

MOSCOW SCHOOL DISTRICT CURRICULUM GUIDE

Subject/Course: Science
Grade 7

Students are expected to know content and apply skills from previous grades.

Standard 1: Nature of Science

Students carry out investigations over time using appropriate tools and equipment. Students make inferences based upon data they collect. Students accurately communicate the results of their investigations and observations. Students support or revise their conclusions by critically analyzing alternate explanations. Students carry out investigations following written lab procedures. Students follow safety protocols in carrying out investigations.

Cognitive Level (CL) codes:

- B: Memorize
- C: Perform procedures
- D: Demonstrate understanding
- E: Conjecture, generalize, prove
- F: Solve non-routine problems, make connections

<i>Goal – The student will:</i>	<i>Objectives (to be reached by the end of seventh grade)</i>	<i>Samples of Applications</i>	<i>Curriculum Materials (including technological resources)</i>	<i>Key Vocabulary for Standard 1</i>
Goal 1.1: Understand Systems, Order, and Organization	<ul style="list-style-type: none"> ● 7.S.1.1.1 Define small systems as a part of a whole system. (633.01.a) CL: E Content Limit: Items should address content that the student has experience with such as fire drills, the organization of sports teams, an orchestra, or a band. Items can also address topics like organelles in protozoa or the role various plant cell types play in the survival of the plant. The idea is to draw learning together for students. ● 7.S.1.1.2 Determine how small systems contribute to the function of the whole. (633.01.a) CL: E Content Limit: Material 	<ul style="list-style-type: none"> ● Protein synthesis activity ● Worm dissection unit ● Create and use dichotomous keys for identifying organisms (organization) 		<ul style="list-style-type: none"> ● cells ● concepts ● conclusion ● controls ● critical thinking ● data ● evaluate ● evidence ● function ● hypothesis ● inference ● investigation ● metric measurements ● models ● observation ● organ systems ● organism ● organs ● predictions ● scientific explanations ● scientific procedures ● stable ● system

	<p>should emphasize major body systems and their component parts including the circulatory, digestive, respiratory, and skeletal systems.</p> <ul style="list-style-type: none"> 7.S.1.1.3 Identify the different structural levels of an organism (cells, tissues, organs, and organ systems). (633.01.b) <p>CL: E Content Limit: Material should emphasize major body systems and their component parts including the circulatory, digestive, respiratory, and skeletal systems.</p>			<ul style="list-style-type: none"> technical instructions techniques tissues tools variables dependent variable independent variable
<p>Goal 1.2: Understand Concepts and Processes of Evidence, Models, and Explanation</p>	<ul style="list-style-type: none"> 7.S.1.2.1 Describe how observations and data are evidence on which to base scientific explanations and predictions. (633.02.a) <p>CL: E Content Limit: Items should offer choices that have a direct link between the observation offered for consideration and the correct answer.</p> <ul style="list-style-type: none"> 7.S.1.2.2 Use observations to make defensible inferences. (633.02.b) <p>CL: Content Limit: Graphics or examples should be limited to natural history topics or observable reactions in living systems.</p> <ul style="list-style-type: none"> 7.S.1.2.3 Use models to explain or demonstrate a concept. (633.02.c) <p>CL: Content Limit: Material should emphasize major body systems and their component parts</p>	<ul style="list-style-type: none"> In a Heartbeat Lab(designing experiments to change heart rate) Roly-Poly/Isopod experiments(designing experiments to test the effect of various stimuli on isopod movement) Create “Jello Cells” with organelles DNA replication models (using and creating models) Simulating mitosis with pipe cleaners Creating dragons and/or bugs to simulate the inheritance of traits 		

	<p>including the circulatory, digestive, respiratory, and skeletal systems. Cell models, the component parts of an eye, and the atomic positioning in solids, liquids, and gases are also suitable topics.</p>			
<p>Goal 1.3: Understand Constancy, Change, and Measurement</p>	<ul style="list-style-type: none"> 7.S.1.3.1 Identify concepts of science that have been stable over time. (633.03.a) <p>CL: E Content Limit: Address concepts including the cell theory, germ theory of disease, molecular theory of matter, and similar topics.</p> <ul style="list-style-type: none"> 7.S.1.3.2 Recognize changes that occur within systems. (633.03.b) <p>CL: E Content Limit: Address topics such as the impact of exercise on breathing and heart rate and the impact of light from a window on the direction of plant growth, etc.</p> <ul style="list-style-type: none"> 7.S.1.3.3 Make metric measurements using appropriate tools. (633.03.c) <p>CL: C Content Limit: Use linear metric measures, volume measures of milliliter and liter, and mass measure of grams.</p>	<ul style="list-style-type: none"> Understanding the difference between scientific laws and theories Observing changes in heart rates due to activity/inactivity (In a Heartbeat lab) Various activities (ongoing all year) involving metric measuring of volume, mass and size. 		
<p>Goal 1.4: Understand the Theory that Evolution is a Process that Relates to the Gradual Changes in the Universe and of Equilibrium as a Physical State</p>	<ul style="list-style-type: none"> Reference to objective 7.S.3.2.1 	<p>(see activities for Goal 3.1 as well)</p> <ul style="list-style-type: none"> Creating a Geologic Timeline Relative Dating lab Examining fossils from the Clarkia Fossil Bowl 		

