SCIENCE

Grade 7

Three-Term Budget Of Work (BOW) for Learning Competencies

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For Learning Competencies

First Term	
Content Standard	• Scientists use models to explain phenomena. • The particle model explains the properties of solids, liquids, and gases and the processes involved in changes of state. • Diagrams and flowcharts are very useful in demonstrating and explaining the motion and arrangement of particles during changes of state. • There are specific processes for planning, conducting, and recording scientific investigations. • The properties of solutions such as solubility and reaction to litmus determine their use. • Familiarity and proper use of a compound microscope are essential to observe cells. • The organelles of plant and animal cells can be identified using a compound microscope.
Performance Standard	By the end of the Term, learners recognize that scientists use models to describe the particle model of matter. They use diagrams and illustrations to explain the motion and arrangement of particles during changes of state. They demonstrate an understanding of the role of solute and solvent in solutions and the factors that affect solubility. They demonstrate skills to plan and conduct a scientific investigation making accurate measurements and using standard units. They demonstrate understanding of the parts and function of a compound microscope and use this to identify cell structure and recognize that the cell is the basic unit of life and that some organisms are unicellular and some are multicellular.
Week	**Learning Competency**

1 to 3	**Use of Models and the Particle Model and Changes of State** • Recognize that scientists use models to explain phenomena that cannot be easily seen or detected; • Describe the Particle Model of Matter as "All matter is made up of tiny particles with each pure substance having its own kind of particles." • Describe that particles are constantly in motion, have spaces between them, attract each other, and move faster as the temperature increases (or with the addition of heat). • Use diagrams and illustrations to describe the arrangement, spacing, and relative motion of the particles in each of the three states (phases) of matter. • Explain the changes of state in terms of particle arrangement and energy changes: a. solid → liquid → vapor b. vapor → liquid → solid
4 to 5	**Planning, Following, and Recording Scientific Investigations** • Follow appropriate steps of a scientific investigation which includes: a. Aim or problem b. Materials and equipment c. Method or procedures d. Results including data e. Conclusion. • Make accurate measurements using standard units for physical quantities and organize the collected data when carrying out a scientific investigation.
6 to 8	**Solutions, Solubility, and Concentration** • Identify the role of the solute and solvent in a solution. • Express quantitatively the amount of solute present in a given volume of solvent. • Demonstrate how different factors affect the solubility of a solute in a given solvent, such as heat; • Identify solutions, which can be found at home and in school and that react with a litmus indicator, as acids, bases, and salts. • Demonstrate proper use and handling of science equipment.
8	**Science Equipment: The Compound Microscope**

	• Identify the parts and functions, and demonstrate proper handling and storing of a compound microscope.
9 to 11	**Plant and Animal Cells** • Use proper techniques in observing and identifying the parts of a cell with a microscope such as the cell membrane, nucleus, cytoplasm, mitochondria, and chloroplasts. • Recognize that some organisms consist of a single cell (unicellular) like in bacteria and some consist of many cells (multicellular) like in a human. • Differentiate plant and animal cells based on their organelles.
Suggested Activities	• Learners observe food coloring spreading in water at different temperatures. They must: ○ Draw diagrams before, during, and after diffusion ○ Explain particle motion with temperature changes ○ Output: Lab sheets • **Mixture station** - Learners rotate through stations with different solutes and solvents (salt, sugar, oil, sand, water). They must: ○ Predict solubility ○ Mix and observe outcomes ○ **Output:** Lab Sheets
Suggested Performance Tasks	• Design and carry out an investigation to determine the amount of salt in a sample of seawater. • Design and carry out an experiment investigating how different factors affects the solubility of a given solute.

Second Term	
Content Standard	• Cells are the basic unit of life and mitosis, and meiosis are the basic forms of cell division. • Fertilization occurs when a male reproductive cell fuses with a female reproductive cell. • Sexual reproduction is the basis of heredity. • The levels of biological organization provide a simple way of connecting the simplest part of the living world to the most complex. • Identifying trophic levels helps understand the transfer of energy from one organism to another as shown in a food pyramid. • Scientists and engineers analyze forces to predict their effects on movement. • Vectors differentiate the concepts of speed and velocity. • Graphing motion provides more accurate predictions about speed and velocity.
Performance Standard	By the end of the Term, learners explain that there are two types of cell division, and that reproduction can occur through sexual or asexual processes. They use diagrams to make connections between organisms and their environment at various levels of organization. They explain the process of energy transfer through trophic levels in food chains. They employ scientific techniques, concepts, and models to investigate forces and motion and represent their understanding using scientific language, force diagrams, and distance-time graphs.
Week	**Learning Competency**
1 to 3	**Cellular Reproduction** • Recognize that cells reproduce through two types of cell division, mitosis and meiosis, and describe mitosis as cell division for growth and repair. • Explain that genetic information is passed on to offspring from both parents by the process of meiosis and fertilization.

