

CURRICULUM MAP

Science and Technology 10 (2nd Edition)

Dear Teacher,

Greetings from Abiva Publishing House, Inc.!

Thank you for adopting our textbook/s. Your chosen series titles come with functional teachers guides that provide you with a detailed curriculum map per grade level. For your reference, we are providing you below some important keys to understanding and using the components, terminologies, and abbreviations found in this teacher's companion tool.

We hope you will find the following curriculum map most helpful in your daily planning and teaching tasks. Do suggest other ways we can make your chosen Abiva textbook/s more attuned to your needs as a teacher. You may send us your comments through our official email address at wecare@abiva.com.ph.

Happy teaching!

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Curriculum Map Components and Content Sources

Key Stage Standards	Taken from the DepEd Curriculum Guide for Science
Grade Level Standards	Taken from the DepEd Curriculum Guide for Science
Content Standards	Taken from the DepEd Curriculum Guide for Science
Performance Standards	Taken from the DepEd Curriculum Guide for Science
Content	Taken from the textbook: Science and Technology 10 (2nd Edition)
K to 12 Learning Competencies with MELCs	Taken from the DepEd Curriculum Guide for Science. The Most Essential Learning Competencies (MELCs) mandated by the DepEd are identified to guide teachers as they address the instructional needs of the learners while ensuring that curriculum standards are developed among home-schooling students in the new normal.
21st-Century Skills	Taken from "New Vision for Education: Unlocking the Potential of Technology," <i>World Economic Forum</i> ® (2015)
Teaching Strategies/Differentiated Instruction	A variety of author-suggested instructional strategies to help the teacher deliver the lessons at varying levels of difficulty based on the students' learning styles.
Assessment	Assessment tools and strategies categorized as either Formative or Summative
Values Integration	A list of values that are inherent in the subject and developed through lesson discussions and skills exercises. The teacher, however, is encouraged to emphasize values that are aligned with the school's own core values.
Resources	A rundown of suggested instructional materials which may take the form of traditional resources, teacher-made resources, educational software, and other digital learning resources.



LEARNING SKILLS (Competencies): Communication • Collaboration • Critical thinking/problem solving • Creativity
LITERACY SKILLS (Foundation Literacies): Literacy and numeracy • Scientific literacy • ICT literacy • Financial literacy • Cultural literacy • Civic literacy
LIFE SKILLS (Character Qualities): Initiative • Persistence • Adaptability • Curiosity • Leadership • Social and cultural awareness • Career • Work ethics

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Key Stage Standards (7–10)

At the end of grade 10, the learners should have developed scientific, technological, and environmental literacy and can make sound decisions that would lead to rational choices on issues confronting them. Having been exposed to scientific investigations related to real life, they should recognize that the central feature of an investigation is that if one variable is changed (while controlling all others), the effect of the change on another variable can be measured. The context of the investigation can be problems at the local or national level to allow them to communicate with learners in other parts of the Philippines or even from other countries using appropriate technology.

The learners should demonstrate an understanding of science concepts and apply science inquiry skills in addressing real-world problems through scientific investigations.

Grade Level Standards

At the end of grade 10, learners realize that volcanoes and earthquakes occur in the same places in the world and that these are related to plate boundaries. They can demonstrate ways to ensure safety and to reduce damage during earthquakes, tsunamis, and volcanic eruptions.

Learners can explain the factors affecting the balance and stability of an object to help them practice appropriate positions and movements to achieve efficiency and safety such as in sports and dancing. They can analyze situations in which energy is harnessed for human use whereby heat is released, affecting the physical and biological components of the environment.

Learners will have completed the study of the entire organism with their deeper study of the excretory and reproductive systems. They can explain in greater detail how genetic information is passed from parents to offspring, and how diversity of species increases the probability of adaptation and survival in changing environments.

Learners can explain the importance of controlling the conditions under which a chemical reaction occurs. They recognize that cells and tissues of the human body are made up of water, a few kinds of ions, and biomolecules. These biomolecules may also be found in the food they eat.

Notes:

1. Italicized text for *Content Standards* and *Performance Standards* are add-ons from the TG.
2. All text without source codes or set in boldface under DepEd K to 12 Learning Competencies column are taken or derived from MELC. Italicized text are add-on competencies. This is applied throughout.
3. The components *Essential Questions* and *Essential Understandings* are set in a per-chapter format, similar to the reference material. The text under *Big Ideas* in the TG were considered for the EU part in this CM (except for some that do not possess the true characteristics of an EU); this is applied throughout. Some EQs and EUs have come from the WT or are author-provided; these were considered as long as they are developed in the WT/TG content.

1st Quarter

Unit 1: Earth and Space		Time Frame: 38 hours	
Content Standards	<p>The learner demonstrates an understanding of . . .</p> <ul style="list-style-type: none"> the relationship among the locations of volcanoes, earthquake epicenters, and mountain ranges; <i>how global climate change is caused by humans;</i> <i>the difference between carbon dioxide and aerosols as to influence on climate;</i> <i>the potential consequences of global warming;</i> <i>the three main types of galaxies;</i> <i>the Milky Way as an example of galaxy;</i> and <i>how astronomers are able to determine that the universe is expanding.</i> 	Performance Standards	<p>The learner should be able to:</p> <ul style="list-style-type: none"> demonstrate ways to ensure disaster preparedness during earthquakes, tsunamis, and volcanic eruptions; suggest ways by which he/she can contribute to government efforts in reducing damage due to earthquakes, tsunamis, and volcanic eruptions; <i>propose a project or an activity that aims to reduce the risks of the effects of climate change and help recover the condition of the environment;</i> and <i>create a model showing an expanding universe.</i>

Chapter 1: Plate Tectonics: The Ever-Changing Earth			
Essential Questions	<ul style="list-style-type: none"> How do the different layers of the Earth differ from each other? How can compositional layers and mechanical layers be differentiated? How do the changes on Earth`s surface occur? How does the distribution of earthquakes, active volcanoes, and mountain ranges relate to plate boundaries? How do the changes on the Earth`s surface occur? What are the positive and negative effects of these changes to people? How do people prepare, react and adapt to these changes? 	Essential Understandings	<ul style="list-style-type: none"> The layers of the Earth differ in composition and structure. The composition and structure of the layers of the Earth affect the behavior of seismic waves as they travel. Earth`s internal layers are categorized as either compositional or mechanical. The occurrence of plate tectonic activities can be explained using the plate tectonics theory, which states that the earth`s surfaces or lithosphere is not a static and intact structure because it is in constant motion. The rigid lithosphere is composed of independently moving segments called tectonic plates. The constant motion of the plates is caused by the fluid motion of the underlying layer of partially molten rocks called the asthenosphere

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	<ul style="list-style-type: none"> What are the possible causes of plate movement? What drives the movement of plates? 		<ul style="list-style-type: none"> The plate tectonic theory suggests that Earth's surface is divided into several segments that constantly move relative to one another over the mechanically weak semi-solid asthenosphere. Plate boundaries are regions on Earth where plates interact with one another. They are categorized into three types: divergent, convergent, and transform. Divergent boundaries are regions on Earth where two plates are moving away from each other. Convergent boundaries are regions on Earth where two plates are moving toward each other. On the other hand, transform boundaries are regions on Earth where two plates are sliding alongside each other. The interaction between the lithosphere and asthenosphere drives the plates' constant motion, which may result in the occurrence of earthquakes for volcanic formations, volcanic eruptions, and tsunamis. These phenomena often occur along the plate boundaries where the plate interactions happen.
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Content	DepEd K to 12 Learning Competencies (MELCs included)	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<i>Internal Structure of the Earth</i>	S10ES-1a-j-36.4 Describe the internal structure of the Earth	Communication <ul style="list-style-type: none"> Expressing thoughts and ideas Presenting a graphic organizer to the class Critical Thinking <ul style="list-style-type: none"> Visualizing layers of Earth as presented in a model 	<ul style="list-style-type: none"> Think-Pair-Share KWL chart to check prior knowledge about volcanoes Hands-on activities using a model or a graphic organizer Use of ICT elements such as videos or online articles about volcanic activities, 	Formative <ul style="list-style-type: none"> KWL chart Questions in Follow-up Graphic organizer about the internal structure of the Earth Summative Chapter test	Appreciating wonderful nature and its support for life	<ul style="list-style-type: none"> avocado or any one-seeded fruit small stone red, pink, orange, yellow, blue, and green clay graphic organizer on the Earth's internal structure LCD projector computer with internet connection

