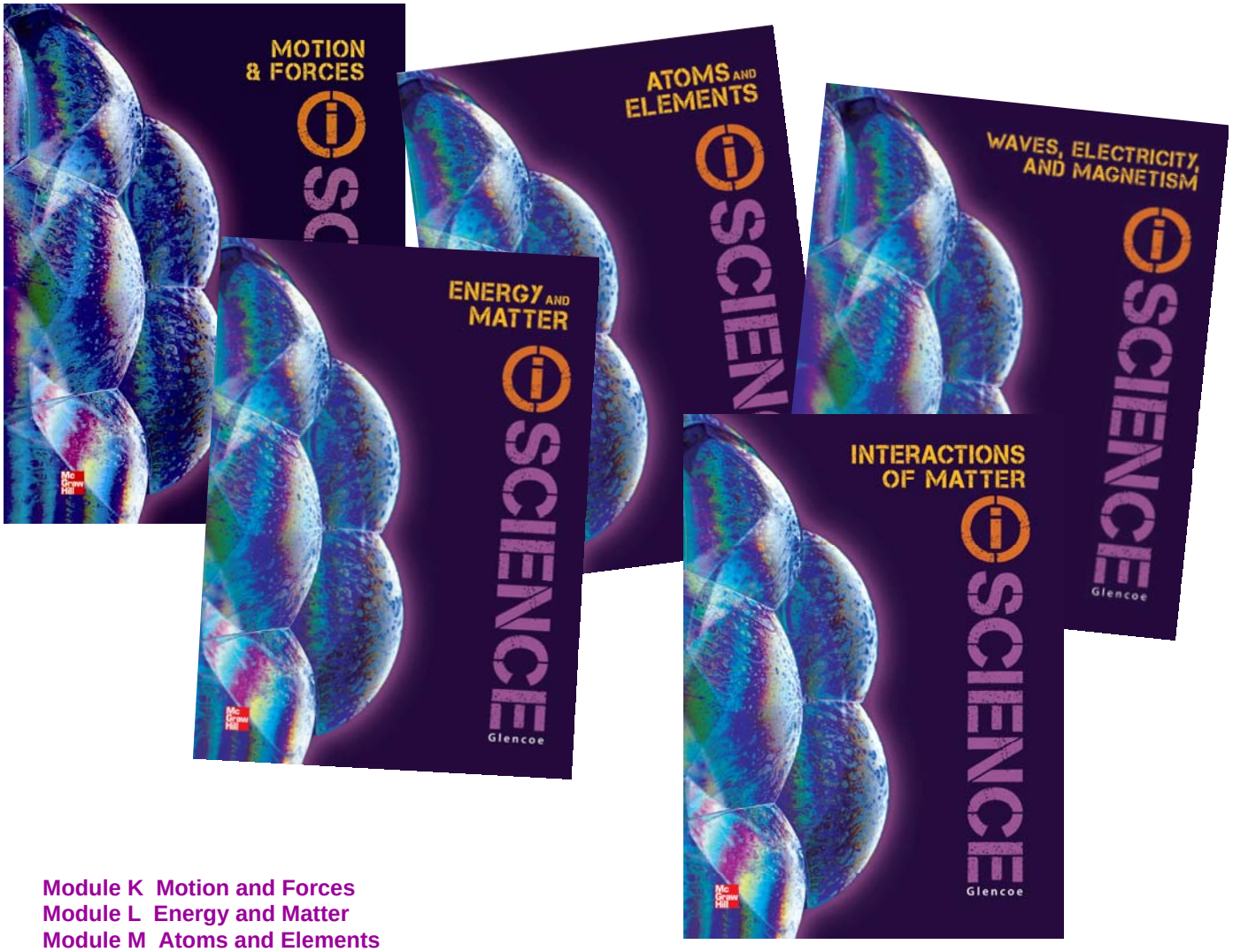
Glencoe

Academic Standards in Science
Grade 6

Minnesota



Module K Motion and Forces
Module L Energy and Matter
Module M Atoms and Elements
Module N Interactions of Matter
Module O Waves, Electricity, and Magnetism

Codes used for Teacher Edition pages are the initial caps of headings on that page.

