

Fourth Grade Science Curriculum Map

Quarter 1

NGSSS Body of Knowledge	<i>Nature of Science</i>	<i>Nature of Science</i>	<i>Nature of Science</i>	<i>Nature of Science/Earth and Space Science</i>	<i>Nature of Science/Earth and Space Science</i>	<i>Nature of Science/Earth and Space Science</i>	<i>Nature of Science/Earth and Space Science</i>
Unit of Study	Introduction to Practice of Science	Introduction to Practice of Science	Introduction to Practice of Science	Space	Space	Earth	Earth
Target Standards	<p>SC.4.N.1.3 : Explain that science does not always follow a rigidly defined method but that science does involve the use of observations and empirical evidence.</p> <p>SC.4.N.2.1 : Explain that science focuses solely on the natural world.</p>	<p>SC.4.N.1.6 : Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.</p> <p>SC.4.N.1.2: Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.</p> <p>SC.4.N.1.5 : Compare the methods and results of investigations done by other classmates.</p>	<p>SC.4.N.1.1 : Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations and generate appropriate explanations based on those explorations.</p> <p>SC.4.N.1.8 : Recognize that science involves creativity in designing experiments.</p> <p>SC.4.N.1.7 : Recognize and explain that scientists base their explanations on evidence.</p> <p>SC.4.N.1.4 : Attempt reasonable answers to scientific questions and cite evidence in support.</p>	<p>SC.4.N.3.1 : Explain that models can be three-dimensional, two-dimensional, an explanation in your mind, or a computer model.</p> <p>SC.4.E.5.3 : Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.</p> <p>SC.4.E.6.5 : Investigate how technology and tools help to extend the ability of humans to observe very small things and very large things.</p>	<p>SC.4.E.5.4 : Relate that the rotation of Earth (day and night) and apparent movements of the sun, moon, and stars are connected.</p> <p>SC.4.E.5.1 : Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons.</p> <p>SC.4.E.5.2: Describe the changes in the observable shape of the moon over the course of about a month.</p> <p>SC.4.E.5.5 : Investigate and report the effects of space research and exploration on the economy and culture of Florida.</p>	<p>SC.4.E.6.4 : Describe the basic differences between physical weathering (breaking down of rock by wind, water, ice, temperature change, and plants) and erosion (movement of rock by gravity, wind, water, and ice).</p>	<p>SC.4.E.6.2 : Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks.</p> <p>SC.4.E.6.1 : Identify the three categories of rocks: igneous, sedimentary, and metamorphic.</p>
Pacing	Week 1	Weeks 2-3	Weeks 2-3	Weeks 4-6	Weeks 4-6	Weeks 7-8	Weeks 9 (continue into Week 10)
Objective/ Learning Goal/SWBT	<ul style="list-style-type: none"> *Explore various fields of science realizing that not all scientists follow the scientific method. *Explain the role of a scientist (ask questions and find answers). *Explain that science does involve the use of observations and evidence. *Define science (study of the natural world through observation and evidence). 	<ul style="list-style-type: none"> *Record observations of an object and/or an event using a variety of data collection tools. *Make inferences based on observations. *Distinguish observations from inferences. *Communicate observations and inferences (findings) with others in the classroom. *Identify appropriate tools to use when making measurements. *Demonstrate proper use of scientific tools to ensure accuracy of measurements. *Engage in a common team investigation using metric measurement tools. 	