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		<ul style="list-style-type: none"> Comparing data on the internal structure of the Earth <p>Creativity Illustrating or drawing a model of the Earth's internal structure</p> <p>ICT Literacy Visiting links/web pages to watch videos or read articles about volcanic activities, tsunamis, and earthquakes</p>	tsunamis, and earthquakes			<ul style="list-style-type: none"> slides, charts, or enlarged images online sources <ul style="list-style-type: none"> http://www.youtube.com/watch?v=SMe0VPQftsc http://www.youtube.com/watch?v=PvpBbiCG-7s http://www.youtube.com/watch?v=74QkHh45bjw http://news.nationalgeographic.com/news/2007/04/070402-tsunami_2.html
<p><i>Continental Drift</i></p> <p><i>Plate Tectonic Theory</i></p>	<p>S10ES-1a-j-36.4 Describe the internal structure of the Earth</p> <p><i>Explain the plate tectonic theory</i></p> <p>S10ES-a-36.1 Describe the distribution of active volcanoes, earthquake epicenters, and major mountain belts</p> <p>MELC Describe and relate the distribution of active volcanoes, earthquake epicenters, and major mountain belts to Plate Tectonic Theory</p>	<p>Communication Discussing the continental drift and plate tectonics theories</p> <p>ICT Literacy Visiting a link to view a video about plate movements</p> <p>Life Skills: Adaptability</p> <ul style="list-style-type: none"> Finding applications of learnings about plate movements in real life Developing an emergency response system Adapting emergency preparedness for use of the environment 	<ul style="list-style-type: none"> Video presentation on plate movements Analyzing figures or diagrams Class-wide discussion 	<p>Formative</p> <ul style="list-style-type: none"> Questions in Follow-Up <p>Identifying evidence of continental drift</p> <ul style="list-style-type: none"> Comparing and contrasting continental drift theory and plate tectonics theory using a Venn diagram <p>Summative</p> <ul style="list-style-type: none"> Chapter test Performance task 	Realizing the need for emergency awareness and preparedness	<ul style="list-style-type: none"> LCD projector computer with internet connection slides, charts, or enlarged images video animation about plate movements online sources <ul style="list-style-type: none"> http://www.study.com/academy/lesson/causes-of-tectonic-plate-movement.html://www.study.com/academy/lesson/causes-of-tectonic-plate-movement.html

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		<p>based on local conditions</p> <p>Critical Thinking</p> <ul style="list-style-type: none"> • Giving a hypothesis to the continental drift theory • Comparing and contrasting continental drift theory and plate tectonics theory <p>Curiosity Posing questions about continental drift and plate tectonics theories</p>				<ul style="list-style-type: none"> ○ http://www.teacher-vision.com/geological-formations/printable/28709.html
<i>Plate Boundaries</i>	<p>S10ES-a-36.1 Describe the distribution of active volcanoes, earthquake epicenters, and major mountain belts</p> <p>MELC Describe and relate the distribution of active volcanoes, earthquake epicenters, and major mountain belts to Plate Tectonic Theory</p> <p>S10ES-la-j-36.2 MELC Describe the different types of plate boundaries</p>	<p>Initiative and Scientific Literacy</p> <ul style="list-style-type: none"> • Assessing and acting independently in applying understanding of effects of plate movements • Taking steps to respond properly to occurrences such as natural disasters such as volcanic eruptions, earthquakes, and tsunamis 	<ul style="list-style-type: none"> • Hands-on activities or experiments • Analysis of diagrams and figures • Video presentations • Small group or team discussion on the types of plate boundaries • Simulating different types of plate boundaries and seafloor spreading • Collaborative activities 	<p>Formative</p> <ul style="list-style-type: none"> • Activities or experiments • Follow-up questions <p>Summative</p> <ul style="list-style-type: none"> • Chapter test • Performance task 	<ul style="list-style-type: none"> • Recognizing the potential and value of preserving life through disaster preparedness • Realizing the importance of safety measures when there is a tsunami warning 	<ul style="list-style-type: none"> • materials for activities/experiments • articles related to the topics /text about volcanic activities, tsunamis, and earthquake • activities about plate boundaries • articles about tsunamis, volcanic eruptions, and earthquakes • computer with internet connection • geological maps • online sources

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	<p>S10Es-laj-36.3 MELC Explain the different processes that occur along the plate boundaries</p> <p>S10Es-laj-36.6 MELC Enumerate the lines of evidence that support plate movement</p>	<p>Communication</p> <ul style="list-style-type: none"> Explaining the relationship of the location of volcanoes and mountain ranges to plate boundaries Explaining how tsunamis are generated <p>Collaboration</p> <ul style="list-style-type: none"> Working with teams or groups to discuss or demonstrate understanding of convergent boundaries and display process skills <p>Critical Thinking</p> <ul style="list-style-type: none"> Differentiating the types of plate boundaries Simulating plate motion at three types of plate boundaries with the use of models Formulating or drawing conclusions <p>ICT Literacy Visiting links for references on active volcanoes, mountain</p>				<ul style="list-style-type: none"> http://earthquake.ack.com/r/philippine-islands/recent http://earthquake.ack.com/r/philippine-islands/recent http://www.volcano.si.edu/showreport.cfm?doi=10.5479/si.GVP.BGVN200605-273010
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<p><i>Driving Mechanisms of Plate Motion</i></p> <p><i>Evidence of Plate Tectonics</i></p>	<p>S10Es-laj-36.5 MELC Describe the possible causes of plate movement</p> <p>S9ES-laj-36.6 MELC Enumerate the lines of evidence that support plate movement</p>	<p>ranges, and plate boundaries</p> <p>Critical Thinking</p> <ul style="list-style-type: none"> Analyzing how convection of materials within the mantle causes plate movement Formulating or drawing conclusions Doing extended research on mechanisms that drive plate motion <p>Communication</p> <ul style="list-style-type: none"> Explaining how convection moves plates Presenting research or activity outputs Imparting understanding of assigned topics <p>Collaboration</p> <ul style="list-style-type: none"> Working with a group to simulate the convection of materials with the mantle that causes plate motion Doing group research on and answering assigned sets of questions on earthquakes, volcanoes, tsunamis 	<ul style="list-style-type: none"> Hands-on activity or experiment Class discussion Presentation of diagram of convection currents Video presentation of the aftermath of the 2013 Bohol earthquake and 1991 Mt. Pinatubo eruption Collaborative activities Research activities Gallery for showcasing research/activity outputs Enrichment activities <ul style="list-style-type: none"> field trip to PHIVOLCS or areas where there is a volcano or fault lines interview with experts or survey among residents Tech Talk activities <ul style="list-style-type: none"> Creating an infographic or graphic organizer 	<p>Formative</p> <ul style="list-style-type: none"> Questions in Follow-Up Creating a concept map or graphic organizer to show understanding of the lessons/topics <p>Summative</p> <ul style="list-style-type: none"> Chapter test Performance task 	<p>Appreciating the value of cause-and-effect relationships in real-life situations</p> <p>Having awareness of the possible dangers and damage caused by natural disasters on the environment</p> <p>Being aware of individual and national preparedness for the occurrence of natural disasters</p> <p>Understanding one's role in responding to situations</p>	<ul style="list-style-type: none"> materials for activities/experiments LCD projector computer with internet connection slides, charts, or enlarged images video clips that show activities of an earthquake, volcanic eruption, and tsunami <ul style="list-style-type: none"> https://www.youtube.com/watch?v=LCJvtUIhPk https://www.youtube.com/watch?v=rjVZdlM https://www.youtube.com/watch?v=9t1u1bkt9z8laiY
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		<p>ICT Literacy Accessing web pages that show activities of an earthquake, volcanic eruption, and tsunami</p> <p>Environmental Awareness Doing research on alternative energy that can be derived from the heat within Earth's interior</p>			
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Chapter 2: Climate Change			
Essential Questions	<ul style="list-style-type: none"> What are the pieces of evidence that show climate change? What are the causes and consequences of global warming? Why do some scientists assert that humans are the major contributors to global climate change? How can a change of one or two degrees in the global average temperatures have an impact on living things? Who should be involved in mitigating climate change and in planning for the future consequences of global warming? 	Essential Understandings	<ul style="list-style-type: none"> Changing the atmospheric abundance of greenhouse gases and particles can lead to warming or cooling of the climate system. Trace gases such as carbon dioxide, methane, and water vapor prevent infrared radiation from escaping back to space by absorbing them or reflecting back to Earth's surface resulting to enhanced greenhouse effect or global warming. The potential consequences of global warming include occurrences of acid rain and stronger and more destructive typhoons, severe droughts, and widespread infectious diseases. Human activities such as the burning of fossil fuels, deforestation, and other industrial and agricultural processes emit large amount of greenhouse gases into the atmosphere. This leads to global warming and changes on Earth's climate and weather patterns.