STANDARDS	PAGE REFERENCES
1. The Nature of Science and Engineering	
2. The Practice of Engineering	
1. Engineers create, develop and manufacture machines, structures, processes and systems that impact society and may make humans more productive.	
6.1.2.1.1 Identify a common engineered system and evaluate its impact on the daily life of humans. *For example:* Refrigeration, cell phone or automobile.	**Student Edition:** **MODULE K** *How It Works* 15 *Science & Society* 93 **MODULE L** *Green Science* 166 **MODULE N** *Science & Society* 497 **MODULE O** 615-622, 664-666 **Teacher Edition:** **MODULE O** DI 535, 619, 691; VL 665

STANDARDS	PAGE REFERENCES
6.1.2.1.2 Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others. *For example:* Seat belts and airbags.	**Student Edition:** **MODULE L** 178-182 *Green Science* 166 *Nature of Science* 156-157 **MODULE M** *Green Science* 388 **MODULE N** *Nature of Science* 414-415 *Science & Society* 497 **Teacher Edition:** **MODULE L** DI 179; GQ 156, 181; WE 182 **MODULE N** GQ 414 **MODULE O** DI 619
6.1.2.1.3 Describe the trade-offs in using manufactured products in terms of features, performance, durability and cost.	**Student Edition:** **MODULE L** 218 *Nature of Science* 156 *Science & Society* 213 **MODULE N** *How Nature Works* 459 **Teacher Edition:** **MODULE K** DI 99

STANDARDS	PAGE REFERENCES
6.1.2.1.4 Explain the importance of learning from past failures, in order to inform future designs of similar products or systems. *For example:* Space shuttle or bridge design.	**Student Edition:** **NATURE OF SCIENCE** NOS•20 - NOS•27 *Lab* NOS•28 - NOS•29 *Skill Practice* NOS•19 **MODULE M** *Green Science* 388 **Teacher Edition:** **NATURE OF SCIENCE** GQ NOS•20; USH NOS•8
2. Engineering design is the process of devising products, processes and systems that address a need, capitalize on an opportunity, or solve a specific problem.	
6.1.2.2.1 Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system that solves a problem. *For example:* Investigate how energy changes from one form to another by designing and constructing a simple roller coaster for a marble.	**Student Edition:** **NATURE OF SCIENCE** *Lab* NOS•28 - NOS•29 **MODULE K** *Lab* 146-147 **MODULE L** *Lab* 220-221 **MODULE O** *Lab* 706-707, 742-743 **Teacher Edition:** **MODULE K** DI 141 **MODULE O** DI 585

STANDARDS	PAGE REFERENCES
3. Interactions Among Science, Technology, Engineering, Mathematics and Society	
1. Designed and natural systems exist in the world. These systems consist of components that act within the system and interact with other systems.	
6.1.3.1.1 Describe a system in terms of its subsystems and parts, as well as its inputs, processes and outputs.	**Student Edition:** **MODULE K** 110, 141 **MODULE L** 216-218 *Lab* 186-187 **MODULE O** 661-663 *How It Works* 571 **Teacher Edition:** **MODULE K** GQ 110; PF 141; RWS 141; TD 111 **MODULE L** DI 217; VL 218 **MODULE O** RS 737; TD 615; VL 662

STANDARDS	PAGE REFERENCES
6.1.3.1.2 Distinguish between open and closed systems. *For example:* Compare mass before and after a chemical reaction that releases a gas in sealed and open plastic bags.	This distinction can be covered in classroom discussion of the following material involving closed systems: **Student Edition:** **MODULE K** 140-141 *Launch Lab* 140 **MODULE L** *MiniLab* 295 **MODULE N** 424-425 *Launch Lab* 419 **Teacher Edition:** **MODULE K** PP 140 **MODULE N** GQ 424

STANDARDS	PAGE REFERENCES
4. Current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact.	
6.1.3.4.1 Determine and use appropriate safe procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a physical science context.	**Student Edition:** **NATURE OF SCIENCE** NOS•6 - NOS•18 **MODULE K** *Lab* 34-35, 76-77 *Skill Practice* 101 **MODULE L** *Lab* 298-299 *Skill Practice* 175, 203, 254 **MODULE N** *Lab* 478-479 *Skill Practice* 469, 506 **MODULE O** *Lab* 554-555 *Nature of Science* 524-525 *Skill Practice* 545, 659, 697, 733 **Teacher Edition:** **NATURE OF SCIENCE** DI NOS•17 **MODULE K** DI 135 **MODULE L** DI 243, 251, 277 **MODULE N** DI 467 **MODULE O** DI 683, 719

