



LJ Group



Educational
Solutions

**Living with Science Supporting
Indiana Science Standards**

CM502/A

Intentionally Blank

Contents

Section 1 – Indiana Science Standards

Section 2 – LWS Correlation at a Glance

Section 3 – LWS Assignment Correlation

Section 4 – LWS Objectives Correlation

Section 5 – LWS Objective Lists

Section 6 – ClassAct Student Report

Section 1.

Indiana Science Standards

Grade 5

Science





The Indiana Academic Standards for science contain six Standards. Each Standard is described below. On the pages that follow, age-appropriate concepts are listed underneath each Standard. These ideas build a foundation for understanding the intent of each Standard.

Standard 1 — The Nature of Science and Technology

It is the union of science and technology that forms the scientific endeavor and that makes it so successful. Although each of these human enterprises has a character and history of its own, each is dependent on and reinforces the other. This first Standard draws portraits of science and technology that emphasize their roles in the scientific endeavor and reveal some of the similarities and connections between them. In order for students to truly understand the nature of science and technology, they must model the process of scientific investigation through inquiries, fieldwork, lab work, etc. Through these experiences, students will practice designing investigations and experiments, making observations, and formulating theories based on evidence.

Standard 2 — Scientific Thinking

There are certain thinking skills associated with science, mathematics, and technology that young people need to develop during their school years. These are mostly, but not exclusively, mathematical and logical skills that are essential tools for both formal and informal learning and for a lifetime of participation in society as a whole. Good communication is also essential in order to both receive and disseminate information and to understand others' ideas as well as have one's own ideas understood. Writing, in the form of journals, essays, lab reports, procedural summaries, etc., should be an integral component of students' experiences in science.

Standard 3 — The Physical Setting

One of the grand success stories of science is the unification of the physical universe. It turns out that all natural objects, events, and processes are connected to each other. This Standard contains recommendations for basic knowledge about the overall structure of the universe and the physical principles on which it seems to run, with emphasis on Earth and the solar system. This Standard focuses on two principle subjects: the structure of the universe and the major processes that have shaped planet Earth, and the concepts with which science describes the physical world in general – organized under the headings of *Matter and Energy* and *Forces of Nature*. In Grade 5, students continue to learn about changes to Earth and the sky. They learn about the properties of materials and how those properties can change.

Standard 4 The Living Environment

People have long been curious about living things – how many different species there are, what they are like, how they relate to each other, and how they behave. Living organisms are made of the same components as all other matter, involve the same kinds of transformations of energy, and move using the same basic kinds of forces. Thus, all of the physical principles discussed in Standard 3 – The Physical Setting, apply to life as well as to stars, raindrops, and television sets. This Standard offers recommendations on basic knowledge about how living things function and how they interact with one another and their environment. In Grade 5, students learn that organisms are composed of collections of similar cells and that these cells benefit from cooperating. They learn that characteristics of organisms, as well as their environment, affect survival.



Standard 5 — The Mathematical World

Mathematics is essentially a process of thinking that involves building and applying abstract, logically connected networks of ideas. These ideas often arise from the need to solve problems in science, technology, and everyday life — problems ranging from how to model certain aspects of a complex scientific problem to how to balance a checkbook.

Standard 6 — Common Themes

Some important themes pervade science, mathematics, and technology and appear over and over again, whether we are looking at ancient civilization, the human body, or a comet. These ideas transcend disciplinary boundaries and prove fruitful in explanation, in theory, in observation, and in design. A focus on *Constancy and Change* within this Standard provides students opportunities to engage in long-term and on-going laboratory and fieldwork, and thus understand the role of change over time in studying The Physical Setting and The Living Environment.



The Nature of Science and Technology

Students work collaboratively to carry out investigations. They observe and make accurate measurements, increase their use of tools and instruments, record data in journals, and communicate results through chart, graph, written, and verbal forms. Students repeat investigations, explain inconsistencies, and design projects.

The Scientific View of the World

5.1.1 Recognize and describe that results of similar scientific investigations may turn out differently because of inconsistencies in methods, materials, and observations*.

* observation: gaining information through the use of one or more of the senses, such as sight, smell, etc.

Scientific Inquiry

5.1.2 Begin to evaluate the validity of claims based on the amount and quality of the evidence cited.

The Scientific Enterprise

5.1.3 Explain that doing science involves many different kinds of work and engages men, women, and children of all ages and backgrounds.

Technology and Science

5.1.4 Give examples of technology, such as telescopes, microscopes, and cameras, that enable scientists and others to observe things that are too small or too far away to be seen without them and to study the motion of objects that are moving very rapidly or are hardly moving.

5.1.5 Explain that technology extends the ability of people to make positive and/or negative changes in the world.

5.1.6 Explain how the solution to one problem, such as the use of pesticides in agriculture or the use of dumps for waste disposal, may create other problems.

5.1.7 Give examples of materials not present in nature, such as cloth, plastic, and concrete, that have become available because of science and technology.



Standard 2

Scientific Thinking

Students use a variety of skills and techniques when attempting to answer questions and solve problems. Students describe their observations accurately and clearly using numbers, words, and sketches, and are able to communicate their thinking to others. They compare, contrast, explain, and justify both information and numerical functions.

Computation and Estimation

5.2.1 Multiply and divide whole numbers* mentally, on paper, and with a calculator.

5.2.2 Use appropriate fractions and decimals when solving problems.

* whole numbers: 0, 1, 2, 3, etc.

Manipulation and Observation

5.2.3 Choose appropriate common materials for making simple mechanical constructions and repairing things.

5.2.4 Keep a notebook to record observations and be able to distinguish inferences* from actual observations.

5.2.5 Use technology, such as calculators or spreadsheets, in determining area and volume from linear dimensions. Find area*, volume*, mass*, time, and cost, and find the difference between two quantities of anything.

* inference: a train of logic based on observations, leading to an explanation

* area: a measure of the size of a two-dimensional region

* volume: a measure of the size of a three-dimensional object

* mass: the amount of matter* in an object

* matter: anything that has mass and takes up space

Communication Skills

5.2.6 Write instructions that others can follow in carrying out a procedure.

5.2.7 Read and follow step-by-step instructions when learning new procedures.

Critical Response Skills

5.2.8 Recognize when and describe that comparisons might not be accurate because some of the conditions are not kept the same.



The Physical Setting

Students continue to investigate changes of Earth and the sky. They explore, describe, and classify materials, motion, and energy*.*

The Universe

- 5.3.1 Explain that telescopes are used to magnify distant objects in the sky, including the moon and the planets.
- 5.3.2 Observe and describe that stars are like the sun, some being smaller and some being larger, but they are so far away that they look like points of light.
- 5.3.3 Observe the stars and identify stars that are unusually bright and those that have unusual colors, such as reddish or bluish.

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

* energy: what is needed to do work

The Earth and the Processes That Shape It

- 5.3.4 Investigate that when liquid water disappears it turns into a gas* (vapor) mixed into the air and can reappear as a liquid* when cooled or as a solid* if cooled below the freezing point of water.
- 5.3.5 Observe and explain that clouds and fog are made of tiny droplets of water.
- 5.3.6 Demonstrate that things on or near Earth are pulled toward it by Earth's gravity*.
- 5.3.7 Describe that, like all planets and stars, Earth is approximately spherical in shape.

* gas: matter with no definite shape or volume

* liquid: matter with no definite shape but with a definite volume

* solid: matter with a definite shape and volume

* gravity: a force that pulls or attracts objects towards one another

Matter and Energy

- 5.3.8 Investigate, observe, and describe that heating and cooling cause changes in the properties of materials, such as water turning into steam by boiling and water turning into ice by freezing. Notice that many kinds of changes occur faster at higher temperatures*.
- 5.3.9 Investigate, observe, and describe that when warmer things are put with cooler ones, the warm ones lose heat* and the cool ones gain it until they are all at the same temperature. Demonstrate that a warmer object can warm a cooler one by contact or at a distance.
- 5.3.10 Investigate that some materials conduct* heat much better than others, and poor conductors can reduce heat loss.

* temperature: a measure of average heat energy that can be measured by using a thermometer



* heat: a form of energy

* conduction: the movement of heat through matter

Forces of Nature

- 5.3.11 Investigate and describe that changes in speed* or direction of motion of an object are caused by forces*. Understand that the greater the force, the greater the change in motion and the more massive an object, the less effect a given force will have.
- 5.3.12 Explain that objects move at different rates, with some moving very slowly and some moving too quickly for people to see them.
- 5.3.13 Demonstrate that Earth's gravity pulls any object toward it without touching it.

* speed: the rate per unit time at which an object moves

* force: a push or a pull that can cause a change in the motion of an object

Standard 4

The Living Environment

Students learn about an increasing variety of organisms – familiar, exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

Diversity of Life

- 5.4.1 Explain that for offspring to resemble their parents there must be a reliable way to transfer information from one generation to the next.
- 5.4.2 Observe and describe that some living things consist of a single cell that needs food, water, air, a way to dispose of waste, and an environment in which to live.
- 5.4.3 Observe and explain that some organisms are made of a collection of similar cells that benefit from cooperating. Explain that some organisms' cells, such as human nerve and muscle cells, vary greatly in appearance and perform very different roles in the organism.

Interdependence of Life and Evolution

- 5.4.4 Explain that in any particular environment, some kinds of plants and animals survive well, some do not survive as well, and some cannot survive at all.
- 5.4.5 Explain how changes in an organism's habitat are sometimes beneficial and sometimes harmful.
- 5.4.6 Recognize and explain that most microorganisms do not cause disease and many are beneficial.



- 5.4.7 Explain that living things, such as plants and animals, differ in their characteristics, and that sometimes these differences can give members of these groups (plants and animals) an advantage in surviving and reproducing.
- 5.4.8 Observe that and describe how fossils can be compared to one another and to living organisms according to their similarities and differences.

Human Identity

- 5.4.9 Explain that like other animals, human beings have body systems.

Standard 5

The Mathematical World

Students apply mathematics in scientific contexts. They make more precise and varied measurements in gathering data. Their geometric descriptions of objects are comprehensive, and their graphing demonstrates specific connections. They identify questions that can be answered by data distribution, e.g., "Where is the middle?" and their support of claims or answers with reasons and analogies becomes important.

Numbers

- 5.5.1 Make precise and varied measurements and specify the appropriate units.

Shapes and Symbolic Relationships

- 5.5.2 Show that mathematical statements using symbols may be true only when the symbols are replaced by certain numbers.
- 5.5.3 Classify objects in terms of simple figures and solids.
- 5.5.4 Compare shapes in terms of concepts, such as parallel and perpendicular, congruence*, and symmetry.
- 5.5.5 Demonstrate that areas of irregular shapes can be found by dividing them into squares and triangles.
- 5.5.6 Describe and use drawings to show shapes and compare locations of things very different in size.

* congruence: same size and shape

Reasoning and Uncertainty

- 5.5.7 Explain that predictions can be based on what is known about the past, assuming that conditions are similar.
- 5.5.8 Realize and explain that predictions may be more accurate if they are based on large collections of objects or events.



- 5.5.9 Show how spreading data out on a number line helps to see what the extremes are, where they pile up, and where the gaps are.
- 5.5.10 Explain the danger in using only a portion of the data collected to describe the whole.

Standard 6

Common Themes

Students work with an increasing variety of systems and begin to modify parts in systems and models and notice the changes that result.

Systems

- 5.6.1 Recognize and describe that systems contain objects as well as processes that interact with each other.

Models and Scale

- 5.6.2 Demonstrate how geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and stories can be used to represent objects, events, and processes in the real world, although such representation can never be exact in every detail.
- 5.6.3 Recognize and describe that almost anything has limits on how big or small it can be.

Constancy and Change

- 5.6.4 Investigate, observe, and describe that things change in steady, repetitive, or irregular ways, such as toy cars continuing in the same direction and air temperature reaching a high or low value. Note that the best way to tell which kinds of changes are happening is to make a table or a graph of measurements.

Section 2.

LWS Correlation at a Glance

		LWS Resource			
		ST20 - Physical Science	ST21 - Life Science	ST22 - Earth Science	ST23 - Scientific Reasoning
Indiana Science Elements Grade 1					
The Nature of Science and Technology					
Scientific Thinking					
The Physical Setting					
The Living Environment					
The Mathematical World					
Common Themes					

	LWS Resource			
	ST20 - Physical Science	ST21 - Life Science	ST22 - Earth Science	ST23 - Scientific Reasoning
Indiana Science Elements Grade 2				
The Nature of Science and Technology				
Scientific Thinking				
The Physical Setting				
The Living Environment				
The Mathematical World				
Common Themes				

		LWS Resource			
		ST20 - Physical Science	ST21 - Life Science	ST22 - Earth Science	ST23 - Scientific Reasoning
Indiana Science Elements Grade 3					
The Nature of Science and Technology					
Scientific Thinking					
The Physical Setting					
The Living Environment					
The Mathematical World					
Common Themes					

	LWS Resource			
	ST20 - Physical Science	ST21 - Life Science	ST22 - Earth Science	ST23 - Scientific Reasoning
Indiana Science Elements Grade 4				
The Nature of Science and Technology	■	■	■	■
Scientific Thinking	■	■	■	■
The Physical Setting	■	□	■	■
The Living Environment	□	■	■	□
The Mathematical World	■	■	■	■
Common Themes	□	□	■	■

Section 4.