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Content	DepEd K to 12 Learning Competencies	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<p><i>The Science of Climate Change and Global Warming</i></p> <p><i>Influence of Aerosols on Climate</i></p> <p><i>Human Impact on Global Climate</i></p> <p><i>Consequences of Global Warming</i></p>	<p><i>Explain how trace gases contribute to global warming</i></p> <p><i>Demonstrate the effect of greenhouse gases on surface air temperature using a model</i></p> <p><i>Compare and contrast carbon dioxide and aerosols based on their influence on climate</i></p> <p><i>Explain how humans cause global climate change</i></p> <p><i>Describe the potential consequences of global warming</i></p>	<p>Communication</p> <ul style="list-style-type: none"> Describing weather patterns observed in the country in the last five years Citing an activity that may possibly contribute to the production of greenhouse gases Giving insights regarding geological and biological sequestrations <p>Collaboration</p> <ul style="list-style-type: none"> Brainstorming about climate change Pair or group discussion about daily activities that may increase the amount of greenhouse gases in the atmosphere Giving answers to essential questions as a group <p>Scientific Literacy Creativity Presenting a project proposal on helping recover the environment</p>	<ul style="list-style-type: none"> Brainstorming activity about climate change Teacher-guided discussion Group dynamics Small group or pair discussion on daily activities that affect the production of greenhouse gases Use of enlarged pictures or illustrations Presentation and analysis of video clips Constructing Frayer's diagram on greenhouse gases Hands-on activities/experiments Library or web research (extended) 	<p>Diagnostic Pretest related to global warming</p> <p>Formative</p> <ul style="list-style-type: none"> Questions in Follow-Up Quiz on relationship between aerosols and climate Seatwork <p>Summative</p> <ul style="list-style-type: none"> Quiz Chapter test Performance task 	<ul style="list-style-type: none"> Developing environmental awareness Caring for the environment 	<ul style="list-style-type: none"> video clips or animation on global warming materials for activities/experiments 10- to 20-year-old weather reports enlarged pictures or illustrations of sources of greenhouse gases LCD projector computer with internet connection online sources <ul style="list-style-type: none"> https://www.youtube.com/watch?v=dP-tg4atr5M https://www.youtube.com/watch?v=wa58h4JJ6Hk https://www.youtube.com/watch?v=2-H4nhlcnCU https://www.youtube.com/watch?v=lhkgmKXOM1A https://www.youtube.com/watch?v=FO46sPwm4xk

		<p>ICT Literacy Accessing web pages about climate change and global warming</p> <p>Critical Thinking Drawing conclusions</p> <p>Environmental Awareness</p> <ul style="list-style-type: none"> • Practicing ways that show care for the environment and support for carbon reduction efforts • Practicing ways to avoid/reduce plastic usage and urging others to do the same 			
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Chapter 3: The Universe and Beyond

Essential Questions	<ul style="list-style-type: none"> • How would you define and describe galaxy? • How are galaxies formed? • How do astronomers determine that the universe is expanding? • How does the study of the expanding universe affect you as a human being? • How did the universe we know today come into existence? 	Essential Understandings	<ul style="list-style-type: none"> • Galaxies are composed of stars, stellar matter, and stellar remnants bound together by gravitational attraction. There are three types of galaxies as differentiated by their distinct shapes: spiral, elliptical, and irregular galaxies. • There are various theories describing the nature of the universe. The currently accepted theory is the <i>big bang theory</i>, suggesting that the universe started as an extremely hot and extremely dense state known as <i>singularity</i>. From this state, the universe continuously expands until now.
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Content	DepEd K to 12 Learning Competencies	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<p><i>Galaxies</i></p> <p><i>The Dynamic Universe</i></p>	<p><i>Compare the three main types of galaxies</i></p> <p><i>Describe the Milky Way as a spiral galaxy</i></p> <p><i>Describe a possible scenario for the formation of an elliptical galaxy</i></p> <p><i>Explain how astronomers are able to determine that the universe is expanding</i></p> <p><i>Create a model to show expanding universe</i></p> <p><i>Describe the properties of the universe that may determine its final state</i></p>	<p>Critical Thinking</p> <ul style="list-style-type: none"> • Differentiating the types of galaxies • Assessing movie clips as truths or myths based on scientific concepts • Expressing ideas on scientific evidence instead of supernatural and religious beliefs by reading aloud or in a debate • Assessing how environmental pollution affects lives • Exploring recent developments on modern astronomy and cosmology • Summarizing the concepts learned through a graphic organizer <p>Environmental Awareness and Civic Literacy</p> <p>Creating a short campaign video on the uniqueness of the Earth and its current condition</p>	<ul style="list-style-type: none"> • Presentation and analysis of clippings from famous space-themed movies • Exit cards with questions • Teacher-guided discussion • Analyzing and comparing images or models of the different galaxies • Hands-on activities or experiments • Library or web research on discoveries using the Hubble space telescope • Data analysis using particle accelerators/colliders • Read-aloud or debate on scientific evidence instead of supernatural and religious beliefs • Viewing of documentary on the birth of the universe 	<p>Formative</p> <ul style="list-style-type: none"> • Questions in Follow-up • Activities/experiments • Reaction/reflection paper about the documentary and Carl Sagan's speech • Exit cards • Reaction paper • Graphic organizer for the summary of the concepts <p>Summative</p> <ul style="list-style-type: none"> • Laboratory report • Chapter test • Performance task 	<ul style="list-style-type: none"> • Developing environmental awareness • Caring for Earth • Realizing the importance of minimizing space junk 	<ul style="list-style-type: none"> • materials for activities/experiments • video clips or documentary on the birth of the universe • clippings from famous space-themed movies • images of the Milky Way • models of universe (figures/images in the TX) • LCD projector • computer with internet connection • exit cards • copy of Carl Sagan's speech from his book <i>Pale Blue Dot</i> • online sources <ul style="list-style-type: none"> ○ https://www.youtube.com/watch?v=9LecNb3CfzA ○ https://www.youtube.com/watch?v=nI5dlbCh8IY ○ http://www.apologisticspress.org/user_images/image/rr/2003/r&r0305b-lg.jpg

		and what people can do to conserve and protect it				
		ICT Literacy Posting output on an online platform or Google classroom				

2nd Quarter

Unit 2: Force, Motion, and Energy		Time Frame: 50 hours	
Content Standards	<p>The learner demonstrates an understanding of . . .</p> <ul style="list-style-type: none"> • the different regions of the electromagnetic spectrum; • the images formed by the different types of mirrors and lenses; • the relationship between electricity and magnetism in electric motors and generators; • <i>equilibrium and stability in relation to balance, strength, and safety</i>; and • <i>the molecular structures and properties of solids and fluids.</i> 	Performance Standards	<p>The learner should be able to . . .</p> <ul style="list-style-type: none"> • compare the relative wavelengths of different forms of electromagnetic waves; • cite examples of practical applications of the different regions of EM waves, such as the use of radio waves in telecommunications; • explain the effects of EM radiation on living things and the environment; • predict the qualitative characteristics (orientation, type, and magnification) of images formed by plane, curved mirrors and lenses; • apply ray diagramming techniques in describing the characteristics and positions of images formed by lenses; • identify ways in which the properties of mirrors and lenses determine their use in optical instruments (e.g., cameras and binoculars); • demonstrate the generation of electricity by movement of a magnet through a coil; • explain the operation of a simple electric motor and generator; • <i>construct a decorative mobile by adhering to the required specifications to attain equilibrium;</i>

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			<ul style="list-style-type: none"> design, perform, and present an experiment to explain the concepts of buoyant force, density, and pressure; draw a concept map showing the transformation of energy in different types of power plants; and illustrate the transmission and distribution of energy from the power plants to the end users.
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Chapter 4: Equilibrium and Stability			
Essential Questions	<ul style="list-style-type: none"> How can a body attain a state of equilibrium? How are concurrent forces different from parallel forces? How does translational equilibrium compare with rotational equilibrium? How does the center of mass affect the equilibrium of a body? What are Newton's laws of motion? Why is equilibrium important in achieving the stability of a body? 	Essential Understandings	<ul style="list-style-type: none"> A body in equilibrium is in a state of balance. A body's stability is its tendency to return to a state of equilibrium given as small displacement. Equilibrium is important in achieving stability of the body.

