

Inquiry Investigations™
Kingdoms of Life MODULE - 1294372
Grades: 7-10

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Virginia Standards of Learning
Science
Grade 7

STRAND / TOPIC	VA.LS.1.	Life Science: The student will plan and conduct investigations in which a) data are organized into tables showing repeated trials and means; b) variables are defined; c) metric units (SI - International System of Units) are used; d) models are constructed to illustrate and explain phenomena; e) sources of experimental error are identified; f) dependent variables, independent variables, and constants are identified; g) variables are controlled to test hypotheses and trials are repeated; h) continuous line graphs are constructed, interpreted, and used to make predictions; i) interpretations from the same set of data are evaluated and defended; and j) an understanding of the nature of science is developed and reinforced.
STANDARD / STRAND	LS.1.1.	Essential Knowledge, Skills, and Processes: Students should be able to design a data table that includes space to organize all components of an investigation in a meaningful way, including levels of the independent variable, measured responses of the dependent variable, number of trials, and mathematical means. <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.1.2.	Essential Knowledge, Skills, and Processes: Students should be able to identify what is deliberately changed in the experiment and what is to be measured as the dependent (responding) variable. <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	LS.1.3.	Essential Knowledge, Skills, and Processes: Students should be able to select appropriate tools for collecting qualitative and quantitative data and record measurements (volume, mass, and distance) in metric units. <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.1.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to evaluate the design of an experiment and the events that occur during an investigation to determine which factors may affect the results of the experiment. This requires students to examine the experimental procedure and decide where or if they have made mistakes.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.1.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to determine the specific component of an experiment to be changed as an independent variable and control the experiment by conducting trials for the experiment in which the independent variable is not applied. This requires the student to set up a standard to which the experimental results can be compared. The student must use the results of the controlled trials to determine whether the hypothesized results were indeed due to the independent variable.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	LS.1.8.	<p>Essential Knowledge, Skills, and Processes: Students should be able to construct appropriate graphs, using data sets from experiments. This requires the student to recognize that a line graph is most appropriate for reporting continuous or real-time data. This also requires a student to comprehend that points along the line that are not actual data points can be used to make predictions. Students should be able to interpret and analyze these graphs.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.1.9.	<p>Essential Knowledge, Skills, and Processes: Students should be able to develop conclusions based on a data set and verify whether the data set truly supports the conclusion. This requires students to cite references to the data that specifically support their conclusions.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the

		<p>Behavior of Pill Bugs</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.1.10.	<p>Essential Knowledge, Skills, and Processes: Students should be able to distinguish between observational and experimental investigations.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.2.	<p>Life Science: The student will investigate and understand that all living things are composed of cells. Key concepts include a) cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus and chloroplast); b) similarities and differences between plant and animal cells; c) development of cell theory; and d) cell division (mitosis and meiosis).</p>
STANDARD / STRAND	LS.2.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to compare and contrast examples of plant and animal cells, using the light microscope and images obtained from microscopes.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey
STANDARD / STRAND	LS.2.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to animal and plant cells. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. An example of such a question is: 'Do onion cells vary in shape or structure depending on where they are found in the plant?'</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.2.8.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to animal and plant cells. This analysis and critique should focus on the skills developed in LS.1. Major emphases should include the following: the clarity of predictions and hypotheses, the organization of data tables, the use of metric measures, adequacy of trials and samples, the identification and use of variables, the identification of constants, the use of controls, displays of graphical data, and the support for conclusions.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy

		<p>to Reproduction</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.3.	Life Science: The student will investigate and understand that living things show patterns of cellular organization. Key concepts include a) cells, tissues, organs, and systems; and b) life functions and processes of cells, tissues, organs, and systems (respiration, removal of wastes, growth, reproduction, digestion, and cellular transport).
STANDARD / STRAND	LS.3.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to differentiate between unicellular organisms and multicellular organisms and name common examples of each.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Teacher Resource CD: A Closer Look at Microbes • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.3.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to compare and contrast how unicellular and multicellular organisms perform various life functions. This includes the application of knowledge about systems in organisms.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Teacher Resource CD: A Closer Look at Microbes • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.3.3.	<p>Essential Knowledge, Skills, and Processes: Students should be able to compare and contrast the various basic life functions of an organism, including respiration, waste removal, growth, irritability, and reproduction, and explain the role that each life function serves for an organism.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Classifying Life

		<ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.3.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to understanding cellular organization, with emphasis on observations of cells and tissue. This analysis and critique should focus on the skills developed in LS.1. Major emphases should include the following: the clarity of predictions and hypotheses, the organization of data tables, the use of metric measures, adequacy of trials and samples, the identification and use of variables, the identification of constants, the use of controls, displays of graphical data, and the support for conclusions.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.4.	<p>Life Science: The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include a) plant needs (light and energy sources, water, gases, nutrients); b) animal needs (food, water, gases, shelter, space); and c) factors that influence life processes.</p>
STANDARD / STRAND	LS.4.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to identify the basic needs of all living things.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	LS.4.3.	<p>Essential Knowledge, Skills, and Processes: Students should be able to explain that there is a specific range or continuum of conditions that will meet the needs of organisms.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.4.4.	<p>Essential Knowledge, Skills, and Processes: Students should be able to explain how organisms obtain the materials that they need.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Classifying Life Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing Virtual Laboratory: Classifying Living Organisms
STANDARD	LS.4.5.	Essential Knowledge, Skills, and Processes: Students should be able to

/ STRAND		<p>create plausible hypotheses about the effects that changes in available materials might have on particular life processes in plants and in animals.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.4.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to animal and plant life needs. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.4.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to animal and plant needs. This analysis and critique should focus on the skills developed in LS.1. Major emphases should include the following: the clarity of predictions and hypotheses, the organization of data tables, the use of metric measures, adequacy of trials and samples, the identification and use of variables, the identification of constants, the use of controls, displays of graphical data, and the support for conclusions.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.5.	Life Science: The student will investigate and understand how organisms can be classified. Key concepts include a) distinguishing characteristics among kingdoms of organisms; b) distinguishing characteristics of major animal and plant phyla; and c) the characteristics of the species.
STANDARD / STRAND	LS.5.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to compare and contrast key features and activities between organisms.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants

