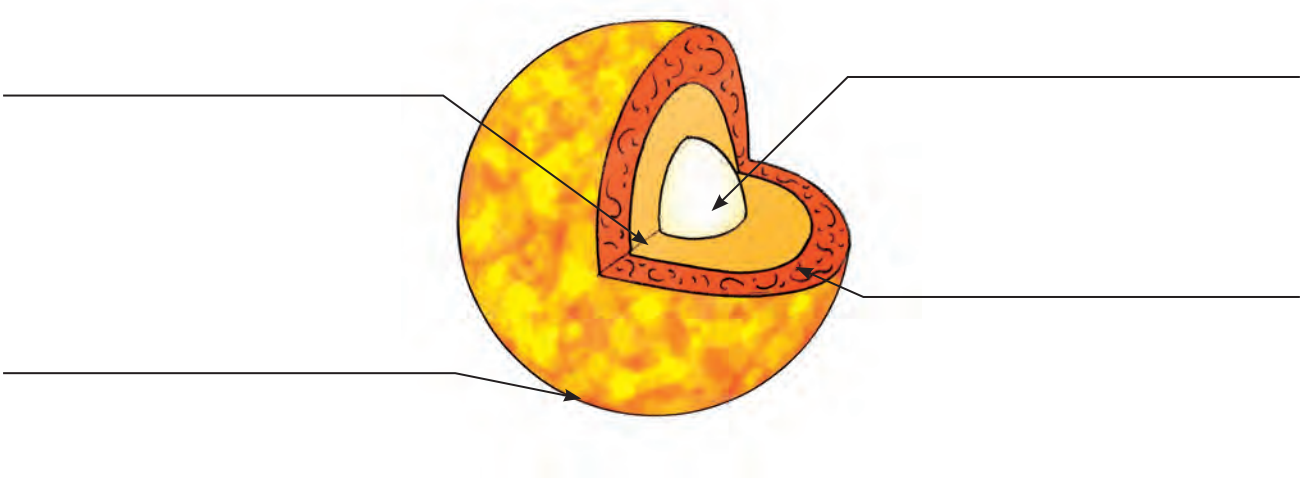

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Explain: _____

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_____ _____

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