Content	DepEd K to 12 Learning Competencies	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<i>Equilibrium</i> <i>Stability</i>	<i>Demonstrate a keen understanding of equilibrium stability</i> <i>Compare translational and rotational equilibria</i> <i>State the first and second conditions of equilibrium</i>	Communication <ul style="list-style-type: none"> Discussing concepts Explaining answers Collaboration <ul style="list-style-type: none"> Working with a group to perform activities or experiments Presenting activity results 	<ul style="list-style-type: none"> Pictures of objects of bodies that are stable and balanced Lecture Teacher-guided discussion Hands-on activities or experiments Problem solving 	Formative <ul style="list-style-type: none"> Questions in Follow-Up Assignment Take-home activity Drills or exercises Group presentations of results of activities Laboratory report 	<ul style="list-style-type: none"> Safety awareness regarding earthquakes and in relation to earthquake-resistant structures Realizing the importance of knowing about the center of gravity and 	<ul style="list-style-type: none"> laboratory manual materials for activities/experiments LCD projector computer with internet connection graphic organizers pictures of stable and balanced objects/bodies

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	<p><i>Construct free-body diagrams to illustrate the forces acting on a system in equilibrium</i></p> <p><i>Demonstrate safe and efficient positions or movements in performing sports and other activities</i></p>	<p>Critical Thinking Deducing and applying the conditions of equilibrium</p> <p>Creativity Creating decorative mobile with required specifications using various materials</p>	<ul style="list-style-type: none"> Constructing a concept map Reporting Enrichment activity 	<p>Summative</p> <ul style="list-style-type: none"> Chapter test Performance task 	<p>applying this knowledge in carrying baggage when taking flights</p>	<ul style="list-style-type: none"> slideshow presentation/diagrams of parallel and concurrent forces online source <ul style="list-style-type: none"> http://www.enchantlearning.com/graphicorganizers/
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Chapter 5: Properties of Solids and Fluids

Essential Questions	<ul style="list-style-type: none"> How are the states of matter different in terms of their molecular structures? How does the molecular structure of matter affect its compressibility, elasticity, density, specific gravity, and pressure? How is stress on a body related to strain? How does knowledge in density help one in explaining the sinking or floating of a substance? In what ways can knowledge about the properties of matter be used to help humans? 	Essential Understandings	<ul style="list-style-type: none"> The properties exhibited by states of matter depend on their molecular structures. When a body is immersed in a fluid, an upward force equal to the weight of the displaced fluid is exerted to the body. The buoyant force opposes the weight of the immersed body and keeps it afloat. Solids and fluids differ in molecular structure and physical properties. Height and density can affect liquid pressure. The greater the height and the density of a liquid, the greater is the pressure exerted by that liquid. The greater the density of a liquid, the greater is its buoyant force.
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Content	DepEd K to 12 Learning Competencies	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<p><i>Molecular Structure and Compressibility</i></p> <p><i>Elasticity</i></p>	<p><i>Demonstrate understanding of the differences between solids and fluids in terms of molecular</i></p>	<p>Collaboration</p> <ul style="list-style-type: none"> Working on activities with a group 	<ul style="list-style-type: none"> Word games Lecture/teacher-guided discussion 	<p>Diagnostic Pretest about properties of matter</p>	<ul style="list-style-type: none"> Realizing the importance of safety awareness and disaster preparedness and of 	<ul style="list-style-type: none"> video clips about molecular behavior, Hooke's law, buoyancy

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<p>Density</p> <p>Specific Gravity</p> <p>Pressure</p> <p>Buoyancy and Archimedes's Principle</p>	<p><i>structure, compressibility, elasticity, density, and specific gravity</i></p> <p><i>Describe the effects of height and density on fluid pressure</i></p> <p><i>Cite real examples where changes in atmospheric pressure are observed</i></p> <p><i>State Pascal's law and apply your knowledge on hydraulic systems to real-life situations</i></p> <p><i>Compare the effects of different liquids on the buoyant force of a given object</i></p>	<p>Communication</p> <ul style="list-style-type: none"> Explaining answers to questions Sharing research findings <p>Literacy</p> <ul style="list-style-type: none"> Doing a written output of activities/experiments Writing a paragraph describing the effect of density on buoyant force Writing haikus about the compressibility of solids and the effect of volume on the amount of force <p>Critical Thinking</p> <ul style="list-style-type: none"> Making predictions about what happens to a block of metal placed on top of various objects and supporting those predictions Inferring the relationship of given terms such as density and specific gravity Differentiating the densities of various substances 	<ul style="list-style-type: none"> Use of PowerPoint presentations, diagrams, or videos Presentation of video clips Group activities or experiments and presentation of results Problem-solving exercises Creating concept maps/graphic organizers 	<p>Formative</p> <ul style="list-style-type: none"> Questions in Follow-Up Seatwork Take-home activity: writing a haiku about compressibility of solids and effect of volume on buoyant force Paper-and-pencil test Assignment: making a concept map of density and specific gravity Doing a research on applications of fluid pressure Laboratory reports <p>Summative</p> <ul style="list-style-type: none"> Essential Questions Posttest Output for Enrichment activities Chapter test Performance task 	<p>being proactive in preserving human life</p> <ul style="list-style-type: none"> Realizing the advantages and disadvantages of constructing dams 	<ul style="list-style-type: none"> drills or problem-solving exercises laboratory manual materials for activities/experiments computer with internet connection LCD projector slides, charts, or enlarged images <p>Online</p> <ul style="list-style-type: none"> http://www.chem.purdue.edu/gchelp/atoms/states.html http://www.youtube.com/watch?v=pVdGUTRI49E https://www.sciencechannel.com/tv-shows/what-the-ancients-knew/videos/buoyancy-defined
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		<ul style="list-style-type: none"> Making a concept map Conducting a research 				
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Chapter 6: Energy and the Environment

Essential Questions	<ul style="list-style-type: none"> How are electromagnetic waves classified in terms of frequency and wavelength? How do electromagnetic waves affect living things (and the environment)? How does the change in frequency and wavelength affect the energy carried by the electromagnetic wave? How are images formed in mirrors and lenses? How can electromagnetism be beneficial to humans? How important is electromagnetism in technology? How do a single electric motor and a generator operate? 	Essential Understandings	<ul style="list-style-type: none"> Electromagnetic radiation is energy transmitted by charged particles that produce oscillating electric and magnetic fields that travel through space in the form of electromagnetic waves which can be described in terms of frequency, wavelength, and energy. Electromagnetic radiation encompasses a range of energies that have distinct wavelengths and frequencies known as the electromagnetic spectrum. The different regions of the electromagnetic spectrum have various applications in telecommunications, public safety operations, digital photography, and allied medicine. Electromagnetic radiation can affect living things and the environment. Safety protocols should be followed in the presence of such. Reflection of light in mirrors cause the formation of images that can either be real or virtual. These images can be described in terms of location, orientation, type, and size. Refraction of light in lenses can likewise form images. Generators are used to convert mechanical energy to electrical energy and this has a big influence on the economy of a country. Electric current is induced through the movement of the magnet or the coil of wire relative to each other. This process is known as electromagnetic induction.
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Content	DepEd K to 12 Learning Competencies (MELCs included)	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<p><i>Electromagnetic Radiation</i></p>	<p>S10FE-IIa-b-47 MELC Compare the relative wavelengths of the different forms of electromagnetic waves</p> <p>S10FE-IIa-b-47.6 Compare the relative wavelengths, frequencies of the differed regions of EM waves</p> <p>S10FE-IIc-d-48 MELC Cite examples of practical applications of the different regions of EM waves, such as the use of radio waves in telecommunications</p> <p>S10FE-IIe-49 MELC Explain the effects of EM radiation on living things and the environment</p>	<p>Collaboration Working on activities with a group</p> <p>Communication</p> <ul style="list-style-type: none"> • Sharing ideas • Presentation of output <p>Problem-Solving Skills/Critical Thinking</p> <ul style="list-style-type: none"> • Formulating ideas or questions related to electromagnetic waves/radiation • Calculating frequency, wavelength, and energy of EM waves • Assessing peer presentation <p>Creativity Composing a jingle about electromagnetic waves</p> <p>Scientific Literacy Manifesting understanding of the science behind telecommunications and medical equipment</p>	<ul style="list-style-type: none"> • Motivational activities • Lecture/discussion • Use of PowerPoint presentations or simple diagrams • Analysis of the electromagnetic spectrum • Peer assessment on the presentation of composed jingles 	<p>Formative</p> <ul style="list-style-type: none"> • Exercises or drills on calculating frequency, wavelength, and energy of EM waves • Questions in Follow-Up • Assignment: composing a jingle about electromagnetic waves <p>Summative</p> <ul style="list-style-type: none"> • Chapter Test 	<ul style="list-style-type: none"> • Realizing the significance of studying the effects and impact of electromagnetic spectrum on living things and the environment • Realizing the need to safeguard the environment from hazards that may arise from the exploitation of electromagnetic radiation 	<ul style="list-style-type: none"> • drills or problem-solving exercises • computer with internet connection • LCD projector • slideshow presentation • diagrams • articles or reading materials about electromagnetic waves • online sources <ul style="list-style-type: none"> ○ https://science.nas.gov/ems/02_anatomy ○ http://www.physicsclassroom.com/mmedia/waves/em.cfm