STANDARDS	PAGE REFERENCES
6.1.3.4.2 Demonstrate the conversion of units within the International System of Units (SI, or metric) and estimate the magnitude of common objects and quantities using metric units.	**Student Edition:** **NATURE OF SCIENCE** NOS•12 - NOS•13 **MODULE L** *Math Skills* 200 *MiniLab* 201 **MODULE O** *It's Your Turn* 607 **SCIENCE SKILL HANDBOOK** SR-24 – SR-25 **Teacher Edition:** **NATURE OF SCIENCE** VL NOS•13 **MODULE K** DI 55 **MODULE L** DI 201; VL 200 **MODULE O** TD 603

STANDARDS	PAGE REFERENCES
1. Physical Science	
1. Matter	
1. Pure substances can be identified by properties which are independent of the sample of the substance and the properties can be explained by a model of matter that is composed of small particles.	
6.2.1.1.1 Explain density, dissolving, compression, diffusion and thermal expansion using the particle model of matter.	**Student Edition:** **MODULE K** 128 **MODULE L** 208, 274-278, 292-293 *Chapter Review* 267 #15 *Launch Lab* 282 *MiniLab* 209 **MODULE N** 463 **Teacher Edition:** **MODULE K** DDM 128 **MODULE L** DI 277; GQ 292; PS 275; TD 209, 273, 279; VL 274, 276, 277, 278, 293 **MODULE N** DI 463; TD 463
2. Substances can undergo physical changes which do not change the composition or the total mass of the substance in a closed system.	
6.2.1.2.1 Identify evidence of physical changes, including changing phase or shape, and dissolving in other materials.	**Student Edition:** **MODULE L** 249-252 *Chapter Review* 267 #16 *Inquiry* 248 *Launch Lab* 249 *MiniLab* 251 **Teacher Edition:** **MODULE L** DI 251; GQ 248, 252; PC 249; RS 251

STANDARDS	PAGE REFERENCES
6.2.1.2.2 Describe how mass is conserved during a physical change in a closed system. *For example:* The mass of an ice cube does not change when it melts.	**Student Edition:** **MODULE L** 252, 288 *Lesson Review* 253 #6 **Teacher Edition:** **MODULE L** GQ 288; TD 249, 253, 289; VL 252
6.2.1.2.3 Use the relationship between heat and the motion and arrangement of particles in solids, liquids and gases to explain melting, freezing, condensation and evaporation.	**Student Edition:** **MODULE L** 250-251, 282-287 *Chapter Review* 267 #14, 303 #17-#18 *Launch Lab* 282 *MiniLab* 288 *Skill Practice* 290 **Teacher Edition:** **MODULE L** C 286; CSM 250-251; DI 285; E 286; GQ 282, 283, 285; VL 250, 285
2. Motion	
1. The motion of an object can be described in terms of speed, direction and change of position.	
6.2.2.1.1 Measure and calculate the speed of an object that is traveling in a straight line.	**Student Edition:** **MODULE K** 17-19, 21 *Lab* 34-35 *Math Skills* 19 *MiniLab* 20 *Skill Practice* 25 **Teacher Edition:** **MODULE K** DI 23; GQ 17, 19; RS 19; TD 21; VL 18, 19, 21

STANDARDS	PAGE REFERENCES
6.2.2.1.2 For an object traveling in a straight line, graph the object's position as a function of time, and its speed as a function of time. Explain how these graphs describe the object's motion.	**Student Edition:** **MODULE K** 20-22, 30-32 *Chapter Review* 39 #12 *Lab* 34-35 *MiniLab* 20 **Teacher Edition:** **MODULE K** CS 31; DI 21, 23, 31; GQ 20, 22; SD 32; SU 31; TD 21, 31; VL 21, 31, 32
2. Forces have magnitude and direction and affect the motion of objects.	
6.2.2.2.1 Recognize that when the forces acting on an object are balanced, the object remains at rest or continues to move at a constant speed in a straight line, and that unbalanced forces cause a change in the speed or direction of the motion of an object.	**Student Edition:** **MODULE K** 56-57, 62-64 *Lab* 76-77 *Launch Lab* 54 *MiniLab* 57 *Skill Practice* 60 **Teacher Edition:** **MODULE K** CDM 64; DI 57; GQ 57, 64; RWS 63; TD 53, 57; UFV 62; VL 56, 63
6.2.2.2.2 Identify the forces acting on an object and describe how the sum of the forces affects the motion of the object. *For example:* Forces acting on a book on a table or a car on the road.	**Student Edition:** **MODULE K** 54-58, 62-64, 66, 70-72 *Chapter Review* 81 #16 *Lab* 76-77 *Launch Lab* 62, 70 *Skill Practice* 60 **Teacher Edition:** **MODULE K** DI 55, 57, 63, 71; GQ 55, 56, 58, 63, 71; HDFCM 62; IF 54; OF 70; TD 57, 67, 71; WMIG 61

