



Active Physical Science Correlation to the Louisiana Grade Level Expectations for Physical Science, Grades 9-12

SCIENTIFIC INQUIRY

Benchmark	Location/Page where Standard is found
The Abilities Necessary to Do Scientific Inquiry	
1. Write a testable question or hypothesis when given a topic (SI-H-A1)	81-85, 86-91, 129-134, 208-213, 309-319, 324-325, 512-525, 666-672
2. Describe how investigations can be observation, description, literature survey, classification, or experimentation (SI-H-A2)	105-121, 129-134, 151-155, 94-98, 576-586, 600-605, 142-146, 147-150, 156-160, 214-217, 340-345
3. Plan and record step-by-step procedures for a valid investigation, select equipment and materials, and identify variables and controls (SI-H-A2)	512-525, 86-91, 666-672, 129-134
4. Conduct an investigation that includes multiple trials and record, organize, and display data appropriately (SI-H-A2)	86-91, 129-134, 147-150, 512-516, 517-525, 666-668, 669-672
5. Utilize mathematics, organizational tools, and graphing skills to solve problems (SIH-A3)	18-25, 15-17, 176-183, 142-146, 340-345, 158-160, 214-217, 86-93, 147-150, 151-155, 239-255, 171-175, 721-725, 726-730, 755-766
6. Use technology when appropriate to enhance laboratory investigations and presentations of findings (SI-H-A3)	129-134, 86-93, 147-150, 151-155, 239-255, 721-725, 726-730, 188-191, 117-121
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)	80-85, 147-150, 433-440, 584, 574-575, 721-730, 731-739, 755-766, 61-68

8. Give an example of how new scientific data can cause an existing scientific explanation to be supported, revised, or rejected (SI-H-A5)	171-175, 600-601, 716-717, 721-725, 726-730, 740-747
9. Write and defend a conclusion based on logical analysis of experimental data (SI-HA6)	94-98, 135, 171-175, 184-188, 600-601
10. Given a description of an experiment, identify appropriate safety measures (SI-H-A7)	86-91, 129-134, 147-150, 512-516, 517-525, 666-668, 669-672, 142-146, 533-537
Understanding Scientific Inquiry	
11. Evaluate selected theories based on supporting scientific evidence (SI-H-B1)	561-566, 702-712, 94-98, 123-134
12. Cite evidence that scientific investigations are conducted for many different reasons (SI-H-B2)	141-150, 151-155, 167-170, 239-255
13. Identify scientific evidence that has caused modifications in previously accepted theories (SI-H-B2)	572-574, 117-121, 171-175, 600-601
14. Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics) (SI-H-B3)	105-110, 147-150, 673-677, 94-98, 396-399, 400-404, 411-416, 463-471
15. Analyze the conclusion from an investigation by using data to determine its validity (SI-H-B4)	142-146, 147-150, 156-160, 214-217, 340-345
16. Use the following rules of evidence to examine experimental results: (a) Can an expert's technique or theory be tested, has it been tested, or is it simply a subjective, conclusive approach that cannot be reasonably assessed for reliability? (b) Has the technique or theory been subjected to peer review and publication? (c) What is the known or potential rate of error of the technique or theory when applied? (d) Were standards and controls applied and maintained? (e) Has the technique or theory been generally accepted in the scientific community? (SI-H-B5) (SI-H-B1) (SI-H-B4)	561-566, 702-712, 94-98, 123-134