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<p><i>Light, Mirrors, and Lenses</i></p>	<p>S10FE-Ilf-50 MELC Predict the qualitative characteristics (orientation, type, and magnification) of images formed by plane and curved mirrors and lenses</p> <p>S10FE-Ilf-51 Apply ray diagramming techniques in describing the characteristics and position of images formed by lenses</p> <p>S10FE-Ilf-52 MELC Identify ways in which the properties of mirrors and lenses determine their use in optical instruments (e.g., cameras and binoculars)</p>	<p>Communication</p> <ul style="list-style-type: none"> Expressing ideas Describing the images formed in plane mirrors in terms of size, position, and distance <p>Collaboration</p> <ul style="list-style-type: none"> Working actively in groups <p>Critical Thinking</p> <ul style="list-style-type: none"> Analyzing and solving problems to arrive at a solution Observing and comparing <p>Literacy Writing the output for the activity/experiment</p> <p>Numeracy Measuring and calculating to solve problems/drills involving lenses and mirrors</p> <p>Adaptability Showing ability to cope with the pressures of mathematical problems involved in the lesson</p>	<ul style="list-style-type: none"> Motivational activity Hands-on activity or experiment Small group discussion Teacher-guided discussion PowerPoint presentations or diagrams Group presentations 	<p>Formative</p> <ul style="list-style-type: none"> Constructing image formed by an object in a mirror Ray diagramming exercises or sample problems Mirror and lens formula drills or sample problems Assignment: concept map of images formed in concave and convex mirrors Questions in Follow-Up Identifying parts of a camera that corresponds to the parts of the eye <p>Summative</p> <ul style="list-style-type: none"> Essential questions Teacher-made test 	<p>Appreciation of the function of the human eye in everyday life</p>	<ul style="list-style-type: none"> additional drills or problem-solving exercises materials for activity or experiment slideshow presentations additional exercises/sample problems sheet of paper magnifying glass enlarged image of the human eye
<p><i>Electromagnetism</i></p>	<p>S10FE-Ili-53 Demonstrate the generation of electricity</p>	<p>Communication</p> <ul style="list-style-type: none"> Expressing observations and ideas 	<ul style="list-style-type: none"> Hands-on activities or experiments Analysis of diagrams 	<p>Formative</p> <ul style="list-style-type: none"> Written laboratory report Quiz 	<ul style="list-style-type: none"> Conserving energy and promoting sustainable development 	<ul style="list-style-type: none"> enlarged pictures or slides video clips from online sources:

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	<p>by movement of a magnet through a coil</p> <p>S10FE-IIi-53.2 Perform an activity and observe of magnetic field in a current carrying coil</p> <p>S10FE-IIj-54 MELC Explain the operation of simple electric motor and generator</p>	<ul style="list-style-type: none"> • Presenting research output <p>Collaboration</p> <ul style="list-style-type: none"> • Sharing ideas with peers • Working in groups to conduct extended research on how different natural power sources generate energy or electricity • Making slideshow presentation of research output <p>Scientific Literacy Suggesting ways to minimize biological effects of microwave radiation</p> <p>Creativity Drawing a concept map of transformation of forms of energy into electrical energy and illustrating how a generator works</p> <p>Critical Thinking Relating induced current to strength of magnet, number of turns of wire, and speed of motion</p>	<ul style="list-style-type: none"> • Collaborative activity/small group discussion • Research on how natural power sources generate energy/electricity • Teacher-guided discussion 	<ul style="list-style-type: none"> • Research output • Seatwork • Assignment • drills or problem-solving exercises <p>Summative</p> <ul style="list-style-type: none"> • Chapter test • Performance task 	<ul style="list-style-type: none"> • Showing obedience, responsibility in managing resources, and mindfulness of other people's safety <ul style="list-style-type: none"> ○ http://www.youtube.com/watch?v=m-ehwxV4nf0 ○ http://www.youtube.com/watch?v=ZjwzpoCiF8A
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3rd Quarter

Unit 3: Living Things and the Environment		Time Frame: 38 hours	
Content Standards	<p>The learner demonstrates an understanding of . . .</p> <ul style="list-style-type: none"> organisms as having feedback mechanisms in reproductive processes, which are coordinated by the nervous and endocrine systems; how feedback mechanisms help the organism maintain homeostasis to reproduce and survive; the information stored in DNA as being used to make proteins; how changes in the DNA molecule may cause changes in its product; mutations that occur in sex cells as being heritable; how evolution through natural selection can result in biodiversity; the influence of biodiversity on the stability of ecosystems; and an ecosystem as being capable of supporting a limited number of organisms. 	Performance Standards	<p>The learner should be able to . . .</p> <ul style="list-style-type: none"> <i>make a presentation of the important processes of reproduction that could give basic insights to the audience;</i> <i>design a multimedia presentation that shows how reproduction occurs from fertilization to childbirth; and</i> write an essay on the importance of adaptation as a mechanism for the survival of a species.

Chapter 7: Reproductive System and Its Coordinated Functions with Nervous and Endocrine Systems			
Essential Questions	<ul style="list-style-type: none"> How does the reproductive system attain its purpose? How does the nervous system influence the functioning of the reproductive system? How are hormones involved in reproductive processes? 	Essential Understandings	<ul style="list-style-type: none"> The reproductive system is composed of organs that function together to perform different processes that lead to production of offspring. The male and female reproductive organs form complementary systems that have unique functions. The reproductive system is greatly influenced by the nervous

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	<ul style="list-style-type: none"> How do the female reproductive organs provide shelter and nourishment to the developing young? 		<p>system and endocrine system.</p> <ul style="list-style-type: none"> The female reproductive organs undergo reproductive cycles in preparation for pregnancy. An unborn child undergoes different stages of development before birth. Different types of hormones regulate the male and female reproductive systems.
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Content	DepEd K to 12 Learning Competencies (MELCs included)	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<p><i>Interactions Between Reproductive, Endocrine, and Nervous Systems</i></p> <p><i>Parts and Functions of the Male Reproductive System</i></p> <p><i>Parts and Functions of the Female Reproductive System</i></p> <p><i>Reproductive Cycles and Hormonal Regulation</i></p> <p><i>Conception and Gestation</i></p>	<p>S10LT-IIIa-33 Describe the parts of the reproductive system and their functions</p> <p>S10LT-IIIb-34 MELC Explain the role of hormones involved in the female and male reproductive systems</p> <p>S10LT-IIIc-35 MELC Describe the feedback mechanisms involved in regulating processes in the female reproductive system (e.g., menstrual cycle)</p>	<p>Critical Thinking</p> <ul style="list-style-type: none"> Comparing and contrasting parts and functions of the female and male reproductive systems Generating a checklist of the hormones utilized in the different processes of the male and female reproductive systems Comparing and contrasting parts and functions of the female and male reproductive systems Proposing ways to convey learnings 	<ul style="list-style-type: none"> Game using crossword puzzle for basic terms Video presentations (micro lectures) about the structure and function of pituitary glands, the functions of male and female reproductive organs, and the reproductive cycle of the female Labeling of parts of the male and female reproductive systems in a picture Class sharing about activity or experiment result or output Picture analysis of 	<p>Formative</p> <ul style="list-style-type: none"> Questions in Follow-Up Oral recitation <p>Summative</p> <ul style="list-style-type: none"> Chapter test Performance task 	<ul style="list-style-type: none"> Reflecting on the ethical issues concerning reproduction Realizing the value of celibacy and responsible parenthood Recognizing the importance of one's sense of responsibility and maturity in sexual behavior Realizing that a woman has rights to her own body only to the extent that the rights of an unborn child within 	<ul style="list-style-type: none"> materials for activities or experiments crossword puzzles multimedia projector computer with internet connection multimedia projector computer with internet connection slides, charts, or enlarged images video clips or interactive images from online sources <ul style="list-style-type: none"> https://www.puzzlefast.com https://www.youtube.com/watch?v=5QTNWNalWtA https://my.cleveland

