

GRADE 3 SCIENCE CURRICULUM GUIDE

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COURSE DESCRIPTION

ELEMENTARY SCIENCE

(Grades 1-3)

0460-01, 0460-02, 0460-03

Elementary Science in the primary grades continues to make use of students' immediate surroundings in order to provide learning experiences through which they develop science habits of mind and acquire an understanding of simple concepts and principles about the nature of science and technology, the physical setting, the living environment, the human organism, the designed world, and the common themes of science. These experiences are designed to allow students to:

- demonstrate a willingness to change original explanations when the evidence suggests different ones;
- use their natural curiosity to explore their surroundings;
- demonstrate confidence and excitement about science;
- develop an appreciation for the aesthetic nature of the world;
- use relevant information from a variety of sources;
- demonstrate an understanding of basic science concepts after participating in science investigations;
- use as many of the five senses as appropriate to collect data;
- select and use simple instruments to investigate their surroundings;
- classify objects into two groups based on similarities and differences;
- put objects in an order based on size, color, or other physical properties;
- offer possible explanations of observations;
- use data to predict future happenings;
- use metric and nonmetric units to measure;
- communicate scientific information verbally and nonverbally;
- work in small groups to discover science concepts;
- demonstrate an understanding of how science and technology affect their lives;
- describe actions that would help improve the environment;
- consider ethical values when caring for plants and animals;
- create a new product using a variety of materials; and
- list inferences from observations.

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE NATURE OF SCIENCE AND TECHNOLOGY

Standard 1: Students, working collaboratively, carry out investigations. They question, observe, and make accurate measurements. Students increase their use of tools, record data in journals, and communicate results through chart, graph, written, and verbal forms.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>The Scientific View of the World</i>			
3.1.1 Recognize and explain that when a scientific investigation is repeated, a similar result is expected.	Observing a classroom set of plants as they grow throughout the unit. Comparing testing results with classmates.	Observation Discussion	Plants Rocks and Minerals Chemistry Sound
<i>Scientific Inquiry</i>			
3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.	Observe the plant cycle. Collect rocks and carry out tests to identify the properties of various rocks and minerals. Carry out tests to identify the properties of various chemicals. Observe the differences in sound produced when changing the length of the string used.	Observations/Record Keeping	Plants Rocks and Minerals Chemistry Sound
3.1.3 Keep and report records of investigations and observations using tools, such as journals, charts, graphs, and computers.	Complete graphs to show plant growth over a period of time. Use journals to record data and observations of experiments.	Observations/Record Keeping Journal Keeping	Plants Rocks and Minerals Chemistry Sound

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE NATURE OF SCIENCE AND TECHNOLOGY

Standard 1: Students, working collaboratively, carry out investigations. They question, observe, and make accurate measurements. Students increase their use of tools, record data in journals, and communicate results through chart, graph, written, and verbal forms.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Scientific Inquiry (continued)</i>			
3.1.4 Discuss the results of investigations and consider the explanations of others	Class discussion and charts based on observations and results of experiments.	Discussion Venn Diagrams	Plants Rocks and Minerals Chemistry Sound
3.1.5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.	Sharing ideas and findings with a classmate.	Cooperative Learning Groups	Plants Rocks and Minerals Chemistry Sound
<i>Technology and Science</i>			
3.1.6 Give examples of how tools, such as automobiles, computers, and electric motors, have affected the way we live.			Social Studies

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STANDARDS REFERENCE**

THE NATURE OF SCIENCE AND TECHNOLOGY

Standard 1: Students, working collaboratively, carry out investigations. They question, observe, and make accurate measurements. Students increase their use of tools, record data in journals, and communicate results through chart, graph, written, and verbal forms.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Technology and Science (continued)</i>			
3.1.7 Recognize that and explain how an invention can be used in different ways, such as a radio being used to get information for entertainment.	Discuss how radios are used for entertainment and telephones can be used for communication.	Class Discussion	Sound
3.1.8 Describe how discarded products contribute to the problem of waste disposal and that recycling can help solve this problem.			Environmental Center St. Joe County Conservation Club w/Rick Glassman -Project Wild -Project Learning Tree

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

SCIENTIFIC THINKING

Standard 2: Students use a variety of skills and techniques when attempting to answer questions and solve problems. They describe their observations accurately and clearly, using numbers, words, and sketches, and are able to communicate their thinking to others.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Computation and Estimation</i>			
3.2.1 Add and subtract whole numbers mentally, on paper, and with a calculator.	Use subtraction to determine the amount of plant growth that has taken place over a period of time.	Data collecting sheets	Plants
<i>Manipulation and Observation</i>			
3.2.2 Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions.	Measure soil and count seeds and fertilizer pellets prior to planting.	Measuring Observation Cooperative Learning Groups	Plants
	Measure dry ingredients and liquid chemicals when performing tests.	Measuring Observation Cooperative Learning Groups	Chemistry
3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.	Record observations and data results in a journal for review and comparisons at a later date.	Journal Keeping Data Notebook	Plants Rocks and Minerals Chemistry

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STANDARDS REFERENCE**

SCIENTIFIC THINKING

Standard 2: Students use a variety of skills and techniques when attempting to answer questions and solve problems. They describe their observations accurately and clearly, using numbers, words, and sketches, and are able to communicate their thinking to others.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Manipulation and Observation (continued)</i>			
3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.	<p>Use a magnifying glass to look at the parts of a flower and bee.</p> <p>Use a nail to determine the hardness of a rock or mineral.</p> <p>Use a funnel to determine whether a mixture is a solution or suspension.</p> <p>Use rulers to create different sounds.</p>	<p>Experimentation</p> <p>Discussion.</p> <p>Observation</p>	<p>Plants</p> <p>Rocks and Minerals</p> <p>Chemistry</p> <p>Sound</p>
3.2.5 Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.	Use tools around the classroom or home to construct a musical instrument.	<p>Discovery Learning</p> <p>Experimentation</p>	Sound

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

SCIENTIFIC THINKING

Standard 2: Students use a variety of skills and techniques when attempting to answer questions and solve problems. They describe their observations accurately and clearly, using numbers, words, and sketches, and are able to communicate their thinking to others.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Communication Skills</i>			
3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas.	<p>Draw a picture of the plant's structures and record its height on a graph.</p> <p>Draw pictures of the rocks and minerals and record identifying characteristics on a table.</p> <p>Describe what happens to the mixtures when mixed with various chemicals.</p> <p>Describe how different sounds can be produced from the same object.</p>	<p>Class Discussion</p> <p>Examples</p> <p>Journal Keeping</p> <p>Cooperative Learning</p> <p>Diagrams</p>	<p>Plants</p> <p>Rocks and Minerals</p> <p>Chemistry</p> <p>Sound</p>
<i>Critical Response Skills</i>			
3.2.7 Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.	Question the findings and results of student and classroom tests.	<p>Class Discussion</p> <p>Journal Keeping</p>	<p>Plants</p> <p>Rocks and Minerals</p> <p>Chemistry</p> <p>Sound</p>