LWS Assignment Correlation

Grade 1 Standards Statement

Living with Science Resource							
Physical Science 1	Physical Science 2	Life Science 1	Life Science 2	Earth Science 1	Earth Science 2	Scientific Reasoning 1	Scientific Reasoning 2

The Nature of Science and Technology

Observe, describe, draw, and sort objects carefully to learn about them.					5, 13	4		
Investigate and make observations to seek answers to questions about the world, such as "In what ways do animals move?"		1, 3, 4		2,4	3			
Recognize that and demonstrate how people can learn much about plants and animals by observing them closely over a period of time. Recognize also that care must be taken to know the needs of living things and how to provide for them.			2,6,11, 21	2,4,7,8		1		
Use tools, such as rulers and magnifiers, to investigate the world and make observations.			6,13	2		1,5		

Scientific Thinking

Use whole numbers, up to 100, in counting, identifying, measuring, and describing objects and experiences.	1,5	3					1,5,11	1,5
Use sums and differences of single digit numbers in investigations and judge the reasonableness of the answers.								
Explain to other students how to go about solving numerical problems.								
Measure the length of objects having straight edges in inches, centimeters, or non-standard units.		3					12,21	5,21
Demonstrate that magnifiers help people see things they could not see without them.			6,13	2				

Describe and compare objects in terms of number, shape, texture, size, weight, color, and motion.		1,5,11			2		4	7
Write brief informational descriptions of a real object, person, place, or event using information from observations.							20	

The Physical Setting

Recognize and explain that water can be a liquid or a solid and can go back and forth from one form to the other. Investigate by observing that if water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.								3
Investigate by observing and then describing that water left in an open container disappears, but water in a closed container does not disappear.								3
Investigate by observing and also measuring that the sun warms the land, air, and water.					3	6		
Investigate by observing and then describe how things move in many different ways, such as straight, zigzag, round-and-round, and back-and-forth.	5	4						
Recognize that and demonstrate how things near Earth fall to the ground unless something holds them up.	5							21

The Living Environment

Identify when stories give attributes to plants and animals, such as the ability to speak, that they really do not have.								
Observe and describe that there can be differences, such as size or markings, among the individuals within one kind of plant or animal group.			21					
Observe and explain that animals eat plants or other animals for food.			4,21	5,7,13				
Explain that most living things need water, food, and air.			4,21	4,5,6,7,8,13				

The Mathematical World

Use numbers, up to 10, to place objects in order, such as first, second, and third, and to name them, such as bus numbers or phone numbers.	21			3,21	5		3	
Make and use simple picture graphs to tell about observations.		8,21		21	21			1
Observe and describe similar patterns, such as shapes, designs, and events that may show up in nature, such as honeycombs, sunflowers, or shells. See similar patterns in the things people make, such as quilts, baskets, or pottery.							22	

Common Themes

Observe and describe that models, such as toys, are like the real things in some ways but different in others.								
Observe that and describe how certain things change in some ways and stay the same in others, such as in their color, size, and weight.	5	5						3

Grade 2 Standards Statement

Living with Science Resource							
Physical Science 1	Physical Science 2	Life Science 1	Life Science 2	Earth Science 1	Earth Science 2	Scientific Reasoning 1	Scientific Reasoning 2

The Nature of Science and Technology

Manipulate an object to gain additional information about it.	2,4	1,3,5,8				4,8	3,8	2,7
Use tools, such as thermometers, magnifiers, rulers, or balances, to gain more information about objects.			6,13	2,4	7		1,4	1,11
Describe, both in writing and verbally, objects as accurately as possible and compare observations with those of other people.	20		20		20		20	
Make new observations when there is disagreement among initial observations.								
	20		20		20		20	
Use tools to investigate, observe, measure, design, and build things.	2,5,8	4	1,8	2	3	8		4,5,8,2 1
Recognize and describe ways that some materials, such as recycled paper, cans, and plastic jugs, can be used over again.					5,13			

Scientific Thinking

Give estimates of numerical answers to problems before doing them formally.							21	
---	--	--	--	--	--	--	----	--

Make quantitative estimates of familiar lengths, weights, and time intervals and check them by measurements.	21	3,5					4	5,7
Estimate and measure capacity using cups and pints.					21			
Assemble, describe, take apart, and/or reassemble constructions using such things as interlocking blocks and erector sets. Sometimes pictures or words may be used as a reference.								4,5,21
Draw pictures and write brief descriptions that correctly portray key features of an object.		20						

The Physical Setting

Investigate by observing and then describe that some events in nature have a repeating pattern such as seasons, day and night, and migrations.					2,3,11	21		
Investigate, compare, and describe weather changes from day to day but recognize, describe, and chart that the temperature and amounts of rain or snow tend to be high, medium, or low in the same months every year.					7	3,6		
Investigate by observing and then describe chunks of rocks and their many sizes and shapes, from boulders to grains of sand and even smaller.						4,11		
Investigate by observing and then describe how animals and plants sometimes cause changes in their surroundings.						1		
Investigate that things can be done to materials, such as freezing, mixing, cutting, heating, wetting, etc., to change some of their properties and observe that not all materials respond in the same way.		1,8				8	11	3,11
Discuss how people use electricity or burn fuels, such as wood, oil, coal, or natural gas, to cook their food and warm their houses.	13	13					2,21	
Investigate and observe that the way to change how something is moving is to give it a push or a pull.	1,5,11,13							
Demonstrate and observe that magnets can be used to make some things move without being touched.	2,11,21						6,13	

The Living Environment

Observe and identify different external features of plants and animals and describe how these features help them live in different environments.			2,3	3		1		
Observe that and describe how animals may use plants, or even other animals, for shelter and nesting.						1		
Observe and explain that plants and animals both need to take in water, animals need to take in food, and plants need light.			4	6,8				
Recognize and explain that living things are found almost everywhere in the world and that there are somewhat different kinds in different places.					1	1		
Recognize and explain that materials in nature, such as grass, twigs, sticks, and leaves, can be recycled and used again, sometimes in different forms, such as in birds' nests.					5,13			
Observe and describe the different external features of people, such as their size, shape, and color of hair, skin, and eyes.			1,5					
Recognize and discuss that people are more like one another than they are like other animals.			20					
Give examples of different roles people have in families and communities.								

The Mathematical World

Recognize and explain that, in measuring, there is a need to use numbers between whole numbers, such as 2½ centimeters.	1,11	8			13		1,5,11,21	1
Recognize and explain that it is often useful to estimate quantities.							21	
Observe that and describe how changing one thing can cause changes in something else such as exercise and its effect on heart rate.				1				
Begin to recognize and explain that people are more likely to believe ideas if good reasons are given for them.								20
Explain that some events can be predicted with certainty, such as sunrise and sunset, and some cannot, such as storms. Understand that people aren't always sure what will happen since they do not know everything that might have an effect.					2	3		
Explain that sometimes a person can find out a lot (but not everything) about a group of things, such as insects, plants, or rocks, by studying just a few of them.			2,6,21	2,4		4,11		

Common Themes

Investigate that most objects are made of parts.			6,7	13				
Observe and explain that models may not be the same size, may be missing some details, or may not be able to do all of the same things as the real things.					2	2		
Describe that things can change in different ways, such as in size, weight, color, age, and movement. Investigate that some small changes can be detected by taking measurements.	21	5,11,21					8	

Grade 3 Standards Statement

Living with Science Resource							
Physical Science 1	Physical Science 2	Life Science 1	Life Science 2	Earth Science 1	Earth Science 2	Scientific Reasoning 1	Scientific Reasoning 2

The Nature of Science and Technology

Recognize and explain that when a scientific investigation is repeated, a similar result is expected.								
Participate in different types of guided scientific investigations such as observing objects and events and collecting specimens for analysis.	2,5,8	1,3,4,7	1	4,8	3			
Keep and report records of investigations and observations using tools, such as journals, charts, graphs, and computers.	20	8,21	20	20	20,21	20	20	1
Discuss the results of investigations and consider the explanations of others.	20		20		20		20	
Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.	20	20	20	20	20	20	20	20
Give examples of how tools, such as automobiles, computers, and electric motors, have affected the way we live.								
Recognize that and explain how an invention can be used in different ways, such as a radio being used to get information and for entertainment.								6
Describe how discarded products contribute to the problem of waste disposal and that recycling can help solve this problem.					5,13			

Scientific Thinking

Add and subtract whole numbers mentally, on paper, and with a calculator.								
Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions.						7,8		
Keep a notebook that describes observations and is understandable weeks or months later.		21						20
Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.			6				1	
Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.								4,5,8
Make sketches and write descriptions to aid in explaining procedures or ideas.	20	20	20	20	20	20	20	20
Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.								

The Physical Setting

Observe and describe the apparent motion of the sun and moon over a time span of one day.					3,6,13	6		
Observe and describe that there are more stars in the sky than anyone can easily count, but they are not scattered evenly.								
Observe and describe that the sun can be seen only in the daytime.					2			
Observe and describe that the moon looks a little different every day, but looks the same again about every four weeks.					6,13			
Give examples of how change, such as weather patterns, is a continual process occurring on Earth.					3,7,13			
Describe ways human beings protect themselves from adverse weather conditions.								
Identify and explain some effects human activities have on weather.						5,13		
Investigate and describe how moving air and water can be used to run machines, like windmills and waterwheels.						5	21	

Demonstrate that things that make sound do so by vibrating, such as vocal cords and musical instruments.	3,11	11,21						
--	------	-------	--	--	--	--	--	--

The Living Environment

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.				3,7		1		
Explain that features used for grouping depend on the purpose of the grouping.				3,11,21	5	4		
Observe that and describe how offspring are very much, but not exactly, like their parents and like one another.			22					
Describe that almost all kinds of animals' food can be traced back to plants.			4,11,21	5,7,13				
Give examples of some kinds of organisms that have completely disappeared and explain how these organisms were similar to some organisms living today.					8,14			
Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do.			5	5				
Explain that eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy.				1,5				
Explain that some things people take into their bodies from the environment can hurt them and give examples of such things.					21			
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 hand washing with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.								

The Mathematical World

Select and use appropriate measuring units, such as centimeters (cm) and meters (m), grams (g) and kilograms (kg), and degrees Celsius (°C).	1,5,11	8			13		1,5,11,21	1,21
Observe that and describe how some measurements are likely to be slightly different, even if what is being measured stays the same.							1	
Construct tables and graphs to show how values of one quantity are related to values of another.		8,21		21	21			1

Illustrate that if 0 and 1 are located on a line, any other number can be depicted as a position on the line.								
Explain that one way to make sense of something is to think of how it relates to something more familiar.								

Common Themes

Investigate how and describe that when parts are put together, they can do things that they could not do by themselves.								4
Investigate how and describe that something may not work if some of its parts are missing.								
Explain how a model of something is different from the real thing but can be used to learn something about the real thing.					2	2		
Take, record, and display counts and simple measurements of things over time, such as plant or student growth.			2,11,21	4		21		
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.								

Grade 4 Standards Statement

Living with Science Resource							
Physical Science 1	Physical Science 2	Life Science 1	Life Science 2	Earth Science 1	Earth Science 2	Scientific Reasoning 1	Scientific Reasoning 2

The Nature of Science and Technology

Observe and describe that scientific investigations generally work the same way in different places.								
Recognize and describe that results of scientific investigations are seldom exactly the same. If differences occur, such as a large variation in the measurement of plant growth, propose reasons for why these differences exist, using recorded information about investigations.								
Explain that clear communication is an essential part of doing science since it enables scientists to inform others about their work, to expose their ideas to evaluation by other scientists, and to allow scientists to stay informed about scientific discoveries around the world.	20	20	20	20	20	20	20	20
Describe how people all over the world have taken part in scientific investigation for many centuries.								
Demonstrate how measuring instruments, such as microscopes, telescopes, and cameras, can be used to gather accurate information for making scientific comparisons of objects and events. Note that measuring instruments, such as rulers, can also be used for designing and constructing things that will work properly.	1,5,11	3,8					1,5,11, 21,	1,4,5,8

Explain that even a good design may fail even though steps are taken ahead of time to reduce the likelihood of failure.								
Discuss and give examples of how technology, such as computers and medicines, has improved the lives of many people, although the benefits are not equally available to all.								
Recognize and explain that any invention may lead to other inventions.								
Explain how some products and materials are easier to recycle than others.					5,13			

Scientific Thinking

Judge whether measurements and computations of quantities, such as length, area*, volume*, weight, or time, are reasonable.	1,5,11	8					1,5,11, 21	1,21
State the purpose, orally or in writing, of each step in a computation.								
Make simple and safe electrical connections with various plugs, sockets, and terminals.	6	2,6						
Use numerical data to describe and compare objects and events.								5
Write descriptions of investigations, using observations and other evidence as support for explanations.	20	20	20	20	20	20	20	20
Support statements with facts found in print and electronic media, identify the sources used, and expect others to do the same.								
Identify better reasons for believing something than "Everybody knows that ..." or "I just know," and discount such reasons when given by others.								

The Physical Setting

Observe and report that the moon can be seen sometimes at night and sometimes during the day.					6,13			
Begin to investigate and explain that air is a substance that surrounds us, takes up space, and whose movements we feel as wind.					3,7,13	21		
Identify salt as the major difference between fresh and ocean waters.								
Describe some of the effects of oceans on climate.								

Describe how waves, wind, water, and glacial ice shape and reshape Earth's land surface by the erosion* of rock and soil in some areas and depositing them in other areas.						4,11		
Recognize and describe that rock is composed of different combinations of minerals.						4,11		
Explain that smaller rocks come from the breakage and weathering of bedrock and larger rocks and that soil is made partly from weathered rock, partly from plant remains, and also contains many living organisms.					4,8,13,21	4,11		
Explain that the rotation of Earth on its axis every 24 hours produces the night-and-day cycle.					2,11			
Draw or correctly select drawings of shadows and their direction and length at different times of day.	8,13				2,11			
Demonstrate that the mass* of a whole object is always the same as the sum of the masses of its parts.								
Investigate, observe, and explain that things that give off light often also give off heat*.	4,7							
Investigate, observe, and explain that heat is produced when one object rubs against another, such as one's hands rubbing together.		1,7,11						
Observe and describe that things that give off heat, such as people, animals, and the sun.	7	7,8						3
Explain that energy in fossil fuels* comes from plants that grew long ago.					4			
Demonstrate that without touching them, a magnet pulls all things made of iron and either pushes or pulls other magnets.	2,21							
Investigate and describe that without touching them, material that has been electrically charged pulls all other materials and may either push or pull other charged material.								