<p>Goal 1.5: Understand Concepts of Form and Function No objectives at this grade level.</p>		<ul style="list-style-type: none"> • Making connections between an organism’s physical adaptations and their function. • “Create your own bird” activity 		
<p>Goal 1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills</p>	<ul style="list-style-type: none"> • 7.S.1.6.1 Identify controls and variables used in scientific investigations. (634.01.b) CL: E Content Limit: Items should stress the students’ ability to distinguish between a control and a variable. • 7.S.1.6.2 Use appropriate tools and techniques to gather and display data. (634.01c) CL: C Content Limit: Line graphs, bar graphs, pie charts, and tables are all suitable for use and interpretation. • 7.S.1.6.3 Evaluate data in order to form conclusions. (634.01.d) CL: E Content Limit: Data offered for consideration should be linear or tied to a focused topic. • 7.S.1.6.4 Use evidence and critical thinking to accept or reject a hypothesis. (634.01.e) CL: E Content Limit: Material offered for consideration should be single-faceted and include topics like the impact of over-watering potted plants or growing plants in light or darkness. • 7.S.1.6.5 Evaluate alternative explanations or predictions. 	<ul style="list-style-type: none"> • Various experiments throughout the year including: In a Heartbeat Lab • Roly Poly/Isopod Experiments 		

	<p>(634.01.f)</p> <p>CL: E Content Limit: Students should be able to identify two explanations and/or predictions that are reasonable for a topic.</p> <ul style="list-style-type: none"> • 7.S.1.6.6 Communicate and defend scientific procedures and explanations. (634.01.g) <p>CL: E Content Limit: Items should address pieces of data or evidence that will support or refute an explanation.</p>			
<p>Goal 1.7: Understand That Interpersonal Relationships Are Important in Scientific Endeavors No objectives at this grade level.</p>		<ul style="list-style-type: none"> • Activities involving shared data in lab groups stress the importance of communication and cooperation 		
<p>Goal 1.8: Understand Technical Communication</p>	<ul style="list-style-type: none"> • 7.S.1.8.1 Read and evaluate technical instructions. (643.02.a) <p>CL: E Content Limit: Items indicate that students can read and follow the instructions for lab procedures and textbook activities.</p>	<ul style="list-style-type: none"> • Follow directions for preparing microscope slides • Writing procedures in experiments • Completing “Stranding Report” in Sea Turtle unit. 		

Standard 2: Physical Science - No goals or objectives at this grade level.

Standard 3: Biology

Students state the levels of cellular organization and list cell parts and their respective functions. Students explain how traits are passed from one generation to another. Students differentiate between plant and animals cells by identifying the characteristic parts of each. Students explain how organisms are adapted to their environment and interact with the biotic and abiotic components of the environment.

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<i>Goal – The student will:</i>	<i>Objectives (to be reached by the end of seventh grade)</i>	<i>Samples of Applications</i>	<i>Curriculum Materials (including technological resources)</i>	<i>Key Vocabulary for Standard 3</i>
<p>Goal 3.1: Understand the Theory of Biological Evolution</p>	<ul style="list-style-type: none"> ● 7.S.3.1.1 Describe how natural selection explains species change over time. (637.01.a) <p>CL: D Content Limit: Items should address environments in flux (new volcanic islands, lakes being impacted by pollution, the margins of a hot spring), and give insights into how life forms would respond to environmental pressure over time.</p>	<ul style="list-style-type: none"> ● Activity “Natural Selection with Mice” ● Darwin’s finches – using a variety of tools to pick up seeds, etc. students make observations about beak adaptations 		<ul style="list-style-type: none"> ● abundance ● atoms ● biosphere ● carnivores ● cells ● chemical reactions ● components ● cycle ● decomposers ● distribution ● dominant traits ● ecosystems ● energy ● energy flow ● function ● herbivores ● inheritance ● limits to resources ● living ● molecules ● natural selection ● nonliving ● organ systems ● organisms ● photosynthesis ● recessive traits ● relationships ● resources ● species ● tissues organs
<p>Goal 3.2: Understand the Relationship between Matter and Energy in Living Systems</p>	<ul style="list-style-type: none"> ● 7.S.3.2.1 Describe how energy stored in food is primarily derived from the sun through photosynthesis. (638.01.a) <p>CL: D Content Limit: Items should probe the basic photosynthetic reaction and the role of producers in the food web.</p> <ul style="list-style-type: none"> ● 7.S.3.2.2 Describe how the availability of resources (matter and energy) limits the distribution and abundance of organisms. (638.01.b) <p>CL: E Content Limit: Use the food web and interaction of</p>	<ul style="list-style-type: none"> ● -Fall leaf activity ● (collection / observations about the reasons for color change) ● Elodea photosynthesis ● Photosynthesis / respiration / fermentation activities ● Create food chain/food webs, energy pyramids ● Migration: Eagle unit and Sea Turtle unit 		

