

**MOSCOW SCHOOL DISTRICT**  
**CURRICULUM GUIDE**  
**Subject/Course: Earth Science**  
**Grade 9**

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

**Standard 1: Nature of Science**

Students exercise the basic tenets of scientific investigation, make accurate observations, exercise critical thinking skills, apply proper scientific instruments of investigation and measurement tools, and communicate results in problem solving. Students evaluate the validity of information by utilizing the tools of scientific thinking and investigation. Students summarize their findings by creating lab reports using technical writing including graphs, charts, and diagrams to communicate the results of investigations.

<i>Goal – The student will:</i>	<i>Objectives (to be reached by the end of ninth grade)</i>	<i>Samples of Applications</i>	<i>Curriculum Materials (including technological resources)</i>	<i>Key Vocabulary for Standard 1</i>
<b>Goal 1.1: Understand Systems, Order, and Organization</b>	<ul style="list-style-type: none"> <li>● 8-9.ES.1.1.1 Explain the scientific meaning of system, order, and organization. (648.01a)</li> <li>● 8-9.ES.1.1.2 Apply the concepts of order and organization to a given system. (648.01a)</li> </ul>	<ul style="list-style-type: none"> <li>● Geologic Time Line</li>   <li>● Geologic Time Line</li> <li>● Phases of the Moon Activity</li> <li>● Parallax Activity</li> </ul>	<ul style="list-style-type: none"> <li>● Meter sticks</li>   <li>● Meter sticks</li> <li>● Shaded</li> <li>● Tennis Balls</li> </ul>	<ul style="list-style-type: none"> <li>● Alternative explanations</li> <li>● hypothesis</li> <li>● model</li> <li>● observation</li> <li>● system</li> </ul>
<b>Goal 1.2: Understand Concepts and Processes of Evidence, Models, and Explanation</b>	<ul style="list-style-type: none"> <li>● 8-9.ES.1.2.1 Use observations and data as evidence on which to base scientific explanations. (648.02a)</li> <li>● 8-9.ES.1.2.2 Develop models to explain concepts or systems. (648.02b)</li> <li>● 8-9.ES.1.2.3 Develop scientific explanations based on knowledge, logic, and analysis. (648.02c)</li> </ul>	<ul style="list-style-type: none"> <li>● Weather Forecast</li>   <li>● Greenhouse Effect Lab</li> <li>● Map Survey Activity</li> <li>● Where In the World</li> <li>● Am I?</li>   <li>● Weather Forecast</li> </ul>	<ul style="list-style-type: none"> <li>● Meter sticks</li>   <li>● Laptop</li> <li>● Computers</li> <li>● Internet</li>   <li>● MS Excel</li> <li>● Vernier</li> <li>● Probes</li> <li>● Laptop</li> <li>● Computers</li> </ul>	
<b>Goal 1.3: Understand Constancy, Change, and Measurement</b>	<ul style="list-style-type: none"> <li>● 8-9.ES.1.3.1 Measure changes that can occur in and among systems. (648.03b)</li> <li>● 8-9.ES.1.3.2 Analyze changes that can occur in and among systems. (648.03b)</li> <li>● 8-9.ES.1.3.3 Measure and calculate using the metric system. (648.03c)</li> </ul>	<ul style="list-style-type: none"> <li>● Stream Table Activity</li>   <li>● Columbia Plateau Activity</li> <li>● Basalt Vs. Granite Lab</li> <li>● Bean Hunter Lab</li> <li>● Dot Hunter Lab</li> </ul>	<ul style="list-style-type: none"> <li>● Internet</li> <li>● Laptop</li> <li>● Computers</li> <li>● NEC</li> <li>● Projector</li>   <li>● Stream Table</li> <li>● Metric Ruler</li>   <li>● Metric</li> </ul>	

