

# Kolbe Academy Home School

## GRADE FIVE SCIENCE

*Harcourt Science 5/6 (Purple)*

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**Teachers' Notes:** Begin every class with a prayer. This is a good way to help the child memorize new prayers. Repeat the same ones every day until they are known. Be sure to explain the meanings of the prayers. Repetition in all areas of study is most beneficial. In most cases, Fridays have been left open. You may do a four-day week or use Friday as a "catch-up" day. While art and music should be worked in during the week, Friday is also a good day to concentrate on those subjects.

Your student may not need all of Week 8 for review. You can use this time to catch up and then go over the subject matter. If you intend to use the sample tests provided, look them over before teaching the subjects and make sure you teach the material in the tests. Some children have a difficult time doing written exams, but it is important for them to learn how to take them. If your fifth grader does poorly on them, give them to him a couple of days after he has taken them and average the grades.

**COURSE TITLE:** Science

**COURSE DESCRIPTION:**

Fifth-grade Science is an intermediate introduction to the life, earth, and physical sciences. The most important part of teaching science in the early years is helping the student see the wonders of God's world, and making him unafraid of the subject when he pursues in-depth science in later years. Children learn more from doing the experiments and investigations along with the reading of the textbook.

The Harcourt Science series has several FREE online learning tools available to anyone who purchases the textbook. The first is provided by the publisher. Simply go to [www.harcourtschool.com](http://www.harcourtschool.com) and click on the Learning Site. This will take you to a login page in which you will be instructed how to access the site. *Be sure to put Kolbe Academy as the school!* This will help create fewer problems when you are trying to access the website. There are several supplementary activities for the student and teacher on this website. Another website is provided by the National Science Teachers Association (NSTA) at [www.scilinks.org/harcourt](http://www.scilinks.org/harcourt). This website allows you to select the topic you are studying in the book, and will take you to a page of selected website links that can help you to enhance and further develop the topics that your child is studying. Be sure to select **Grade 6** to see the topics that correspond to the book you are using. The online resources are a wonderful addition to the activities provided within the text alone.

**COURSE OBJECTIVES:**

This course is a continuation of the work of the third and fourth grades in the further development of scientific skills necessary to apply the scientific method:

- ❖ the observation and examination of data
- ❖ experimentation
- ❖ formulations of explanations by means of hypotheses and theories
- ❖ testing the hypotheses
- ❖ making observations
- ❖ analyzing data
- ❖ drawing conclusions

Introduction to scientific concepts

- ❖ furthering science vocabulary in preparation for later coursework
- ❖ experience with the three main disciplines in science: life, earth, and physical science

**SCOPE AND SEQUENCE:**

1. **Life Science:** Understanding Living things
  - a. Cells, Genetics, and Heredity: Plant and animal cells, reproduction, trait inheritance
  - b. Classification: Kingdoms and subdivisions of kingdoms
2. **Earth Science:** The Living Planet
  - a. Ecosystems – Characteristics and Cycles: natural cycles, natural resources
  - b. Interactions in Ecosystems: Energy for Organisms, Symbiosis
  - c. Earth's Oceans: Ocean Ecosystems
  - d. Weather Changes: Atmosphere, weather fronts, weather prediction, and severe storms

**3. Physical Science:** Matter and Energy

- a. Atoms, Elements, and Compounds: Components and properties of atoms, states of matter
- b. Matter – Properties and Changes: Physical and chemical properties of matter
- c. Energy: Thermal energy and heat, magnetism and electricity, chemical and nuclear energy
- d. Sound and Light: Properties of waves, sound waves, light

**SKILLS TO BE DEVELOPED:**

- ❖ Observation and forming of hypotheses
- ❖ Keeping accurate notes
- ❖ Analyzing scientific data accurately
- ❖ Measuring with precision
- ❖ Drawing conclusions
- ❖ Reporting findings

**INVESTIGATION MATERIALS:**

The following are a list of the harder to find materials used in the corresponding investigations throughout the course. If at any point finding the materials becomes a hardship, the parent should feel free to skip the investigation for that week. **A comprehensive list of materials for the investigations is included at the very end of the course plan (located after the quarterly exams).**

SUGGESTED MATERIALS NEEDED FOR INVESTIGATIONS	INVESTIGATION PAGE
Safety Goggles	Most!
Hand lens (magnifying glass)	Several
Bar magnet	E12, E58
Red and green clay	A4
Sand	A4, E58
Balloon	A4
2 cups of mixed dry beans	A40
Toy wooden blocks (Jenga pieces would work well)	E4
Marbles	E4
Thermometer or other temperature sensor	C106, E20
Iron filings	E58
Galvanometer, battery tester or other voltage meter	E82, E90 (optional investigations)
Slinky	E106

**COURSE TEXT:** *Harcourt Science, 6<sup>th</sup> Grade* (Copyright 2005), Purple book with tiger on cover

**COURSE PLAN METHODOLOGY:** *Harcourt Science* is represented by the abbreviation **HAR**. Each weekly assignment is summarized in the first line of the week’s daily course plan. The specific daily assignments are outlined in the following lines indicated by the **MON, TUES, WED,** and **THUR** abbreviations.