		<ul style="list-style-type: none"> • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.5.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to classify organisms based on physical features.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.5.3.	<p>Essential Knowledge, Skills, and Processes: Students should be able to arrange organisms in a hierarchy according to similarities and differences in features.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
<p>STANDARD / STRAND</p>	<p>LS.5.4.</p>	<p>Essential Knowledge, Skills, and Processes: Students should be able to categorize examples of organisms as representatives of the kingdoms and recognize that the number of kingdoms is subject to change.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.5.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to recognize scientific names as part of a binomial nomenclature.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.5.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to recognize examples of major animal phyla.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD	LS.5.7.	Essential Knowledge, Skills, and Processes: Students should be able to

/ STRAND		<p>recognize examples of major plant phyla (divisions).</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.6.	<p>Life Science: The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concepts include a) energy transfer between sunlight and chlorophyll; b) transformation of water and carbon dioxide into sugar and oxygen; and c) photosynthesis as the foundation of virtually all food webs.</p>
STANDARD / STRAND	LS.6.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to describe the process of photosynthesis in terms of raw materials and products generated.</p> <ul style="list-style-type: none"> • Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	LS.6.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to identify and describe the organelles involved in the process of photosynthesis.</p> <ul style="list-style-type: none"> • Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	LS.6.4.	<p>Essential Knowledge, Skills, and Processes: Students should be able to relate the importance of photosynthesis to the role of producers as the foundation of food webs.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy

		<p>to Reproduction</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.6.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to photosynthesis. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Plants • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.6.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to photosynthesis. This analysis and critique should focus on the skills developed in LS.1. Major emphases should include the following: the clarity of predictions and hypotheses, the organization of data tables, the use of metric measures, adequacy of trials and samples, the identification and use of variables, the identification of constants, the use of controls, displays of graphical data, and the support for conclusions.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Teacher Resource CD: A Closer Look at Plants • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.7.	Life Science: The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include a) the carbon, water, and nitrogen cycles; b) interactions resulting in a flow of energy and matter throughout the system; c) complex relationships within terrestrial, freshwater, and marine ecosystems; and d) energy flow in food webs and energy pyramids.
STANDARD / STRAND	LS.7.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to observe and identify common organisms in ecosystems and collect, record, and chart data concerning the interactions of these organisms (from observations and print and electronic resources).</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.7.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to classify organisms found in local ecosystems as producers or first-, second-, or third-order consumers. Design and construct models of food webs with these organisms.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? -

		<p>Creating Food Webs</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey
STANDARD / STRAND	LS.7.3.	<p>Essential Knowledge, Skills, and Processes: Students should be able to observe local ecosystems and identify, measure, and classify the living and nonliving components.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey
STANDARD / STRAND	LS.7.4.	<p>Essential Knowledge, Skills, and Processes: Students should be able to differentiate among key processes in the water, carbon, and nitrogen cycles and analyze how organisms, from bacteria and fungi to third-order consumers, function in these cycles.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Teacher Resource CD: A Closer Look at Microbes
STANDARD / STRAND	LS.7.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to identify examples of interdependence in terrestrial, freshwater, and marine ecosystems.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	LS.7.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to apply the concepts of food chains, food webs, and energy pyramids to analyze how energy and matter flow through an ecosystem.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.7.8.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to food webs. The investigation may be a complete experimental design or may focus on</p>

		<p>systematic observation, description, measurement, and/or data collection and analysis.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.7.9.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to food webs.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife
STRAND / TOPIC	VA.LS.8.	<p>Life Science: The student will investigate and understand that interactions exist among members of a population. Key concepts include a) competition, cooperation, social hierarchy, territorial imperative; and b) influence of behavior on a population.</p>
STANDARD / STRAND	LS.8.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to differentiate between the needs of the individual and the needs of a population.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey
STANDARD / STRAND	LS.8.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to interpret, analyze, and evaluate data from systematic studies and experiments concerning the interactions among members of a population.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey
STANDARD / STRAND	LS.8.3.	<p>Essential Knowledge, Skills, and Processes: Students should be able to determine the relationship between a population's position in a food web and the types of interactions seen among the individuals of the population.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey
STANDARD / STRAND	LS.8.4.	<p>Essential Knowledge, Skills, and Processes: Students should be able to observe and identify populations in ecosystems and collect, record, chart, and interpret data concerning the interactions of these organisms (from observations and print and electronic resources).</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	LS.8.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to interactions within a population. This analysis and critique should focus on the skills developed in LS.1. Major emphases should include the following: the clarity of predictions and hypotheses, the organization of data tables, the use of metric measures, adequacy of trials and samples, the identification and use of variables, the identification of constants, the use of controls, displays of graphical data, and the support for conclusions.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.9.	<p>Life Science: The student will investigate and understand interactions among populations in a biological community. Key concepts include a) the relationship among producers, consumers, and decomposers in food webs; b) the relationship of predators and prey; c) competition and cooperation; d) symbiotic relationships; and e) niches.</p>
STANDARD / STRAND	LS.9.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to identify the populations of producers, consumers, and decomposers and describe the roles they play in their communities.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? -

		<p>Creating Food Webs</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Teacher Resource CD: A Closer Look at Microbes
STANDARD / STRAND	LS.9.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to interpret, analyze, and evaluate data from systematic studies and experiments concerning the interactions of populations in an ecosystem.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	LS.9.3.	<p>Essential Knowledge, Skills, and Processes: Students should be able to predict the effect of population changes on the food web of a community.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife
STANDARD / STRAND	LS.9.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to generate predictions based on graphically represented data of competition and cooperation between populations.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	LS.9.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to differentiate between the types of symbiosis and explain examples of each.</p>