<ul style="list-style-type: none"> *Generate testable questions about the world that can be answered through observation and investigation. *Form a hypothesis based on research. *Investigate student-generated questions, through free exploration, experimentation, or other types of investigations using appropriate science tools. *Define data and evidence. *Discuss previously acquired data/evidence to form a conclusion. *Explain that scientists base their explanations on data and evidence. 	<ul style="list-style-type: none"> *Explain that models can be three-dimensional, two-dimensional, a mental model, or a computer model. *Use a model to demonstrate the difference between Earth's rotation and Earth's revolution. *Explain that Earth rotates once on its axis in approximately a 24-hour period. *Explain that Earth revolves (orbits) around the sun once in a year. *Discuss the types of investigations in which a microscope or hand lens might be used. *Identify the telescope and satellite as tools that have allowed scientists to see very large things. 	<ul style="list-style-type: none"> *Review that the sun is the closest star to Earth. *Demonstrate that the star patterns (constellations) in the sky do not move although they appear to shift across the sky nightly due to Earth's rotation. *Explain that Earth moves, but the sun and other stars remain fixed in the sky. *Recognize that the moon does not produce its own light; it reflects light from the sun. *Sequence moon patterns. *Explain that the moon's physical shape does not actually change. *Research products that were generated specifically for space but have now found purpose for public use. 	<ul style="list-style-type: none"> *Observe and record evidence of physical weathering in nature. *Describe causes of physical weathering occurs. *Investigate the processes of physical weathering using a model. *Describe causes of erosion. *Investigate the processes of erosion using a model. *Discuss the cause/effect relationships for erosion and weathering. *Provide examples of how physical weathering and the erosion processes change Earth's surface (constructive and destructive). 	<ul style="list-style-type: none"> *Identify the physical properties of common earth-forming minerals. *Investigate and record the physical properties of minerals using technology and tools when appropriate. *Compare observations made by other classmates explaining any differences in data. *Compare minerals based on physical properties. *Observe and identify examples for each of the three categories of rocks. *Explain, pictorially and in words, the steps of the rock cycle. *Describe how each category of rock is formed within the rock cycle. *Differentiate between the three different categories of rocks based on how each is formed and/or their physical properties
Inquiry Flipcharts/Labs	<ul style="list-style-type: none"> *Spin-a-copter p.2 *Pendulum Swing p.3 	<ul style="list-style-type: none"> *Why Do Scientists Compare Results? p.5 *Rain, Rain, Come Again p. 4 *Bridge Building p.6 	<ul style="list-style-type: none"> *Why Do Scientists Compare Results? p.5 *Rain, Rain, Come Again p. 4 *Bridge Building p.6 	<ul style="list-style-type: none"> *How...Earth Move in Space? p.9 *How Can...Model a School? p.7 *Spin and Model p.8 *From Full...New & Back Again p.10 *Working in Space p.11 	<ul style="list-style-type: none"> *How...Earth Move in Space? p.9 *How Can...Model a School? p.7 *Spin and Model p.8 *From Full...New & Back Again p.10 *Working in Space p.11 	<ul style="list-style-type: none"> *Grooving with Glaciers p.12 	<ul style="list-style-type: none"> *Mineral Match-Up p.13 *Getting Stones to Stick p.15 *What are the Properties of Minerals? p.14
Fusion Textbook	TE p.1-16, 17A	TE p.17-44, 45A	TE p.17-44, 45A	TE p.45-102	TE p.45-102	TE p.107-122	TE p.123A-150