			<ul style="list-style-type: none"> <li>• Balances</li> <li>• Beakers</li> <li>• Graduated</li> <li>• Cylinders</li> <li>• Internet</li> <li>• Slides</li> <li>• NEC</li> <li>• Projector</li> </ul>
<b>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</b> No objectives in Earth Science			
<b>Goal 1.5: Understand Concepts of Form and Function - No objectives in Earth Science</b>			
<b>Goal 1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills</b>	<ul style="list-style-type: none"> <li>• 8-9.ES.1.6.1 Identify questions and concepts that guide scientific investigations. (649.01a)</li> <li>• 8-9.ES.1.6.2 Utilize the components of scientific problem solving to design, conduct, and communicate results of investigations. (649.01b)</li> <li>• 8-9.ES.1.6.3 Use appropriate technology and mathematics to make investigations. (649.01c)</li> <li>• 8-9.ES.1.6.4 Formulate scientific explanations and models using logic and evidence. (649.01d)</li> <li>• 8-9.ES.1.6.5 Analyze alternative explanations and models. (649.01e)</li> <li>• 8-9.ES.1.6.6 Communicate and defend a scientific argument. (649.01f)</li> <li>• 8-9.ES.1.6.7 Explain the differences among observations, hypotheses, and theories. (649.01g)</li> </ul>	<ul style="list-style-type: none"> <li>• Ozone Video</li> <li>• Global Warming Activity/Video</li> <li>• Heat Transfer Lab</li> <li>• Solar System</li> <li>• Activity/Presentations</li> <li>• Bread Into Rocks</li> <li>• Model Activity</li> <li>• Ozone Video</li> <li>• Sea Floor Spreading</li> <li>• Activity</li> <li>• Epicenter Activity</li> <li>• Origins DVD</li> </ul>	<ul style="list-style-type: none"> <li>• VCR</li> <li>• NEC</li> <li>• Projector</li> <li>• Bunsen</li> <li>• Burner</li> <li>• Hot Plate</li> <li>• Heat Lamp</li> <li>• Thermometer</li> <li>• NEC</li> <li>• Projector</li> <li>• Laptop</li> <li>• Computers</li> <li>• Internet</li> <li>• NEC</li> <li>• Projector</li> <li>• SEISVOL</li> <li>• Software</li> <li>• Internet</li> <li>• DVD</li> <li>• NEC</li> <li>• Projector</li> <li>• Vernier</li> <li>• Probes</li> <li>• Laptop</li> <li>• Computers</li> </ul>
<b>Goal 1.7: Understand That Interpersonal Relationships Are Important in Scientific Endeavors - No objectives in Earth Science</b>			
<b>Goal 1.8: Understand Technical Communication</b>	<ul style="list-style-type: none"> <li>• 8-9.ES.1.8.1 Analyze technical writing, graphs, charts, and diagrams. (658.02a)</li> </ul>	Greenhouse Effect Lab Mapping A Plate Boundary Activity	<ul style="list-style-type: none"> <li>• DVD</li> <li>• NEC</li> <li>• Projector</li> <li>• Vernier</li> <li>• Probes</li> <li>• Laptop</li> <li>• Computers</li> </ul>

**Standard 2: Physical Science** - No goals or objectives in Earth Science.

**Standard 3: Biology** - No goals or objectives in Earth Science.

### **Standard 4: Earth and Space Systems**

Students describe the current theory explaining the formation of the solar system. Students explain earth processes, events (erosion, uplifting, earthquakes, volcanic eruptions, etc.), and geological time. Students explain Earth's heat sources.

<i>Goal – The student will:</i>	<i>Objectives (to be reached by the end of ninth grade)</i>	<i>Samples of Applications</i>	<i>Curriculum Materials (including technological resources)</i>	<i>Key Vocabulary for Standard 4</i>
<b>Goal 4.1: Understand Scientific Theories of Origin and Subsequent Changes in the Universe and Earth Systems</b>	<ul style="list-style-type: none"> <li>8-9.ES.4.1.1 Explain the current scientific theory that suggests that the solar system formed from a nebular cloud of dust and gas. (654.01a)</li> <li>8-9.ES.4.1.2 Identify methods used to estimate geologic time. (654.01b)</li> <li>8-9.ES.4.1.3 Show how interactions among the solid earth, oceans, atmosphere, and organisms have changed the earth system over time. (654.01c)</li> </ul>	<ul style="list-style-type: none"> <li>Origins DVD</li> <li>Which is Older Activity</li> <li>Half-life Lab</li> <li>Greenhouse</li> <li>Lab/Discussion,</li> <li>Global Warming</li> <li>Discussion</li> </ul>	<ul style="list-style-type: none"> <li>DVD</li> <li>NEC</li> <li>Projector</li> <li>Pennies</li> <li>Laptop</li> <li>Computers</li> <li>Laptop</li> <li>Computers</li> <li>Guest</li> <li>Speaker</li> </ul>	<ul style="list-style-type: none"> <li>atmosphere</li> <li>geologic time</li> <li>nebular cloud</li> <li>theory</li> </ul>
<b>Goal 4.2: Understand Geo-chemical Cycles and Energy in the Earth System</b>	<ul style="list-style-type: none"> <li>8-9.ES.4.2.1 Explain the internal and external energy sources of the earth (654.02a)</li> </ul>	<ul style="list-style-type: none"> <li>Rock Cycle Activity</li> <li>Discussion Water Cycle</li> <li>Plate Tectonic Map</li> <li>Activity</li> <li>Why Volcanoes Go</li> <li>Boom Activity</li> </ul>	<ul style="list-style-type: none"> <li>Overhead</li> <li>Projector</li> <li>Bunsen</li> <li>Burner</li> <li>Erlenmeyer</li> <li>Flasks</li> </ul>	