		<ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Microbes
STANDARD / STRAND	LS.9.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to infer the niche of organisms from their physical characteristics.</p> <ul style="list-style-type: none"> Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.9.8.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to interactions among populations. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.10.	<p>Life Science: The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include a) differences between ecosystems and biomes; b) characteristics of land, marine, and freshwater ecosystems; and c) adaptations that enable organisms to survive within a specific ecosystem.</p>
STANDARD / STRAND	LS.10.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to differentiate between ecosystems and biomes.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond

		<p>Microlife</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.10.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to recognize and give examples of major biomes: desert, forest, grassland, and tundra.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.10.3.	<p>Essential Knowledge, Skills, and Processes: Students should be able to compare and contrast the biotic and abiotic characteristics of land, marine, and freshwater ecosystems.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.10.4.	<p>Essential Knowledge, Skills, and Processes: Students should be able to observe and describe examples of specific adaptations that organisms have which enable them to survive in a particular ecosystem.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the

		<p>Behavior of Pill Bugs</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.10.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze specific adaptations of organisms to determine how they help the species survive in its ecosystem.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.10.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to how organisms adapt to biotic and abiotic factors in a ecosystems. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.10.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to how organisms adapt to biotic and abiotic factors in ecosystems.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.11.	<p>Life Science: The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time (daily, seasonal, and long term). Key concepts include a) phototropism, hibernation, and dormancy; b) factors that increase or decrease population size; and c) eutrophication, climate change, and catastrophic disturbances.</p>
STANDARD / STRAND	LS.11.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to relate the responses of organisms to daily, seasonal, or long-term events.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	LS.11.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to differentiate between ecosystems, communities, populations, and organisms.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.11.4.	<p>Essential Knowledge, Skills, and Processes: Students should be able to compare and contrast the factors that increase or decrease population size.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STANDARD / STRAND	LS.11.6.	<p>Essential Knowledge, Skills, and Processes: Students should be able to classify the various types of changes that occur over time in ecosystems, communities, populations, and organisms.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STANDARD / STRAND	LS.11.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to change over time in ecosystems, communities, populations, or organisms. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	LS.11.8.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and critique the experimental design of basic investigations related to change over time in ecosystems, communities, populations, and organisms.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STRAND / TOPIC	VA.LS.12.	<p>Life Science: The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include a) food production and harvest; b) change in habitat size, quality, and structure; c) change in species competition; d) population disturbances and factors that threaten and enhance species survival; and e) environmental issues (water supply, air quality, energy production, and waste management).</p>
STANDARD / STRAND	LS.12.1.	<p>Essential Knowledge, Skills, and Processes: Students should be able to identify examples of ecosystem dynamics.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	LS.12.2.	<p>Essential Knowledge, Skills, and Processes: Students should be able to describe the relationship between human food harvest and the ecosystem.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs
STANDARD / STRAND	LS.12.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to design an investigation from a testable question related to the relationships between ecosystem dynamics and human activity. The investigation may be</p>

		<p>a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.LS.14.	Life Science: The student will investigate and understand that organisms change over time. Key concepts include a) the relationships of mutation, adaptation, natural selection, and extinction; b) evidence of evolution of different species in the fossil record; and c) how environmental influences, as well as genetic variation, can lead to diversity of organisms.
STANDARD / STRAND	LS.14.5.	<p>Essential Knowledge, Skills, and Processes: Students should be able to analyze and evaluate data from investigations on variations within a local population.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey

STRAND / TOPIC	VA.PS.1.	Physical Science: The student will plan and conduct investigations in which a) chemicals and equipment are used safely; b) length, mass, volume, density, temperature, weight, and force are accurately measured and reported using the International System of Units (SI - metric); c) conversions are made among metric units applying appropriate prefixes; d) triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, and spring scales are used to gather data; e) numbers are expressed in scientific notation where appropriate; f) research skills are utilized using a variety of resources; g) independent and dependent variables, constants, controls, and repeated trials are identified; h) data tables showing the independent and dependent variables, derived quantities, and the number of trials are constructed and interpreted; i) data tables for descriptive statistics showing specific measures of central tendency, the range of the data set, and the number of repeated trials are constructed and interpreted; j) frequency distributions, scattergrams, line plots, and histograms are constructed and interpreted; k) valid conclusions are made after analyzing data; l) research methods are used to investigate practical problems and questions; m) experimental results are presented in appropriate written form; and n) an understanding of the nature of science is developed and reinforced.
STANDARD / STRAND	PS.1.7.	<p>Essential Knowledge, Skills, and Processes: Students should be able to identify the key components of controlled experiments: hypotheses, independent and dependent variables, constants, controls, and repeated trials.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	PS.1.9.	<p>Essential Knowledge, Skills, and Processes: Students should be able to apply the methodology of scientific inquiry: begin with a question, design an investigation, gather evidence, formulate an answer to the original question, and communicate the investigative process and results.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
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**Virginia Standards of Learning
Science
Grade 9**

STRAND / TOPIC	VA.ES.1.	Earth Science: The student will plan and conduct investigations in which a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools; b) technologies, including computers, probeware, and global positioning systems (GPS) are used to collect, analyze, and report data and to demonstrate concepts and simulate experimental conditions; c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted; d) variables are manipulated with repeated trials; e) a scientific viewpoint is constructed and defended (the nature of science).
STANDARD / STRAND	ES.1.12.	<p>Essential Knowledge and Skills: Students should be able to compare topographic maps of different scales.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STRAND / TOPIC	VA.ES.2.	Earth Science: The student will demonstrate scientific reasoning and logic by a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems; b) recognizing that evidence is required to evaluate hypotheses and explanations; c) comparing different scientific explanations for the same observations about the Earth; d) explaining that observation and logic are essential for reaching a conclusion; e) evaluating evidence for scientific theories.
STANDARD / STRAND	ES.2.7.	<p>Essential Understandings: All students should understand that there can be more than one explanation for any phenomena.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded)