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE PHYSICAL SETTING

Standard 3: Students observe changes of the earth and sky. They continue to explore the concepts of energy* and motion*.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>The Universe</i>			
3.3.1 Observe and describe the apparent motion* of the sun and moon over a time span of one day.			
3.3.2 Observe and describe that there are more stars in the sky than anyone can easily count, but they are not scattered evenly.			
3.3.3 Observe and describe that the sun can be seen only in the daytime.			
3.3.4 Observe and describe that the moon looks a little different every day, but looks the same again about every four weeks.			

*energy: what is needed to make things move

*motion: the change in position of an object in a certain amount of time

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE PHYSICAL SETTING

Standard 3: Students observe changes of the earth and sky. They continue to explore the concepts of energy* and motion*.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>The Earth and the Processes that Shape It</i>			
3.3.5 Give examples of how change, such as weather patterns, is a continual process occurring on Earth.	Discuss the effects of weather on the earth's surface and rock formations.		Rocks & Minerals
3.3.6 Describe ways human beings protect themselves from adverse weather conditions.			-Social Studies St. Joseph County Conservation Club w/Rick Glassman -Project Wild/Project Learning Tree
3.3.7 Identify and explain some effects human activities have on weather.			-Social Studies St. Joseph County Conservation Club w/Rick Glassman -Project Wild/Project Learning Tree
<i>Matter and Energy*</i>			
3.3.8 Investigate and describe how moving air and water can be used to run machines, like windmills and waterwheels.			Bonneyville Mill
<i>Forces of Nature</i>			
3.3.9 Demonstrate that things that make sound do so by vibrating, such as vocal cords and musical instruments.	Use a guitar to produce sounds and observe what happens when the sounds are produced.	Class Discussion Experimentation	Sound

*energy: what is needed to make things move

*motion: the change in position of an object in a certain amount of time

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE LIVING ENVIRONMENT

Standard 4: Students learn about an increasing variety of organisms. They use appropriate tools to identify similarities and differences among them. Students explore how organisms satisfy their needs in typical environments.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Diversity of Life</i>			
3.4.1 Demonstrate that a great variety of living things can be sorted into groups in many ways using various features, such as how they look, where they live, and how they act, to decide which things belong to which group.	Describe how different plants can be grouped according to different characteristics.	Class Discussion Examples Compare/Contrast	Plants
3.4.2 Explain that features used for grouping depend on the purpose of the grouping.	Group rocks according to color, size, texture, etc.	Class Discussion Examples Compare/Contrast Observations Journal Keeping	Plants Rocks and Minerals Sound
3.4.3 Observe that and describe how offspring are very much, but not exactly, like their parents and like one another.	Compare the classroom set of plants, noticing similarities and differences between them.	Compare/Contrast Class Discussion Examples (children look like their parents but are not identical)	Plants
<i>Interdependence of Life and Evolution</i>			
3.4.4 Describe that almost all kinds of animals' food can be traced back to plants.	Describe the importance of plants.	Class Discussion Journal Keeping Examples	Plants

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE LIVING ENVIRONMENT

Standard 4: Students learn about an increasing variety of organisms. They use appropriate tools to identify similarities and differences among them. Students explore how organisms satisfy their needs in typical environments.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Interdependence of Life and Evolution (continued)</i>			
3.4.5 Give examples of some kinds of organisms that have completely disappeared and explain how these organisms were similar to some organisms living today.			St. Joseph County Conservation Club w/Rick Glassman -Project Wild/Project Learning Tree
<i>Human Identity</i>			
3.4.6 Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do.			St. Joseph County Conservation Club w/Rick Glassman -Project Wild/Project Learning Tree
3.4.7 Explain that eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy.			Health
3.4.8 Explain that some things people take into their bodies from the environment can hurt them and give examples of such things.			Health St. Joseph County Conservation Club w/Rick Glassman -Project Wild/Project Learning Tree

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE LIVING ENVIRONMENT

Standard 4: Students learn about an increasing variety of organisms. They use appropriate tools to identify similarities and differences among them. Students explore how organisms satisfy their needs in typical environments.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Human Identity (continued)</i>			
3.4.9 Explain that some diseases are caused by germs and some are not. Note that diseases caused by germs may be spread to other people. Also understand that washing hands with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.			Health

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE MATHEMATICAL WORLD

Standard 5: Students apply mathematics in scientific contexts. Students make more precise and varied measurements when gathering data. Based upon collected data, they pose questions and solve problems. Students use numbers to record data and construct graphs and tables to communicate their findings.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Numbers</i>			
3.5.1 Select and use appropriate measuring units, such as centimeters (cm) and meters (m), grams (g) and kilograms (kg), and degrees Celsius (°C).	<p>Measure plant growth using cm cubes or rulers.</p> <p>Measure the length of a string and describe the sound it produces.</p>	<p>Manipulatives Tables/Graphs Observation</p> <p>Manipulatives Tables/Graphs Observation Experimentation</p>	<p>Plants</p> <p>Sound</p>
3.5.2 Observe that and describe how some measurements are likely to be slightly different, even if what is being measured stays the same.	Using cm cubes and rulers will provide similar, but possibly different, results when measuring the same object such as a plant.	Tables/Graphs Observations	Plants
<i>Shapes and Symbolic Relationships</i>			
3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.	<p>Create a graph to show plant growth over a period of time.</p> <p>Complete a table to identify the properties of various rocks and minerals.</p> <p>Complete a table to describe what happens to various mixtures when chemicals are added to them.</p>	<p>Tables/Graphs</p> <p>Data Collecting Sheets</p> <p>Data Collecting Sheets</p>	<p>Plants</p> <p>Rocks and Minerals</p> <p>Chemistry</p>

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

THE MATHEMATICAL WORLD

Standard 5: Students apply mathematics in scientific contexts. Students make more precise and varied measurements when gathering data. Based upon collected data, they pose questions and solve problems. Students use numbers to record data and construct graphs and tables to communicate their findings.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Shapes and Symbolic Relationships (continued)</i>			
3.5.4 Illustrate that if 0 and 1 are located on a line, any other number can be depicted as a position on the line.	Use a bar graph to illustrate the height of a plant.	Data Collecting Sheets	Plants
<i>Reasoning and Uncertainty</i>			
3.5.5 Explain that one way to make sense of something is to think of how it relates to something more familiar.	Relate concepts and skills learned to the real world.	Class Discussion Examples	Plants Rocks and Minerals Chemistry Sound