The Living Environment

Investigate, such as by using microscopes, to see that living things are made mostly of cells.			6					
Investigate, observe, and describe that insects and various other organisms depend on dead plant and animal material for food.			4	7,13				
Observe and describe that organisms interact with one another in various ways, such as providing food, pollination, and seed dispersal.			2	2,11				
Observe and describe that some source of energy is needed for all organisms to stay alive and grow.	13			7				
Observe and explain that most plants produce far more seeds than those that actually grow into new plants.			2					
Explain how in all environments, organisms are growing, dying, and decaying, and new organisms are being produced by the old ones.			2,3,11,21	2				
Describe that human beings have made tools and machines, such as x-rays, microscopes, and computers, to sense and do things that they could not otherwise sense or do at all, or as quickly, or as well.			6,13	2				
Know and explain that artifacts and preserved remains provide some evidence of the physical characteristics and possible behavior of human beings who lived a very long time ago.					8,13,21			
Explain that food provides energy and materials for growth and repair of body parts. Recognize that vitamins and minerals, present in small amounts in foods, are essential to keep everything working well. Further understand that as people grow up, the amounts and kinds of food and exercise needed by the body may change.				5,7,13				
Explain that if germs are able to get inside the body, they may keep it from working properly. Understand that for defense against germs, the human body has tears, saliva, skin, some blood cells, and stomach secretions. Also note that a healthy body can fight most germs that invade it. Recognize, however, that there are some germs that interfere with the body's defenses.								
Explain that there are some diseases that human beings can only catch once. Explain that there are many diseases that can be prevented by vaccinations, so that people do not catch them even once.								

The Mathematical World

Explain that the meaning of numerals in many-digit numbers depends on their positions.								
Explain that in some situations, "0" means none of something, but in others it may be just the label of some point on a scale.								
Illustrate how length can be thought of as unit lengths joined together, area as a collection of unit squares, and volume as a set of unit cubes.								
Demonstrate how graphical displays of numbers may make it possible to spot patterns that are not otherwise obvious, such as comparative size and trends.		1,8,21		21	21		22	1
Explain how reasoning can be distorted by strong feelings.								

Common Themes

Demonstrate that in an object consisting of many parts, the parts usually influence or interact with one another.								4
Show that something may not work as well, or at all, if a part of it is missing, broken, worn out, mismatched, or incorrectly connected.								
Recognize that and describe how changes made to a model can help predict how the real thing can be altered.								
Observe and describe that some features of things may stay the same even when other features change.						7		

Section 4.

LWS Objectives Correlation

Indiana Science Standards Gr1

1 The Nature of Science and Technology

- 1 Observe, describe, draw, and sort objects carefully to learn about them.**
Describes the appearance of reflections and shadows.
Describes how fossils are formed.
Describes the behavior of light.
Uses a simple classification key to sort three different types of metal.
Uses classification keys to sort animals.
Sorts rocks into sedimentary, metamorphic and igneous rock types.
- 2 Investigate and make observations to seek answers to questions about the world, such as "In what ways do animals move?"**
Observes the weather during different seasons in a virtual representation of New York.
Observes the growth of a plant when grown under different watering conditions.
Observes flower pollen magnified by a microscope.
Observes the mixing of colored light to make other colors, including the making of white light.
Observes the force of friction.
Observes the relationship between length of rubber band and pitch of sound made by a stringed instrument.
- 3 Recognize that and demonstrate how people can learn much about plants and animals by observing them closely over a period of time. Recognize also that care must be taken to know the needs of living things and how to provide for them.**
Observes the growth of a plant when grown under different watering conditions.
Compares the life cycles of plants and identifies similarities and differences between them.
Identifies stages in the life cycle of animals.
Discovers the characteristics of animals that allow them to survive in their natural habitats.
Compares the life cycles of animals and identifies similarities and differences between them.
Determines the nutrients that plants need to grow.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.
Describes different forms of climate control used to grow plants.
Observes the growth of a plant when grown under different temperature conditions.
Discovers how insects aid pollination in the life cycle of a plant.
Identifies foods that come from plants and animals.
Identifies the stages in the life cycle of a plant.
Uses a microscope to view the cells of plants.
Uses a board-game to discover the stages in the life cycle of a plant.
Uses software to discover methods of seeds dispersal from different plants.

<p>2 Scientific Thinking</p>	<p>4 Use tools, such as rulers and magnifiers, to investigate the world and make observations. <i>Observes flower pollen magnified by a microscope.</i> <i>Identifies the parts and controls of a microscope.</i> <i>Uses an analogue light meter to measure light levels in a room.</i> <i>Uses a digital light meter to measure light levels in a room.</i> <i>Measures temperature using thermometers.</i> <i>Uses a ruler and a motion sensor to measure height.</i> <i>States the uses of a microscope.</i> <i>Uses a microscope to view the cells of plants.</i></p>
	<p>1 Use whole numbers, up to 100, in counting, identifying, measuring, and describing objects and experiences. <i>Identifies different ways to measure things.</i> <i>Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.</i> <i>Observes the effect of the changing the weight of a pendulum on the time of its swing.</i> <i>Measures temperature using thermometers.</i> <i>Uses an analogue light meter to measure light levels in a room.</i> <i>Uses a ruler and a motion sensor to measure height.</i> <i>Uses a motion sensor to measure distances.</i> <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i> <i>Identifies units of measurement that would be most suitable for measuring a series of different items.</i> <i>Compares the heat loss in different materials using graphs.</i> <i>Observes the relationship between volume of air and pitch of sound made by a percussion instrument.</i> <i>Observes the relationship between length of tube and pitch of sound made by a wind instrument.</i> <i>Measures pulling forces using a Newton meter.</i> <i>Observes the effect of changing the length of a pendulum on the time of its swing.</i></p>
	<p>2 Use sums and differences of single digit numbers in investigations and judge the reasonableness of the answers. <i>N/A</i></p>
	<p>3 Explain to other students how to go about solving numerical problems. <i>N/A</i></p>

- | | | |
|---|----------------------|---|
| 3 | The Physical Setting | <p>4 Measure the length of objects having straight edges in inches, centimeters, or non-standard units.
 <i>Uses non-standard measurements, such as paper clips and hands, to measure different objects.</i>
 <i>Observes the effect of changing the length of a pendulum on the time of its swing.</i>
 <i>Observes the relationship between length of tube and pitch of sound made by a wind instrument.</i>
 <i>Observes the relationship between length of rubber band and pitch of sound made by a stringed instrument.</i>
 <i>Identifies units of measurement that would be most suitable for measuring a series of different items.</i>
 <i>Identifies different ways to measure things.</i></p> <p>5 Demonstrate that magnifiers help people see things they could not see without them.
 <i>Identifies the parts and controls of a microscope.</i>
 <i>Uses a microscope to view the cells of plants.</i>
 <i>States the uses of a microscope.</i>
 <i>Observes flower pollen magnified by a microscope.</i></p> <p>6 Describe and compare objects in terms of number, shape, texture, size, weight, color, and motion.
 <i>Relates the weight, shape and size of a material to its density.</i>
 <i>Predicts how the pitch of sound produced by a vibrating object changes with object size.</i>
 <i>Compares the force of friction between different materials.</i>
 <i>Uses a shadow trainer to find out why shadows change shape during the day.</i>
 <i>Uses a lever to balance weights.</i>
 <i>Discovers that the stretch of spring is proportional to the weight placed on it.</i></p> <p>7 Write brief informational descriptions of a real object, person, place, or event using information from observations.
 <i>Writes a report on science.</i></p> <p>1 Recognize and explain that water can be a liquid or a solid and can go back and forth from one form to the other. Investigate by observing that if water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.
 <i>Describes the changes that occur in different materials when they are heated.</i>
 <i>Describes the changes that occur in different materials when they are cooled.</i>
 <i>States if changes in different materials, caused by heating and cooling, can be reversed.</i></p> |
|---|----------------------|---|

- | | | |
|---|------------------------|--|
| 4 | The Living Environment | <p>2 Investigate by observing and then describing that water left in an open container disappears, but water in a closed container does not disappear.
 <i>Describes the changes that occur in different materials when they are heated.</i>
 <i>Describes the changes that occur in different materials when they are cooled.</i>
 <i>States if changes in different materials, caused by heating and cooling, can be reversed.</i></p> <p>3 Investigate by observing and also measuring that the sun warms the land, air, and water.
 <i>States the effects that the Sun has on the light levels on the planets of the solar system.</i>
 <i>Uses a software simulation to find out how seasons are linked to the position of the Earth in relation to the Sun.</i>
 <i>Observes the effect that distance has on light levels.</i></p> <p>4 Investigate by observing and then describe how things move in many different ways, such as straight, zigzag, round-and-round, and back-and-forth.
 <i>Uses lenses to bend light rays.</i>
 <i>Observes the mixing of colored light to make other colors, including the making of white light.</i>
 <i>Squashes a ball and stretches a spring to observe the effects of pushing and pulling forces.</i>
 <i>Observes how a varying incline effects the speed of a model car.</i>
 <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i></p> <p>5 Recognize that and demonstrate how things near Earth fall to the ground unless something holds them up.
 <i>Determines the effect of air resistance on an object when gravity is pulling the object towards the ground.</i>
 <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i></p> |
| | | <p>1 Identify when stories give attributes to plants and animals, such as the ability to speak, that they really do not have.
 <i>N/A</i></p> <p>2 Observe and describe that there can be differences, such as size or markings, among the individuals within one kind of plant or animal group.
 <i>Compares the life cycles of plants and identifies similarities and differences between them.</i>
 <i>Compares the life cycles of animals and identifies similarities and differences between them.</i></p> |

- | | | |
|---|---------------------------------------|---|
| 5 | The
Mathematical
World | <p>3 Observe and explain that animals eat plants or other animals for food.
 <i>Uses a matching game to find what foods humans can obtain from plants.</i>
 <i>Determines the placement of animals and plants in food chains.</i>
 <i>Identifies the producers primary consumers and secondary consumers in food chains.</i>
 <i>Identifies the nutrients contained in different foods.</i>
 <i>Uses a matching game to find what foods humans can obtain from animals.</i>
 <i>Identifies if everyday foods come from plants or animals.</i>
 <i>States the energy transfer that occurs between plants to animals and animals to animals in food chains.</i></p> <p>4 Explain that most living things need water, food, and air.
 <i>Discovers that plants require carbon dioxide and produce oxygen as a waste product.</i>
 <i>Determines the placement of animals and plants in food chains.</i>
 <i>Identifies the nutrients contained in different foods.</i>
 <i>Interprets text and diagrams to identify natural sources of water, such as rivers, lakes and oceans.</i>
 <i>Observes the growth of a plant when grown under different watering conditions.</i>
 <i>Discovers the effects that sunlight and water have on the growth of plants.</i>
 <i>Observes the effects of tap water, salt water and fertilizer on the growth of plants in a nine day period.</i>
 <i>Uses a matching game to find what foods humans can obtain from animals.</i>
 <i>Discovers the food groups necessary for a healthy balanced diet.</i>
 <i>States the energy transfer that occurs between plants to animals and animals to animals in food chains.</i>
 <i>Associates various nutrients with food groups.</i>
 <i>Identifies the parts of plants that help them to make their own food.</i>
 <i>Identifies if everyday foods come from plants or animals.</i></p> <p>1 Use numbers, up to 10, to place objects in order, such as first, second, and third, and to name them, such as bus numbers or phone numbers.
 <i>Uses classification keys to sort animals.</i>
 <i>Identifies if different objects should be flexible, inflexible or elastic in order to do their jobs.</i>
 <i>Identifies the weight of objects in units of Newton's and places them in order of their weight.</i>
 <i>Inserts questions into the correct places in a classification key so that it can be used to sort a series of dogs.</i>
 <i>Creates questions in a classification key to sort a group of farmyard animals.</i>
 <i>Uses a simple classification key to sort three different types of metal.</i></p> |
|---|---------------------------------------|---|

6	Common Themes	<p>2 Make and use simple picture graphs to tell about observations. <i>Experiments with actions that effect heart rate and creates a table to record their results.</i> <i>Displays results from a friction experiment in a series of bar charts.</i> <i>Uses graphs to plot the change of temperature over periods of time.</i> <i>Compares the heat loss in different materials using graphs.</i> <i>Records rainfall information into a table and constructs a bar chart of the results.</i></p> <p>3 Observe and describe similar patterns, such as shapes, designs, and events that may show up in nature, such as honeycombs, sunflowers, or shells. See similar patterns in the things people make, such as quilts, baskets, or pottery. <i>Students reorder data into logical sequences to identify patterns in results.</i></p> <p>1 Observe and describe that models, such as toys, are like the real things in some ways but different in others. <i>N/A</i></p> <p>2 Observe that and describe how certain things change in some ways and stay the same in others, such as in their color, size, and weight. <i>Observes how a varying incline effects the speed of a model car.</i> <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i> <i>Discovers the elastic properties of metal springs.</i> <i>Discovers that the stretch of spring is proportional to the weight placed on it.</i> <i>Describes the changes that occur in different materials when they are heated.</i> <i>Describes the changes that occur in different materials when they are cooled.</i> <i>States if changes in different materials, caused by heating and cooling, can be reversed.</i> <i>Squashes a ball and stretches a spring to observe the effects of pushing and pulling forces.</i></p>
---	---------------	--

Indiana Science Standards Gr2

1 The Nature of Science and Technology

6 Use tools to investigate, observe, measure, design, and build things.

Observes the mixing of colored light to make other colors, including the making of white light.

Constructs a bridge to span a gap.

Investigates the pH levels of virtual fields to find which field is most suitable to grow crops.

Constructs models from three different designs and compares the advantages and disadvantages of each design.

Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.

Observes the effect of adding an insoluble material to a liquid.

Observes flower pollen magnified by a microscope.

Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.

Observes that images are reversed when reflected in a mirror.

Observes the magnetic attraction and repulsion forces between the poles of magnets.

Observes how a varying incline effects the speed of a model car.

Investigates the joints of the human body.

Investigates the bones of the human body.

Observes the weather during different seasons in a virtual representation of New York.

7 Recognize and describe ways that some materials, such as recycled paper, cans, and plastic jugs, can be used over again.

Identifies how different materials can be recycled.

Identifies processes by which different materials can be recycled.

- 1 Manipulate an object to gain additional information about it.**
 - Sorts rocks into sedimentary, metamorphic and igneous rock types.*
 - Describes how density of an object can effect if it floats or sinks in water.*
 - Changes the balance of a model airplane to see the effect on flight.*
 - Changes the size and shape of a wing of a model airplane to see the effect in the lift given.*
 - Uses wing flaps and rudders to control the direction of airplanes in the air.*
 - Modifies a crawler to change the direction it moves in.*
 - Modifies a crawler so that it can store enough energy to reach the top of a slope.*
 - Tests if materials are soluble or insoluble.*
 - Measures and compares the heat insulation properties of different materials.*
 - Discovers the elastic properties of metal springs.*
 - Observes the relationship between length of tube and pitch of sound made by a wind instrument.*
 - Compares the force of friction between different materials.*
 - Determines if objects are transparent or opaque using a light ray box.*
 - Determines which materials stick to a magnet.*
 - Tests a series of different objects to find if they are flexible, inflexible or elastic.*

- 2 Use tools, such as thermometers, magnifiers, rulers, or balances, to gain more information about objects.**
 - Uses a ruler and a motion sensor to measure height.*
 - Identifies the parts and controls of a microscope.*
 - Observes flower pollen magnified by a microscope.*
 - Uses a lever to balance weights.*
 - States the uses of a microscope.*
 - Uses a microscope to view the cells of plants.*
 - Observes the growth of a plant when grown under different temperature conditions.*
 - Uses a virtual weather station to record temperature and rainfall.*
 - Measures temperature using thermometers.*
 - Indicates how levers can be used to balance weights.*
 - States how temperature can be measured and identifies the temperature of the human body.*

- 3 Describe, both in writing and verbally, objects as accurately as possible and compare observations with those of other people.**
 - Critiques written and oral explanations of a physical science.*
 - Critiques written and oral explanations of science.*
 - Writes a report on science.*
 - Critiques written and oral explanations of an Earth and space science.*
 - Writes a report about an Earth and space science topic.*
 - Writes a report about a life science topic.*
 - Writes a report about a physical science topic.*
 - Critiques written and oral explanations of a life science.*

2 Scientific Thinking

- 4 **Make new observations when there is disagreement among initial observations.**
N/A
- 5 **Demonstrate the ability to work with a team but still reach and communicate one's own conclusions about findings.**
*Makes a presentation about an Earth and space science topic.
Makes a presentation about a physical science topic.
Makes a presentation on science.
Debates issues that relate to science.
Critiques written and oral explanations of science.
Critiques written and oral explanations of an Earth and space science.
Debates issues that relate to Earth and space science.
Critiques written and oral explanations of a life science.
Debates issues that relate to life science.
Makes a presentation about a life science topic.
Debates issues that relate to physical science.
Critiques written and oral explanations of a physical science.*
- 1 **Give estimates of numerical answers to problems before doing them formally.**
Uses non-standard measurements, such as paper clips and hands, to measure different objects.
- 2 **Make quantitative estimates of familiar lengths, weights, and time intervals and check them by measurements.**
*Observes the relationship between length of tube and pitch of sound made by a wind instrument.
Relates the weight, shape and size of a material to its density.
Observes the effect of the changing the weight of a pendulum on the time of its swing.
Discovers that the stretch of spring is proportional to the weight placed on it.
Uses a lever to balance weights.
Identifies the weight of objects in units of Newton's and places them in order of their weight.
Observes the effect of changing the length of a pendulum on the time of its swing.
Observes the relationship between length of rubber band and pitch of sound made by a stringed instrument.
Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.*
- 3 **Estimate and measure capacity using cups and pints.**
Uses non-standard measurements, such as paper clips and hands, to measure different objects.

3 The Physical Setting

- 4 **Assemble, describe, take apart, and/or reassemble constructions using such things as interlocking blocks and erector sets. Sometimes pictures or words may be used as a reference.**
Constructs models from three different designs and compares the advantages and disadvantages of each design.
Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.
Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.
- 5 **Draw pictures and write brief descriptions that correctly portray key features of an object.**
Writes a report about a physical science topic.
Critiques written and oral explanations of a physical science.
Makes a presentation about a physical science topic.
Creates a physical science poster.
- 1 **Investigate by observing and then describe that some events in nature have a repeating pattern such as seasons, day and night, and migrations.**
Uses a model of the Earth to identify how the position of the Earth during different seasons effects the hours of daylight.
Observes the weather during different seasons in a virtual representation of New York.
Uses a software simulation to find out how seasons are linked to the position of the Earth in relation to the Sun.
Identifies the seasons at different places on the Earth.
Uses software to find out why there is day and night.
Describes what causes day and night and what happens to shadows during the day.
- 2 **Investigate, compare, and describe weather changes from day to day but recognize, describe, and chart that the temperature and amounts of rain or snow tend to be high, medium, or low in the same months every year.**
States the different forms of water in the water cycle.
States the effects that the Sun has on the light levels on the planets of the solar system.
Replicates and observes the stages of the water cycle.
States the necessary conditions for the formation of clouds and precipitation.
Uses a virtual weather station to record temperature and rainfall.
Discovers symbols that are used to represent the weather.
Observes the effect that distance has on light levels.
- 3 **Investigate by observing and then describe chunks of rocks and their many sizes and shapes, from boulders to grains of sand and even smaller.**
Describes the different conditions for the formation of various rocks.
Sorts rocks into sedimentary, metamorphic and igneous rock types.
States how different rocks are formed.

- 4 Investigate by observing and then describe how animals and plants sometimes cause changes in their surroundings.**
Discovers the characteristics of animals that allow them to survive in their natural habitats.
Discovers the habitats of different animals.
- 5 Investigate that things can be done to materials, such as freezing, mixing, cutting, heating, wetting, etc., to change some of their properties and observe that not all materials respond in the same way.**
Describes the changes that occur in different materials when they are heated.
Identifies flexible, inflexible and elastic material properties.
Compares the force of friction between different materials.
Compares the heat loss in different materials using graphs.
Measures and compares the heat insulation properties of different materials.
Identifies the use of insulating domestic water pipes against cold.
Tests if materials are soluble or insoluble.
Describes the changes that occur in different materials when they are cooled.
States if changes in different materials, caused by heating and cooling, can be reversed.
Identifies the changes that happen to materials when they are heated and cooled.
Observes the effect of adding an insoluble material to a liquid.
- 6 Discuss how people use electricity or burn fuels, such as wood, oil, coal, or natural gas, to cook their food and warm their houses.**
Identifies places where alternative energy sources could be used.
Identifies different types of energy.
Identifies renewable and non-renewable energy sources.
Uses a solar panel to generate electricity in a circuit.
Recognizes different forms of energy.
- 7 Investigate and observe that the way to change how something is moving is to give it a push or a pull.**
Squashes a ball and stretches a spring to observe the effects of pushing and pulling forces.
Identifies that pushes and pulls are forces that can be measured in Newton's.
Measures pulling forces using a Newton meter.
States if illustrated movements are pushes or pulls.
Describes the effect of pushing and pulling forces.

<p>4 The Living Environment</p>	<p>8 Demonstrate and observe that magnets can be used to make some things move without being touched. <i>Identifies everyday items that would stick to a magnet. Determines which materials stick to a magnet. Discovers that materials containing iron stick to magnets. Observes the magnetic attraction and repulsion forces between the poles of magnets. Identifies the attraction and repulsion between magnets and other objects. Uses a bar magnet and an electromagnet to find the differences and similarities between them. Increases the strength of an electromagnet. Identifies the behavior of temporary and permanent magnets.</i></p>
	<p>1 Observe and identify different external features of plants and animals and describe how these features help them live in different environments. <i>Uses a board-game to discover the stages in the life cycle of a plant. Creates questions in a classification key to sort a group of farmyard animals. Discovers the habitats of different animals. Discovers the characteristics of animals that allow them to survive in their natural habitats. Using software, discovers the different stages in the life cycle of butterflies and frogs. Uses software to discover methods of seeds dispersal from different plants. Using software, discovers the different stages of the human life cycle. Uses classification keys to sort animals.</i></p>
	<p>2 Observe that and describe how animals may use plants, or even other animals, for shelter and nesting. <i>Discovers the characteristics of animals that allow them to survive in their natural habitats. Discovers the habitats of different animals.</i></p>
	<p>3 Observe and explain that plants and animals both need to take in water, animals need to take in food, and plants need light. <i>Discovers the effects that sunlight and water have on the growth of plants. Observes the effects of tap water, salt water and fertilizer on the growth of plants in a nine day period. Discovers that plants require carbon dioxide and produce oxygen as a waste product. Recognizes the purpose of photosynthesis in plants. Uses a matching game to find what foods humans can obtain from plants. Uses a matching game to find what foods humans can obtain from animals. Determines the nutrients that plants need to grow.</i></p>

- 4 **Recognize and explain that living things are found almost everywhere in the world and that there are somewhat different kinds in different places.**
Uses a checklist of the seven life processes to identify if things are living or not living.
Identifies what effect pollution can have on rivers and ponds.
Discovers the characteristics of animals that allow them to survive in their natural habitats.
Discovers the habitats of different animals.
- 5 **Recognize and explain that materials in nature, such as grass, twigs, sticks, and leaves, can be recycled and used again, sometimes in different forms, such as in birds' nests.**
Identifies how different materials can be recycled.
Identifies processes by which different materials can be recycled.
- 6 **Observe and describe the different external features of people, such as their size, shape, and color of hair, skin, and eyes.**
Investigates the stomach of the human body.
Investigates the heart of the human body.
Investigates the joints of the human body.
Investigates the bones of the human body.
Investigates the lungs of the human body.
- 7 **Recognize and discuss that people are more like one another than they are like other animals.**
Critiques written and oral explanations of a life science.
Writes a report about a life science topic.
Debates issues that relate to life science.
- 8 **Give examples of different roles people have in families and communities.**
N/A
- 5 **The Mathematical World**
- 1 **Recognize and explain that, in measuring, there is a need to use numbers between whole numbers, such as 2½ centimeters.**
Uses an analogue light meter to measure light levels in a room.
Measures temperature using thermometers.
Measures and compares the heat insulation properties of different materials.
Uses a digital light meter to measure light levels in a room.
Uses non-standard measurements, such as paper clips and hands, to measure different objects.
Identifies symbols and instruments which can be used to represent and measure the weather.
Identifies that pushes and pulls are forces that can be measured in Newton's.
Measures pulling forces using a Newton meter.
Identifies units of measurement that would be most suitable for measuring a series of different items.
Uses a motion sensor to measure distances.
Identifies different ways to measure things.

- 2 Recognize and explain that it is often useful to estimate quantities.**
Uses non-standard measurements, such as paper clips and hands, to measure different objects.
- 3 Observe that and describe how changing one thing can cause changes in something else such as exercise and its effect on heart rate.**
*Determines the effect of exercise on heart rate.
Discovers the relationship between heartbeat and pulse.*
- 4 Begin to recognize and explain that people are more likely to believe ideas if good reasons are given for them.**
*Critiques written and oral explanations of science.
Debates issues that relate to science.
Writes a report on science.
Makes a presentation on science.
Creates a science poster.*
- 5 Explain that some events can be predicted with certainty, such as sunrise and sunset, and some cannot, such as storms. Understand that people aren't always sure what will happen since they do not know everything that might have an effect.**
*States the necessary conditions for the formation of clouds and precipitation.
Uses software to find out why there is day and night.
States the different forms of water in the water cycle.
Replicates and observes the stages of the water cycle.*
- 6 Explain that sometimes a person can find out a lot (but not everything) about a group of things, such as insects, plants, or rocks, by studying just a few of them.**
*Sorts rocks into sedimentary, metamorphic and igneous rock types.
States how different rocks are formed.
Describes the different conditions for the formation of various rocks.
Describes different forms of climate control used to grow plants.
Observes the growth of a plant when grown under different temperature conditions.
Uses a microscope to view the cells of plants.
Uses software to discover methods of seeds dispersal from different plants.
Interprets text and diagrams to identify the habitats of different plants.
Identifies if everyday foods come from plants or animals.
Compares the life cycles of animals and identifies similarities and differences between them.
Compares the life cycles of plants and identifies similarities and differences between them.
Observes the growth of a plant when grown under different watering conditions.
Discovers how insects aid pollination in the life cycle of a plant.*

6 Common Themes

- 1 **Investigate that most objects are made of parts.**
Identifies the parts of plants that help them to make their own food.
Uses software to find what parts of the human body give each of the five senses.
Identifies the parts and controls of a microscope.
- 2 **Observe and explain that models may not be the same size, may be missing some details, or may not be able to do all of the same things as the real things.**
Uses a shadow trainer to find out why shadows change shape during the day.
Recognizes planets in the solar system.
- 3 **Describe that things can change in different ways, such as in size, weight, color, age, and movement. Investigate that some small changes can be detected by taking measurements.**
Modifies a crawler to change the direction it moves in.
Discovers that the stretch of spring is proportional to the weight placed on it.
Identifies the weight of objects in units of Newton's and places them in order of their weight.
Identifies how the size of a vibration can effect the loudness of a sound.
Predicts how the pitch of sound produced by a vibrating object changes with object size.

