

Oregon Physics Standards Correlation

Oregon Science Standards
Certificate of Initial Mastery (CIM)/Grade 10

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
PHYSICAL SCIENCE			
MATTER			
Understand structure and properties of matter.			
Describe properties of elements and their relationship to the periodic table.			
<i>Explain atoms and their base components (protons, neutrons, and electrons) as a basis for all matter.</i>	23.1, 42.9, 44.1 - 44.3	23.1, 41.9, 43.1 - 43.3	22.1, 36.8, 38.1 - 38.3
<i>Read and interpret the periodic table, recognizing the relationship of the chemical and physical properties of the elements to their position on the periodic table.</i>	n/a	n/a	n/a
<i>Recognize that the historical development of atomic theory demonstrates how scientific knowledge changes over time, and how those changes have had an impact on society.</i>	Ch 42 (e.g. 42.9, 42.18 - 42.21) Ch 44 (e.g. 44.0 - 44.2, 44.13, 44.19, 44.20)	Ch 41 (e.g. 41.9, 41.17 - 41.20) Ch 43 (e.g. 43.0 - 43.2, 43.13, 43.19, 43.20)	Ch 36 (e.g. 36.8, 36.15 - 36.17) Ch 38 (e.g. 38.0 - 38.2, 38.13)
Understand chemical and physical changes.			
Analyze the effects of various factors on physical changes and chemical reactions.			
<i>Describe how transformations among solids, liquids, and gases occur (change of state).</i>	19.21	19.18	18.14
<i>Identify factors that can influence change of state, including temperature, pressure, and concentration.</i>	19.21 - 19.22	19.18 - 19.19	18.14 - 18.15
<i>Describe chemical reactions in terms of reactants and products.</i>	n/a	n/a	n/a
<i>Describe the factors that affect the rate of chemical reactions.</i>	n/a	n/a	n/a
<i>Recognize examples that show when substances combine or break apart in a chemical reaction, the total mass remains the same (conservation of mass).</i>	n/a	n/a	n/a
FORCE			
Understand fundamental forces, their forms, and their effects on motion.			
Describe and explain the effects of multiple forces acting on an object.			
<i>Understand and apply the relationship $F=ma$ in situations in which one force acts on an object.</i>	Chapters 5 & 6	Chapters 5 & 6	Chapter 5
<i>Recognize that equal and opposite forces occur when one object exerts a force on another.</i>	5.10	5.10	5.10

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<i>Describe the forces acting on an object, based on the motion of that object.</i>	Chapters 5 & 6	Chapters 5 & 6	Chapter 5
Recognize that gravity is a universal force.			
<i>Describe the relationship of mass and distance to gravitational force.</i>	13.1	13.1	12.1
ENERGY			
Understand energy, its transformations, and interactions with matter.			
Describe differences and similarities between kinds of waves, including sound, seismic, and electromagnetic, as a means of transmitting energy.			
<i>Recognize that waves of all kinds have energy that can be transferred when the waves interact with matter.</i>	16.1, 16.19	16.1	15.1
<i>Apply the concepts of frequency, wavelength, amplitude, and energy to electromagnetic and mechanical waves.</i>	Chapters 16 & 35	Chapters 16 & 34	Chapters 15 & 30
Describe and analyze examples of conservation of energy.			
<i>Recognize that heat energy is a by-product of most energy transformations.</i>	7.22, 21.2, Chapters 19 - 22	7.19, 21.2, Chapters 19 - 22	6.16, 20.2, Chapters 18 - 21
<i>Describe ways in which energy can be transferred, including chemical reactions, nuclear reactions, and light waves.</i>	7.7, 7.22, 16.1, 19.25, 19.28, 19.29, 30.27, 35.9, 42.6, 44.13 - 44.15, more	7.5, 7.19, 16.1, 19.22, 19.25, 19.26, 30.26, 34.6, 41.6, 43.13 - 43.15, more	6.3, 6.16, 15.1, 18.17, 18.19, 18.20, 28.19, 36.5, 38.13 - 38.15, more
<i>Explain the difference between potential and kinetic energy.</i>	7.8, 7.16	7.6, 7.13	6.4, 6.10
<i>Analyze the flow of energy through a system by applying the law of conservation of energy.</i>	7.22 - 7.25, 8.11, 8.20, 11.19, 15.21, 19.21, 21.1, 29.3, more	7.19 - 7.22, 8.10, 8.18, 11.14, 15.19, 19.18, 21.1, 29.3, more	6.16 - 6.19, 7.8, 7.13, 10.7, 18.14, 20.1, 27.3, more
EARTH AND SPACE SCIENCE (only relevant standards listed)			
THE EARTH IN SPACE			
Understand the Earth's place in the solar system and the universe.			
Explain how mass and distance affect the interaction between Earth and other objects in space.			
<i>Recognize that the sun's gravitational pull holds the Earth and other planets in their orbits, just as the planets' gravitational pull keeps their moons in orbit around them.</i>	Chapter 13	Chapter 13	Chapter 12

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<i>Explain that the force of gravity between Earth and other objects in space depends only upon their masses and the distances between them.</i>	13.1	13.1	12.1