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

COMMON THEMES

Standard 6: Students work with an increasing variety of systems and begin to modify parts in systems and models and notice the changes that result. They question why change occurs.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Systems</i>			
3.6.1 Investigate how and describe that when parts are put together, they can do things that they could not do by themselves.	Create a musical instrument using fishing line and a piece of pegboard.	Experimentation Observation	Sound
3.6.2 Investigate how and describe that something may not work if some of its parts are missing.			
<i>Models and Scale</i>			
3.6.3 Explain how a model of something is different from the real thing but can be used to learn something about the real world.	Create a model plant and a model bee to use in identifying parts.	Class Discussion Observation Diagrams	Plants
<i>Constancy and Change</i>			
3.6.4 Take, record, and display counts and simple measurements of things over time, such as plant or student growth.	Measure the growth of a plant over a period of time.	Data Collection Sheets	Plants

**GRADE 3 SCIENCE CURRICULUM GUIDE
STANDARDS REFERENCE**

COMMON THEMES

Standard 6: Students work with an increasing variety of systems and begin to modify parts in systems and models and notice the changes that result. They question why change occurs.			
Indicator	Example	Instruction/Assessment Reference	Resource
<i>Constancy and Change (continued)</i>			
3.6.5 Observe that and describe how some changes are very slow and some are very fast and that some of these changes may be hard to see and/or record.	Record observations as a plant undergoes the life cycle (seed, plant, flower, seed). Discuss how rocks are formed and changed over time. Observe the changes that occur when chemicals are added to a mixture.	Journal Keeping Data Collection Sheets Observations Class Discussion Discovery Learning	Plants Rocks and Minerals Chemistry

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 1: Thinking about Chemicals			
Objective	Indicator	Instruction/Assessment Reference	Resource
The teacher will assess student knowledge and understanding about chemicals through informal oral assessments. (T.M.* p. 17)	3.1.1 Recognize and explain that when a scientific investigation is repeated, a similar result is expected. 3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis. 3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers. * observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.	Complete a KWL chart. Investigate unknown chemicals in a mystery bag. (T.M.* p. 21) Set up science journals for record keeping and collection of data. (See Appendix for Journal Page.)	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.) Lesson 2: Investigating Unknown Solids: Getting Ready Lesson 3: Exploring the Five Unknown Solids			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW investigate unknown chemicals and prepare for the inquiry process. (T.M.* p. 27)</p> <p>TLW explore the five unknown solids, observing and describing the properties of each. (T.M.* p. 37)</p>	<p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>* observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students learn about the importance of safety when performing science experiments.</p> <p>Students observe and describe the properties of common classroom objects and the five unknown chemicals.</p> <p>Students will record and organize data in their science journals.</p>	<p>See Appendix.</p>

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 4: Testing Unknown Solids with Water			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW test unknown solids using water.	3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.	Observe changes which occur when the unknown solids are mixed with water.	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 5: Exploring Water Mixtures			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW explore water mixtures (solution, suspension, and filtering)	<p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>3.1.5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.</p> <p>* observation: gaining information through the use of one or more of the senses, such as sight, smell, etc</p>	<p>Students work cooperatively to explain observations and results.</p> <p>Students keep science journals.</p>	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 6: Discovering Crystals			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW discover crystals.	3.1.4 Discuss the results of investigations and consider the explanations of others. 3.2.2 Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions. 3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas. 3.6.5 Observe that and describe how some changes are very slow and some are very fast and that some of these changes may be hard to see and/or record.	Students mix dry and wet ingredients. Students explore the properties of two types of mixtures (solutions and suspensions). Students write, discuss, and sketch their findings. Students will observe a variety of changes. (Slow moving: crystallization)	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)
Lesson 7: Testing Unknown Solids with Vinegar
Lesson 8: Testing Unknown Solids with Iodine
Lesson 9: Testing Unknown Solids with Red Cabbage Juice
Lesson 10: Testing Unknown Solids with Heat

Objective	Indicator	Instruction/Assessment Reference	Resource
TLW test unknown solids with: vinegar, iodine, red cabbage juice, and heat.	3.2.2 Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions. 3.2.3 Keep a notebook that describes observations and is understandable weeks or months later. 3.6.5 Observe that and describe how some changes are very slow and some are very fast and that some of these changes may be hard to see and/or record.	Students mix dry and wet ingredients. Students record data and sketches in a science journal. Students will observe a variety of changes. (Fast moving: vinegar and baking soda)	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 11: Reviewing the Evidence			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW review the evidence.	3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas. 3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.	“How do you know what happened?” Explain your results. Summarize and analyze.	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 12: Identifying the Unknown Solids			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW identify the unknown solids.	3.1.5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings. 3.2.3 Keep a notebook that describes observations and is understandable weeks or months later. 3.2.7 Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.	Students work cooperatively to analyze results and draw conclusions. Students will use science journals to review data and make predictions. Students will discuss "How do you know?" and attempt reasonable answers to explain their findings and conclusions.	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Chemical Tests (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.) Lesson 13: Identifying the ‘Mystery Bag Chemical’ Lesson 14: Testing Mixtures of Two Unknown Solids Lesson 15: Testing Household Liquids with Red Cabbage Juice Lesson 16: Using the Known Solids to Identify Unknown Liquids			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW identify the mystery bag chemical TLW test mixtures of two unknown solids TLW test household solids with red cabbage juice TLW use known solids to identify unknown liquids	3.1.5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one’s own conclusions about findings. 3.2.3 Keep a notebook that describes observations and is understandable weeks or months later. 3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.	Students work cooperatively to analyze results and draw conclusions. Students will use science journals to review data and make predictions. Students will discuss “How do you know?” and attempt reasonable answers to explain their findings and conclusions.	See Appendix. Evan Moor Science Series, Kitchen Chemistry
Post-Unit Assessment	Standards covered in the unit.	An analysis of unknown mixtures from the student swap activity in lesson 14.	(T.M.* p. 180)