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	<p>S10LT-IIIc-36 MELC Describe how the nervous system coordinates and regulates these feedback mechanisms to maintain homeostasis</p>	<p>effectively using different forms of presentation</p> <p>Creativity</p> <ul style="list-style-type: none"> • Illustrating the different organs of the male and female reproductive system • Creating a flowchart of the ovarian and menstrual cycles • Creating charts to sequence and explain events and developments from embryonic and fetal stages <p>Creativity and Civic Literacy</p> <ul style="list-style-type: none"> • Creating slogans on the positive effects of responsible parenthood at home and in the society • Designing a visual presentation of reproduction to educate young pregnant women <p>ICT Literacy</p> <ul style="list-style-type: none"> • Making use of online 	<p>the stages of fetal development</p> <ul style="list-style-type: none"> • Hands-on activities or experiments 		<p>her are protected.</p>	<p><i>clinic.org/health/articles/9117-male-reproductive-system</i></p> <ul style="list-style-type: none"> ○ <i>http://www.true.org.au/Health-information/mens-health</i> ○ <i>https://www.youtube.com/watch?v=N66sAZH1VA8</i> ○ <i>http://www.true.org.au/Healthinformation/Womens-health</i> ○ <i>https://www.youtube.com/watch?v=tOluxtc3Cpw</i> ○ <i>http://www.webmd.com/baby/interactive-pregnancy-tool-fetal-development#week-14</i> ○ <i>https://www.youtube.com/watch?v=-TXkZ_sjyUk</i> ○ <i>https://www.youtube.com/watch?v=0gAsdEUNUJY</i>
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		<p>resources to obtain additional information about pressing issues on overpopulation and family planning</p> <ul style="list-style-type: none"> • Visiting websites/links to watch videos about the reproductive systems <p>Scientific Literacy</p> <ul style="list-style-type: none"> • Explaining the important events/stages in the development of an offspring • Making informed decisions in applying the learning about reproductive, endocrine, and nervous systems such as in the use of birth control pills <p>Communication</p> <ul style="list-style-type: none"> • Explaining the functions of the reproductive system and relating it to the nervous and endocrine systems 				
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		<ul style="list-style-type: none"> Being able to transfer learnings through slideshow presentations Sharing and discussing work on activities or experiments 			
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Chapter 8: Heredity, Biodiversity, and Evolution

Essential Questions	<ul style="list-style-type: none"> How does DNA control the production of proteins? How does DNA influence the appearance of a person? What could happen if DNA is altered? How do organisms change over time? How do mutations affect people? How does DNA influence the appearance of a person? What could happen if DNA is altered? How do organisms change over time? How does evolution happen? 	Essential Understandings	<ul style="list-style-type: none"> All the characteristics of organisms are the result of the expression of chemical substances found in the cells forming the organism's body. Damages or alterations in the genetic materials result in malfunction or changes in the biological processes of living things. Diversity among living things is a result of a gradual change in the genetic makeup of the descendants of an organism as influenced by changes in the environment. These changes lead to adaptive traits observed among living things.
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Content	DepEd K to 12 Learning Competencies (MELCs included)	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<i>Heredity</i> <i>Evolution</i>	S10LT-IIIId-37 MELC Explain how protein is made using information from DNA	Critical Thinking and Scientific Literacy <ul style="list-style-type: none"> Pointing out similar and different 	<ul style="list-style-type: none"> Motivational exercise: pairing pictures of animals to offspring 	Formative <ul style="list-style-type: none"> Test on prior knowledge (questions about DNA) 	<ul style="list-style-type: none"> Evaluating why cigarette smoking is hazardous to health; practicing self-control 	<ul style="list-style-type: none"> materials for activities or experiments video clip about frog embryo development

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	<p>S10LT-IIIe-38 MELC Explain how mutations may cause changes in the structure and function of a protein</p> <p>S10LT-III f-39 MELC Explain how fossil records, comparative anatomy, and genetic information provide evidence for evolution</p> <p>S10LT-IIIg-40 MELC Explain the occurrence of evolution</p>	<p>characteristics based on pictures of family members</p> <ul style="list-style-type: none"> Recognizing that evolution is possible Generating solutions to avoid mutagens <p>Creativity</p> <ul style="list-style-type: none"> Determining best analogies to convey the process of replication, transcription, and translation Creating an acrostic poem based on their learnings <p>Collaboration</p> <ul style="list-style-type: none"> Working in groups to finish an activity or an assigned task Working with a group to prepare a comparison chart on theory of acquired traits and theory of natural selection 	<ul style="list-style-type: none"> Q&A to check the students' prior knowledge Analogy presentation to emphasize on DNA function Picture: labeling parts of DNA Activities/laboratory experiments Video presentations on embryo development with follow-up questions Interactive web pages that demonstrate replication, transcription, and translation Research work about disorders associated with chromosome numbers Creation of a graphic organizer on comparing and contrasting DNA and RNA Acrostic poem based on key terms Model building of types of RNA 	<ul style="list-style-type: none"> Making an acrostic poem Activities/experiments Questions in Follow-Up <p>Summative</p> <ul style="list-style-type: none"> Pen-and-paper test Enrichment activities Chapter test Performance task 	<p>to avoid getting into the habit of smoking</p> <ul style="list-style-type: none"> Persuading smokers to stop smoking Recognizing health hazards and realizing the importance of disseminating information on the dangers of exposure to mutagens or carcinogens 	<ul style="list-style-type: none"> interactive animation on DNA replication video clip about DNA transcription acrostic poem template interactive animation on DNA translation video animation about tumor cell growth video clip about fossil formation video clip about human evolution multimedia projector with projection screen computer with internet connection slides, charts, or enlarged images online sources <ul style="list-style-type: none"> https://www.youtube.com/watch?v=gmlaclb3K2o https://www.youtube.com/watch?v=Qqe4thU-os8&t=81s https://www.youtube.com/watch?v=WsofH466lqk http://rebeccasatom.sacroscopicpoem
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		<p>Social and Cultural Awareness, and Civic Literacy</p> <ul style="list-style-type: none"> • Reflecting on some habits that could lead to the development of genetic disorders • Raising awareness of the importance of DNA function and how cancer results from DNA damage <p>Communication</p> <ul style="list-style-type: none"> • Describing the DNA structure • Describing important events in DNA replication, transcription, and translation • Presenting activity output • Sharing knowledge and ideas <p>ICT Literacy Visiting web links for an interactive demonstration of DNA replication, translation, and transcription</p>	<ul style="list-style-type: none"> • Class discussion: functions of protein/ amino acids • PowerPoint presentation of whale evolution • Comparison chart of natural selection and theory of acquired traits • Video presentation on fossil formation • Cooperative learning: Inside-Outside Circle for recall of key terms 			<p><i>blogspot.com/</i></p> <ul style="list-style-type: none"> ○ https://www.youtube.com/watch?v=5bLEdd-PSTQ ○ https://www.youtube.com/watch?v=5bLEdd-PSTQ ○ https://www.youtube.com/watch?v=WXTsxPPcTEs ○ https://www.youtube.com/watch?v=3rkGu0BltKM ○ https://www.youtube.com/watch?v=2W5hOJaFjxU
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Chapter 9: Ecosystems

Essential Questions	<ul style="list-style-type: none"> How do interactions in the ecosystem influence ecological balance? How do humans contribute to ecological collapse? How can humans reverse environmental damage? How important is species biodiversity? How does the population size of each species affect the ecosystem? 	Essential Understandings	<ul style="list-style-type: none"> An ecosystem is composed of life-forms and the nonliving environment they live in. The variation of organisms in the environment contributes to its stability. Ecological balance can be disrupted by environmental changes and human activities. The population growth of any species in an ecosystem is regulated by factors such as limited resources and predations. Carrying capacity refers to the maximum number of living organisms a habitat can sustain without succumbing to habitat destruction. Proper waste disposal, minimal use of chemical fertilizers and pesticides, consumption of organic food, and reducing plastic use are only some of the many practices humans should observe to minimize damage on the environment.
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Content	DepEd K to 12 Learning Competencies (MELCs included)	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<i>Flow of Energy in Ecosystems</i> <i>Biodiversity and Stability</i> <i>Population Growth and Carrying Capacity</i> <i>Human Impact on Ecosystem</i>	S10LT-IIIh-41 MELC Explain how species diversity increases the probability of adaptation and survival of organisms in changing environments S10LT-IIIi-42 MELC Explain the relationship between population	Critical Thinking and Environmental Awareness <ul style="list-style-type: none"> Creating plans on saving and protecting threatened ecosystems Studying advantages and disadvantages of hydrogen fuel cells as 	<ul style="list-style-type: none"> Presentation of a music video Game: matching uncommon animals with their habitats Picture analysis: picture of an ecosystem and its components Group activity/experiment 	Formative Questions in Follow-up Summative <ul style="list-style-type: none"> Chapter test Performance task 	Realizing the importance of practicing waste segregation	<ul style="list-style-type: none"> materials for activities or experiments article entitled “Feral Rabbits in Australia” puzzle maker application multimedia projector computer with the internet connection slides, charts, or enlarged images