		<p>Area) Survey</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.ES.3.	Earth Science: The student will investigate and understand how to read and interpret maps, globes, models, charts, and imagery. Key concepts include a) maps (bathymetric, geologic, topographic, and weather) and star charts; b) imagery (aerial photography and satellite images); c) direction and distance measurements on any map or globe; d) location by latitude and longitude and topographic profiles.
STANDARD / STRAND	ES.3.1.	<p>Essential Understandings: All students should understand that scale relates to actual distance.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.3.2.	<p>Essential Understandings: All students should understand that topographic maps, air photos, and satellite images relate to actual 3-D landforms.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.3.3.	<p>Essential Understandings: All students should understand that grid systems are used to define locations and directions on maps, globes, and charts.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.3.4.	<p>Essential Knowledge and Skills: Students should be able to read and interpret maps, including legends and lines (e.g., contour and isobar).</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.3.6.	<p>Essential Knowledge and Skills: Students should be able to construct profiles from topographic contours.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.3.7.	<p>Essential Knowledge and Skills: Students should be able to determine distance and elevation on a map.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing

STANDARD / STRAND	ES.3.8.	Essential Knowledge and Skills: Students should be able to identify a hilltop, stream, and valley on a topographic map. <ul style="list-style-type: none"> Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STRAND / TOPIC	VA.ES.7.	Earth Science: The student will investigate and understand the differences between renewable and nonrenewable resources. Key concepts include a) fossil fuels, minerals, rocks, water, and vegetation; b) advantages and disadvantages of various energy sources; c) resources found in Virginia; d) making informed judgments related to resource use and its effects on Earth systems; e) environmental costs and benefits.
STANDARD / STRAND	ES.7.3.	Essential Understandings: All students should understand that Virginia has many natural resources. <ul style="list-style-type: none"> Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STRAND / TOPIC	VA.ES.8.	Earth Science: The student will investigate and understand geologic processes including plate tectonics. Key concepts include a) how geologic processes are evidenced in the physiographic provinces of Virginia including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateau; b) processes (faulting, folding, volcanism, metamorphism, weathering, erosion, deposition, and sedimentation and their resulting features; c) tectonic processes (subduction, rifting and sea floor spreading, and continental collision).
STANDARD / STRAND	ES.8.5.	Essential Understandings: All students should understand that weathering, erosion, and deposition are interrelated processes. <ul style="list-style-type: none"> Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.8.17.	Essential Knowledge and Skills: Students should be able to label on a map and recognize the major features of the physiographic provinces of Virginia. <ul style="list-style-type: none"> Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.8.19.	Essential Knowledge and Skills: Students are expected to know that erosion is the process by which Earth materials are transported by moving water, ice, or wind. <ul style="list-style-type: none"> Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STRAND / TOPIC	VA.ES.9.	Earth Science: The student will investigate and understand how freshwater resources are influenced by geologic processes and the activities of humans. Key concepts include a) processes of soil development; b) development of Karst topography; c) identification of groundwater zones including water table, zone of saturation, and zone of aeration; d) identification of other sources of fresh water including rivers, springs, and aquifers with reference to the hydrologic cycle; e) dependence on freshwater resources and the effects of human usage on water quality; f) identification of the major watershed systems in Virginia including the Chesapeake Bay and its tributaries.
STANDARD	ES.9.7.	Essential Knowledge and Skills: Students are expected to know that soil is

/ STRAND		<p>loose rock fragments and clay derived from weathered rock mixed with organic material.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STRAND / TOPIC	VA.ES.11.	<p>Earth Science: The student will investigate and understand that oceans are complex, interactive physical, chemical, and biological systems and are subject to long- and short-term variations. Key concepts include a) physical and chemical changes (tides, waves, currents, sea level and ice cap variations, upwelling, and salinity concentrations); b) importance of environmental and geologic implications; c) systems interactions (density differences, energy transfer, weather, and climate); d) features of the sea floor (continental margins, trenches, mid-ocean ridges, and abyssal plains) reflect tectonic processes; e) economic and public policy issues concerning the oceans and the coastal zone including the Chesapeake Bay.</p>
STANDARD / STRAND	ES.11.2.	<p>Essential Understandings: All students should understand that the oceans are environmentally and economically important.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.11.3.	<p>Essential Understandings: All students should understand that human activities and public policy have important consequences for the oceans.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	ES.11.18.	<p>Essential Knowledge and Skills: Students are expected to know that chemical pollution and sedimentation are great threats to the chemical and biological well-being of estuaries and oceans.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STRAND / TOPIC	VA.ES.12.	<p>Earth Science: The student will investigate and understand the origin and evolution of the atmosphere and the interrelationship of geologic processes, biologic processes, and human activities on its composition and dynamics. Key concepts include a) scientific evidence for atmospheric changes over geologic time; b) current theories related to the effects of early life on the chemical makeup of the atmosphere; c) comparison of the Earth's atmosphere to that of other planets; d) atmospheric regulation mechanisms including the effects of density differences and energy transfer; e) potential atmospheric compositional changes due to human, biologic, and geologic activity.</p>
STANDARD / STRAND	ES.12.2.	<p>Essential Understandings: All students should understand that earth's atmosphere is unique in the solar system in that it contains substantial oxygen.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey
STANDARD / STRAND	ES.12.4.	<p>Essential Knowledge and Skills: Students are expected to know that the early atmosphere contained little oxygen and more carbon dioxide than the modern atmosphere.</p>