Fourth Grade Science Curriculum Map

Quarter 2							
NGSSS Body of Knowledge	<i>Nature of Science/Earth and Space Science</i>	<i>Nature of Science/Earth and Space Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>
Unit of Study	Earth	Earth	Matter	Matter	Matter	Matter	Energy and Motion
Target Standards	<p>SC.4.E.6.2 : Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks.</p> <p>SC.4.E.6.1 : Identify the three categories of rocks: igneous, sedimentary, and metamorphic.</p>	<p>SC.4.E.6.3 : Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.</p> <p>SC.4.E.6.6 : Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).</p>	<p>SC.4.P.8.1 : Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets.</p>	<p>SC.4.P.8.3 : Explore the Law of Conservation of Mass by demonstrating that the mass of a whole object is always the same as the sum of the masses of its parts.</p> <p>SC.4.P.8.2 : Identify properties and common uses of water in each of its states.</p>	<p>SC.4.P.8.4 : Investigate and describe that magnets can attract magnetic materials and attract and repel other magnets.</p>	<p>SC.4.P.9.1 : Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.</p>	<p>SC.4.P.10.1 : Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.</p> <p>SC.4.P.10.3 : Investigate and explain that sound is produced by vibrating objects and that pitch depends on how fast or slow the object vibrates.</p>
Pacing	Week 10	Week 11	Weeks 12-14	Weeks 12-14	Weeks 15-16	Week 17	Week 18 (continued in 19)
Objective/ Learning Goal/SWBT	<ul style="list-style-type: none"> *Identify the physical properties of common earth-forming minerals. *Investigate and record the physical properties of minerals using technology and tools when appropriate. *Compare observations made by other classmates explaining any differences in data. *Compare minerals based on physical properties. *Observe and identify examples for each of the three categories of rocks. *Explain, pictorially and in words, the steps of the rock cycle. *Describe how each category of rock is formed within the rock cycle. *Differentiate between the three different categories of rocks based on how each is formed and/or their physical properties 	<ul style="list-style-type: none"> *Define resources as anything from the environment that meets our needs and wants. *Provide examples of renewable resources. *Provide examples of nonrenewable resources. *Identify renewable and nonrenewable resources found on Earth that humans need and how they are used. *Distinguish between renewable and nonrenewable resources found on Earth. *Explain that nonrenewable resources exist in a fixed quantity in Earth and may be used up. *Identify natural resources available in Florida. *Distinguish Florida's natural resources as renewable and nonrenewable. 	<ul style="list-style-type: none"> *Compare objects based on observable and measurable physical properties. *Investigate and explain that all matter has the following measurable properties: volume and mass. *Record and compare the mass and volume of solid and liquid matter using metric units. *Record and compare the volume of regular- and irregular-shaped solids using the water displacement method. *Display data appropriately in charts, tables, and graphs. *Compare measurement data with other lab groups checking for accuracy. *Explain any differences that may have occurred across groups. 	<ul style="list-style-type: none"> *Explore the Law of Conservation of Mass (whole = sum of its parts) to obtain the mass of various objects using tools and technology. *Demonstrate that the mass of a whole object is always equal to the sum of its parts. *Investigate and describe properties of water in all three states. *Identify common uses of water in all three states. *Explain the importance of water to life on Earth. 	<ul style="list-style-type: none"> *Investigate and classify objects that are attracted to magnets and those that are not. *Investigate that all magnets, regardless of shape, have a north pole (N) and a south pole (S) although they may not be marked. *Investigate the presence of a magnetic field with different-shaped magnets. *Describe the effects of the magnetic field of different shaped magnets using iron filings. *Investigate how magnets attract and repel other magnets based on the presence of a magnetic field. 	<ul style="list-style-type: none"> *Identify familiar physical changes in matter in which the objects' properties are retained. *Identify familiar chemical changes in matter that result in a new substance with new properties. *Record observations of physical and chemical changes. *Make inferences about observations made of physical and chemical changes. *Describe observable signs that a chemical change may exhibit. 	<ul style="list-style-type: none"> *Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion (mechanical). *Identify examples of these energy forms in their life and in the natural world. *Compare and contrast these types of energy. *Review how light travels in a straight path until interrupted by an object. *Review how light passes through other objects. *Review how light reflects, bends, and absorbs. *Describe the requirements/components necessary for sound to be produced. *Investigate the production of sound. *Explain that sound is produced by vibrating objects. *Investigate variations in pitch. *Explain that pitch depends on the speed an object vibrates and the measurements.
Inquiry Flipcharts/Labs	Mineral Match-Up p.13, Getting Stones to Stick p.15, What are the Properties of Minerals? p.14	Recycle Resources Yourself, p. 16	How Are Physical Properties Observed?, p. 18 What is Conservation of Mass?, p. 19 Measuring Liquids, p. 17	How Are Physical Properties Observed?, p. 18 What is Conservation of Mass?, p. 19 Measuring Liquids, p. 17	How Do Magnets Attract Objects?, p. 22 Needle Dance, p. 21	How Can You Tell When a New Substance Forms?, p. 24 Melt, Boil, Evaporate, p. 20 Kitchen Chemistry, p. 23	Where Does Energy Come From?, p. 26 Energy Sources, p. 25
Fusion Textbook	TE p.123A-150	TE p.151A-168	TE p.169-177, 180-202	TE p.169-177, 180-202	TE p.203A-222	TE p.193A, 223-246	TE p.247-268