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	<p>growth and carrying capacity</p> <p>S10LT-IIIj-43 Suggest ways to minimize human impact on the environment</p>	<p>alternative energy sources</p> <p>Social and Cultural Awareness, Environmental Awareness, and Scientific Literacy</p> <ul style="list-style-type: none"> • Identifying human impact on local ecosystems • Proposing suggestions on how local government and the citizens could prevent extinction of the country's endangered species • Identifying activities that harm the environment and refraining from engaging in them <p>Leadership and Initiative Initiating activities that could help save the environment</p> <p>ICT Literacy Accessing online articles that discuss</p>	<ul style="list-style-type: none"> • Thought-provoking questions that lead the students to the concepts • Journal writing about ecological structure • Presentation of a video clip about sea turtles • Picture labeling: ecological pyramid • Class discussion • Reading an online article • Brainstorming activity on possible solutions to ecological problems 			<ul style="list-style-type: none"> • online sources <ul style="list-style-type: none"> ○ music video entitled "Karaniwang Tao" https://www.youtube.com/watch?v=7jRGcACdKMM ○ video clip entitled "The Survival of the Sea Turtle" https://www.youtube.com/watch?v=t-KmQ6pGxg4 ○ "Feral Rabbits in Australia," from http://geography.about.com/od/australiamaps/a/Feral-Rabbits-In-Australia.htm ○ https://www.puzzleref.com
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		<p>current issues on the environment</p> <p>Collaboration</p> <ul style="list-style-type: none"> • Working with a group to do research about an assigned ecosystem and presenting the research output • Brainstorming on practical solutions to the country's ecological crisis <p>Communication</p> <ul style="list-style-type: none"> • Explaining answers to questions • Writing a journal about ecological structure 			
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4th Quarter

Unit 4: Matter		Time Frame: 52 hours	
Content Standards	<p>The learners demonstrate an understanding of:</p> <ul style="list-style-type: none"> • how gases behave based on the motion and relative distances between gas particles; 	Performance Standards	<p>The learners should be able to...</p> <ul style="list-style-type: none"> • <i>solve situational problems involving the laws governing the behavior of gases;</i> • <i>perform simple research activities;</i> • <i>compose a poem that integrates behavior of gases;</i>

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	<ul style="list-style-type: none"> the structures of biomolecules that are made up mostly of a limited number of elements such as carbon, hydrogen, oxygen, and nitrogen; and the chemical reactions associated with the biological and industrial processes affecting life and the environment. 		<ul style="list-style-type: none"> <i>work as a team to solve and come up with analysis of the nutritional value of three popular full cream milk for children;</i> <i>solve situational problems involving the four categories of biomolecules;</i> <i>do simple research about the procedure for testing the presence of carbohydrates, lipids, and proteins and performing the approved procedure; and</i> use any form of media and present chemical reactions involved in biological and industrial processes affecting life and the environment.
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Chapter 10: Particles on the Move

Essential Questions	<ul style="list-style-type: none"> How do gases behave? How does the kinetic molecular theory of matter explain the behavior of gases? How do the various gas laws explain the relationship among pressure, volume, temperature, and the number of particles in a gas sample? How do some activities and situations demonstrate gas laws? How do different laws and principles describe gases? 	Essential Understandings	<ul style="list-style-type: none"> Particles of matter move constantly all the time. They move differently in solids, liquids, and gases. The kinetic molecular theory (KMT) of matter explains the macroscopic properties of solids, liquids, and gases. The KMT of gases explains the properties and behavior of gases in terms of particle motion. The ideal gas law equation relates the four variable properties of gas: pressure, volume, temperature, and number of moles. The volume of a fixed amount of gas at a constant temperature is inversely proportional to the gas pressure. When the pressure is doubled, the volume is halved. On the other hand, when the pressure is held constant, the volume of a fixed amount of gas is directly proportional to the absolute temperature of the gas. In this case, a gas sample expands when heated and contracts when cooled. Scientists established the relationships between the physical properties of gases that include pressure, volume, temperature, and the amount of gas.
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Content	DepEd K to 12 Learning Competencies (MELCs included)	21st-Century Skills	Teaching Strategies/ Differentiated Instruction	Assessment	Values Integration	Resources
<p><i>Kinetic Molecular Theory</i></p> <p><i>Gas Law</i></p> <p><i>Applications of Gas Laws in Everyday Life</i></p> <p><i>Environmental and Health Problems Caused by Diffusion of Gases</i></p>	<p>S10MT-IVa-b-21 MELC</p> <p>1. Investigate the relationship between:</p> <p style="padding-left: 20px;">1.1 volume and pressure at constant temperature of a gas;</p> <p style="padding-left: 20px;">1.2 volume and temperature at constant pressure of a gas; and</p> <p>2. explain these relationships using the kinetic molecular theory.</p>	<p>Critical Thinking or Problem Solving</p> <ul style="list-style-type: none"> • Formulating conclusions • Inferring the relationships among the four variable properties of gas • Applying the derived formulas to solve problems • Relating the kinetic molecular theory to the changing phases of matter • Applying the principles of gas law in solving equations • Debating the pros and cons of using gas laws in creating chemical weapons <p>Communication</p> <ul style="list-style-type: none"> • Describing the feeling of riding a bike against the wind • Explaining answers to given questions 	<ul style="list-style-type: none"> • Use of audiovisual material that shows the KMT of matter and phase changes of matter in the molecular level • Think-Pair-Share activity on studying the phases of water • Lecture/discussion • Cooperative learning • Use of J-shaped tube to investigate PV relationship • Demonstration of Boyle's Law • Group investigation of the behavior of molecules in each phase of matter • Activity on graphical representation of Charles's Law • Problem-based activities about how matter changes phase • Use of figures/models to 	<p>Formative</p> <ul style="list-style-type: none"> • Open-ended questions • Questions in Follow-Up • Seatwork • Check-up test using Tech Talk • Enrichment activities <p>Summative</p> <ul style="list-style-type: none"> • Chapter test • Performance task 	<ul style="list-style-type: none"> • Practicing cleanliness using natural methods to prevent infestations and avoiding the use of gas pesticides • Realizing the importance of observing safety precautions in handling and storing chemicals • Practicing ways to lessen indoor pollutants 	<ul style="list-style-type: none"> • materials for activity or experiment • printed worksheets • computer with internet connection • materials to demonstrate thermal expansion • LCD projector • slides, charts, enlarged images • online sources <ul style="list-style-type: none"> ○ Video about the KMT of matter https://www.youtube.com/watch?v=N9OL6AwyM5I ○ video clips about mixtures of gases <ul style="list-style-type: none"> - https://www.youtube.com/watch?v=6UcreY6H5d4 - https://www.youtube.com/watch?v=jbmOch1fFKs - https://www.youtube.com/watch?v=jbmOch1fFKs