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey
STANDARD / STRAND	ES.12.7.	<p>Essential Knowledge and Skills: Students are expected to know that earth's atmosphere is 21 percent oxygen, 78 percent nitrogen, and 1 percent trace gases.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey

Virginia Standards of Learning
Science
Grade 10

STRAND / TOPIC	VA.BIO.1.	<p>Biology: The student will plan and conduct investigations in which a) observations of living organisms are recorded in the lab and in the field; b) hypotheses are formulated based on direct observations and information from the scientific literature; c) variables are defined and investigations are designed to test hypotheses; d) graphing and arithmetic calculations are used as tools in data analysis; e) conclusions are formed based on recorded quantitative and qualitative data; f) sources of error inherent in experimental design are identified and discussed; g) validity of data is determined; h) chemicals and equipment are used in a safe manner; i) appropriate technology, including computers, graphing calculators, and probeware, is used for gathering and analyzing data and communicating results; j) research utilizes scientific literature; k) differentiation is made between a scientific hypothesis and theory; l) alternative scientific explanations and models are recognized and analyzed; m) a scientific viewpoint is constructed and defended (the nature of science).</p>
STANDARD / STRAND	BIO.1.1.	<p>Essential Understandings: All students should understand that active participation in scientific investigations is necessary to develop an understanding of biology as an experimental science.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey

		<ul style="list-style-type: none"> Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.2.	<p>Essential Understandings: All students should understand that the continual use and development of cognitive and manipulative skills associated with the formulation of the scientific explanations is important.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.5.	<p>Essential Understandings: All students should understand that it Because of this inherent subjectivity, scientific inquiry involves evaluating the results and conclusions proposed by other scientists.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.6.	<p>Essential Understandings: All students should understand that the analysis of evidence and data is essential in order to make sense of the content of science.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.7.	<p>Essential Understandings: All students should understand that multiple data manipulation and analysis strategies are available to help explain results of quantitative investigations.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
<p>STANDARD / STRAND</p>	<p>BIO.1.8.</p>	<p>Essential Understandings: All students should understand that data and evidence should come from a variety of sources, including student investigation, peer investigation, and databases.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.9.	<p>Essential Knowledge and Skills: Students should be able to collect preliminary observations, both qualitative and quantitative.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.10.	<p>Essential Knowledge and Skills: Students should be able to make clear distinctions among observations, inferences, and predictions.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.13.	<p>Essential Knowledge and Skills: Students should be able to identify the independent variable (IV) and the values of the IV that will be used in the experiment.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	BIO.1.14.	<p>Essential Knowledge and Skills: Students should be able to select dependent variables that allow collection of quantitative data.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	BIO.1.16.	<p>Essential Knowledge and Skills: Students should be able to identify variables that must be held constant.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	BIO.1.17.	<p>Essential Knowledge and Skills: Students should be able to establish controls as appropriate.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	BIO.1.18.	<p>Essential Knowledge and Skills: Students should be able to write clear, replicable procedures.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.19.	<p>Essential Knowledge and Skills: Students should be able to record quantitative data in clearly labeled tables with units.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.1.20.	<p>Essential Knowledge and Skills: Students should be able to include labeled diagrams in the data record.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the

		<p>Behavior of Pill Bugs</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.23.	<p>Essential Knowledge and Skills: Students should be able to recognize that in order to ensure the validity of scientific investigations, other members of the scientific community must evaluate the work.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.24.	<p>Essential Knowledge and Skills: Students should be able to determine the range, mean, and values for data, using a graphing calculator and/or computer spreadsheet software.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement
STANDARD / STRAND	BIO.1.25.	<p>Essential Knowledge and Skills: Students should be able to plot data graphically, showing independent and dependent variables.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.1.30.	<p>Essential Knowledge and Skills: Students should be able to use evidence, apply logic, and construct an argument for conclusions based on reported data.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.1.31.	<p>Essential Knowledge and Skills: Students should be able to determine the extent to which data supports/does not support a hypothesis, and propose further hypotheses and directions for continued research.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.BIO.2.	Biology: The student will investigate and understand the history of biological concepts. Key concepts include a) evidence supporting the cell theory; b) scientific explanations of the development of organisms through time (biological evolution); c) evidence supporting the germ theory of infectious disease; d) development of the structural model of DNA; e) the collaborative efforts of scientists, past and present.
STANDARD / STRAND	BIO.2.1.	<p>Essential Understandings: All students should understand that in order to develop an understanding of biology as an experimental science, there must be knowledge of how scientific discoveries are made and how these discoveries have led to the accumulation of knowledge that is presented in textbooks. A historical perspective encourages the examination of concrete examples in the context from which they were developed.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.2.2.	<p>Essential Understandings: All students should understand that the scientific establishment sometimes rejects new ideas, and new discoveries often spring from unexpected findings.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.2.3.	<p>Essential Understandings: All students should understand that scientific knowledge usually grows slowly through contributions from many different investigators from diverse cultures.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.2.4.	<p>Essential Knowledge and Skills: Students are expected to know that the development and refinement of magnifying lenses and light microscopes made the observation and description of microscopic organisms and living cells possible.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey
STANDARD / STRAND	BIO.2.5.	<p>Essential Knowledge and Skills: Students are expected to know that the development of the cell theory was accelerated by the ability to make observations on a microscopic level.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey
STANDARD / STRAND	BIO.2.7.	<p>Essential Knowledge and Skills: Students are expected to know that continued advances in microscopy allowed observation of cell organelles and ultrastructure. Current technology allows the observation of cellular processes underlying both cell structure and function.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey
STANDARD / STRAND	BIO.2.8.	<p>Essential Knowledge and Skills: Students are expected to know that scientists have developed hypotheses about conditions on early Earth that could have led to the formation of the first organic molecules, early self-replicating molecules, the source of free oxygen in Earth's atmosphere, and the appearance of prokaryotic and later eukaryotic cells.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.2.11.	<p>Essential Knowledge and Skills: Students are expected to know that Pasteur's and Koch's experimentation and hypotheses led to an understanding of the presence of microorganisms and their relationship to diseases.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.2.15.	<p>Essential Knowledge and Skills: Students are expected to know that once DNA was shown to be the genetic material, a race among scientists took place to work out its structure.</p> <ul style="list-style-type: none"> Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.2.19.	<p>Essential Knowledge and Skills: Students are expected to know that science depends on experimental and observational confirmation and is subject to change as new evidence becomes available.</p> <ul style="list-style-type: none"> Teacher Resource CD: Classifying Life
STRAND / TOPIC	VA.BIO.3.	<p>Biology: The student will investigate and understand the chemical and biochemical principles essential for life. Key concepts include a) water chemistry and its impact on life processes; b) the structure and function of macromolecules; c) the nature of enzymes; d) the capture, storage, transformation, and flow of energy through the processes of photosynthesis and respiration.</p>
STANDARD / STRAND	BIO.3.1.	<p>Essential Understandings: All students should understand that water is essential for life on Earth.</p>