Kolbe Academy has worked diligently to create the best possible course plans with the home schooling family in mind. Remember, however, that our program is intended to be flexible. Per the principle of subsidiarity, these course plans are a **suggested** course of study. As the teacher, you should adapt and modify these course plans to meet the individual learning needs of your child. **Do not feel obligated to follow these course plans exactly.**

◆ ◆ ◆ **FIRST QUARTER** ◆ ◆ ◆

WEEK 1		
Throughout the year, there will be several opportunities for hands-on scientific investigations. These investigations will be a wonderful tool for understanding the material in each lesson. This week the students will concentrate mainly on reading about the processes involved in making a proper scientific investigation. This includes working safely and appropriately in the laboratory. Students will gradually learn how to formalize the scientific method by writing lab reports on a few of the investigations this year. These will be assigned in the 3 <sup>rd</sup> and 4 <sup>th</sup> quarters.		
<b>HAR</b>	Pages x – xvii Pages xxxii – xxiv	Goals: To understand how to apply the steps of the scientific method within an investigation. To understand how to analyze results and draw conclusions. To understand how to work safely in the laboratory while performing experiments.
<b>MON</b>	<b>Read pages x – xii.</b> Go over the steps of the scientific method with the student before beginning any investigations. You may choose to do the paperclip investigation outlined on these pages if you wish, although it is for demonstration of the scientific method only.	
<b>TUES</b>	<b>Read pages xiii – xvii.</b> These pages give good examples of the scientific method in action. For future investigations, students can be asked to research what materials may be needed for the upcoming week’s investigation.	
<b>WED</b>	<b>Read pages xxii – xxiii.</b> There will be some application of the students’ mathematics skills throughout the lessons and investigations. These pages will explain the importance of accurate measurements and the application of math skills to interpreting collected data.	
<b>THUR</b>	<b>Read page xxiv.</b> It is very important for student’s to continue to develop a sense of responsibility within the laboratory. Although the investigations are fairly safe, understanding safety at this age is important for preparing them to work safely in a laboratory environment in high school. Discuss each safety rule with the student and ask him what would happen if each rule were not followed.	
<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">Notes</div>		
WEEK 2		
◆ ◆ ◆ UNIT A: Understanding Living Things ◆ ◆ ◆		
<b>HAR</b>	Chapter 1 Lesson 1	Goals: To recognize that cells make up all living things. To understand the differences between plant and animal cells. To understand the function of the nucleus within a cell.

MON	<p><b>Review pages A2 – A3 and discuss the fast facts.</b> Have the students look over the vocabulary review previous to beginning the lesson. <b>Investigation pages A4 – A5:</b> The Structure of Cells. The student should build a 3-dimensional model that includes a representation of the cell wall, cell membrane, nucleus, and organelles. <b>Have the student draw conclusions by writing the answers to the questions at the end of the investigation.</b> The “Investigate Further” is an interesting addition to this investigation, but is optional due to the material requirements.</p>	
TUES	<p><b>Read page A6 – A7. Have the student answer the embedded “check” questions orally.</b> Have the student compare the different cells located on page A7. Have the student tell how they are alike and how they are different. Ask the student why all cells do not look exactly alike (they each have a different function). Discuss with the student why the nerve cell might have long extensions (the long extensions allow nerve signals to travel over great distances within the body).</p>	
WED	<p><b>Read pages A8 – A9. Have the student answer the embedded “check” questions orally.</b> Discuss with the student the parts of the cell that animal and plant cells have in common by comparing the diagrams on pages A8 &amp; A9. Discuss the function of the parts of the cell described in these pages. Have the student compare the similarities and differences of the animal and plant cell (plant cells have cell walls and chloroplasts, but animal cells do not).</p>	
THUR	<p><b>Read pages A10 – A11. Have the student answer the embedded “check” questions orally.</b> Explain to the student that all of the cell’s functions are controlled within the nucleus of a cell. Have the student look at the picture of the magnified nucleus and drawing of the nucleus, and discuss the role of the pores visible in those pictures to the function of the nucleus (allows chemical instructions to move from within the nucleus to the rest of the cell). Discuss the relationship between chromosomes and DNA. Explain to the student that each person in the world has a different blueprint of DNA. <b>Answer Review questions at the end of the lesson on a separate piece of paper.</b> Go over the questions to be sure the student understands the correct answers.</p>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;">Notes</div>		
<p><b>WEEK 3</b></p>		
HAR	<p>Chapter 1 Lesson 2</p>	<p>Goals: To understand the processes of both mitosis and meiosis. To understand that different types of parent DNA can produce a number of variations in the resultant organism. <b>This chapter references reproductive cells (e.g. eggs and sperm), as this is the primary purpose of meiosis.</b></p>
MON	<p><b>Optional: Investigation pages A12 – A13:</b> How New Cells are Made. This is a great investigation to do if you have access to a microscope. Simply cut a very small piece of a purple onion and place on a slide (prepared slides are not necessary). The student should be able to see the different stages of cell division. <b>Read pages A14 – A15.</b> Discuss the beginnings of the tadpole into the multi-celled organism of the frog (pictured on page A14). Have the student analyze the chart on Typical Plant Growth on page A15. Discuss the two axes and what they mean (the horizontal axis shows how old the plant is in days, and the vertical axis shows the plant’s total mass). Discuss with the student when the plant is growing the fastest and the slowest. <b>Have the student answer the embedded “check” questions orally.</b></p>	