

## Side-by-Side Comparison of the Texas Educational Knowledge and Skills (TEKS) and Louisiana Grade Level Expectations (GLEs)

### SCIENCE: Physics

| TEKS  | Comments                                | Louisiana GLE  |
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| (Phy.1) Scientific Processes. The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. |   | The Abilities Necessary to Do Scientific Inquiry<br>Understanding Scientific Inquiry   |
| (Phy.1.A) demonstrate safe practices during field and laboratory investigations;  | <i>Approximate</i>                      | SI GLE 10. Given a description of an experiment, identify appropriate safety measures (SI-H-A7)  |
| (Phy.1.B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.  | <i>Not specifically addressed in LA</i> |  |
| (Phy.2) Scientific Processes. The student uses scientific methods during field and laboratory investigations.   | <i>Implied</i>                          | Science as Inquiry The Abilities Necessary to Do Scientific Inquiry<br>Understanding Scientific Inquiry  |
| (Phy.2.A) plan and implement experimental procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;                                       | <i>Approximate</i>                      | SI GLE 1. Write a testable question or hypothesis when given a topic (SI-H-A1)<br><br>SI GLE 2. Describe how investigations can be observation, description, literature survey, classification, or experimentation (SI-H-A2)<br><br>SI GLE 3. Plan and record step-by-step procedures for a valid investigation, select equipment and materials, and identify variables and controls (SI-H-A2)<br><br>SI GLE 4. Conduct an investigation that includes multiple display data appropriately (SI-H-A2)<br><br>SI GLE 5. Utilize mathematics, organizational tools, and graphing skills to solve problems (SI-H-A3)<br><br>SI GLE 6. Use technology when appropriate to enhance laboratory investigations and presentations of findings (SI-H-A3) |
| (Phy.2.B) make quantitative observations and measurements with precision;   | <i>Implied</i>                          | Phys GLE 1. Measure and determine the physical quantities of an object or unknown sample using correct prefixes and metric system units (e.g., mass, charge, pressure, volume, temperature, density) (PS-H-A1)<br><br>Phys GLE 2. Determine and record measurements correctly using significant digits and scientific notation (PS-H-A1)   |
| (Phy.2.C) organize, analyze, evaluate, make inferences, and predict trends from data;   | <i>Approximate</i>                      | SI GLE 5. Utilize mathematics, organizational tools, and graphing skills to solve problems (SI-H-A3)   |

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|   |  | SI GLE 9. Write and defend a conclusion based on logical analysis of experimental data (SI-H-A6) (SI-H-A2)<br><br>SI GLE 15. Analyze the conclusion from an investigation by using data to determine its validity (SI-H-B4)   |
| (Phy.2.D) communicate valid conclusions;  | <i>Implied</i>   | SI GLE 7. Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples, role-playing, computer simulations) (SI-H-A4)<br><br>SI GLE 9. Write and defend a conclusion based on logical analysis of experimental data (SI-H-A6) (SI-H-A2)<br><br>SI GLE 15. Analyze the conclusion from an investigation by using data to determine its validity (SI-H-B4)  |
| (Phy.2.E) graph data to observe and identify relationships between variables; and   | <i>Implied</i>   | SI GLE 3. Plan and record step-by-step procedures for a valid investigation, select equipment and materials, and identify variables and controls (SI-H-A2)<br><br>SI GLE 5. Utilize mathematics, organizational tools, and graphing skills to solve problems (SI-H-A3)  |
| (Phy.2.F) read the scale on scientific instruments with precision.  | <i>Approximates</i>  | Phys GLE 3. Determine accuracy and precision of measured data (PS-H-A1)   |
| (Phy.3) Scientific Processes. The student uses critical thinking and scientific problem solving to make informed decisions.   | <i>Implied across LA SI GLEs involving problem-solving processes</i> | Science as Inquiry  |
| (Phy.3.A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information; | <i>Implied</i>   | SI GLE 11. Evaluate selected theories based on supporting scientific evidence (SI-H-B1)<br><br>SI GLE 12. Cite evidence that scientific investigations are conducted for many different reasons (SI-H-B2)<br><br>SI GLE 13. Identify scientific evidence that has caused modifications in previously accepted theories (SI-H-B2)<br><br>SI GLE 15. Analyze the conclusion from an investigation by using data to determine its validity (SI-H-B4)<br><br>SI GLE 16. (See Appendix for complete text of this GLE.) |
| (Phy.3.B) express laws symbolically and employ mathematical procedures including vector addition and right-triangle geometry to solve physical problems;                            | <i>Implied</i>   | Phys GLE 12. Model scalar and vector quantities (PS-H-E2)<br><br>Phys GLE 13. Solve for missing variables in kinematic equations relating to actual situations (PS-H-E2)  |