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design
STANDARD / STRAND	BIO.3.3.	<p>Essential Understandings: All students should understand that most life processes are a series of chemical reactions influenced by environmental and genetic factors.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	BIO.3.6.	<p>Essential Understandings: All students should understand that plant cells and many microorganisms use solar energy to combine molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen into the environment.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.3.7.	<p>Essential Understandings: All students should understand that the process of photosynthesis provides a vital connection between the sun and the energy needs of living systems.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.3.26.	<p>Essential Knowledge and Skills: Students are expected to know that photosynthesis and cell respiration are complementary processes for cycling carbon dioxide and oxygen as well as transferring energy in ecosystems.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Plants

STANDARD / STRAND	BIO.3.27.	Essential Knowledge and Skills: Students are expected to know that during photosynthesis, cells trap energy from sunlight with chlorophyll and use the energy, carbon dioxide and water to produce energy-rich organic molecules (glucose) and oxygen. <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	BIO.3.29.	Essential Knowledge and Skills: Students are expected to know that light is the initial source of energy for most communities. <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.3.30.	Essential Knowledge and Skills: Students are expected to know that photosynthesis involves an energy conversion in which light energy is converted to chemical energy in specialized cells. These cells are found in autotrophs such as plants and some protists. <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.3.33.	Essential Knowledge and Skills: Students should be able to discuss Recognize the equations for photosynthesis and respiration and identify the reactants and products. <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Plants
STRAND / TOPIC	VA.BIO.4.	Biology: The student will investigate and understand relationships between cell structure and function. Key concepts include a) characteristics of prokaryotic and eukaryotic cells; b) exploring the diversity and variation of eukaryotes; c) similarities between the activities of a single cell and a whole organism; and d) the cell membrane model (diffusion, osmosis, and active transport).
STANDARD / STRAND	BIO.4.2.	Essential Understandings: All students should understand that the simplest life forms exhibiting cellular structure are the prokaryotes. <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: Classifying Life Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.3.	Essential Understandings: All students should understand that cell structure is one of the ways in which organisms differ from each other.

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.4.	<p>Essential Understandings: All students should understand that the diversity that exists ranges from simple prokaryotic cells to complex multi-cellular organisms.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.6.	<p>Essential Understandings: All students should understand that relationships between structure and function can be examined at each of the hierarchical levels of organization: molecular, cellular, organism, population, community, and ecosystem.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.10.	<p>Essential Knowledge and Skills: Students are expected to know that earth's first cells were prokaryotes.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi

		<ul style="list-style-type: none"> • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.11.	<p>Essential Knowledge and Skills: Students are expected to know that prokaryotic cells exist in two major forms: eubacteria and archaeobacteria.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.12.	<p>Essential Knowledge and Skills: Students are expected to know that prokaryotes are the Earth's most abundant inhabitants. They can survive in a wide range of environments and obtain energy in a variety of ways.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Teacher Resource CD: A Closer Look at Microbes • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.13.	<p>Essential Knowledge and Skills: Students are expected to know that eukaryotes arose from prokaryotes and developed into larger more complex organisms, from single-celled protists to multi-cellular fungi, plants, and animals.</p> <ul style="list-style-type: none"> • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.4.14.	<p>Essential Knowledge and Skills: Students are expected to know that several differences between eukaryotes and prokaryotes include size, genetic material surrounded by a nuclear membrane, and the addition of mitochondria and chloroplasts.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.17.	<p>Essential Knowledge and Skills: Students are expected to know that some organisms exist as a single cell, while others are composed of many cells, each specialized to perform distinct metabolic functions.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Teacher Resource CD: A Closer Look at Microbes

		<ul style="list-style-type: none"> Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.18.	<p>Essential Knowledge and Skills: Students are expected to know that the basic processes necessary for living things to survive are the same for a single cell as they are for a more complex organism.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Teacher Resource CD: Classifying Life Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.4.19.	<p>Essential Knowledge and Skills: Students are expected to know that a single-celled organism has to conduct all life processes by itself. A multicellular organism has groups of cells that specialize to perform specific functions.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Teacher Resource CD: A Closer Look at Microbes Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.BIO.5.	<p>Biology: The student will investigate and understand life functions of archaeobacteria, monerans (eubacteria), protists, fungi, plants, and animals, including humans. Key concepts include a) how their structures and functions vary between and within the kingdoms; b) comparison of their metabolic activities; c) analyses of their responses to the environment; d) maintenance of homeostasis; e) human health issues, human anatomy, body systems, and life functions; and f) how viruses compare with organisms.</p>
STANDARD / STRAND	BIO.5.1.	<p>Essential Understandings: All students should understand that the millions of different organisms that live on Earth today share many structural and metabolic features, including cellular organization, common molecular mechanisms for energy transformation and utilization and maintenance of homeostasis, common genetic code, and mechanisms for the transmission of traits from one generation to the next.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Teacher Resource CD: Classifying Life Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.5.2.	<p>Essential Understandings: All students should understand that the diversity that is evident in the natural world can be studied in the local environment in the context of variations on a common theme.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing Virtual Laboratory: Classifying Living Organisms
STANDARD	BIO.5.7.	<p>Essential Knowledge and Skills: Students should be able to differentiate and</p>