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.) Lesson 1: What Do You Know About Plants?			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW share prior knowledge about plants and discuss what they want to know.</p> <p>TLW practice observation and prediction skills.</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.</p> <p>3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Set up science journals for record keeping and collection of data. (See Appendix for Journal Page.)</p> <p>Students will familiarize themselves with a magnifying lens and how it is used in science investigations.</p> <p>Students will observe a dry lima bean, describing its properties. Students will record information on a chart. (T.M.* p. 14)</p>	<p>See Appendix.</p> <p>Project AIMS K-3, Primarily Plants</p>

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 2: What Is Inside a Seed?			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW observe changes in their lima bean after soaking it overnight.</p> <p>TLW use a magnifying lens to view the inside of a lima bean (seed).</p>	<p>3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.</p> <p>3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.</p>	<p>Students will observe a soaked lima bean, describing its properties. They will compare the properties of the dry bean to the soaked bean and record information on a chart. (T.M.* p. 14)</p> <p>Students will open the bean and observe the inside parts of the seed. Students will draw and label these parts.</p>	<p>See Appendix.</p>

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 3: Planting the Seed			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW prepare for planting seeds.	3.1.5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.	Students will work cooperatively in a small group, gathering materials and planting seeds.	See Appendix.

**GRADE 3 SCIENCE CURRICULUM GUIDE
UNIT REFERENCE**

Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 4: Thinning and Transplanting			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW discuss the purpose of thinning and transplanting seeds. Students will carry out this process on their own.	3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis. 3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.	Students will use forceps to thin and transplant their crop. Students will use their hand lens to observe the root structure of the baby plants.	See Appendix.

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 5: How Does Your Plant Grow?			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW learn how to measure plants to the nearest cm.</p> <p>TLW record results on a bar graph.</p>	<p>3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.</p> <p>3.5.1 Select and use appropriate measuring units, such as centimeters (cm) and meters (m), grams (g) and kilograms (kg), and degrees Celsius (C).</p> <p>3.5.2 Observe that and describe how some measurements are likely to be slightly different, even if what is being measured stays the same.</p> <p>3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.</p>	<p>Students will use cm cubes (strips or rulers may also be used) to measure their plant's height. Students will transfer this information to a bar graph. (T.M.* p. 35) A usable graph can be found in the Appendix of the T.M.* (Growth Graph)</p>	<p>See Appendix.</p>

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 6: Observing Leaves and Flower Buds			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW observe true leaves and flower buds with their plants.</p> <p>TLW record observations and draw illustrations in their notebooks.</p> <p>TLW discuss the life cycle of a plant through the current stage.</p>	<p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p> <p>3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas.</p> <p>3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>3.3.5 Give examples of how change, such as weather patterns, is a continual process occurring on Earth.</p> <p>3.4.3 Observe that and describe how offspring are very much, but not exactly, like their parents and like one another.</p>	<p>Students will look at their plant, using a hand lens to observe the true leaves and flower buds present. Seed leaves may become visible during this time as well. Students will record information and make illustrations in their notebooks concerning color, size, shape, and number of buds. Students will discuss how their plant has changed so far in the life cycle of their plant. (T.M.* p. 43)</p>	<p>See Appendix.</p>

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 7: Observing the Growth Spurt			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW measure plant height in cm every day for one week. (Growth Spurt)	3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems. 3.5.1 Select and use appropriate measuring units, such as centimeters (cm) and meters (m), grams (g) and kilograms (kg), and degrees Celsius (C). 3.5.2 Observe that and describe how some measurements are likely to be slightly different, even if what is being measured stays the same. 3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.	Students will review the proper way of measuring plants accurately, using either paper strips, cm cubes, or a ruler. Students will measure their plant's height daily and record data in their notebook. They will observe changes in the plant growth and compare these changes in growth to previous growth patterns. Students will predict their plant's height for each following day. Students will develop an understanding of a growth spurt and what this means in a plant's life cycle. (T.M.* p. 48)	See Appendix.

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.) Lesson 7: Observing the Growth Spurt (continued)			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW predict their plant's growth each day.	3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.	Students will complete a bar graph showing plant growth over a period of time. Students will use this information to identify trends, make predictions about future growth and verify those predictions based on actual growth.	See Appendix.
	3.2.7 Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.		
	3.6.4 Take, record, and display counts and simple measurements of things over time, such as plant or student growth.		
TLW analyze data on the plant's growth spurt.	3.6.5 Observe that and describe how some changes are very slow and some are very fast and that some of these changes may be hard to see and/or record.		

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 8: Why Are Bees Important?			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW share information about bees.</p> <p>TLW draw a picture of what they think a bee looks like.</p> <p>TLW discover the interdependence of bees, flowers, and plants.</p>	<p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p> <p>3.4.4 Describe that almost all kinds of animals' food can be traced back to plants.</p> <p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas.</p> <p>Standard 4: Interdependence of Life and Evolution</p> <p>3.4.1 Demonstrate that a great variety of living things can be sorted into groups in, many ways using various features, such as how they look, where they lie, and how they act, to decide which things belong to which group.</p> <p>3.4.2 Explain that features used for grouping depend on the purpose of the grouping.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will compile a KWL chart concerning bees, their appearance, and their importance in nature. Students will draw a picture of what they think a bee looks like. Students will discuss how bees help plants reproduce through the process of pollination.</p>	<p>See Appendix.</p>

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 8: Why Are Bees Important? (continued)			
Objective	Indicator	Instruction/Assessment Reference	Resource
	3.4.3 Observe that and describe how offspring are very much, but not exactly, like their parents and like one another. 3.4.4 Describe that almost all kinds of animals' food can be traced back to plants. 3.4.5 Give examples of some kinds of organisms that have completely disappeared and explain how these organisms were similar to some organisms living today. 3.4.6 Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do. 3.4.7 Explain that eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy. 3.4.8 Explain that some things people take into their bodies from the environment can hurt them and give examples of such things. 3.4.9 Explain that some diseases are caused by germs and some are not. Note that diseases caused by germs may be spread to other people. Also understand that washing hands with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.		