Indiana Science Standards Gr3

- | | |
|--|---|
| <p>1 The Nature of Science and Technology</p> | <p>1 Recognize and explain that when a scientific investigation is repeated, a similar result is expected.
<i>N/A</i></p> <p>2 Participate in different types of guided scientific investigations such as observing objects and events and collecting specimens for analysis.
<i>Observes the effects of tap water, salt water and fertilizer on the growth of plants in a nine day period.</i>
<i>Observes the growth of a plant when grown under different watering conditions.</i>
<i>Observes the change from kinetic energy into heat and sound energy when rubbing hands together.</i>
<i>Observes the mixing of colored light to make other colors, including the making of white light.</i>
<i>Observes the relationship between volume of air and pitch of sound made by a percussion instrument.</i>
<i>Observes the force of friction.</i>
<i>Observes the weather during different seasons in a virtual representation of New York.</i>
<i>Observes how a varying incline effects the speed of a model car.</i>
<i>Investigates the bones of the human body.</i>
<i>Squashes a ball and stretches a spring to observe the effects of pushing and pulling forces.</i>
<i>Observes the magnetic attraction and repulsion forces between the poles of magnets.</i>
<i>Investigates the pH levels of virtual fields to find which field is most suitable to grow crops.</i>
<i>Investigates the joints of the human body.</i>
<i>Observes that images are reversed when reflected in a mirror.</i></p> <p>3 Keep and report records of investigations and observations using tools, such as journals, charts, graphs, and computers.
<i>Displays results from a friction experiment in a series of bar charts.</i>
<i>Writes a report about a physical science topic.</i>
<i>Compares the heat loss in different materials using graphs.</i>
<i>Writes a report on science.</i>
<i>Uses graphs to plot the change of temperature over periods of time.</i>
<i>Experiments with actions that effect heart rate and creates a table to record their results.</i>
<i>Records rainfall information into a table and constructs a bar chart of the results.</i>
<i>Writes a report about a life science topic.</i>
<i>Writes a report about an Earth and space science topic.</i></p> |
|--|---|

- | | | |
|---|---------------------|--|
| 2 | Scientific Thinking | <p>4 Discuss the results of investigations and consider the explanations of others.
 <i>Debates issues that relate to life science.</i>
 <i>Critiques written and oral explanations of science.</i>
 <i>Debates issues that relate to science.</i>
 <i>Critiques written and oral explanations of an Earth and space science.</i>
 <i>Critiques written and oral explanations of a life science.</i>
 <i>Critiques written and oral explanations of a physical science.</i>
 <i>Debates issues that relate to physical science.</i>
 <i>Debates issues that relate to Earth and space science.</i></p> <p>5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.
 <i>Critiques written and oral explanations of an Earth and space science.</i>
 <i>Critiques written and oral explanations of science.</i>
 <i>Debates issues that relate to science.</i>
 <i>Debates issues that relate to physical science.</i>
 <i>Critiques written and oral explanations of a physical science.</i>
 <i>Debates issues that relate to life science.</i>
 <i>Critiques written and oral explanations of a life science.</i>
 <i>Debates issues that relate to Earth and space science.</i></p> <p>6 Give examples of how tools, such as automobiles, computers, and electric motors, have affected the way we live.
 <i>N/A</i></p> <p>7 Recognize that and explain how an invention can be used in different ways, such as a radio being used to get information and for entertainment.
 <i>Sends messages using light signals.</i>
 <i>Sends messages using radio waves.</i>
 <i>Sends messages using coded signals.</i></p> <p>8 Describe how discarded products contribute to the problem of waste disposal and that recycling can help solve this problem.
 <i>Identifies how different materials can be recycled.</i>
 <i>Identifies processes by which different materials can be recycled.</i></p> <p>1 Add and subtract whole numbers mentally, on paper, and with a calculator.
 <i>N/A</i></p> <p>2 Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions.
 <i>Separates mixtures using a sieve.</i>
 <i>Separates solids and liquids using filter paper.</i>
 <i>Tests if materials are soluble or insoluble.</i>
 <i>Observes the effect of adding an insoluble material to a liquid.</i></p> |
|---|---------------------|--|

- | | | |
|---|------------------------------------|--|
| 3 | <p>The Physical Setting</p> | <p>3 Keep a notebook that describes observations and is understandable weeks or months later.
 <i>Writes a report on science.</i>
 <i>Critiques written and oral explanations of science.</i>
 <i>Displays results from a friction experiment in a series of bar charts.</i></p> <p>4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.
 <i>Identifies the parts and controls of a microscope.</i>
 <i>Uses a microscope to view the cells of plants.</i>
 <i>Uses a ruler and a motion sensor to measure height.</i></p> <p>5 Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.
 <i>Constructs models from three different designs and compares the advantages and disadvantages of each design.</i>
 <i>Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.</i>
 <i>Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.</i>
 <i>Constructs a bridge to span a gap.</i></p> <p>6 Make sketches and write descriptions to aid in explaining procedures or ideas.
 <i>Writes a report about an Earth and space science topic.</i>
 <i>Writes a report about a physical science topic.</i>
 <i>Makes a presentation on science.</i>
 <i>Creates a science poster.</i>
 <i>Creates an Earth and space science poster.</i>
 <i>Makes a presentation about an Earth and space science topic.</i>
 <i>Writes a report on science.</i>
 <i>Writes a report about a life science topic.</i>
 <i>Creates a physical science poster.</i>
 <i>Makes a presentation about a physical science topic.</i>
 <i>Creates a life science poster.</i>
 <i>Makes a presentation about a life science topic.</i></p> <p>7 Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.
 <i>N/A</i></p> |
| 3 | <p>The Physical Setting</p> | <p>1 Observe and describe the apparent motion of the sun and moon over a time span of one day.
 <i>Uses software to discover the different phases of the Moon.</i>
 <i>Identifies characteristics of the Moon and its phases.</i>
 <i>Uses software to discover facts about the Moon and its relation to the Earth.</i>
 <i>States the effects that the Sun has on the light levels on the planets of the solar system.</i>
 <i>Uses a software simulation to find out how seasons are linked to the position of the Earth in relation to the Sun.</i></p> |

- 2** Observe and describe that there are more stars in the sky than anyone can easily count, but they are not scattered evenly.
N/A
- 3** Observe and describe that the sun can be seen only in the daytime.
Uses a shadow trainer to find out why shadows change shape during the day.
Uses software to find out why there is day and night.
- 4** Observe and describe that the moon looks a little different every day, but looks the same again about every four weeks.
Uses software to discover facts about the Moon and its relation to the Earth.
Uses software to discover the different phases of the Moon.
Identifies characteristics of the Moon and its phases.
- 5** Give examples of how change, such as weather patterns, is a continual process occurring on Earth.
Discovers symbols that are used to represent the weather.
Observes the weather during different seasons in a virtual representation of New York.
Identifies symbols and instruments which can be used to represent and measure the weather.
- 6** Describe ways human beings protect themselves from adverse weather conditions.
N/A
- 7** Identify and explain some effects human activities have on weather.
Identifies some causes and effects of global warming.
Explores the effects of global warming and alternative energy sources.
Discovers some of the causes of global warming.
- 8** Investigate and describe how moving air and water can be used to run machines, like windmills and waterwheels.
Explores the effects of global warming and alternative energy sources.
Identifies places where alternative energy sources could be used.
- 9** Demonstrate that things that make sound do so by vibrating, such as vocal cords and musical instruments.
Identifies how the size of a vibration can effect the loudness of a sound.
Identifies that sound travels as a vibration by speaking into a balloon.
Identifies that sound travels through string as a vibration by using a string telephone.
Identifies that sound travels as a vibration and so can travel through solids.
Predicts how the pitch of sound produced by a vibrating object changes with object size.

4 The Living Environment

- 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.**
Discovers the characteristics of animals that allow them to survive in their natural habitats.
Discovers the habitats of different animals.
Classifies animals as carnivores, herbivores or omnivores.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.
Uses classification keys to sort animals.
Creates questions in a classification key to sort a group of farmyard animals.
Identifies the producers primary consumers and secondary consumers in food chains.

- 2 **Explain that features used for grouping depend on the purpose of the grouping.**
Creates questions in a classification key to sort a group of farmyard animals.
Inserts questions into the correct places in a classification key so that it can be used to sort a series of dogs.
Identifies questions that can be asked to sort different animals.
Uses classification keys to sort animals.
Uses a simple classification key to sort three different types of metal.
Sorts rocks into sedimentary, metamorphic and igneous rock types.

- 3 **Observe that and describe how offspring are very much, but not exactly, like their parents and like one another.**
Students identify the differences between learnt and inherited traits.
Students identify that heredity traits are those that are passed between parent and offspring.

- 4 **Describe that almost all kinds of animals' food can be traced back to plants.**
Identifies the producers primary consumers and secondary consumers in food chains.
Identifies foods that come from plants and animals.
Determines the placement of animals and plants in food chains.
Identifies the parts of plants that help them to make their own food.
Identifies if everyday foods come from plants or animals.
Identifies the nutrients contained in different foods.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.
Uses a matching game to find what foods humans can obtain from animals.
Discovers the food groups necessary for a healthy balanced diet.
Uses a matching game to find what foods humans can obtain from plants.

- 5** Give examples of some kinds of organisms that have completely disappeared and explain how these organisms were similar to some organisms living today.
Uses a virtual excavation to find different fossils.
Uses software to find out how different types of fossils are formed.
Describes how fossils are formed.
- 6** Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do.
Investigates the lungs of the human body.
Investigates the stomach of the human body.
Investigates the heart of the human body.
Identifies the nutrients contained in different foods.
Discovers the food groups necessary for a healthy balanced diet.
- 7** Explain that eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy.
Determines the effect of exercise on heart rate.
Identifies the nutrients contained in different foods.
Discovers the relationship between heartbeat and pulse.
Discovers the food groups necessary for a healthy balanced diet.
- 8** Explain that some things people take into their bodies from the environment can hurt them and give examples of such things.
Interprets text to identify things that harm, preserve or protect the environment.
- 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 hand washing with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.
N/A

<p>5 The Mathematical World</p>	<p>1 Select and use appropriate measuring units, such as centimeters (cm) and meters (m), grams (g) and kilograms (kg), and degrees Celsius (°C). <i>Identifies different ways to measure things.</i> <i>Measures temperature using thermometers.</i> <i>Measures and compares the heat insulation properties of different materials.</i> <i>Identifies symbols and instruments which can be used to represent and measure the weather.</i> <i>Uses non-standard measurements, such as paper clips and hands, to measure different objects.</i> <i>Measures pulling forces using a Newton meter.</i> <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i> <i>Identifies units of measurement that would be most suitable for measuring a series of different items.</i> <i>Identifies that pushes and pulls are forces that can be measured in Newton's.</i> <i>Uses a digital light meter to measure light levels in a room.</i> <i>Uses a motion sensor to measure distances.</i> <i>Uses a ruler and a motion sensor to measure height.</i> <i>Uses an analogue light meter to measure light levels in a room.</i></p> <p>2 Observe that and describe how some measurements are likely to be slightly different, even if what is being measured stays the same. <i>Uses a motion sensor to measure distances.</i> <i>Uses a ruler and a motion sensor to measure height.</i></p> <p>3 Construct tables and graphs to show how values of one quantity are related to values of another. <i>Uses graphs to plot the change of temperature over periods of time.</i> <i>Compares the heat loss in different materials using graphs.</i> <i>Records rainfall information into a table and constructs a bar chart of the results.</i> <i>Experiments with actions that effect heart rate and creates a table to record their results.</i> <i>Displays results from a friction experiment in a series of bar charts.</i></p> <p>4 Illustrate that if 0 and 1 are located on a line, any other number can be depicted as a position on the line. <i>N/A</i></p> <p>5 Explain that one way to make sense of something is to think of how it relates to something more familiar. <i>N/A</i></p>
<p>6 Common Themes</p>	<p>1 Investigate how and describe that when parts are put together, they can do things that they could not do by themselves. <i>Discovers the uses of a windlass.</i> <i>Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.</i></p>

- 2 Investigate how and describe that something may not work if some of its parts are missing.**
N/A
- 3 Explain how a model of something is different from the real thing but can be used to learn something about the real thing.**
Uses a shadow trainer to find out why shadows change shape during the day.
Recognizes planets in the solar system.
- 4 Take, record, and display counts and simple measurements of things over time, such as plant or student growth.**
Uses a board-game to discover the stages in the life cycle of a plant.
Interprets text and diagrams to identify the habitats of different plants.
Identifies the stages in the life cycle of a plant.
Compares the life cycles of plants and identifies similarities and differences between them.
Describes different forms of climate control used to grow plants.
Observes the growth of a plant when grown under different watering conditions.
Observes the growth of a plant when grown under different temperature conditions.
- 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.**
N/A

Indiana Science Standards Gr4

- | | |
|---|---|
| 1 The Nature of Science and Technology | 1 Observe and describe that scientific investigations generally work the same way in different places.
<i>N/A</i> |
| | 2 Recognize and describe that results of scientific investigations are seldom exactly the same. If differences occur, such as a large variation in the measurement of plant growth, propose reasons for why these differences exist, using recorded information about investigations.
<i>N/A</i> |
| | 3 Explain that clear communication is an essential part of doing science since it enables scientists to inform others about their work, to expose their ideas to evaluation by other scientists, and to allow scientists to stay informed about scientific discoveries around the world.
<i>Debates issues that relate to science.</i>
<i>Critiques written and oral explanations of science.</i>
<i>Makes a presentation on science.</i>
<i>Creates a science poster.</i>
<i>Writes a report on science.</i> |
| | 4 Describe how people all over the world have taken part in scientific investigation for many centuries.
<i>N/A</i> |

- 5 Demonstrate how measuring instruments, such as microscopes, telescopes, and cameras, can be used to gather accurate information for making scientific comparisons of objects and events. Note that measuring instruments, such as rulers, can also be used for designing and constructing things that will work properly.**
Measures temperature using thermometers.
Constructs a bridge to span a gap.
Identifies that pushes and pulls are forces that can be measured in Newton's.
Uses a ruler and a motion sensor to measure height.
Uses an analogue light meter to measure light levels in a room.
Uses a digital light meter to measure light levels in a room.
Measures and compares the heat insulation properties of different materials.
Observes the relationship between length of rubber band and pitch of sound made by a stringed instrument.
Observes the relationship between length of tube and pitch of sound made by a wind instrument.
Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.
Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.
Identifies different ways to measure things.
Measures the effect that the force of gravity has on a mass placed on an inclined plane.
Uses non-standard measurements, such as paper clips and hands, to measure different objects.
Uses a motion sensor to measure distances.
Measures pulling forces using a Newton meter.
Identifies units of measurement that would be most suitable for measuring a series of different items.
- 6 Explain that even a good design may fail even though steps are taken ahead of time to reduce the likelihood of failure.**
N/A
- 7 Discuss and give examples of how technology, such as computers and medicines, has improved the lives of many people, although the benefits are not equally available to all.**
N/A
- 8 Recognize and explain that any invention may lead to other inventions.**
N/A
- 9 Explain how some products and materials are easier to recycle than others.**
Identifies processes by which different materials can be recycled.
Identifies how different materials can be recycled.