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|  |  | SI GLE 5. Utilize mathematics, organizational tools, and graphing skills to solve problems (SI-H-A3)   |
| (Phy.3.C) evaluate the impact of research on scientific thought, society, and the environment;           | <i>Implied</i>                               | SI GLE 13. Identify scientific evidence that has caused modifications in previously accepted theories (SI-H-B2)<br><br>SI GLE 14. Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics) (SI-H-B3)   |
| (Phy.3.D) describe the connection between physics and future careers; and                                | <i>Not specifically addressed in LA GLEs</i> |  |
| (Phy.3.E) research and describe the history of physics and contributions of scientists.                  | <i>Not specifically addressed in LA GLEs</i> |  |
| (Phy.4) Science Concepts. The student knows the laws governing motion.                                   |  | Forces and Motion in Physics   |
| (Phy.4.A) generate and interpret graphs describing motion including the use of real-time technology;     | <i>Implied</i>                               | Phys GLE 11. Plot and interpret displacement-time and velocity-time graphs and explain how these two types of graphs are interrelated (PS-H-E2)<br><br>Phys GLE 13. Add and resolve vectors graphically and mathematically to determine resultant/equilibrant of concurrent force vectors (PS-H-E3)  |
| (Phy.4.B) analyze examples of uniform and accelerated motion including linear, projectile, and circular; | <i>Implied</i>                               | SI GLE 9. Describe and measure motion in terms of position, displacement time, and the derived quantities of velocity and acceleration (PS-H-E2)<br><br>SI GLE 10. Determine constant velocity and uniform acceleration mathematically and graphically (PS-H-E2)<br><br>SI GLE 15. Calculate centripetal force and acceleration in circular motion (PS-H-E3)<br><br>SI GLE 16. Analyze circular motion to solve problems relating to angular velocity, acceleration, momentum, and torque (PS-H-E3)<br><br>SI GLE 18. Demonstrate the independence of perpendicular components in projectile motion and predict the optimum angles and velocities of projectiles (PS-H-E3) |
| (Phy.4.C) demonstrate the effects of forces on the motion of objects;                                    | <i>Approximate</i>                           | Phys GLE 14. Add and resolve vectors graphically and mathematically to determine resultant/equilibrant of concurrent force vectors (PS-H-E3)<br><br>Phys GLE 17. Analyze simple harmonic motion (PS-H-E3)  |
| (Phy.4.D) develop and interpret a free-body diagram for force analysis;                                  | <i>Not specifically addressed in LA</i>      |  |

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|  | <i>GLEs</i>   |   |
| (Phy.4.E) identify and describe motion relative to different frames of reference.  | <i>Not specifically addressed in LA at the Physics level. This concept is introduced in 9th grade PS GLE 35</i> |   |
| (Phy.5) Science Concepts. The student knows that changes occur within a physical system and recognizes that energy and momentum are conserved. |   | Physics: Energy   |
| (Phy.5.A) interpret evidence for the work-energy theorem;  | <i>Not specifically addressed in LA at the Physics level.</i>   |   |
| (Phy.5.B) observe and describe examples of kinetic and potential energy and their transformations;   | <i>Implied</i>  | Phys GLE 19. Explain quantitatively the conversion between kinetic and potential energy for objects in motion (PS-H-F1)                             |
| (Phy.5.C) calculate the mechanical energy and momentum in a physical system such as billiards, cars, and trains;                               | <i>Approximates</i>   | Phys GLE 24. Apply the concept of momentum to actual situations with different masses and velocities (PS-H-F2)                                      |
| (Phy.5.D) demonstrate the conservation of energy and momentum.   | <i>Approximates</i>   | Phys GLE 23. Apply the law of conservation of momentum to collisions in one and two dimensions, including angular momentum (PS-H-F2)                |
| (Phy.6) Science Concepts. The student knows forces in nature.  |   | Physics: Forces and Motion  |
| (Phy.6.A) identify the influence of mass and distance on gravitational forces;   | <i>Approximates</i>   | Phys GLE 7. Relate gravitational force to mass and distance (PS-H-E1)   |
| (Phy.6.B) research and describe the historical development of the concepts of gravitational, electrical, and magnetic force;                   | <i>Not specifically addressed in LA at the Physics level.</i>   |   |
| (Phy.6.C) identify and analyze the influences of charge and distance on electric forces;   | <i>Approximates</i>   | Phys GLE 8. Compare and calculate electrostatic forces acting within and between atoms to the gravitational forces acting between atoms (PS-H-E1)   |
| (Phy.6.D) demonstrate the relationship between electricity and magnetism;  | <i>Approximates</i>   | Phys GLE 31. Describe the relationship of electricity, magnetism, and inductance as aspects of a single electromagnetic force (PS-H-G2)             |
| (Phy.6.E) design and analyze electric circuits;  | <i>Implied</i>  | Phys GLE 30. Construct basic electric circuits and solve problems involving voltage, current, resistance, power, and energy (PS-H-G2)               |
| (Phy.6.F) identify examples of electrical and magnetic forces in everyday life.  | <i>Implied</i>  | Phys GLE 29. Describe observed electrostatic phenomena, calculate Coulomb's law, and test charge pole, electric field, and magnetic field (PS-H-G2) |
| (Phy.7) Science Concepts. The student knows the laws of thermodynamics.  |   | Energy  |
| (Phy.7.A) analyze and explain everyday examples that illustrate the laws of thermodynamics;  | <i>Implied</i>  | Phys GLE 22. Analyze energy transformations using the law of conservation of energy (PS-H-F2)   |
| (Phy.7.B) evaluate different methods of heat energy transfer that result in an increasing amount of disorder.                                  | <i>Implied</i>  | Phys GLE 21. Explain and calculate the conversion of one form of energy to another (e.g., chemical to thermal, thermal to mechanical, magnetic to   |