PHYSICAL SCIENCE

Benchmark	Location/Page where Standard is found
Measurement and Symbolic Representation	
1. Measure the physical properties of different forms of matter in metric system units (e.g., length, mass, volume, temperature) (PS-H-A1)	650-655, 656-665, 626-633, 696-701, 779-784, 721-730, 816-825, 826-829, 678-682, 772-778
2. Gather and organize data in charts, tables, and graphs (PS-H-A1)	18-25, 15-17, 176-183, 142-146, 340-345, 158-160, 214-217, 86-93, 147-150, 151-155, 239-255, 171-175, 721-725, 726-730, 755-766
3. Distinguish among symbols for atoms, ions, molecules, and equations for chemical reactions (PS-H-A2)	660-670, 702-711, 713-719, 721-730, 740-747, 450-454, 826-829
4. Name and write chemical formulas using symbols and subscripts (PS-H-A2)	748-754, 785-791
Atomic Structure	
5. Identify the three subatomic particles of an atom by location, charge, and relative mass (PS-H-B1)	660-670, 702-711, 713-719, 721-730, 740-747, 450-454, 826-829
6. Determine the number of protons, neutrons, and electrons of elements by using the atomic number and atomic mass from the periodic table (PS-H-B1)	660-670, 702-711, 713-719, 721-730, 740-747, 450-454, 826-829
7. Describe the results of loss/gain of electrons on charges of atoms (PS-H-B1) (PS-HC5)	660-670, 702-711, 713-719, 721-730, 740-747, 450-454, 826-829
8. Evaluate the uses and effects of radioactivity in people's daily lives (PS-H-B2)	595-604, 605-611, 612-619, 620

9. Compare nuclear fission to nuclear fusion (PS-H-B2)	755-76, 595-604, 605-611, 612-619
10. Identify the number of valence electrons of the first 20 elements based on their positions in the periodic table (PS-H-B3)	666-672, 702-712, 713-720, 731-739, 755-766, 785-791
The Structure and Properties of Matter	
11. Investigate and classify common materials as <i>elements</i> , <i>compounds</i> , or <i>mixtures</i> (heterogeneous or homogeneous) based on their physical and chemical properties (PS-H-C1)	626-633, 678-682, 696-701, 644-649
12. Classify elements as <i>metals</i> or <i>nonmetals</i> based on their positions in the periodic table (PS-H-C2)	666-672, 702-712, 713-720, 731-739, 755-766, 785-791
13. Predict how factors such as particle size and temperature influence the rate of dissolving (PS-H-C3)	644-649, 809-815
14. Investigate and compare methods for separating mixtures by using the physical properties of the components (PS-H-C4) (PS-H-C1)	644-649, 626-633, 696-701, 772-778, 740-747, 792-801, 802-807
15. Using selected elements from atomic numbers 1 to 20, draw Bohr models (PS-H-C5) (PS-H-B3)	666-672, 702-712, 713-720, 731-739, 755-766, 785-791
16. Name and write the formulas for simple ionic and covalent compounds (PS-H-C5)	748-754, 785-791
17. Name and predict the bond type formed between selected elements based on their locations in the periodic table (PS-H-C5)	748-754, 785-791
18. Diagram or construct models of simple hydrocarbons (four or fewer carbons) with single, double, or triple bonds (PS-H-C6)	683-690
19. Analyze and interpret a graph that relates temperature and heat energy absorbed during phase changes of water (PS-H-C7)	634-643

20. Predict the particle motion as a substance changes phases (PS-H-C7) (PS-H-C3)	634-643
Chemical Reactions	
21. Classify changes in matter as <i>physical</i> or <i>chemical</i> (PS-H-D1)	626-633, 644-649, 650-655, 656-665, 666-672, 673-677, 683-688, 696-701
22. Identify evidence of chemical changes (PS-H-D1)	702-712, 760-766, 785-791, 792-801, 802-808
23. Classify unknowns as <i>acidic</i> , <i>basic</i> , or <i>neutral</i> using indicators (PS-H-D2)	816-825
24. Identify balanced equations as neutralization, combination, and decomposition reactions (PS-H-D3)	792-801, 779-784, 785-791
25. Determine the effect of various factors on reaction rate (e.g., temperature, surface area, concentration, agitation) (PS-H-D4)	802-808, 809-815
26. Illustrate the laws of conservation of matter and energy through balancing simple chemical reactions (PS-H-D5) (PS-H-D3) (PS-H-D7)	792-801, 826-830
27. Distinguish between endothermic and exothermic reactions (PS-H-D6)	802-808, 809-815
28. Identify chemical reactions that commonly occur in the home and nature (PS-H-D7)	816-825, 826-829, 772-778, 779-784, 792-801
Forces and Motion	
29. Differentiate between <i>mass</i> and <i>weight</i> (PS-H-E1)	656-665, 253-265