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 9: Getting a Handle on Your Bee			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW observe a dried bee and prepare bee sticks to use as a tool in pollination.	3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.	Students will construct bee sticks as a tool for pollination.	See Appendix

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 10: Looking at Flowers			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW observe the details of the flower's anatomy and identify the flower's major parts.</p> <p>TLW learn about the Crucifer family.</p>	<p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>3.5.5 Explain that one way to make sense of something is to think of how it relates to something more familiar.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will observe the flowers on their plants and identify the parts of the flower using a hand lens. Students will draw and label the parts of a flower in their notebook. Students will observe other members of the Crucifer family and discuss the similarities and differences seen. Students will make bee sticks and then use them to cross-pollinate their plants. Students will learn about the difference between self-pollination and cross-pollination.</p>	<p>See Appendix.</p>

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 11: Pollinating Flowers			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW use a bee stick to cross-pollinate their plants.</p> <p>TLW read about the interdependence of bees and flowers.</p>	<p>Standard 4: Interdependence of Life and Evolution</p> <p>3.4.1 Demonstrate that a great variety of living things can be sorted into groups in many ways using various features, such as how they look, where they live, and how they act, to decide which things belong to which group.</p> <p>3.4.2 Explain that features used for grouping depend on the purpose of the grouping.</p> <p>3.4.3 Observe that and describe how offspring are very much, but not exactly, like their parents and like one another.</p> <p>3.4.4 Describe that almost all kinds of animals' food can be traced back to plants.</p> <p>3.4.5 Give examples of some kinds of organisms that have completely disappeared and explain how these organisms were similar to some organisms living today.</p> <p>3.4.6 Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do.</p>	<p>Students will observe the flowers on their plants and identify the parts of the flower using a hand lens. Students will draw and label the parts of a flower in their notebook. Students will observe other members of the Crucifer family and discuss the similarities and differences seen. Students will make bee sticks and then use them to cross-pollinate their plants. Students will learn about the difference between self-pollination and cross-pollination.</p>	<p>See Appendix.</p>

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 11: Pollinating Flowers (continued)			
Objective	Indicator	Instruction/Assessment Reference	Resource
	<p>3.4.7 Explain that eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy.</p> <p>3.4.8 Explain that some things people take into their bodies from the environment can hurt them and give examples of such things.</p> <p>3.4.9 Explain that some diseases are caused by germs and some are not. Note that diseases caused by germs may be spread to other people. Also understand that washing hands with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.</p>		

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 12: Observing Pods			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW observe the continuous life cycle of the plant as it begins to develop seedpods.	3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question. 3.6.4 Take, record, and display counts and simple measurements of things over time, such as plant or student growth. 3.6.5 Observe that and describe how some changes are very slow and some are very fast and that some of these changes may be hard to see and/or record.	Students will observe the changes in their plant’s life cycle, observing the development of pods. Students will discuss and record their observations in their notebook. Students will discuss the stages of the plant’s life cycle, as it goes from seed, to plant, and back to seed again.	See Appendix.

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.) Lesson 13: Making a <i>Brassica</i> Model Lesson 14: Making a Bee Model			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW develop a model of a <i>Brassica</i> plant.</p> <p>TLW develop a model of a bee.</p>	<p>3.6.3 Explain how a model of something is different from the real thing but can be used to learn something about the real thing.</p> <p>3.2.5 Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.</p>	<p>Students will apply their knowledge of plants and bees by constructing a model of each.</p>	<p>See Appendix.</p>

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)

Lesson 15: Interpreting Graphs

Lesson 16: Harvesting and Threshing the Seed

Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW interpret information shown on a bar graph.</p> <p>TLW harvest and thresh their plant's seeds.</p> <p>TLW count their seeds and compare this to their original number of eight seeds planted to determine their profit or loss.</p> <p>TLW discuss what they have learned and questions that they still have regarding plants.</p>	<p>3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.</p> <p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>3.2.7 Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.</p>	<p>Students will look at bar graphs and learn how to interpret the information presented, comparing and contrasting data recorded. Students will harvest and thresh their seeds, discussing how their plants have changed from Day One and the results produced at the end of the plant life cycle. Students will compare the number of seeds collected with their classmates and discuss profits and losses.</p> <p>Students will discuss what they have learned from their study of plant life, as well as remaining questions they wonder about.</p> <p>Students will put the plant's life cycle in sequential order to demonstrate their understanding of the plant's life cycle.</p>	<p>See Appendix.</p>

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Unit: Plant Growth (Standards 3.1.1, 3.1.3, and 3.1.4 are covered throughout the entire unit.)			
Lesson 17: Post-Unit Assessment			
Objective	Indicator	Instruction/Assessment Reference	Resource
Post-Unit Assessment	Standards covered in the unit.	Assessments can be found in the T.M. *p. 103.	See Appendix.

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.) Lesson 1: Sharing What We Know about Rocks Lesson 2: Observing Rocks: How Are They the Same and Different?			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW share prior knowledge about rocks and minerals and discuss what they want to know.</p> <p>TLW practice observation and prediction skills.</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p> <p>3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will set up science notebooks to record their observations, ideas, and questions. (See Appendix for Journal Page.)</p> <p>Students will observe twelve rocks and record their observations. Students will sort rocks according to similarities and differences observed, and be able to discuss what properties they used to sort their rocks.</p>	<p>See Appendix.</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.) Lesson 3: Learning More about Rocks			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW use a Venn diagram to identify and discuss similarities and differences among rocks.</p> <p>TLW read about and discuss how rocks are formed T.M.* p. 35. Also in the student’s handbook.</p> <p>TLW identify observable properties that are related to how rocks are formed and be able to sort rocks into classes: sedimentary, igneous, and metamorphic.</p>	<p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>1.1.1 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>3.3.5 Give examples of how change, such as weather patterns, is a continual process occurring on Earth.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will make a Venn diagram to show similarities and differences based on observable physical characteristics. (texture, color, shape, size)</p> <p>Read information in T.M.* p. 35 titled <u>Rocks-Here, There, Everywhere</u>.</p> <p>Students will use information from the reading to assist in classifying their rocks into the three classes.</p>	<p>See Appendix.</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.)			
Lesson 4: Discovering Minerals			
Lesson 5: Sharing What We Know About Minerals			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW review and summarize the properties of the rocks observed.</p> <p>TLW share their ideas and questions about minerals. TLW observe and describe their twelve minerals on a class chart, listing questions they have about minerals.</p> <p>TLW compare the similarities and differences between their minerals.</p> <p>TLW compare rocks and minerals and discuss the similarities and differences. TLW record their observations of their twelve minerals in their notebooks.</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will review the class Venn diagram from the previous lesson and discuss what they have learned so far.</p> <p>Students will work together to complete a class KWL chart on minerals to be displayed in the classroom.</p> <p>Students will observe the physical properties of their minerals and look for similarities and differences.</p> <p>Students will compare rocks and minerals on a class chart, discussing the similarities and differences between them.</p>	<p>See Appendix.</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.)			
Lesson 6: Observing Minerals: How Are They the Same and Different?			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW observe, describe, and draw each mineral. TLW record the physical properties of texture (feel) and smell for each mineral on their Mineral Profile Sheet (T.M. 61).</p> <p>TLW discuss the similarities and differences observed between the mineral.</p>	<p>3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.</p> <p>3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p>	<p>Copy and distribute twelve Mineral Profile Sheets (T.M.* 61) for each student. Allow students time to draw and record information.</p> <p>Students will read about sulfur on page 22 in the Student Activity Book. Lead a class discussion about the similarities and differences of the physical properties of each mineral.</p>	<p>See Appendix.</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.)