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|  |  | electrical) (PS-H-F1)<br>Phys GLE 22. Analyze energy transformations using the law of conservation of energy (PS-H-F2)   |
| (Phy.8) Science Concepts. The student knows the characteristics and behavior of waves.   |  | Interactions of Energy and Matter  |
| (Phy.8.A) examine and describe a variety of waves propagated in various types of media and describe wave characteristics such as velocity, frequency, amplitude, and behaviors such as reflection, refraction, and interference; | <i>Implied</i>                               | Phys GLE 9. Describe and measure motion in terms of position, displacement time, and the derived quantities of velocity and acceleration (PS-H-E2)<br><br>Phys GLE 25. Determine the relationships among amplitude, wavelength, frequency, period, and velocity in different media (PS-H-G1)<br><br>Phys GLE 26. Evaluate how different media affect the properties of reflection, refraction, diffraction, polarization, and interference (PS-H-G1)<br><br>Phys GLE 27. Investigate and construct diagrams to illustrate the laws of reflection and refraction (PS-H-G1)<br><br>Phys GLE 28. Draw constructive and destructive interference patterns and explain how the principle of superposition applies to wave propagation (PS-H-G1) |
| (Phy.8.B) identify the characteristics and behaviors of sound and electromagnetic waves;   | <i>Implied</i>                               | Phys GLE 32. Compare properties of electromagnetic and mechanical waves (PS-H-G3)<br><br>Phys GLE 34. Compare the properties of the electromagnetic spectrum as a wave and as a particle (PS-H-G3)<br><br>Phys GLE 35. Analyze the Doppler effect of a moving wave source (PS-H-G3)  |
| (Phy.8.C) interpret the role of wave characteristics and behaviors found in medicinal and industrial applications.   | <i>Approximate</i>                           | SI GLE 14. Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics) (SI-H-B3)  |
| (Phy.9) Science Concepts. The student knows simple examples of quantum physics.  |  | Interactions of Energy and Matter  |
| (Phy.9.A) describe the photoelectric effect;   | <i>Implied</i>                               | Phys GLE 34. Compare the properties of the electromagnetic spectrum as a wave and as a particle (PS-H-G3)  |
| (Phy.9.B) explain the line spectra from different gas-discharge tubes.   | <i>Not specifically addressed in LA GLEs</i> |  |
|  | <i>Not specifically addressed in TX TEKS</i> | Phys GLE 6. Explain the role of strong nuclear forces and why they are the strongest of all forces (PS-H-E1)   |

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|      | <i>Not specifically addressed in TX TEKS</i> | Phys GLE 8. Give an example of how new scientific data can cause an existing scientific explanation to be supported, revised, or rejected (SI-H-A5)               |
|      | <i>Not specifically addressed in TX TEKS</i> | Phys GLE 20. Calculate the mechanical advantage and efficiency of simple machines and explain the loss of efficiency using the dynamics of the machines (PS-H-F1) |