30. Compare the characteristics and strengths of forces in nature (e.g., gravitational, electrical, magnetic, nuclear) (PS-H-E1)	512-516, 517-520, 450-454, 455-462, 472-485, 521-525, 526-532, 533-538, 539-541, 548-555, 253-265, 19-20, 277-281, 31-44, 558-559
31. Differentiate between speed and velocity (PS-H-E2)	86-93, 142-146, 156-159, 171-175, 31-44, 45-49, 50-55, 151-155, 160-166, 176-183, 184-193
32. Plot and compare line graphs of acceleration and velocity (PS-H-E2)	80-85, 86-93, 147-150, 171-175, 218-230
33. Calculate velocity and acceleration using equations (PS-H-E2)	86-93, 142-146, 156-159, 171-175, 31-44, 45-49, 50-55, 151-155, 160-166, 176-183, 184-193
34. Demonstrate Newton's three laws of motion (e.g., inertia, net force using $F = ma$, equal and opposite forces) (PS-H-E3)	15-25, 31-44, 45-49, 69-74, 99-104, 105-110, 117-121, 123-134, 161-166, 208-217, 253-265, 239-252
35. Describe and demonstrate the motion of common objects in terms of the position of the observer (PS-H-E4)	4-13, 176-183, 56-60, 81-85
Energy	
36. Measure and calculate the relationships among energy, work, and power (PS-H-F1)	286-296, 297-308, 463-471
37. Model and explain how momentum is conserved during collisions (PS-H-F2)	56-60, 61-68, 111-116, 117-121, 122-128
38. Analyze diagrams to identify changes in kinetic and potential energy (PS-H-F2)	31-44, 184-193, 194-202, 218-230, 231-238, 286-296, 297-308
39. Distinguish among thermal, chemical, electromagnetic, mechanical, and nuclear energy (PS-H-F2)	31-44, 184-193, 194-202, 218-230, 231-238, 286-296, 297-308, 340-345, 346-353, 411-415, 416-420, 421-424, 425-428, 429-432, 433-440, 446-449, 450-454, 486-498, 533-538, 539-541, 567-576, 595-604, 612-620, 683-688, 802-808

40. Demonstrate energy transformation and conservation in everyday actions (PS-H-F2)	31-44, 184-193, 194-202, 218-230, 231-238, 286-296, 297-308, 340-345, 346-353, 411-415, 416-420, 421-424, 425-428, 429-432, 433-440, 446-449, 450-454, 486-498, 533-538, 539-541, 567-576, 595-604, 612-620, 683-688, 802-808
Interactions of Energy and Matter	
41. Identify the parts and investigate the properties of transverse and compression waves (PS-H-G1)	326-339, 340-345, 346-353, 411-415, 416-420
42. Describe the relationship between wavelength and frequency (PS-H-G1)	326-339, 340-345, 576-586
43. Investigate and construct diagrams to illustrate the laws of reflection and refraction (PS-H-G1)	354-361, 362-370, 371-376, 377-385, 386-390
44. Illustrate the production of static electricity (PS-H-G2)	548-555, 713-720, 755-766
45. Evaluate diagrams of series and parallel circuits to determine the flow of electricity (PS-H-G2)	455-462, 463-471, 472-485
46. Diagram a magnetic field (PS-H-G2)	512-516, 517-520, 521-525, 526-532, 533-538
47. Explain how electricity and magnetism are related (PS-H-G2)	512-516, 517-520, 450-454, 455-462, 472-485, 521-525, 526-532, 533-538, 539-541, 548-555
48. Compare properties of waves in the electromagnetic spectrum (PS-H-G3)	416-420, 326-339, 576-586
49. Describe the Doppler effect on sound (PS-H-G3)	

50. Identify positive and negative effects of electromagnetic/mechanical waves on humans and human activities (e.g., sound, ultraviolet rays, X-rays, MRIs, fiber optics) (PS-H-G4) (PS-H-G3)

721-730, 731-739, 740-747