Lesson 7: Describing the Color of Minerals

Lesson 8: Shining a Light on the Minerals

Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW describe and record the observable color of their twelve minerals. Students will sort their minerals according to observable color.</p>	<p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p>	<p>Students will sort minerals according to observable color.</p>	<p>See Appendix.</p>
<p>TLW apply the streak test to determine the identifying color of each mineral. TLW compare and discuss the differences between the observable color and the identifying color produced by the streak test.</p>	<p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p>	<p>Students will follow procedure on page 25 of the Student Activity Book for performing the streak test. Students will understand and be able to explain the difference between observable color and identifying (streak) color. Students will read about Hematite and Graphite on page 26 of the Student Activity Book.</p>	
<p>TLW shine light through each of the twelve minerals, comparing and discussing how light is transmitted through each mineral.</p>	<p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p>	<p>Students will use a light to determine how much light is transmitted through each mineral. Students will learn the vocabulary words opaque, translucent, and transparent. Students will record their results in their notebooks and sort the minerals accordingly.</p>	
<p>TLW record results of the light test in their notebook and sort their minerals according to these results.</p>	<p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p>	<p>Students will read about Calcite and Muscovite on page 30 of the Student Activity Book.</p>	

Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.)

Lesson 9: Exploring the Luster of Minerals

Lesson 10: Exploring the Hardness of Minerals

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Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW observe, discuss, and describe the luster of minerals when they are placed under a bright light. TLW sort the minerals according to similarities and differences in terms of luster.</p> <p>TLW will summarize information to date and begin identifying distinguishing properties of each mineral.</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Teacher will provide examples of each type of luster: glassy, waxy, dull, and metallic. (T.M.* 76) Students will follow procedures for luster test on page 33 of the Student Activity Book. A blackline master for sorting minerals by luster can be found in T.M.* 80. Allow students time to record information on Mineral Profile Sheet. Students will read about Galena and Gypsum on page 34 of the Student Activity Book.</p> <p>Students will look at their notebooks and attempt to find properties unique to certain minerals that can be used in identification.</p>	<p>See Appendix.</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.) Lesson 9: Exploring the Luster of Minerals Lesson 10: Exploring the Hardness of Minerals (continued)			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW compare and discuss the hardness of the minerals, recording their findings in their notebook and sorting their minerals according to hardness.</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will follow procedures for the hardness test found on page 37 of the Student Activity Book. A blackline master for the hardness test can be found on T.M.* 89. Students will complete the test, record results, and sort their minerals accordingly. Students will learn about the Mohs scale standard. Students will read about Diamonds and Talc on page 38 of the Student Activity Book.</p>	

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.)			
Lesson 11: Testing Minerals With A Magnet			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW test minerals with a magnet. TLW observe and describe the results.</p> <p>TLW record and compare results of their test.</p> <p>TLW read to learn more about the mineral Magnetite. (T.M.* 94-95)</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.1.2 Participate in different types of guided scientific investigations such as observing objects and events and collecting specimens for analysis.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will follow instructions for the magnetic testing found on p. 41 of the Student Activity Book.</p> <p>Students will record the results of the magnetism test on their 12 Mineral Profile Sheets.</p> <p>Students will read about Magnetite on pages 42-43 of the Student Activity Book.</p>	<p>See Appendix.</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.15, and 3.2.4 are covered throughout the entire unit.)			
Lesson 12: Describing the Shape of Minerals			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW observe and describe the shapes of four new mineral samples.</p> <p>TLW compare shapes of their twelve minerals and the four new samples.</p> <p>TLW sort the twelve minerals on the basis of their shapes, or cleavage. TLW discuss and record the shapes of their twelve minerals based on shape, or cleavage.</p> <p>TLW read to learn more about the minerals quartz and fluorite (T.M.* p 101)</p>	<p>3.1.2 Participate in different types of guided scientific investigations such as observing objects and events and collecting specimens for analysis.</p> <p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Procedures found in T.M.* pp. 88-89. Students will use the Mineral Identification Cards (T.M.* p. 150) to assist in identifying their new mineral samples.</p> <p>Students will use the Mineral Identification Cards and their Mineral Profile Sheets to compare the properties of minerals and draw conclusions.</p> <p>Students will apply their knowledge and understanding of minerals to identify and classify their minerals based on the shape of the minerals.</p> <p>Students will read about quartz and fluorite in their Student Activity Book, p. 47.</p>	<p>See Appendix</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.)

Lesson 13: Comparing Samples of the Same Mineral

Lesson 14: Identifying the Minerals

Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW review and summarize what they have learned about the twelve minerals.</p>	<p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p>	<p>Teacher will lead discussion regarding learning to date, focusing on the various properties used to identify each mineral.</p>	<p>See Appendix.</p>
<p>TLW identify distinctive properties of each mineral and use these properties to describe the minerals.</p>	<p>3.1.2 Participate in different types of guided scientific investigations such as observing objects and events and collecting specimens for analysis.</p>	<p>Procedures can be found on page 104 of the T. M.*</p>	
<p>TLW compare and contrast several samples of the same mineral.</p>	<p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p>	<p>Students will use a Venn diagram to compare the properties of the minerals.</p>	
<p>TLW think about their new observations of minerals and share ideas and questions with each other.</p>	<p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p>	<p>Class discussion will take place using Mineral Profile Sheets and Mineral Identification Cards to describe the properties of each mineral.</p>	
<p>TLW analyze a Mineral Identification Card and select the properties that will allow them to identify a sample of that mineral from the twelve minerals in the set. (T.M.* pp 111-114)</p>	<p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p>		
<p>TLW apply problem-solving skills to identify each of the twelve minerals by name.</p>	<p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p>	<p>Students will apply their knowledge from the class discussion to summarize and draw conclusions as they identify each of the twelve minerals correctly.</p>	

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.)

Lesson 15: Exploring New Minerals

Lesson 16: How are Rocks and Minerals Used?

Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW apply tests to describe new minerals. TLW record and discuss test results.</p> <p>TLW identify, discuss similarities and differences between known and unknown minerals.</p> <p>TLW use this information to identify three new minerals by name. TLW communicate in writing how they identified the new minerals.</p> <p>TLW suggest possible uses for rocks and minerals. TLW read to learn more about rocks and minerals. TLW prepare and share reports on specific rocks and minerals.</p> <p>TLW show the similarities and differences between rocks and minerals they have studied using a Venn diagram.</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>3.1.3 Keep and report records of investigations and observations* using tools such as journals, charts, graphs, and computers.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p>	<p>Procedures to be followed on pages 116-117 in the T.M.*</p> <p>Procedures to be followed on pages 127-129 in the T.M.*</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>See Appendix.</p>

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Unit: Rocks and Minerals (Standards 3.1.1, 3.1.3, 3.1.4, 3.1.5, and 3.2.4 are covered throughout the entire unit.) Post-Unit Assessments			
Objective	Indicator	Instruction/Assessment Reference	Resource
Post-Unit Assessment	Standards covered in the unit.	Assessments can be found in the T.M.* pp. 139-147.	See Appendix.

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Unit: Sound (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 1: Thinking about Sound			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>The teacher will assess students' prior knowledge of sound.</p> <p>TLW investigate and describe sounds produced by tuning forks. Students will classify the sounds heard.</p> <p>TLW work cooperatively to investigate and analyze results of experiment. (T.M.* p. 13)</p>	<p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers</p> <p>3.1.1 Recognize and explain that when a scientific investigation is repeated, a similar result is expected.</p> <p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>3.1.5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Set up science journals for record keeping and collection of data. (See Appendix for Journal Page.)</p> <p>Students will use the tuning forks to produce and classify sounds heard. Students will observe the vibrations, produced by a tuning fork, which result in the production of a sound.</p> <p>Students will discuss results in a small group and share finding and observations with the class.</p> <p>See Appendix for Sound Scale and Decibel Scale for Sound.</p>	<p>See Appendix.</p> <p>AIMS Activities, Grades K-3, Primarily Physics</p>

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Unit: Sound (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 2: How Sound Travels			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW investigate how sound travels through various states of matter. Students will devise and present demonstrations which support their ideas.</p> <p>TLW compare and discuss the concepts of vibrations, pitch, and the loudness of sound.</p>	<p>3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas.</p> <p>3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.</p> <p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.5.5 Explain that one way to make sense of something is to think of how it relates to something more familiar.</p>	<p>Students are able to answer the question “How do you know?” in appropriate situations and attempt to find reasonable answers based on their experimentation with sound. Students may use sketches or written descriptions to aid in demonstrating their understanding of the concepts of sound.</p> <p>Students will use metersticks, twine, foil, and cotton to determine how sound travels through different mediums.</p>	<p>See Appendix.</p>

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<p>Unit: Sound (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.) Lesson 3: Making Sounds with Nails Lesson 4: Making Sounds with Rulers Lesson 5: Exploring Pitch</p>			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW investigate and predict the sounds, specifically the pitch produced by objects varying in length, such as nails and rulers.</p> <p>TLW identify, compare and discuss the similarities and differences between the sounds produced by tuning forks and nails. (T.M.* p. 27)</p>	<p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.5.5 Explain that one way to make sense of something is to think of how it relates to something more familiar.</p> <p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>*observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.</p>	<p>Students will use rulers and nails to investigate the pitch of sound produced depending on length of the ruler. This is similar to the pitch produced by a xylophone. Students can predict the pitch produced by a xylophone based on the length of the xylophone bar.</p> <p>Students will keep and record results produced in their experiments.</p>	<p>See Appendix</p>

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Unit: Sound (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.) Lesson 6: Vibrations We Can't See Lesson 7: Designing a Reed Instrument			
Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW investigate the relationship between airspace and pitch produced, as well as the construction of wind instruments. Students will investigate and learn about vibrations that they cannot see.</p> <p>TLW learn how to vary the pitch produced by an instrument by changing the airspace the instrument uses.</p> <p>TLW construct a graph to record observations.</p>	<p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.2.5 Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.</p> <p>3.5.5 Explain that one way to make sense of something is to think of how it relates to something more familiar.</p> <p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis</p> <p>3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.</p>	<p>Students will construct wind instruments to investigate the pitch of sound produced depending on the airspace used by the instrument.</p> <p>Students will investigate how changes in airspace effect the sounds produced.</p> <p>Students will complete the chart provided in the teacher's manual and graph the results. (T.M.* p.56)</p>	<p>See Appendix</p>

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Unit: Sound (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 8: Making a Model Eardrum			
Objective	Indicator	Instruction/Assessment Reference	Resource
TLW construct a model eardrum and apply their knowledge of sound to understand how the human ear works. Students will learn how different vibrations are received by the eardrum and how these vibrations produce the sounds we hear.	3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas. 3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.	Students make models to aid in explaining procedures and ideas related to how sound is received by the ear. Students will attempt to answer the question “How do you know that this is how the eardrum works?” and attempt reasonable responses based on what they have learned throughout the unit. See Appendix for Your Amazing Ears, The Ear, Now Hear This!, and Sound Travels.	See Appendix

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Unit: Sound (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)
Lesson 9: Making Sounds with String
Lesson 10: Changing Pitch by Changing Tension
Lesson 11: Tuning a Stringed Instrument
Lesson 12: How Do Different Strings Sound?
Lesson 13: Making Louder Sounds From Strings
Lesson 14: Making Sounds With Air and Strings: The Human Vocal Cards

Objective	Indicator	Instruction/Assessment Reference	Resource
<p>TLW investigate how the relationship between length, tension, or thickness of string effects the frequency of vibration and, therefore, the pitch of the sound that is produced. Students will construct their own string instruments for the investigation.</p> <p>TLW learn how to vary the pitch produced by an instrument by changing the length and thickness of the strings the instrument uses.</p>	<p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p> <p>3.2.5 Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.</p> <p>3.5.5 Explain that one way to make sense of something is to think of how it relates to something more familiar.</p> <p>3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.</p>	<p>Students will construct string instruments to investigate the pitch of sound produced depending on the length, tension, or thickness of the strings used by the instrument.</p> <p>Students will investigate how changes in the length, tension, or thickness of the strings effect the sounds produced.</p>	<p>See Appendix</p>

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Unit: Sound (Standards 3.1.3, 3.1.4, and 3.1.5 are covered throughout the entire unit.)			
Lesson 15: Post Unit Assessment			
Objective	Indicator	Instruction/Assessment Reference	Resource
Post-Unit Assessment	Standards covered in the unit.	Sharing what students learned throughout the unit concerning vibrations, pitch, and volume. Students should be able to explain these concepts and how changes in vibrations effect the pitch or volume of the sound produced.	(T.M.* pp. 113, 127, 129)