2 Scientific Thinking

- 1 **Judge whether measurements and computations of quantities, such as length, area*, volume*, weight, or time, are reasonable.**
Measures and compares the heat insulation properties of different materials.
Measures temperature using thermometers.
Uses a motion sensor to measure distances.
Uses a ruler and a motion sensor to measure height.
Identifies different ways to measure things.
Uses a digital light meter to measure light levels in a room.
Measures the effect that the force of gravity has on a mass placed on an inclined plane.
Measures pulling forces using a Newton meter.
Identifies units of measurement that would be most suitable for measuring a series of different items.
Uses non-standard measurements, such as paper clips and hands, to measure different objects.
Identifies that pushes and pulls are forces that can be measured in Newton's.
Uses an analogue light meter to measure light levels in a room.
- 2 **State the purpose, orally or in writing, of each step in a computation.**
N/A
- 3 **Make simple and safe electrical connections with various plugs, sockets, and terminals.**
Uses components, like lamps and buzzers, to discover that electrical energy can be changed into different energies.
Interprets electrical diagrams to predict the behavior of electrical components connected in parallel.
Discovers how electricity flows in series and parallel circuits.
Interprets electrical diagrams to predict the behavior of electrical components connected in series.
Determines if materials are electrical conductors or electrical insulators using a simple lamp circuit.
Discovers that electricity cannot flow unless a circuit is complete.
States the use of parallel and series electrical circuits in the home.
- 4 **Use numerical data to describe and compare objects and events.**
Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.
Observes the effect of the changing the weight of a pendulum on the time of its swing.
Observes the effect of changing the length of a pendulum on the time of its swing.
- 5 **Write descriptions of investigations, using observations and other evidence as support for explanations.**
Writes a report about a physical science topic.
Writes a report about a life science topic.
Writes a report about an Earth and space science topic.
Writes a report on science.

3 The Physical
Setting

- 6 Support statements with facts found in print and electronic media, identify the sources used, and expect others to do the same.
N/A
- 7 Identify better reasons for believing something than "Everybody knows that ..." or "I just know," and discount such reasons when given by others.
N/A
- 1 Observe and report that the moon can be seen sometimes at night and sometimes during the day.
Uses software to discover facts about the Moon and its relation to the Earth.
Uses software to discover the different phases of the Moon.
Identifies characteristics of the Moon and its phases.
- 2 Begin to investigate and explain that air is a substance that surrounds us, takes up space, and whose movements we feel as wind.
Observes the weather during different seasons in a virtual representation of New York.
Uses a virtual weather station to record temperature and rainfall.
Identifies symbols and instruments which can be used to represent and measure the weather.
Discovers symbols that are used to represent the weather.
Interprets text and diagrams to identify physical, chemical and biological forms of weathering.
- 3 Identify salt as the major difference between fresh and ocean waters.
N/A
- 4 Describe some of the effects of oceans on climate.
N/A
- 5 Describe how waves, wind, water, and glacial ice shape and reshape Earth's land surface by the erosion* of rock and soil in some areas and depositing them in other areas.
Sorts rocks into sedimentary, metamorphic and igneous rock types.
States how different rocks are formed.
Describes the different conditions for the formation of various rocks.
- 6 Recognize and describe that rock is composed of different combinations of minerals.
Describes the different conditions for the formation of various rocks.
Sorts rocks into sedimentary, metamorphic and igneous rock types.
States how different rocks are formed.

- 7 Explain that smaller rocks come from the breakage and weathering of bedrock and larger rocks and that soil is made partly from weathered rock, partly from plant remains, and also contains many living organisms.**
Identifies what fossils fuels can be used for.
Describes how fossils are formed.
Uses software to find out how different types of fossils are formed.
Uses a virtual excavation to find different fossils.
Identifies how fossil fuels are made and where they come from.
States how different rocks are formed.
Sorts rocks into sedimentary, metamorphic and igneous rock types.
Describes the different conditions for the formation of various rocks.
Uses symbols to represent different types of fossil.
- 8 Explain that the rotation of Earth on its axis every 24 hours produces the night-and-day cycle.**
Describes what causes day and night and what happens to shadows during the day.
Uses software to find out why there is day and night.
- 9 Draw or correctly select drawings of shadows and their direction and length at different times of day.**
Identifies how shadows are formed and how they change depending on their distance from a light source.
Describes the appearance of reflections and shadows.
Uses a shadow trainer to find out why shadows change shape during the day.
Describes what causes day and night and what happens to shadows during the day.
- 10 Demonstrate that the mass* of a whole object is always the same as the sum of the masses of its parts.**
N/A
- 11 Investigate, observe, and explain that things that give off light often also give off heat*.**
Discovers where kinetic, potential, chemical, light, heat and sound energy can occur.
Identifies objects around the classroom that are light sources.
- 12 Investigate, observe, and explain that heat is produced when one object rubs against another, such as one's hands rubbing together.**
Observes the force of friction.
Compares the force of friction between different materials.
Describes the friction force that occurs between two surfaces.
Observes the change from kinetic energy into heat and sound energy when rubbing hands together.

- 13 Observe and describe that things that give off heat, such as people, animals, and the sun.**
Measures and compares the heat insulation properties of different materials.
Observes the change from kinetic energy into heat and sound energy when rubbing hands together.
States if changes in different materials, caused by heating and cooling, can be reversed.
Compares the heat loss in different materials using graphs.
Discovers where kinetic, potential, chemical, light, heat and sound energy can occur.
- 14 Explain that energy in fossil fuels* comes from plants that grew long ago.**
Identifies how fossil fuels are made and where they come from.
Identifies what fossils fuels can be used for.
- 15 Demonstrate that without touching them, a magnet pulls all things made of iron and either pushes or pulls other magnets.**
Determines which materials stick to a magnet.
Discovers that materials containing iron stick to magnets.
Identifies everyday items that would stick to a magnet.
Observes the magnetic attraction and repulsion forces between the poles of magnets.
- 16 Investigate and describe that without touching them, material that has been electrically charged pulls all other materials and may either push or pull other charged material.**
N/A
- 4 The Living Environment**
- 1 Investigate, such as by using microscopes, to see that living things are made mostly of cells.**
Identifies the parts and controls of a microscope.
Uses a microscope to view the cells of plants.
- 2 Investigate, observe, and describe that insects and various other organisms depend on dead plant and animal material for food.**
Uses a matching game to find what foods humans can obtain from animals.
Classifies animals as carnivores, herbivores or omnivores.
Determines the placement of animals and plants in food chains.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.
Uses a matching game to find what foods humans can obtain from plants.
Identifies if everyday foods come from plants or animals.
Identifies the producers primary consumers and secondary consumers in food chains.

- 3 Observe and describe that organisms interact with one another in various ways, such as providing food, pollination, and seed dispersal.**
*Observes flower pollen magnified by a microscope.
Discovers how insects aid pollination in the life cycle of a plant.
Describes the relationship between a honeybee and a flower for pollination to occur.
Uses software to discover methods of seeds dispersal from different plants.*
- 4 Observe and describe that some source of energy is needed for all organisms to stay alive and grow.**
*Identifies different types of energy.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.*
- 5 Observe and explain that most plants produce far more seeds than those that actually grow into new plants.**
*Uses a board-game to discover the stages in the life cycle of a plant.
Uses software to discover methods of seeds dispersal from different plants.*
- 6 Explain how in all environments, organisms are growing, dying, and decaying, and new organisms are being produced by the old ones.**
*Using software, discovers the different stages in the life cycle of butterflies and frogs.
Identifies the stages in the life cycle of a plant.
Identifies stages in the life cycle of animals.
Uses a board-game to discover the stages in the life cycle of a plant.
Compares the life cycles of animals and identifies similarities and differences between them.
Compares the life cycles of plants and identifies similarities and differences between them.
Discovers how insects aid pollination in the life cycle of a plant.
Using software, discovers the different stages of the human life cycle.*
- 7 Describe that human beings have made tools and machines, such as x-rays, microscopes, and computers, to sense and do things that they could not otherwise sense or do at all, or as quickly, or as well.**
*States the uses of a microscope.
Observes flower pollen magnified by a microscope.
Uses a microscope to view the cells of plants.
Identifies the parts and controls of a microscope.*
- 8 Know and explain that artifacts and preserved remains provide some evidence of the physical characteristics and possible behavior of human beings who lived a very long time ago.**
*Uses a virtual excavation to find different fossils.
Uses symbols to represent different types of fossil.
Uses software to find out how different types of fossils are formed.
Describes how fossils are formed.*

5 The
Mathematical
World

- 9 Explain that food provides energy and materials for growth and repair of body parts. Recognize that vitamins and minerals, present in small amounts in foods, are essential to keep everything working well. Further understand that as people grow up, the amounts and kinds of food and exercise needed by the body may change.
Associates various nutrients with food groups.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.
Discovers the food groups necessary for a healthy balanced diet.
Identifies the nutrients contained in different foods.
- 10 Explain that if germs are able to get inside the body, they may keep it from working properly. Understand that for defense against germs, the human body has tears, saliva, skin, some blood cells, and stomach secretions. Also note that a healthy body can fight most germs that invade it. Recognize, however, that there are some germs that interfere with the body's defenses.
N/A
- 11 Explain that there are some diseases that human beings can only catch once. Explain that there are many diseases that can be prevented by vaccinations, so that people do not catch them even once.
N/A
- 1 Explain that the meaning of numerals in many-digit numbers depends on their positions.
N/A
- 2 Explain that in some situations, "0" means none of something, but in others it may be just the label of some point on a scale.
N/A
- 3 Illustrate how length can be thought of as unit lengths joined together, area as a collection of unit squares, and volume as a set of unit cubes.
N/A
- 4 Demonstrate how graphical displays of numbers may make it possible to spot patterns that are not otherwise obvious, such as comparative size and trends.
Uses graphs to plot the change of temperature over periods of time.
Compares the heat loss in different materials using graphs.
Experiments with actions that effect heart rate and creates a table to record their results.
Records rainfall information into a table and constructs a bar chart of the results.
Displays results from a friction experiment in a series of bar charts.
Students reorder data into logical sequences to identify patterns in results.

- | | | | |
|---|---------------|---|---|
| 6 | Common Themes | 5 | Explain how reasoning can be distorted by strong feelings.
<i>N/A</i> |
| | | 1 | Demonstrate that in an object consisting of many parts, the parts usually influence or interact with one another.
<i>Discovers the uses of a windlass.
Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.</i> |
| | | 2 | Show that something may not work as well, or at all, if a part of it is missing, broken, worn out, mismatched, or incorrectly connected.
<i>N/A</i> |
| | | 3 | Recognize that and describe how changes made to a model can help predict how the real thing can be altered.
<i>N/A</i> |
| | | 4 | Observe and describe that some features of things may stay the same even when other features change.
<i>Separates solids and liquids using filter paper.
Separates mixtures using a sieve.</i> |

Section 5.

LWS Objective Lists

ST20-1 Living with Physical Science Level-1

1 Pushes and Pulls

- 1 States if illustrated movements are pushes or pulls.
- 2 Measures pulling forces using a Newton meter.

2 Magnets

- 1 Determines which materials stick to a magnet.
- 2 Discovers that materials containing iron stick to magnets.
- 3 Observes the magnetic attraction and repulsion forces between the poles of magnets.

3 Sound Travel

- 1 Identifies that sound travels as a vibration by speaking into a balloon.
- 2 Identifies that sound travels through string as a vibration by using a string telephone.

4 Light Sources

- 1 Identifies objects around the classroom that are light sources.
- 2 Determines if objects are transparent or opaque using a light ray box.

5 Effects of Force

- 1 Squashes a ball and stretches a spring to observe the effects of pushing and pulling forces.
- 2 Observes how a varying incline effects the speed of a model car.
- 3 Measures the effect that the force of gravity has on a mass placed on an inclined plane.

6 Electrical Conductors

- 1 Determines if materials are electrical conductors or electrical insulators using a simple lamp circuit.
- 2 Discovers that electricity cannot flow unless a circuit is complete.

7 Types of Energy

- 1 Discovers where kinetic, potential, chemical, light, heat and sound energy can occur.
- 2 Uses a model car on a track to find when the car has enough energy to travel over a hill.

8 Reflections and Shadows

- 1 Observes that images are reversed when reflected in a mirror.
- 2 Identifies how shadows are formed and how they change depending on their distance from a light source.

11 Pre Test Quiz 1

- 1 Identifies that pushes and pulls are forces that can be measured in Newton's.
- 2 Identifies the attraction and repulsion between magnets and other objects.
- 3 Identifies that sound travels as a vibration and so can travel through solids.
- 4 Identifies if objects are light sources and if they are transparent or opaque.