	<p>trophic levels to probe this content.</p> <ul style="list-style-type: none"> 7.S.3.2.3 Illustrate how atoms and molecules cycle among the living and nonliving components of the biosphere. (638.01.c) <p>CL: D Content Limit: Assessed in the classroom, not on the ISAT.</p> <ul style="list-style-type: none"> 7.S.3.2.4 Identify how energy flows through ecosystems in one direction, from photosynthetic organisms to herbivores, carnivore, and decomposers. (638.01.d) <p>CL: D Content Limit: Use the food web as the basis for items.</p>			
<p>Goal 3.3: Understand the Cell is the Basis of Form and Function for All Living Things</p>	<ul style="list-style-type: none"> 7.S.3.3.1 Explain the relationships among specialized cells, tissues, organs, organ systems, and organisms. (636.01.a) <p>CL: E Content Limit: Items should address the components of an individual system, such as the digestive system.</p> <ul style="list-style-type: none"> 7.S.3.3.2 Identify the parts of specialized plant and animal cells. (636.01.b) <p>CL: B Content Limit: Include neurons, skeletal muscle, smooth muscle, cardiac muscle, stomata, and root hairs.</p> <ul style="list-style-type: none"> 7.S.3.3.3 Identify the functions of cell structures. (636.01.b) <p>CL: D Content Limit: Organelles that are visible with a light microscope, like vacuoles,</p>	<ul style="list-style-type: none"> Worm dissection Microscope labs: viewing plant/animal cells and noting differences and similarities Build cell models/illustrate plant and animal cells Prepare cheek cell slides Osmosis lab (using carrots or potatoes in salt water) Fermentation lab (yeast) Cell size activity Plant Alleles lab Charting classmates genetic traits 		

	<p>chloroplasts, and the nucleus are suitable. Organelles that require an electron microscope for observation (endoplasmic reticulum, ribosomes, etc.) should not be addressed.</p> <ul style="list-style-type: none"> 7.S.3.3.4 Describe cell functions that involve chemical reactions. (630.01.c) <p>CL: D Content Limit: Include organelles that are visible with a light microscope: nucleus, vacuoles, chloroplasts, and the cell membrane.</p> <ul style="list-style-type: none"> 7.S.3.3.5 Describe how dominant and recessive traits are inherited. (636.01.e) <p>CL: D Content Limit: Include traits easily observed: hair color, eye color, and skin color.</p>	<ul style="list-style-type: none"> Punnett square activities Creating Genetic Dragons/Bugs given certain inherited traits. 		
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Standard 4: Earth and Space Systems - No goals or objectives at this grade level.

Standard 5: Personal and Social Perspectives; Technology

Students understand that science and technology interact and impact both individuals and society.

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<i>Goal – The student will:</i>	<i>Objectives (to be reached by the end of seventh grade)</i>	<i>Samples of Applications</i>	<i>Curriculum Materials (including technological resources)</i>	<i>Key Vocabulary for Standard 5</i>
<p>Goal 5.1: Understand Common Environmental Quality Issues, Both Natural and Human Induced No objectives at this grade level.</p>		<ul style="list-style-type: none"> Sea Turtle unit explores the reasons for tracking sea turtles, reasons for decline in population Eagle Unit explores the reasons for the 		<ul style="list-style-type: none"> alternative energy technology

		decline of eagles, the importance of the endangered species act and the effect of this legislation on the eagle population		
Goal 5.2: Understand the Relationship between Science and Technology	<ul style="list-style-type: none"> 7.S.5.2.1 Explain how science and technology are interrelated. (640.01.a) Content Limit: Assessed in the classroom, not on the ISAT. 7.S.5.2.2 Explain how science advances technology. (640.01.b) Content Limit: Assessed in the classroom, not on the ISAT. 	<ul style="list-style-type: none"> Exploration of the Human Genome Project Research of genetic diseases 		
Goal 5.3: Understand the Importance of Natural Resources and the Need to Manage and Conserve Them	<ul style="list-style-type: none"> 7.S.5.3.1 Identify alternative sources of energy. (641.03.a) CL: D Content Limit: Content may include solar and wind power and hybrid vehicles. 	<ul style="list-style-type: none"> Current events – looking for news articles about alternative sources of energy. 		

Terms of significance that are not derived from a particular standard

adaptation
adapted
additive
allele
arteries
artificial light
ATP
cellular respiration
celsius
centimeter
clotting
composition
consumer
deoxygenated
diaphragm
dominant
endoplasmic reticulum
erosion
excessive
extend
flex
flow chart
fossilized
graduated cylinder
guard cells

heterozygous
homozygous
indicator solution
juvenile
larva
larvae
manipulated variable
maturity
measured variable
membrane
millimeter
mitochondria
mitosis
mutation
natural light
nutrients
omnivores
organelle
osmosis
oxygen
oxygenated
pH indicator
phloem
pores
predator

producer
protein
recessive
standard
sucession
trait
tropism
vacuole
veins
venn diagram
vital
xylem