

**PACE ACADEMY
PHYSICAL SCIENCE
CURRICULUM GUIDE
S.Y. 2020-2021**

Most Essential Learning Competencies	Science Lesson
THIRD QUARTER	
Give evidence for and describe the formation of heavier elements during star formation and evolution	Nuclear reactions and origins of elements
Explain how the concept of atomic number led to the synthesis of new elements in the laboratory	Atomic Mass and Atomic Number
Determine if a molecule is polar or non-polar given its structure	Substances and their Properties
Relate the polarity of a molecule to its properties	
Describe the general types of intermolecular forces	Intermolecular Forces of Attraction
Explain how the structures of biological macromolecules such as carbohydrates, lipids, nucleic acid, and proteins determine their properties and functions	The Chemistry of Carbon
Use simple collision theory to explain the effects of concentration, temperature, and particle size on the rate of reaction	Understanding Chemical Reactions and Equations
Define catalyst and describe how it affects reaction rate	Rate of Reaction
Determine the limiting reactant in a reaction and calculate the amount of product formed	
Describe how energy is harnessed from	Energy in Chemical Reactions

different sources: A. Fossil fuels B. Biogas C. Geothermal D. Hydrothermal E. Batteries F. Solar cells G. Biomass	
From product labels, identify the active ingredient(s) of cleaning products used at home	Understanding Labels on Consumer Products
Give the use of the other ingredients in cleaning agents	
FOURTH QUARTER	
Explain how the Greeks knew that the Earth is spherical	Motions in the Sky
Cite examples of astronomical phenomena known to astronomers before the advent of telescopes	The Birth of Modern Astronomy
Explain how Brahe's innovations and extensive collection of data in observational astronomy paved the way for Kepler's discovery of his laws of planetary motion	
Compare and contrast the Aristotelian and Galilean conceptions of vertical motion, horizontal motion, and projectile motion.	
Explain how Galileo inferred that objects in vacuum fall with uniform acceleration, and that force is not necessary to sustain horizontal motion	
Explain the subtle distinction between Newton's 1st Law of Motion (or Law of Inertia) and Galileo's assertion that force is not necessary to sustain horizontal motion	Newton's Laws of Motion

Describe how the propagation of light, reflection, and refraction are explained by the wave model and the particle model of light	Nature of Light Geometric Optics Physical Optics
Explain how the photon concept and the fact that the energy of a photon is directly proportional to its frequency can be used to explain why red light is used in photographic dark rooms, why we get easily sunburned in ultraviolet light but not in visible light, and how we see colors	
Cite experimental evidence showing that electrons can behave like waves	
Differentiate dispersion, scattering, interference, and diffraction	
Explain various light phenomena such as: A. Your reflection on the concave and convex sides of a spoon looks different B. Mirages C. Light from a red laser passes more easily through red cellophane than green cellophane D. Clothing of certain colors appear different in artificial light and in sunlight E. Haloes, sundogs, primary rainbows, secondary rainbows, and supernumerary bows F. Why clouds are usually white and rainclouds dark G. Why the sky is blue and sunsets are reddish	
Describe how Hertz produced radio pulses	
Explain how special relativity resolved the conflict between Newtonian mechanics and Maxwell's electromagnetic theory	Special Relativity
Explain the consequences of the postulates of Special Relativity (e.g.,	

relativity of simultaneity, time dilation, length contraction, mass-energy equivalence, and cosmic speed limit)	
Explain the consequences of the postulates of General Relativity (e.g., correct predictions of shifts in the orbit of Mercury, gravitational bending of light, and black holes)	General Relativity
Explain how the speeds and distances of far-off objects are estimated (e.g., doppler effect and cosmic distance ladder)	
Explain how we know that we live in an expanding universe, which used to be hot and is approximately 14 billion years old	

Reference:

Exploring Life Through Science Series: Physical Science. Quezon City: Phoenix Publishing House, Inc.

Time Allotment: Two (2) synchronous sessions (40 minutes per session); Five (5) asynchronous sessions (40 minutes per session)

Promotion/Retention:

- Assessments will be categorized as the following with the corresponding weight:
 - Short Quizzes (20%)
 - Written Outputs (35%)
 - Product and Performance Tasks (45%)
- **Short Quizzes.** These include summative assessments after every lesson, group of related lessons, or chapter.
- **Written Outputs.** These include concept maps, data recording and analyses, laboratory reports and documentations, reaction/reflection papers, article reviews, and surveys.
- **Product and Performance Tasks.** These include portfolios, investigatory projects, models and diagrams construction, prototype building, research papers, debates, designing and implementation of action plans, designing various models, doing scientific investigations, issue-awareness campaigns, laboratory activity, multimedia presentations, simulation, skills demonstration, and verification experiments.