STANDARDS	PAGE REFERENCES
6.2.2.2.3 Recognize that some forces between objects act when the objects are in direct contact and others, such as magnetic, electrical and gravitational forces can act from a distance.	**Student Edition:** **MODULE K** 45-47 *Launch Lab* 54 *Lesson Review* 51 #3 **MODULE O** 680-681, 718 *MiniLab* 682 **Teacher Edition:** **MODULE K** DI 47; GQ 46; TD 45; V 44 **MODULE M** TD 317 **MODULE O** GQ 680, 718
6.2.2.2.4 Distinguish between mass and weight.	**Student Edition:** **MODULE K** 47-48 *Lesson Review* 51 #2 **MODULE L** 242 *Chapter Review* 267 #13 *MiniLab* 242 **Teacher Edition:** **MODULE K** GQ 48 **MODULE L** SDP 242; VL 244

STANDARDS	PAGE REFERENCES
3. Energy	
1. Waves involve the transfer of energy without the transfer of matter.	
6.2.3.1.1 Describe properties of waves, including speed, wavelength, frequency and amplitude.	**Student Edition:** **MODULE O** 539-543, 573-575 *Chapter Review* 559 #23 *Lab* 554-555 *MiniLab* 541 *Skill Practice* 545 **Teacher Edition:** **MODULE O** AE 539; DI 541, 543, 575; GQ 541, 542, 573, 575; RS 543; VL 540
6.2.3.1.2 Explain how the vibration of particles in air and other materials results in the transfer of energy through sound waves.	**Student Edition:** **MODULE O** 565-566, 573 *Launch Lab* 565 *Lesson Review* 570 #7 **Teacher Edition:** **MODULE O** GQ 565; TD 565, 567; VL 566
6.2.3.1.3 Use wave properties of light to explain reflection, refraction and the color spectrum.	**Student Edition:** **MODULE O** 549-550, 635, 637-638, 643-644, 650-651, 654-655 *Launch Lab* 635, 650 *MiniLab* 549, 652 *Skill Practice* 613, 648 **Teacher Edition:** **MODULE O** DI 549, 551; GQ 550, 634, 651; RL 650; RW 654; TD 603, 645, 649, 651; VL 549, 637, 643, 655

STANDARDS	PAGE REFERENCES
2. Energy can be transformed within a system or transferred to other systems or the environment.	
6.2.3.2.1 Differentiate between kinetic and potential energy and analyze situations where kinetic energy is converted to potential energy and vice versa.	**Student Edition:** **MODULE L** 162-163, 170, 197 *Chapter Review* 191 #17 *Lesson Review* 174 #6 *Skill Practice* 175 **Teacher Edition:** **MODULE L** CBKPE 170; GQ 162, 163; KPE 197; RS 165; TD 163, 169; WITE 198
6.2.3.2.2 Trace the changes of energy forms, including thermal, electrical, chemical, mechanical or others as energy is used in devices. *For example:* A bicycle, light bulb or automobile.	**Student Edition:** **MODULE L** 169-173, 215-218 *Chapter Review* 191 #12, 225 #16 *Lesson Review* 174 #7, 219 #4 *Standardized Test Practice* 227 #14 **MODULE O** 699-700, 736-738 *How It Works* 571 *Lab* 742-743 **Teacher Edition:** **MODULE L** DI 171, 173; GQ 169, 171; HA 215; HE 218; TD 215; URE 172 **MODULE O** EDTE 700; EG 736; MEEE 738; RWS 701

STANDARDS	PAGE REFERENCES
6.2.3.2.3 Describe how heat energy is transferred in conduction, convection and radiation.	**Student Edition:** **MODULE L** 205-206, 210-211 *Chapter Review* 225 #17 *Lab* 220-221 *Standardized Test Practice* 227 #11 **MODULE M** *MiniLab* 359 **Teacher Edition:** **MODULE L** C 206, 210; DI 211; GQ 204; R 205; TD 211; V 204; VL 210