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Introduction to Chemistry by Jane Chisholm and Mary Johnson

Adventures with a Hand Lens by Richard Headstrom

How to Think Like A Scientist by Stephen Kramer

Chemical Changes by Kathryn Whyman

Gobs of Goo by Vicki Cobb

Kitchen Chemistry by Robert Gardner

Everyday Chemicals by Terry Jennings

Cup and Saucer Chemistry by Marlene Robinson

Chemistry for Every Kid by Janice VanCleave

Science Fun with a Homemade Chemistry Set by Rose Wyler

Messing Around with Baking Chemistry Bernie Zubrowski

Chemistry Experiments by Mary Johnson

Adventures with Atoms and Molecules by Thomas Rybolt and Robert Mebane

Science Experiments You Can Eat by Vicki Cobb

The Magic School Bus at the Waterworks by Joanna Cole

The Crystal Kit by Marlene Robinson

Snowflakes, Sugar, and Salt: Crystals Up Close by Chu Maki

"The Great Tape Robbery" by D. Brooks, P. Green, K. Kleck and D. Muench from Science and Children 5/95

Mr. Wizard's Supermarket Science by Don Herbert

The Junior Boom Academy 100 Chemistry Experiments for the Teachers of Anklebiters by B. K. Hixson

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Pocket Scientist Chemistry Experiments by Mary Johnson

"The Chemistry of Corrosion" by Tom Runyan and Susan Gertz from Science Scope 2/93

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See Teacher's Guide – Appendix D

Bibliography – for teacher & student resources

Silver Burdett, Chapter 3, pp. 38-59, “Seed Plants”

Dave Emery, Cooper Science Lab

Video #VHS1598 *How Plants Grow*, (17 min.)

VHS1593, *How Plants Get Food*, (17 min.)

Silver Burdett, Chapter 2, p. 24 “Honeybees”

Interview a beekeeper.

Interview a florist.

VHS1594, *What Is Pollination?* (16 min.)

Interview a farmer.

VHS1595, “*How Seeds Get Here . . . There*” (16 min.)

The Big Rock by Bruce Hiscock

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Rocks and Minerals by Pat Bell and David Wright

Rocks and Minerals by Basil Booth

Rocks and Minerals by Nelson Hyler

Rocks and Minerals by David Lambert

The Concise Illustrated Book of Rocks and Minerals by Richard Moody

Rocks and Minerals by Rae Bains

Rock Collecting by Roma Gans

Suburban Geology by Richard Headstrom

Rocks and Minerals by Alice Fitch Martin and Bertha Morris Parker

A First Look at Rocks by Millicent Selsam

Volcano by Bradbury Press

Disaster! Volcanoes by Dennis Brindell Fradin

Dinosaurs Walked Here by Patricia Lauber

Metals and Minerals by Jacqueline Dineen

Rock Collecting by Roma Gans

Rocks and Minerals by Alice Fitch Martin and Bertha Morris Parker

A First Look at Rocks by Millicent Selsam and Joyce Hunt

Janice VanCleave's Earth Science for Every Kid by Janice VanCleave

The Big Rock by Bruce Hiscock

"Science Learning in the Sand" by Ursula Sexton from Science and Children 1/97

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Suburban Geology by Richard Headstrom

"Science Learning in the Sand" by Ursula Sexton from Science and Children 1/97

I Can Be a Geologist by Paul Sipiera

Susan Humphris, Geologist by Liza Ketchum Murrow

"Crystal Creations" by Nona Whipple and Sherry Whitmore from Science and Children 1/89
Crystal & Gem by R.R. Harding and R.F. Symes

Susan Humphris, Geologist by Liza Ketchum Murrow

How Did We Find Out About Coal? by Isaac Asimov

Sounds Teacher's Guide pp. 7-10 & Appendix C, pp. 119-120

Silver Burdett Science – Gr. 3, pp. 143-145

GRADE 3 SCIENCE CURRICULUM GUIDE
APPENDIX

Learning About Sound p. 218, 1975, 8 min.

How Science Works – Judith Hann, pp. 104-105

Make It Work! Sound – Wendy Baker & Andrew Haslam

Activity Sheet #1 – Teacher’s Guide p. 20

Sounds Teacher’s Guide pp. 13-20

Silver Burdett Science – Gr. 3, pp. 146-147

Physics For Every Kid – Janice Van Cleave pp. 222, 226-227

The Science Book – Sara Stein, pp. 181-183

Sounds, Teacher’s Guide, pp. 23-28

Sounds Teacher’s Guide pp. 31-39

The Orchestra – VHS 1625, 40 min.

The Young Person’s Guide to the Orchestra – VHS 1633

Meet The Instruments – EK 306

Sounds Teacher’s Guide pp. 41-47

Activity Sheet #2 – Teacher’s Guide p. 54

Sounds Teacher’s Guide pp. 49-54

Silver Burdett Science – Gr. 3, pp. 148

Physics For Every Kid – Janice Van Cleave pp. 216

How Science Works – Judith Hann, pp. 106-107

Sounds Teacher’s Guide pp. 57-59

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Sounds Teacher's Guide pp. 61-66

The Science Book – Sara Stein, pp. 184

Sounds Teacher's Guide pp. 69-73

Physics For Every Kid – Janice Van Cleave pp. 228-229

Sounds Teacher's Guide pp. 75-77

Decibel Level Sheet, p. 48 (1987-93 Curriculum Guide)

Sounds Teacher's Guide pp. 79-83

Sounds Teacher's Guide pp. 85-87

Silver Burdett Science – Gr. 3, pp. 149-153

Sounds Teacher's Guide pp. 91 – 97

Sounds Appendix B, pp. 117 – 118

Ludwig vanBeethoven: Master of a Silent World: On The Horizon, Teacher's Edition, pp. 416 – 435

Deaf Like Me E291 – 23 min.

You And Your Ears p. 10, 8 min.

Sounds Teacher's Guide pp. 99 – 105

Being Healthy, HBJ, p. 27 & p. 31

Ear Model – AV

101 Great Science Experiments – Neil Ardley p. 67 & p. 71

The Science Book – Sara Stein, pp. 174-175

Sounds Teacher's Guide pp. 107 – 109

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Activity Sheet #3, p. 110

Silver Burdett Science – Gr. 3, pp. 154 – 163

Sound Tracks – MECC A 159

Mr. Wizard's World, Sound Instruments, VHS 1647, (Tape X1)

My First Science Book, Angela Wilkes, pp. 22 - 25

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