/ STRAND		<p>give examples of the following from local ecosystems: autotrophs and heterotrophs (producers, consumers, and decomposers); multicellular and unicellular organisms; motile and non-motile organisms; organisms with and without cell walls; sexually and asexually reproducing organisms; aquatic and terrestrial organisms; behavioral responses to the environment.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.5.17.	<p>Essential Knowledge and Skills: Students are expected to know that viruses can reproduce only inside a living cell, the host cell.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STANDARD / STRAND	BIO.5.18.	<p>Essential Knowledge and Skills: Students are expected to know that the viral reproductive process includes the following steps: A virus must insert its genetic material into the host cell.; The viral genetic material takes control of the host cell and uses it to produce viruses.; The newly formed viruses are released from the host cell.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STRAND / TOPIC	VA.BIO.6.	<p>Biology: The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include a) cell growth and division; b) gamete formation; c) cell specialization; d) prediction of inheritance of traits based on the Mendelian laws of heredity; e) genetic variation (mutation, recombination, deletions, additions to DNA); f) the structure, function, and replication of nucleic acids (DNA and RNA); g) events involved in the construction of proteins; h) use, limitations, and misuse of genetic information; and i) exploration of the impact of DNA technologies.</p>
STANDARD / STRAND	BIO.6.2.	<p>Essential Understandings: All students should understand that many organisms are capable of combining genetic information from two parents to produce offspring. Sex cells are produced through meiosis. This allows sexually reproducing organisms to produce genetically differing offspring.</p> <ul style="list-style-type: none"> • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants
STANDARD / STRAND	BIO.6.25.	<p>Essential Knowledge and Skills: Students are expected to know that the sorting and recombination of genes in sexual reproduction results in a great</p>

		<p>variety of gene combinations in the offspring of any two parents.</p> <ul style="list-style-type: none"> • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants
STRAND / TOPIC	VA.BIO.7.	Biology: The student will investigate and understand bases for modern classification systems. Key concepts include a) structural similarities in organisms; b) fossil record interpretation; c) comparison of developmental stages in different organisms; d) examination of biochemical similarities and differences among organisms; and e) systems of classification that are adaptable to new scientific discoveries.
STANDARD / STRAND	BIO.7.1.	<p>Essential Understandings: All students should understand that biological classifications are based on how organisms are related.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.2.	<p>Essential Understandings: All students should understand that organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships over a period of time.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.3.	<p>Essential Understandings: All students should understand that species is the basic unit of classification.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.4.	<p>Essential Understandings: All students should understand that investigations of local flora and fauna provide opportunities to enhance understanding and stimulate interest in local environmental issues by developing and applying classification systems in the field.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.5.	<p>Essential Understandings: All students should understand that information about relationships among living organisms and those that inhabited Earth in the past is gained by comparing developmental stages of organisms and by examining and interpreting the fossil record. This information is continually being gathered and used to modify and clarify existing classification systems.</p> <ul style="list-style-type: none"> • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.7.6.	<p>Essential Understandings: All students should understand that similarities among organisms on the structural and metabolic levels are reflected in the large degree of similarity in proteins and nucleic acids of different organisms. Diversity is the product of variations in these molecules.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.7.	<p>Essential Knowledge and Skills: Students are expected to know that binomial nomenclature is a standard way of identifying a species with a scientific two-word name. The first word is the genus name and the second the species name.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.8.	<p>Essential Knowledge and Skills: Students are expected to know that a species is defined as a group of organisms that has the ability to interbreed and produce fertile offspring.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Classifying Life • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.9.	<p>Essential Knowledge and Skills: Students should be able to construct and utilize dichotomous keys to classify groups of objects and organisms.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying,

		<p>and Observing</p> <ul style="list-style-type: none"> Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.10.	<p>Essential Knowledge and Skills: Students should be able to describe relationships based on homologous structures.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Classifying Life Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.7.11.	<p>Essential Knowledge and Skills: Students should be able to compare structural characteristics of an extinct organism, as evidenced by its fossil record, with present, familiar organisms.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Animals
STANDARD / STRAND	BIO.7.13.	<p>Essential Knowledge and Skills: Students should be able to interpret a clad gram or phylogenetic tree showing evolutionary relationships among organisms.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants

		<ul style="list-style-type: none"> Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.7.14.	<p>Essential Knowledge and Skills: Students should be able to describe relationships between organisms, given amino acid or nucleotide sequences.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Classifying Life
STRAND / TOPIC	VA.BIO.8.	<p>Biology: The student will investigate and understand how populations change through time. Key concepts include a) evidence found in fossil records; b) how genetic variation, reproductive strategies, and environmental pressures impact the survival of populations; c) how natural selection leads to adaptations; d) emergence of new species; and e) scientific explanations for biological evolution.</p>
STANDARD / STRAND	BIO.8.1.	<p>Essential Understandings: All students should understand that although there is not a complete record of ancient life for the past 3.5 billion years, a great deal of modern knowledge about the history of life comes from the fossil record.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Animals Teacher Resource CD: A Closer Look at Plants Teacher Resource CD: Classifying Life
STANDARD / STRAND	BIO.8.8.	<p>Essential Knowledge and Skills: Students are expected to know that populations are groups of interbreeding individuals that live in the same place at the same time and compete with each other for food, water, shelter, and mates.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey
STANDARD / STRAND	BIO.8.9.	<p>Essential Knowledge and Skills: Students are expected to know that populations produce more offspring than the environment can support.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded

		<p>Area) Survey</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey
STANDARD / STRAND	BIO.8.16.	<p>Essential Knowledge and Skills: Students are expected to know that adaptations sometimes arise in response to environmental pressures, for example, the development of antibiotic resistance in bacterial populations, morphological changes in the peppered moth population, the development of pesticide resistance in insect populations.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 2: Environmental Preference of Pill Bugs • Kingdoms of Life: Unit 2 Lab 4 Activity 3: Experimental Design • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STRAND / TOPIC	VA.BIO.9.	<p>Biology: The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include a) interactions within and among populations including carrying capacities, limiting factors, and growth curves; b) nutrient cycling with energy flow through ecosystems; c) succession patterns in ecosystems; d) the effects of natural events and human influences on ecosystems; and e) analysis of the flora, fauna, and microorganisms of Virginia ecosystems including the Chesapeake Bay and its tributaries.</p>
STANDARD / STRAND	BIO.9.1.	<p>Essential Understandings: All students should understand that as any population of organisms grows, it is held in check by interactions among a variety of biotic and abiotic factors.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STANDARD / STRAND	BIO.9.2.	<p>Essential Understandings: All students should understand that ecosystems demonstrate an exchange of energy and nutrients among inhabiting organisms.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction

		<ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement Teacher Resource CD: A Closer Look at Microbes Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.9.5.	<p>Essential Understandings: All students should understand that investigations of local ecosystems provide opportunities for students to enhance their understanding and stimulate their interest in local environmental issues by applying ecological principles in the field.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife
STANDARD / STRAND	BIO.9.6.	<p>Essential Knowledge and Skills: Students are expected to know that a community is a collection of interacting populations.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs
STANDARD / STRAND	BIO.9.7.	<p>Essential Knowledge and Skills: Students are expected to know that population growth curves exhibit many characteristics, such as initial growth stage, exponential growth, steady state, decline, and extinction.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STANDARD / STRAND	BIO.9.10.	<p>Essential Knowledge and Skills: Students are expected to know that abiotic factors are the nonliving elements in an ecosystem, such as temperature, moisture, air, salinity, and pH. Biotic factors are all the living organisms that inhabit the environment, including predators, food sources, and competitors.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey
STANDARD / STRAND	BIO.9.11.	<p>Essential Knowledge and Skills: Students are expected to know that symbiosis is a close and permanent relationship between organisms of two different species. Examples include mutualism, commensalism, and parasitism.</p> <ul style="list-style-type: none"> Teacher Resource CD: A Closer Look at Microbes
STANDARD / STRAND	BIO.9.12.	<p>Essential Knowledge and Skills: Students should be able to graph and interpret a population growth curve.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi
STANDARD / STRAND	BIO.9.13.	<p>Essential Knowledge and Skills: Students are expected to know that an ecosystem consists of all the interacting species and the abiotic environment in a given geographic area.</p> <ul style="list-style-type: none"> Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs

		<ul style="list-style-type: none"> • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.9.15.	<p>Essential Knowledge and Skills: Students are expected to know that flow of energy occurs between trophic levels in all ecosystems and can be depicted as follows: food chain; food web; pyramid of energy; pyramid of biomass; pyramid of numbers.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD / STRAND	BIO.9.18.	<p>Essential Knowledge and Skills: Students should be able to, given an illustration of a food chain and a food web, describe each organism as a producer (autotroph), consumer (primary/second order), or decomposer.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing
STANDARD	BIO.9.21.	Essential Knowledge and Skills: Students should be able to observe and

/ STRAND		<p>identify flora and fauna in a local community, using field guides and dichotomous keys for identifying and describing organisms that characterize the local ecosystem.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 4 Activity 1: Observing the Behavior of Pill Bugs • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey • Teacher Resource CD: A Closer Look at Animals • Teacher Resource CD: A Closer Look at Microbes • Teacher Resource CD: A Closer Look at Plants • Teacher Resource CD: Classifying Life • Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing • Virtual Laboratory: Classifying Living Organisms
STANDARD / STRAND	BIO.9.22.	<p>Essential Knowledge and Skills: Students should be able to identify and describe an ecosystem in terms of the following: effects of biotic and abiotic components; examples of interdependence; evidence of human influences; energy flow and nutrient cycling; diversity analysis; ecological succession.</p> <ul style="list-style-type: none"> • Kingdoms of Life: Unit 1 Lab 1 Activity 1: Classifying Life Forms • Kingdoms of Life: Unit 1 Lab 1 Activity 2: Who Eats Whom? - Creating Food Webs • Kingdoms of Life: Unit 2 Lab 2 Activity 1: Scavenging for Bacteria and Fungi • Kingdoms of Life: Unit 2 Lab 2 Activity 2: Scavenging for Pond Microlife • Kingdoms of Life: Unit 2 Lab 3 Activity 1: Plant Life Cycle • Kingdoms of Life: Unit 2 Lab 3 Activity 2: Flowers and Pollination • Kingdoms of Life: Unit 2 Lab 3 Activity 3: Redirecting Energy to Reproduction • Kingdoms of Life: Unit 2 Lab 3 Activity 4: Seed Harvesting and Measurement • Kingdoms of Life: Unit 3 Lab 5 Activity 1: Site Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 2: Forest (Wooded Area) Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 3: Grassland Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 4: Stream/River Survey • Kingdoms of Life: Unit 3 Lab 5 Activity 5: Microlife Survey

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| | | <ul style="list-style-type: none">• Kingdoms of Life: Unit 3 Lab 5 Activity 6: Soil Survey• Teacher Resource CD: A Closer Look at Animals• Teacher Resource CD: A Closer Look at Plants• Teacher Resource CD: Field Biology - Collecting, Identifying, and Observing• Virtual Laboratory: Classifying Living Organisms |
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