	• Differentiate sexual from asexual reproduction in terms of: a. number of parents involved b. similarities of offspring to parents
4	**Levels of Biological Organization** • Use a labelled diagram to describe the connections between the levels of biological organization to one another from cells to the biosphere.
5	**Trophic Levels** • Describe the trophic levels of an organism as levels of energy in a food pyramid.
6	**Transfer of Energy** • Use examples of food pyramids to describe the transfer of energy between organisms from one trophic level to another.
7 to 9	**Balance and Unbalanced Forces** • Identify that forces act between objects and can be measured. • Identify and describe everyday situations that demonstrate: a. balanced forces such as a box resting on an inclined plane, a man standing still, or an object moving with constant velocity b. unbalanced forces, such as freely falling fruit or an accelerating car • Draw a free-body diagram to represent the relative magnitude and direction of the forces involving balanced and unbalanced forces • Identify that when forces are not balanced, they can cause changes in the object's speed or direction of motion.
10 to 11	**Motion: Displacement and Velocity, Graphing Motion, and Identifying and Controlling Variables** • Explain the difference between distance and displacement in everyday situations in relation to a reference point. • Distinguish between speed and velocity using the concept of vectors. • Describe uniform velocity and represent it using distance-time graphs.

Suggested Activities	• Image sorter to identify sexual and asexual reproduction. • Free-body diagramming of objects acted upon by multiple forces.
Suggested Performance Tasks	• Create a visual representation, such as poster, model, or e-poster, explaining the trophic level in a chosen ecosystem. • Create a board game that can be played multiple times involving the concepts of forces, graphs, vectors, and reference point in the mechanics of the game.

Third Term	
Content Standard	• The particle model explains natural systems and processes. • Scientists and engineers conduct innovative research to find solutions to the current global energy crisis by seeking renewable energy solutions. • Rapid movements along normal, reverse or strike-slip faults cause earthquakes. • The damage or effects on communities depend on the magnitude of and distance from an earthquake. • Sunlight is the Earth's external source of energy. • Solar energy influences the atmosphere and weather patterns. • The revolution, rotation, and the tilt of the Earth explain the patterns of day and night and the seasons.
Performance Standard	By the end of the Term, learners use their curiosity, knowledge and understanding, and skills to propose solutions to problems related to energy. They explore how modern technologies might be used to overcome current global energy concerns. They appreciate the value of using systems to analyze and explain natural phenomena and demonstrate their understanding in explaining the dynamics of faults and earthquakes. They are confident in identifying and assessing the earthquake risk for their local communities using authentic and reliable secondary data. They use the country's disaster awareness and risk reduction management plans to identify and explain to others what to do in the event of an earthquake. Learners explain the cause and effects of secondary impacts that some coastal communities may experience should a tsunami be produced by either local or distant earthquake activity. Learners use reliable scientific information to identify and explain how solar energy influences the atmosphere and weather systems of the Earth and use such information to appreciate and explain the dominant processes that influence the climate of the Philippines.
Week	**Learning Competency**

1 to 4	**Heat Transfer** • Explain the difference between heat and temperature. • Identify advantageous and disadvantageous examples of conduction, convection, and radiation. • Explain in terms of the particle model the processes underlying convection and conduction of heat energy. • Gather information from secondary sources to identify and describe examples of innovative devices that can be used to transform heat energy into electrical energy.
3 to 8	**Earthquakes and System Models** • Classify geological faults according to the angle of the fault plane and direction of slip. • Use models or illustrations to explain how movements along faults generate earthquakes and identify and explain which types of faults are most likely to occur in the Philippines and explain why. • Describe how the effects of earthquakes on communities depend on their magnitude. • Use the PHIVOLCS FaultFinder or other reliable information source to identify where the nearest fault system is located from their community and assess the risk of earthquakes to their local community. • Make models of fault scenarios to illustrate: a. the epicenter of an earthquake from its focus b. the intensity of an earthquake from its magnitude c. how underwater earthquakes may or may not generate tsunamis. • Refer to the local disaster readiness plans to demonstrate what to do during and after an earthquake. • Explain how earthquakes result in tsunamis that devastate shoreline communities. • Describe procedures that the authorities have in place to alert communities of pending tsunamis and what procedures can be implemented should a tsunami impact a community.
9 to 11	**The Sun's Influence on Earth and System Models** • Explain how energy from the Sun interacts with the atmosphere. • Make a physical model or use drawings to demonstrate how the tilt of the Earth relative to its orbit around the Sun affects the intensity of sunlight absorbed by different areas of Earth over a year. • Explain, using models, how the tilt of the Earth affects the changes in the length of daytime at

	different times of the year. • Explain how solar energy contributes to the occurrence of land and sea breezes, monsoons, and the Intertropical Convergence Zone (ITCZ).
Suggested Activities	• Learners examine images showing applications of heat transfer and classify conduction, convection, and radiation as advantageous or disadvantageous. • Learners research heat-to-electricity devices (e.g., thermoelectric generators, geothermal plants) from secondary sources. • Learners build paper-block or clay models showing how different fault movements cause earthquakes, and identify which occur in the Philippines. • Learners use PHIVOLCS FaultFinder to locate the nearest fault and assess earthquake risk in their barangay. They must: ○ Map distance to the nearest fault ○ Write a short risk assessment
Suggested Performance Tasks	• Develop a 2-4 page brochure for parents or leaders in your community to inform them about modern technologies that can be used sustainably to transform heat into electricity in the local community. • Design, test, and evaluate a model house that can withstand a model earthquake. • Design, test, and evaluate a model of an innovative house that can adapt to the different weather conditions in the country.