12 Post Test Quiz 1

- 1 Identifies that pushes and pulls are forces that can be measured in Newton's.
- 2 Identifies the attraction and repulsion between magnets and other objects.
- 3 Identifies that sound travels as a vibration and so can travel through solids.
- 4 Identifies if objects are light sources and if they are transparent or opaque.

13 Pre Test Quiz 2

- 1 Describes the effect of pushing and pulling forces.
- 2 Identifies if objects are electrical conductors or electrical insulators.
- 3 Identifies different types of energy.
- 4 Describes the appearance of reflections and shadows.

14 Post Test Quiz 2

- 1 Describes the effect of pushing and pulling forces.
- 2 Identifies if objects are electrical conductors or electrical insulators.
- 3 Identifies different types of energy.
- 4 Describes the appearance of reflections and shadows.

ST20-2 Living with Physical Science Level-2

1 Friction

- 1 Observes the force of friction.
- 2 Compares the force of friction between different materials.

2 Series Circuits

- 1 Uses components, like lamps and buzzers, to discover that electrical energy can be changed into different energies.
- 2 Interprets electrical diagrams to predict the behavior of electrical components connected in series.

3 Musical Sounds

- 1 Observes the relationship between length of rubber band and pitch of sound made by a stringed instrument.
- 2 Observes the relationship between length of tube and pitch of sound made by a wind instrument.
- 3 Observes the relationship between volume of air and pitch of sound made by a percussion instrument.

4 Light Rays

- 1 Uses lenses to bend light rays.
- 2 Observes the mixing of colored light to make other colors, including the making of white light.

5 Springs

- 1 Discovers the elastic properties of metal springs.
- 2 Discovers that the stretch of spring is proportional to the weight placed on it.

6 Parallel Circuits

- 1 Discovers how electricity flows in series and parallel circuits.
- 2 Interprets electrical diagrams to predict the behavior of electrical components connected in parallel.
- 3 States the use of parallel and series electrical circuits in the home.

7 Energy Conversion

- 1 Uses flow diagrams to track the conversion of energy.
- 2 Observes the change from kinetic energy into heat and sound energy when rubbing hands together.
- 3 Discovers that a dynamo can be used to convert kinetic energy into electrical energy.

8 Cooling

- 1 Compares the heat loss in different materials using graphs.
- 2 Measures and compares the heat insulation properties of different materials.
- 3 Identifies the use of insulating domestic water pipes against cold.

11 Pre Test Quiz 3

- 1 Describes the friction force that occurs between two surfaces.
- 2 Describes how electrical components work in series circuits.
- 3 Predicts how the pitch of sound produced by a vibrating object changes with object size.
- 4 Recognizes the lenses that bend light rays.

12 Post Test Quiz 3

- 1 Describes the friction force that occurs between two surfaces.
- 2 Predicts how the pitch of sound produced by a vibrating object changes with object size.
- 3 Describes how electrical components work in series circuits.
- 4 Describes the behavior of light.

13 Pre Test Quiz 4

- 1 Predicts that the stretch of a spring is proportional to the weight placed on it.
- 2 Describes how electrical components work in parallel circuits.
- 3 Recognizes different forms of energy.
- 4 Describes how heat insulators and heat conductors lose heat.

14 Post Test Quiz 4

- 1 Predicts that the stretch of a spring is proportional to the weight placed on it.
- 2 Describes how electrical components work in parallel circuits.
- 3 Recognizes different forms of energy.
- 4 Describes how heat insulators and heat conductors lose heat.

ST21-1 Living with Life Science Level-1

1 Bones

- 1 Investigates the bones of the human body.
- 2 Investigates the joints of the human body.

2 Plant Life Cycles

- 1 Uses a board-game to discover the stages in the life cycle of a plant.
- 2 Uses software to discover methods of seeds dispersal from different plants.

3 Animal Life Cycles

- 1 Using software, discovers the different stages of the human life cycle.
- 2 Using software, discovers the different stages in the life cycle of butterflies and frogs.

4 Food Providers

- 1 Uses a matching game to find what foods humans can obtain from animals.
- 2 Uses a matching game to find what foods humans can obtain from plants.

5 The Body

- 1 Investigates the lungs of the human body.
- 2 Investigates the stomach of the human body.
- 3 Investigates the heart of the human body.

6 Using a Microscope

- 1 Identifies the parts and controls of a microscope.
- 2 Uses a microscope to view the cells of plants.

7 Senses

- 1 Uses software to find what parts of the human body give each of the five senses.
- 2 Specifies what senses can be used to identify different things.

8 Acids and Bases

- 1 Uses litmus paper to find out if samples are acidic, basic or neutral.
- 2 Investigates the pH levels of virtual fields to find which field is most suitable to grow crops.

11 Pre Test Quiz 1

- 1 Identifies bones and joints of the human body.
- 2 Identifies the stages in the life cycle of a plant.
- 3 Identifies stages in the life cycle of animals.
- 4 Identifies foods that come from plants and animals.

12 Post Test Quiz 1

- 1 Identifies bones and joints of the human body.
- 2 Identifies the stages in the life cycle of a plant.
- 3 Identifies stages in the life cycle of animals.
- 4 Identifies foods that come from plants and animals.

13 Pre Test Quiz 2

- 1 Identifies characteristics of the lungs, stomach and heart of the human body.
- 2 States the uses of a microscope.
- 3 Identifies senses of the human body.
- 4 Identifies the pH levels of acids and bases.

14 Post Test Quiz 2

- 1 Identifies characteristics of the lungs, stomach and heart of the human body.
- 2 States the uses of a microscope.
- 3 Identifies senses of the human body.
- 4 Identifies the pH levels of acids and bases.

ST21-2 Living with Life Science Level-2

1 Exercise

- 1 Discovers the relationship between heartbeat and pulse.
- 2 Determines the effect of exercise on heart rate.

2 Pollination

- 1 Observes flower pollen magnified by a microscope.
- 2 Discovers how insects aid pollination in the life cycle of a plant.

3 Sorting Animals

- 1 Uses classification keys to sort animals.
- 2 Creates questions in a classification key to sort a group of farmyard animals.

4 Climate Control

- 1 Observes the growth of a plant when grown under different watering conditions.
- 2 Observes the growth of a plant when grown under different temperature conditions.
- 3 Describes different forms of climate control used to grow plants.

5 Diet

- 1 Identifies the nutrients contained in different foods.
- 2 Discovers the food groups necessary for a healthy balanced diet.

6 Plant Food

- 1 Recognizes the purpose of photosynthesis in plants.
- 2 Discovers the effects that sunlight and water have on the growth of plants.
- 3 Discovers that plants require carbon dioxide and produce oxygen as a waste product.

7 Food Chains

- 1 States the energy transfer that occurs between plants to animals and animals to animals in food chains.
- 2 Identifies the producers primary consumers and secondary consumers in food chains.
- 3 Classifies animals as carnivores, herbivores or omnivores.

8 Nutrients

- 1 Determines the nutrients that plants need to grow.
- 2 Observes the effects of tap water, salt water and fertilizer on the growth of plants in a nine day period.

11 Pre Test Quiz 3

- 1 Describes the pulse as a method of detecting blood flow around the body.
- 2 Describes the relationship between a honeybee and a flower for pollination to occur.
- 3 Identifies questions that can be asked to sort different animals.
- 4 Relates plant growth with climate.

12 Post Test Quiz 3

- 1 Identifies questions that can be asked to sort different animals.
- 2 Describes the relationship between a honeybee and a flower for pollination to occur.
- 3 States the appropriate climate to grow different plants.
- 4 Describes the pulse as a method of detecting blood flow around the body.

13 Pre Test Quiz 4

- 1 Associates various nutrients with food groups.
- 2 Identifies the parts of plants that help them to make their own food.
- 3 Determines the placement of animals and plants in food chains.
- 4 Identifies the nutrients plants use for growth.

14 Post Test Quiz 4

- 1 Associates various nutrients with food groups.
- 2 Identifies the parts of plants that help them to make their own food.
- 3 Identifies the various nutrients plants use for growth.
- 4 Distinguishes between a herbivore and a carnivore.

ST22-1 Living with Earth Science Level-1

1 Rivers and Ponds

- 1 Uses a checklist of the seven life processes to identify if things are living or not living.
- 2 Identifies what effect pollution can have on rivers and ponds.

2 Day and Night

- 1 Uses software to find out why there is day and night.
- 2 Uses a shadow trainer to find out why shadows change shape during the day.

3 The Seasons

- 1 Observes the weather during different seasons in a virtual representation of New York.
- 2 Uses a software simulation to find out how seasons are linked to the position of the Earth in relation to the Sun.

4 Fossil Fuels

- 1 Identifies how fossil fuels are made and where they come from.
- 2 Identifies what fossil fuels can be used for.

5 Recycling

- 1 Identifies how different materials can be recycled.
- 2 Uses a simple classification key to sort three different types of metal.

6 The Moon

- 1 Uses software to discover facts about the Moon and its relation to the Earth.
- 2 Uses software to discover the different phases of the Moon.

7 Weather Records

- 1 Discovers symbols that are used to represent the weather.
- 2 Uses a virtual weather station to record temperature and rainfall.

8 Fossils

- 1 Uses a virtual excavation to find different fossils.
- 2 Uses software to find out how different types of fossils are formed.

11 Pre Test Quiz 1

- 1 Identifies if things are alive or not alive and how they can be affected by pollution.
- 2 Describes what causes day and night and what happens to shadows during the day.
- 3 Identifies the seasons at different places on the Earth.
- 4 Identifies fossil fuels and how they are made.

12 Post Test Quiz 1

- 1 Identifies if things are alive or not alive and how they can be affected by pollution.
- 2 Describes what causes day and night and what happens to shadows during the day.
- 3 Identifies the seasons at different places on the Earth.
- 4 Identifies fossil fuels and how they are made.

13 Pre Test Quiz 2

- 1 Identifies processes by which different materials can be recycled.
- 2 Identifies characteristics of the Moon and its phases.
- 3 Identifies symbols and instruments which can be used to represent and measure the weather.
- 4 Describes how fossils are formed.

14 Post Test Quiz 2

- 1 Identifies processes by which different materials can be recycled.
- 2 Identifies characteristics of the Moon and its phases.
- 3 Identifies symbols and instruments which can be used to represent and measure the weather.
- 4 Describes how fossils are formed.

ST22-2 Living with Earth Science Level-2

1 Habitats

- 1 Discovers the characteristics of animals that allow them to survive in their natural habitats.
- 2 Discovers the habitats of different animals.

2 The Planets

- 1 States the position of the planets in the solar system.
- 2 Recognizes planets in the solar system.

3 Rain and Clouds

- 1 States the necessary conditions for the formation of clouds and precipitation.
- 2 Replicates and observes the stages of the water cycle.
- 3 States the different forms of water in the water cycle.

4 Rocks

- 1 Describes the different conditions for the formation of various rocks.
- 2 Sorts rocks into sedimentary, metamorphic and igneous rock types.

5 Global Warming

- 1 Discovers some of the causes of global warming.
- 2 Explores the effects of global warming and alternative energy sources.

6 The Sun

- 1 States the effects that the Sun has on the light levels on the planets of the solar system.
- 2 Observes the effect that distance has on light levels.

7 Separating Mixtures

- 1 Separates mixtures using a sieve.
- 2 Separates solids and liquids using filter paper.

8 Solubility

- 1 Tests if materials are soluble or insoluble.
- 2 Observes the effect of adding an insoluble material to a liquid.

11 Pre Test Quiz 3

- 1 Describes characteristics of animals habitats.
- 2 Identifies planets in the solar system.
- 3 Describes the states and processes of the water cycle.
- 4 States how different rocks are formed.

12 Post Test Quiz 3

- 1 Describes characteristics of animals habitats.
- 2 States how different rocks are formed.
- 3 Identifies planets in the solar system.
- 4 Describes the states and processes of the water cycle.

13 Pre Test Quiz 4

- 1 Identifies some causes and effects of global warming.
- 2 Relates the position of a planet in the solar system to the amount of light it receives.
- 3 Identifies how mixtures can be separated using different filters.
- 4 Describes what happens to soluble and insoluble materials when they are added to a liquid.

14 Post Test Quiz 4

- 1 Describes what happens to soluble and insoluble materials when they are added to a liquid.
- 2 Identifies how mixtures can be separated using filters.
- 3 Relates the position of a planet in the solar system to the amount of light it receives.
- 4 Identifies some causes and effects of global warming.

ST23-1 Living with Scientific Reasoning Level-1

1 Measuring Distance

- 1 Uses a motion sensor to measure distances.
- 2 Uses a ruler and a motion sensor to measure height.

2 Alternative Energy

- 1 Identifies renewable and non-renewable energy sources.
- 2 Uses a solar panel to generate electricity in a circuit.

3 Elasticity

- 1 Tests a series of different objects to find if they are flexible, inflexible or elastic.
- 2 Identifies if different objects should be flexible, inflexible or elastic in order to do their jobs.

4 Balance

- 1 Discovers the effect of forces on a lever.
- 2 Uses a lever to balance weights.

5 Light Levels

- 1 Uses an analogue light meter to measure light levels in a room.
- 2 Uses a digital light meter to measure light levels in a room.

6 Electromagnets

- 1 Uses a bar magnet and an electromagnet to find the differences and similarities between them.
- 2 Increases the strength of an electromagnet.

7 Natural Materials

- 1 Identifies where different natural materials come from.
- 2 Identifies what natural materials have been used to make a series of sample objects.

8 Crawler

- 1 Finds the effects of giving a crawler more energy.
- 2 Modifies a crawler so that it can store enough energy to reach the top of a slope.
- 3 Modifies a crawler to change the direction it moves in.

11 Pre Test Quiz 1

- 1 Identifies different ways to measure things.
- 2 Identifies renewable and non-renewable energy sources.
- 3 Identifies flexible, inflexible and elastic material properties.
- 4 Indicates how levers can be used to balance weights.