Fourth Grade Science Curriculum Map

Quarter 3

NGSSS Body of Knowledge	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Physical Science</i>	<i>Nature of Science/Life Science</i>	<i>Nature of Science/Life Science</i>
Unit of Study	Energy and Motion	Energy and Motion	Energy and Motion	Energy and Motion	Energy and Motion	Life	Life
Target Standards	<p>SC.4.P.10.2 : Investigate and describe that energy has the ability to cause motion or create change.</p> <p>SC.4.P.10.4 : Describe how moving water and air are sources of energy and can be used to move things.</p>	<p>SC.4.P.11.2 : Identify common materials that conduct heat well or poorly</p>	<p>SC.4.P.11.1 : Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature.</p>	<p>SC.4.P.12.1 : Recognize that an object in motion always changes its position and may change its direction.</p>	<p>SC.4.P.12.2 : Investigate and describe that the speed of an object is determined by the distance it travels in a unit of time and that objects can move at different speeds.</p>	<p>SC.4.L.16.4 : Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete metamorphosis, and flowering and nonflowering seed-bearing plants.</p>	<p>SC.4.L.16.1 : Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.</p>
Pacing	Week 19	Weeks 20-21	Weeks 20-21	Weeks 22-23	Weeks 22-23	Weeks 24-25	Weeks 26-27
Objective/ Learning Goal/SWBT	<p>*Investigate and describe how energy can cause motion (e.g., moving water can turn a water wheel to make hydropower, wind can move sand across the beach or sail a model boat, solar energy can power a model car).</p> <p>*Investigate and describe how energy can create change in matter (e.g., heat energy can melt ice, moving water can make rocks smooth, light can keep food warm).</p> <p>*Explain the relationship between energy and motion.</p>	<p>*Review how things that give off light often give off heat.</p> <p>*Review how heat is produced when two objects rub against each other.</p> <p>*Investigate heat energy by measuring temperature changes in a liquid.</p> <p>*Compare observations with classmates explaining any differences that occur.</p> <p>*Collect and record temperature readings during investigations in charts, tables, and graphs.</p> <p>*Investigate which materials are the best conductors of heat (e.g., clay, metal, and glass).</p> <p>*Investigate which materials are non-conductors/insulators of heat (e.g., plastic, wood, styrofoam).</p> <p>*Form conclusions about which materials conduct heat well or poorly based on investigations.</p>	<p>*Investigate and diagram the direction of heat flow.</p> <p>*Record observations of heat transfer (in the form of temperature changes) within tables, charts, and graphs.</p> <p>*Analyze and form conclusions based on their recorded observations and data.</p>	<p>*Describe an object's position and motion in space.</p> <p>*Explain that motion is a change of an object's position.</p> <p>*Demonstrate that moving objects always change position.</p> <p>*Demonstrate that moving objects may change direction.</p>	<p>*Explain that the speed of an object is determined by the distance it travels within a unit of time.</p> <p>*Investigate and compare the speeds of different objects by measuring the distance each object travels during a set amount of time using tools and technology.</p> <p>*Investigate and compare the speeds of different objects by measuring the amount of time it takes each object to travel a set amount of distance using tools and technology.</p> <p>*Display obtained speeds in chart, table and graph format.</p>	<p>*Review that all living things have a life cycle.</p> <p>*Explore life cycles of various plants found in Florida (e.g., orange tree, pine tree, hibiscus).</p> <p>*Diagram the major stages in the life cycles of plants.</p> <p>*Compare the major stages in the life cycles of Florida plants, both flowering and nonflowering seed-bearing plants (e.g., daisies and pine trees).</p>	<p>*Identify the reproductive structures of a flower and their functions.</p> <p>*Identify and describe processes of reproduction in flowering plants.</p>
Inquiry Flipcharts/Labs	<p>Make a Pinwheel, p. 28</p> <p>Make a Water Wheel, p. 28</p> <p>What Is Sound?, p. 27</p>	<p>How Is Heat Produced?, p. 30</p> <p>Heating Things Up, p. 29</p> <p>Sunny Side Up, p. 31</p> <p>Which Materials Are Conductors?, p. 32</p>	<p>How Is Heat Produced?, p. 30</p> <p>Heating Things Up, p. 29</p> <p>Sunny Side Up, p. 31</p> <p>Which Materials Are Conductors?, p. 32</p>	<p>Fast Walk, Slow Walk, p. 33</p> <p>What Is Speed?, p. 34</p>	<p>Fast Walk, Slow Walk, p. 33</p> <p>What Is Speed?, p. 34</p>	<p>Finding Out About Flowers, p.35</p> <p>What Factors Affect Germination Rate?, p. 36</p>	<p>Finding Out About Flowers, p.35</p> <p>What Factors Affect Germination Rate?, p. 36</p>
Fusion Textbook	p.269A-286	p.287-318	p.287-318	p.319-342	p.319-342	p.343-362	p.363A-376