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		<ul style="list-style-type: none"> Explaining investigations done by Charles and Gay-Lussac <p>Curiosity</p> <ul style="list-style-type: none"> Demonstrating the effects of heat on the gas inside the balloon Performing a laboratory activity that demonstrates gas pressure in a container <p>Scientific Literacy</p> <ul style="list-style-type: none"> Being able to explain natural phenomenon resulting from the principles of kinetic molecular theory Explaining the derivation of Dalton's law of partial pressures <p>ICT Literacy</p> <ul style="list-style-type: none"> Visiting links to watch video animation of KMT of matter and video clip on mixtures of gases Using PowerPoint 	<p>help students visualize the molecules of gases given different conditions</p> <ul style="list-style-type: none"> Demonstration of Boyle's law Posing questions on properties and behavior of gases Sample problems to explain gas laws Activity on plotting a set of gas volumes against temperature and interpreting the relationship between volume and temperature based on a volume-versus-temperature plot Research work and debate on the effects of creating chemical weapons and pesticides to living organisms 			Ks
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		<p>and other programs to explain concepts or present activity results</p> <p>Collaboration</p> <ul style="list-style-type: none"> • Working in groups to explain the gas laws • Working with a group to propose and conduct a research on gas laws using three balloons of the same size and type • Doing research work and debating on the use of chemical weapons and pesticides to living organisms <p>Creativity</p> <p>Composing a poem about the assumptions of the KMT and the corresponding properties of gases</p> <p>Environmental Awareness</p> <p>Learning that efforts to monitor indoor pollutants in real time could bring health</p>				
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		benefits			
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Chapter 11: Biomolecules	
Essential Questions	<ul style="list-style-type: none"> How do the four biomolecules (carbohydrates, lipids, proteins, and nucleic acids) differ in terms of composition and structure? What are the specific physiological functions of each biomolecule? How can the knowledge on different biomolecules be applied in everyday life?
Essential Understandings	<ul style="list-style-type: none"> Biomolecules are large organic molecules that are normally present as essential components of organisms. Carbohydrates are organic molecules containing hydroxyl and carbonyl groups. They serve as an important source of energy and exist in supporting tissues of many organisms. Carbohydrates are classified based on the number of saccharide units as mono-, di-, and polysaccharides. Lipids are water-insoluble biomolecules that function in the body as energy storage and as the major component of the cell membrane. Proteins have a variety of functions in the body. They are major component of muscles and the skin, and aid in digestion of nutrients. Amino acids are the primary building blocks of peptides and proteins. Nucleic acids are the chemical carriers of an organism's genetic information. They are composed of building blocks called nucleotides having three basic components—a phosphoric acid molecule, a five-carbon sugar, and a nitrogen-containing organic base (can be adenine, guanine, thymine, cytosine, or uracil). The bases can form specific hydrogen bonds with their partner bases to form a nitrogen base pair.

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<p><i>Carbohydrates</i></p> <p><i>Lipids</i></p> <p><i>Proteins</i></p> <p><i>Nucleic Acids</i></p>	<p>S10MT-IVc-d-22 MELC</p> <p>Recognize the major categories of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids;</p>	<p>Critical Thinking</p> <ul style="list-style-type: none"> Decoding amino acid sequence from a given peptide chain using one-letter symbols Doing a research on the pros and cons of keto diet <p>Problem Solving and Scientific Literacy</p> <ul style="list-style-type: none"> Applying knowledge of the function of biomolecules in the body to design an efficient diet plan Being aware of the health hazards of too much or too little consumption of certain biomolecules <p>Creativity</p> <p>Presenting lab activity results using slideshow presentation or other visual aids</p>	<ul style="list-style-type: none"> Class discussions about biomolecules Use of pictures, slides, or other visual aids Cooperative learning strategies assigning a biomolecule to each group of students and sharing what they learned with other groups Use of worksheet on identifying macromolecules Laboratory exercises on identifying biomolecules from food samples Collaborative activity: working in pairs or groups Recitation Game Case study: asking questions about the benefits of diet trends 	<p>Formative</p> <ul style="list-style-type: none"> Food party Activity to identify the biomolecules present in abundance in a food sample Questions in Follow-Up Assignment <p>Summative</p> <ul style="list-style-type: none"> Short pen-and-paper test Chapter test Performance task 	<ul style="list-style-type: none"> Appreciating the benefits of a healthy diet Evaluating the health effects of some diet trends 	<ul style="list-style-type: none"> materials for activity/experiment flash cards of amino acids computer with internet connection LCD projector models or figures of biomolecules video clips about heredity pictures of carbohydrate- and lipid-rich food, and dietary sources of protein images of medical conditions caused by malnutrition online sources <ul style="list-style-type: none"> picture or slide of the structures of protein http://www.bio.iitb.ac.in/~sanjeeva/virtual_lab/Virtual_Laboratory/2DG_manual_files/2010-10-18_Protein%20structure_theory.jpg

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		<p>Social and Cultural Awareness Relating the prevalence of some disorders and diseases among people to overconsumption or lack of consumption of certain biomolecules</p> <p>Collaboration</p> <ul style="list-style-type: none"> ● Working together within a group to accomplish a given task ● Working in pairs or groups to do a lab activity on being tested for sugar <p>Communication Sharing experiences and giving insights on the importance of biomolecules and the results of having them in low amounts or in excess in the body</p> <p>Literacy Writing a report</p> <p>ICT Literacy Using PowerPoint or other visual aids</p>				<p>○ video clip about heredity https://www.youtube.com/watch?v=zwibgNGe4aY</p>
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Chapter 12: Chemical Reactions

Essential Questions	<ul style="list-style-type: none"> • What is the importance of studying chemical reactions? • How does knowledge on chemical equations help in understanding the nature of various substances? • How do the factors that affect the rates of chemical reactions aid in the understanding the different chemical changes that occur in the environment? • How are chemical reactions represented through chemical equations? • Why is it important to balance chemical equations? • How is a chemical reaction described in terms of its rate? 	Essential Understandings	<ul style="list-style-type: none"> • Chemical reactions involve the rearrangement of atoms among reacting substances undergoing chemical changes. • There are different types of chemical reactions. Each of which has its specific uses and applications. • Chemical equation is a shorthand way of representing a chemical change that involves symbols and formulas. • Chemical reactions involve the rearrangement of the atoms of reacting substances, which undergo chemical changes. • A chemical reaction is endothermic if the heat energy is absorbed from the surroundings which results in the decrease in the temperature of the surroundings. A reaction is exothermic if heat energy is released which results in the increase in the temperature of surroundings. • The law of conservation of mass is expressed through balanced chemical equations. • A balanced chemical equation utilizes stoichiometry which describes the quantitative relationships among the substances involved in a chemical reaction and shows that the number of different atoms on the reactant side is equal to the number of atoms on the product side.
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<p><i>Chemical Reactions Everywhere</i></p> <p><i>Representation of Chemical Reactions</i></p> <p><i>Law of Conservation of Mass</i></p> <p><i>Balancing Chemical Equations</i></p> <p><i>Types of Chemical Reactions</i></p> <p><i>Energy Changes in Chemical Reactions</i></p> <p><i>Factors That Affect Rates of Reaction</i></p> <p><i>Biological Catalysts</i></p>	<p>S10MT-IVe-g-23 MELC Apply the principles of conservation of mass to chemical reactions</p> <p>S10MT-IVh-j-24 MELC Explain how the factors affecting rates of chemical reactions are applied in food preservation and materials production, control of fire, pollution, and corrosion</p>	<p>Critical Thinking or Problem Solving</p> <ul style="list-style-type: none"> Expressing chemical reactions in a complete and balanced chemical equation Drawing or formulating conclusions Conducting extended research Differentiating chemical reactions <p>Scientific Literacy, Social and Cultural Awareness, and Environmental Awareness</p> <ul style="list-style-type: none"> Identifying chemical reactions that are naturally seen at home or in the environment Being aware of chemical hazards found in commercial products 	<ul style="list-style-type: none"> Use of creative poster or drawing Lecture/discussion Problem-based inquiry: observing chemical reactions followed by answering guide questions Class discussion about chemical reactions and law of conservation of mass and how to express it in balanced equations Laboratory activities/experiments with pre- and post-laboratory discussions Video presentations Models/figures that represent atoms and molecules and chemical reactions in the molecular level Mind mapping on the significance of 	<p>Formative</p> <ul style="list-style-type: none"> Answering questions and solving problems about chemical reactions and chemical equations using a round table strategy Questions in Follow-Up Seatwork activities Assignment Reflection paper <p>Summative</p> <ul style="list-style-type: none"> Chapter test Performance task 	<p>Awareness of the chemical hazards found in commercial products</p>	<ul style="list-style-type: none"> materials for activities or experiments figures of molecular models teacher-provided worksheets about balancing equations materials for demonstrating chemical reactions and conservation of mass downloaded videos that show chemical reactions laboratory worksheets LCD projector computer with internet connection online source <ul style="list-style-type: none"> video that shows chemical reactions https://www.youtube.com/watch?v=TX6BYceUSL0

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		<ul style="list-style-type: none"> Suggesting methods to minimize the number of pollutants such as ammonia in the environment <p>Leadership Taking the initiative to promote environmental awareness of the harmful effects of pollutants in the environment</p> <p>Collaboration</p> <ul style="list-style-type: none"> Efficiently accomplishing tasks assigned to groups Brainstorming on answering the essential questions and creating a concept map <p>Communication</p> <ul style="list-style-type: none"> Sharing or presenting output Explaining concepts Citing examples and uses of enzymes 	<p>chemical reactions in everyday life</p> <ul style="list-style-type: none"> Collaborative activity: brainstorming on answering questions and creating concept maps 			
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		<p>Literacy Writing a reflection paper about chemical reactions</p> <p>Creativity</p> <ul style="list-style-type: none"> • Creating a concept map of chemical reactions • Creating a documentary about chemical reactions that affect the environment • Giving responses to essential questions through poster or drawing 				
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