12 Post Test Quiz 1

- 1 Identifies different ways to measure things.
- 2 Identifies renewable and non-renewable energy sources.
- 3 Identifies flexible, inflexible and elastic material properties.
- 4 Indicates how levers can be used to balance weights.

13 Pre Test Quiz 2

- 1 Identifies how the level of light can be measured.
- 2 Identifies the behavior of temporary and permanent magnets.
- 3 Identifies if materials come from the Earth, from plants or from animals.
- 4 Identifies how a device called a crawler works on different surfaces when given varying amounts of energy.

14 Post Test Quiz 2

- 1 Identifies how the level of light can be measured.
- 2 Identifies the behavior of temporary and permanent magnets.
- 3 Identifies if materials come from the Earth, from plants or from animals.
- 4 Identifies how a device called a crawler works on different surfaces when given varying amounts of energy.

ST23-2 Living with Scientific Reasoning Level-2

1 Temperature

- 1 Measures temperature using thermometers.
- 2 Uses graphs to plot the change of temperature over periods of time.

2 Flight

- 1 Uses wing flaps and rudders to control the direction of airplanes in the air.
- 2 Changes the size and shape of a wing of a model airplane to see the effect in the lift given.
- 3 Changes the balance of a model airplane to see the effect on flight.

3 Changes

- 1 Describes the changes that occur in different materials when they are heated.
- 2 Describes the changes that occur in different materials when they are cooled.
- 3 States if changes in different materials, caused by heating and cooling, can be reversed.

4 Lifting Machines

- 1 Discovers the uses of a windlass.
- 2 Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.

5 Pendulum

- 1 Observes the effect of the changing the weight of a pendulum on the time of its swing.
- 2 Observes the effect of changing the length of a pendulum on the time of its swing.
- 3 Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.

6 Sending Signals

- 1 Sends messages using radio waves.
- 2 Sends messages using light signals.
- 3 Sends messages using coded signals.

7 Density

- 1 Describes how density of an object can effect if it floats or sinks in water.
- 2 Relates the weight, shape and size of a material to its density.

8 Bridges

- 1 Uses different supports to make a bridge stronger.
- 2 Constructs a bridge to span a gap.
- 3 Observes the weakness of a beam bridge.

11 Pre Test Quiz 3

- 1 States how temperature can be measured and identifies the temperature of the human body.
- 2 States how wings can be used in flight.
- 3 Identifies the changes that happen to materials when they are heated and cooled.
- 4 Describes the function of lifting machines.

12 Post Test Quiz 3

- 1 States how temperature can be measured and states the temperature of the human body.
- 2 Identifies the change that happens to materials when they are heated and cooled.
- 3 States how wings can be used in flight.
- 4 Describes the function of a lifting machine.

13 Pre Test Quiz 4

- 1 Relates the swing time of a pendulum with its length.
- 2 States different ways that signals can be sent.
- 3 States the relationship between weight, size and density of a material.
- 4 Identifies different types of bridges.

14 Post Test Quiz 4

- 1 States the relationship between weight, size and density of a material.
- 2 States different ways that signals can be sent.
- 3 Identifies different types of bridges.
- 4 Relates the swing time of a pendulum with its length.

Section 6.

ClassAct Student Report

Indiana Science Standards Gr3

Student Name: Bruce Denby

Student ID: BD18479

Class: Grade 3 Science

Scores – A*, A, B, C, D, F

A – The Nature of Science and Technology

Recognize and explain that when a scientific investigation is repeated, a similar result is expected.

N/A

A Participate in different types of guided scientific investigations such as observing objects and events and collecting specimens for analysis.

Observes the effects of tap water, salt water and fertilizer on the growth of plants in a nine day period.

Observes the growth of a plant when grown under different watering conditions.

Observes the change from kinetic energy into heat and sound energy when rubbing hands together.

Observes the mixing of colored light to make other colors, including the making of white light.

Observes the relationship between volume of air and pitch of sound made by a percussion instrument.

Observes the force of friction.

Observes the weather during different seasons in a virtual representation of New York.

Observes how a varying incline effects the speed of a model car.

Investigates the bones of the human body.

Squashes a ball and stretches a spring to observe the effects of pushing and pulling forces.

Observes the magnetic attraction and repulsion forces between the poles of magnets.

Investigates the pH levels of virtual fields to find which field is most suitable to grow crops.

Investigates the joints of the human body.

Observes that images are reversed when reflected in a mirror.

A Keep and report records of investigations and observations using tools, such as journals, charts, graphs, and computers.

Displays results from a friction experiment in a series of bar charts.

Writes a report about a physical science topic.

Compares the heat loss in different materials using graphs.

Writes a report on science.

Uses graphs to plot the change of temperature over periods of time.

Experiments with actions that effect heart rate and creates a table to record their results.

Records rainfall information into a table and constructs a bar chart of the results.

Writes a report about a life science topic.

Writes a report about an Earth and space science topic.

A* Discuss the results of investigations and consider the explanations of others.

Debates issues that relate to life science.
Critiques written and oral explanations of science.
Debates issues that relate to science.
Critiques written and oral explanations of an Earth and space science.
Critiques written and oral explanations of a life science.
Critiques written and oral explanations of a physical science.
Debates issues that relate to physical science.
Debates issues that relate to Earth and space science.

A Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.

Critiques written and oral explanations of an Earth and space science.
Critiques written and oral explanations of science.
Debates issues that relate to science.
Debates issues that relate to physical science.
Critiques written and oral explanations of a physical science.
Debates issues that relate to life science.
Critiques written and oral explanations of a life science.
Debates issues that relate to Earth and space science.

Give examples of how tools, such as automobiles, computers, and electric motors, have affected the way we live.

N/A

B Recognize that and explain how an invention can be used in different ways, such as a radio being used to get information and for entertainment.

Sends messages using light signals.
Sends messages using radio waves.
Sends messages using coded signals.

A Describe how discarded products contribute to the problem of waste disposal and that recycling can help solve this problem.

Identifies how different materials can be recycled.
Identifies processes by which different materials can be recycled.

A – Scientific Thinking

Add and subtract whole numbers mentally, on paper, and with a calculator.

N/A

A Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions.

Separates mixtures using a sieve.
Separates solids and liquids using filter paper.
Tests if materials are soluble or insoluble.
Observes the effect of adding an insoluble material to a liquid.

- A** Keep a notebook that describes observations and is understandable weeks or months later.
Writes a report on science.
Critiques written and oral explanations of science.
Displays results from a friction experiment in a series of bar charts.
- B** Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.
Identifies the parts and controls of a microscope.
Uses a microscope to view the cells of plants.
Uses a ruler and a motion sensor to measure height.
- A*** Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.
Constructs models from three different designs and compares the advantages and disadvantages of each design.
Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.
Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.
Constructs a bridge to span a gap.
- A** Make sketches and write descriptions to aid in explaining procedures or ideas.
Writes a report about an Earth and space science topic.
Writes a report about a physical science topic.
Makes a presentation on science.
Creates a science poster.
Creates an Earth and space science poster.
Makes a presentation about an Earth and space science topic.
Writes a report on science.
Writes a report about a life science topic.
Creates a physical science poster.
Makes a presentation about a physical science topic.
Creates a life science poster.
Makes a presentation about a life science topic.
- Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.
N/A

B – The Physical Setting

- B** Observe and describe the apparent motion of the sun and moon over a time span of one day.
Uses software to discover the different phases of the Moon.
Identifies characteristics of the Moon and its phases.
Uses software to discover facts about the Moon and its relation to the Earth.
States the effects that the Sun has on the light levels on the planets of the solar system.
Uses a software simulation to find out how seasons are linked to the position of the Earth in relation to the Sun.

- C** Observe and describe that there are more stars in the sky than anyone can easily count, but they are not scattered evenly.
N/A
- A** Observe and describe that the sun can be seen only in the daytime.
Uses a shadow trainer to find out why shadows change shape during the day.
Uses software to find out why there is day and night.
- B** Observe and describe that the moon looks a little different every day, but looks the same again about every four weeks.
Uses software to discover facts about the Moon and its relation to the Earth.
Uses software to discover the different phases of the Moon.
Identifies characteristics of the Moon and its phases.
- B** Give examples of how change, such as weather patterns, is a continual process occurring on Earth.
Discovers symbols that are used to represent the weather.
Observes the weather during different seasons in a virtual representation of New York.
Identifies symbols and instruments that can be used to represent and measure the weather.
- A** Describe ways human beings protect themselves from adverse weather conditions.
N/A
- B** Identify and explain some effects human activities have on weather.
Identifies some causes and effects of global warming.
Explores the effects of global warming and alternative energy sources.
Discovers some of the causes of global warming.
- C** Investigate and describe how moving air and water can be used to run machines, like windmills and waterwheels.
Explores the effects of global warming and alternative energy sources.
Identifies places where alternative energy sources could be used.
- B** Demonstrate that things that make sound do so by vibrating, such as vocal cords and musical instruments.
Identifies how the size of a vibration can effect the loudness of a sound.
Identifies that sound travels as a vibration by speaking into a balloon.
Identifies that sound travels through string as a vibration by using a string telephone.
Identifies that sound travels as a vibration and so can travel through solids.
Predicts how the pitch of sound produced by a vibrating object changes with object size.

A – The Living Environment

- B** 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.
Discovers the characteristics of animals that allow them to survive in their natural habitats.
Discovers the habitats of different animals.
Classifies animals as carnivores, herbivores or omnivores.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.
Uses classification keys to sort animals.
Creates questions in a classification key to sort a group of farmyard animals.
Identifies the producers primary consumers and secondary consumers in food chains.
- A*** Explain that features used for grouping depend on the purpose of the grouping.
Creates questions in a classification key to sort a group of farmyard animals.
Inserts questions into the correct places in a classification key so that it can be used to sort a series of dogs.
Identifies questions that can be asked to sort different animals.
Uses classification keys to sort animals.
Uses a simple classification key to sort three different types of metal.
Sorts rocks into sedimentary, metamorphic and igneous rock types.
- A** Observe that and describe how offspring are very much, but not exactly, like their parents and like one another.
Students identify the differences between learnt and inherited traits.
Students identify that heredity traits are those that are passed between parent and offspring.
- B** Describe that almost all kinds of animals' food can be traced back to plants.
Identifies the producers primary consumers and secondary consumers in food chains.
Identifies foods that come from plants and animals.
Determines the placement of animals and plants in food chains.
Identifies the parts of plants that help them to make their own food.
Identifies if everyday foods come from plants or animals.
Identifies the nutrients contained in different foods.
States the energy transfer that occurs between plants to animals and animals to animals in food chains.
Uses a matching game to find what foods humans can obtain from animals.
Discovers the food groups necessary for a healthy balanced diet.
Uses a matching game to find what foods humans can obtain from plants.

- A** Give examples of some kinds of organisms that have completely disappeared and explain how these organisms were similar to some organisms living today.

Uses a virtual excavation to find different fossils.

Uses software to find out how different types of fossils are formed.

Describes how fossils are formed.

- A** Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do.

Investigates the lungs of the human body.

Investigates the stomach of the human body.

Investigates the heart of the human body.

Identifies the nutrients contained in different foods.

Discovers the food groups necessary for a healthy balanced diet.

- B** Explain that eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy.

Determines the effect of exercise on heart rate.

Identifies the nutrients contained in different foods.

Discovers the relationship between heartbeat and pulse.

Discovers the food groups necessary for a healthy balanced diet.

- A*** Explain that some things people take into their bodies from the environment can hurt them and give examples of such things.

Interprets text to identify things that harm, preserve or protect the environment.

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 hand washing with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.

N/A

B – The Mathematical World

- B** Select and use appropriate measuring units, such as centimeters (cm) and meters (m), grams (g) and kilograms (kg), and degrees Celsius (°C).
Identifies different ways to measure things.
Measures temperature using thermometers.
Measures and compares the heat insulation properties of different materials.
Identifies symbols and instruments that can be used to represent and measure the weather.
Uses non-standard measurements, such as paper clips and hands, to measure different objects.
Measures pulling forces using a Newton meter.
Measures the effect that the force of gravity has on a mass placed on an inclined plane.
Identifies units of measurement that would be most suitable for measuring a series of different items.
Identifies that pushes and pulls are forces that can be measured in Newton's.
Uses a digital light meter to measure light levels in a room.
Uses a motion sensor to measure distances.
Uses a ruler and a motion sensor to measure height.
Uses an analogue light meter to measure light levels in a room.
- B** Observe that and describe how some measurements are likely to be slightly different, even if what is being measured stays the same.
Uses a motion sensor to measure distances.
Uses a ruler and a motion sensor to measure height.

- B** Construct tables and graphs to show how values of one quantity are related to values of another.
Uses graphs to plot the change of temperature over periods of time.
Compares the heat loss in different materials using graphs.
Records rainfall information into a table and constructs a bar chart of the results.
Experiments with actions that effect heart rate and creates a table to record their results.
Displays results from a friction experiment in a series of bar charts.

Illustrate that if 0 and 1 are located on a line, any other number can be depicted as a position on the line.

N/A

Explain that one way to make sense of something is to think of how it relates to something more familiar.

N/A

A – Common Themes

- A** Investigate how and describe that when parts are put together, they can do things that they could not do by themselves.
Discovers the uses of a windlass.
Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.

Investigate how and describe that something may not work if some of its parts are missing.

N/A

- A** Explain how a model of something is different from the real thing but can be used to learn something about the real thing.
Uses a shadow trainer to find out why shadows change shape during the day.
Recognizes planets in the solar system.

- A** Take, record, and display counts and simple measurements of things over time, such as plant or student growth.

Uses a board-game to discover the stages in the life cycle of a plant.
Interprets text and diagrams to identify the habitats of different plants.

Identifies the stages in the life cycle of a plant.

Compares the life cycles of plants and identifies similarities and differences between them.

Describes different forms of climate control used to grow plants.

Observes the growth of a plant when grown under different watering conditions.

Observes the growth of a plant when grown under different

temperature conditions.

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.

N/A