Fourth Grade Science Curriculum Map

Quarter 4

NGSS Body of Knowledge	Nature of Science/Life Science	Nature of Science/Life Science	Nature of Science/Life Science	Nature of Science/Life Science	Nature of Science/Life Science	Nature of Science	Nature of Science	Nature of Science
Unit of Study	Life	Life	Interdependence	Interdependence	Interdependence	Practice of Science	Practice of Science	Practice of Science
Target Standards	SC.4.L.16.4 : Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete metamorphosis, and flowering and nonflowering seed-bearing plants.	SC.4.L.16.2 : Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment. SC.4.L.16.3 : Recognize that animal behaviors may be shaped by heredity and learning.	SC.4.L.17.1 : Compare the seasonal changes in Florida plants and animals to those in other regions of the country.	SC.4.L.17.2 : Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them. SC.4.L.17.3 : Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.	SC.4.L.17.4 : Recognize ways plants and animals, including humans, can impact the environment.	SC.4.N.1.3 : Explain that science does not always follow a rigidly defined method ("the scientific method") but that science does involve the use of observations and empirical evidence. SC.4.N.2.1 : Explain that science focuses solely on the natural world. SC.4.N.1.2 : Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.	SC.4.N.1.1 : Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations and generate appropriate explanations based on those explorations. SC.4.N.1.8 : Recognize that science involves creativity in designing experiments.	SC.4.N.1.7 : Recognize and explain that scientists base their explanations on evidence. SC.4.N.1.4 : Attempt reasonable answers to scientific questions and cite evidence in support.
Pacing	Week 28	Weeks 29-30	Week 31	Week 32	Week 33	Weeks 34-36	Weeks 34-36	Weeks 34-36
Objective/Learning Goal/SWBT	*Explore life cycles of various animals living in Florida. *Describe complete metamorphosis (4 stages) using animals that undergo this change. *Describe incomplete metamorphosis (3 stages) using animals that undergo this change. *Compare and contrast differences in body structures of the different stages (egg, larva, pupa, adult, nymph). *Differentiate between the major stages in life cycles of Florida animals including, but not limited to, those that undergo incomplete and complete metamorphosis.	*Explain that some characteristics (traits) of plants and animals are inherited by offspring from parents. *Explain that some characteristics (traits) of plants and animals are affected by the environment in both positive and negative ways. *Explain that environmental factors such as climate, disease, light, temperature, predator-prey relationships, and food supply, can affect some characteristics of organisms. *Give examples of how animal behaviors may be shaped by heredity or learning. *Form conclusions that many animal behaviors are a combination of both heredity and learning. *Differentiate between learned/acquired behaviors and inherited/innate behaviors	*Review how plants respond to different stimuli (heat, light, and gravity). *Compare ecosystems in Florida to ones found in other regions of the country. *Discuss environmental and biological triggers that initiate an organism's response to seasonal change both in Florida and in different regions of the country. *Differentiate the seasonal changes of Florida plants to those in other regions of the country. *Differentiate the seasonal changes of Florida animals to those in other regions of the country.	*Review that all living things need energy to survive. *Explain that plants make their own food (photosynthesis) and are called producers. *Explain that animals, including humans, cannot make their own food and are called consumers. *Explain that when animals eat plants or other animals, the energy stored in the food source is passed to them. *Describe that all life on Earth is dependent upon the sun. *Trace the flow of energy from the sun as it is transferred along the food chain through the producers to the consumers. *Explain that some energy is lost from one organism to the next in the form of heat. *Classify consumers as herbivores, carnivores, or omnivores. *Describe the relationship between plants as producers and animals as consumers.	*Describe the positive (helpful) and negative (harmful) impact plants may have on the environment. *Describe the positive (helpful) and negative (harmful) impact animals may have on the environment. *Describe ways that humans help and harm the environment.	*Explain the role of a scientist (ask questions and find answers). *Explain that scientific investigations do not always follow a rigidly defined method. *Explain that science does involve the use of observations and evidence. *Demonstrate proper use of scientific tools to ensure accuracy of measurements. *Engage in a common team investigation using metric measurement tools.	*Generate testable questions about the world that can be answered through observation and investigation. *Research topics related to the questions they generate. *Form a hypothesis based on research. *Investigate student-generated questions, individually and in teams, through free exploration, experimentation (scientific method), or other types of investigations using appropriate science tools (metric measurement). *Form conclusions based on data obtained during investigations. *Identify any flaw(s) in the experimental design that may have affected the outcome.	*Define data and evidence (a collection of observable and measurable information gathered during an investigation). *Discuss previously acquired data/evidence to form a conclusion (a statement that explains whether the data does or does not support the hypothesis including an explanation of why). *Compare conclusions. *Recognize that sharing ideas and conclusions is a source of new information and knowledge for a scientist. *Explain that scientists base their explanations on data and evidence.
Inquiry Flipcharts/Labs	Breeding Brine Shrimp , p. 37	Puzzled, p. 38	How Does Light Affect Pill Bugs?, p. 39	Model a Food Web, p. 41	How Does Weather Pollution Affect Plants, p.42 How Do People Affect Their Environment?, p. 43	Spin-a-copter, p. 2 Pendulum Swing, p. 3 Why Do Scientists Compare Results?, p. 5 Rain, Rain, Come Again, p. 4; Bridge Building, p. 6	Spin-a-copter, p. 2 Pendulum Swing, p. 3 Why Do Scientists Compare Results?, p. 5 Rain, Rain, Come Again, p. 4; Bridge Building, p. 6	Spin-a-copter, p. 2 Pendulum Swing, p. 3 Why Do Scientists Compare Results?, p. 5 Rain, Rain, Come Again, p. 4; Bridge Building, p. 6
Fusion Textbook	p.363A-376	p.377A-396	p.397-412	p.414-440	p.441A-460	p.1-45A	p.1-45A	p.1-45A