### **Standard 5: Personal and Social Perspectives; Technology**

Students understand that science and technology interact and impact both society and the environment.

Students describe issues such as water and air quality, hazardous waste, renewable and nonrenewable resources.

<i>Goal – The student will:</i>	<i>Objectives (to be reached by the end of ninth grade)</i>	<i>Samples of Applications</i>	<i>Curriculum Materials (including technological resources)</i>	<i>Key Vocabulary for Standard 5</i>
<b>Goal 5.1: Understand Common Environmental Quality Issues, Both Natural and Human Induced</b>	<ul style="list-style-type: none"> <li>8-9.ES.5.1.1 Analyze environmental issues such as water and air quality, hazardous waste, and depletion of natural resources. (656.01a)</li> </ul>	<ul style="list-style-type: none"> <li>Global Warming Activities</li> <li>Guest Speaker</li> <li>Columbia Plateau Activity</li> <li>Mineral Identification Lab</li> </ul>	<ul style="list-style-type: none"> <li>NEC</li> <li>Projector</li> <li>Mineral Samples</li> <li>Mineral Id. Key</li> </ul>	<ul style="list-style-type: none"> <li>hazardous waste</li> <li>nonrenewable resources</li> <li>renewable resources</li> <li>technology</li> </ul>
<b>Goal 5.2: Understand the Relationship between Science and Technology</b>	<ul style="list-style-type: none"> <li>8-9.ES.5.2.1 Explain how science advances technology. (655.01a)</li> <li>8-9.ES.5.2.2 Explain how technology advances</li> </ul>	<ul style="list-style-type: none"> <li>Video-Deep Sea Vents</li> <li>Planet Model Activity</li> </ul>	<ul style="list-style-type: none"> <li>Internet</li> </ul>	

	<p>science. (655.01a)</p> <ul style="list-style-type: none"> <li>8-9.ES.5.2.3 Explain how science and technology are pursued for different purposes. (655.01b)</li> </ul>	<ul style="list-style-type: none"> <li>The Cost of Cool Video</li> </ul>	<ul style="list-style-type: none"> <li>Laptops</li> <li>NEC</li> <li>Projector</li> <li>Video</li> <li>NEC</li> <li>Projector</li> </ul>	
<p><b>Goal 5.3: Understand the Importance of Natural Resources and the Need to Manage and Conserve Them</b></p>	<ul style="list-style-type: none"> <li>8-9.ES.5.3.1 Describe the difference between renewable and nonrenewable resources. (656.03a)</li> </ul>	<ul style="list-style-type: none"> <li>Global Warming Activities (discussion of fossil fuel consumption)</li> <li>Mineral Id. Lab</li> <li>Mining in Idaho Video</li> </ul>	<ul style="list-style-type: none"> <li>NEC</li> <li>Projector</li> <li>Mineral Samples</li> <li>Video</li> </ul>	

**Terms of significance that are not derived from a particular standard**

abiotic  
 absorb  
 absorption  
 adaptation  
 additives  
 antibiotic  
 atomic mass  
 atomic number  
 ATP  
 autotroph  
 average  
 bacterium  
 biotic  
 blastocyst  
 cell transport  
 cellular respiration  
 centimeter  
 chemical reactivity  
 chloroplast  
 competition  
 concentration  
 daughter cell  
 decaying  
 decline  
 decomposer  
 dilated  
 differentiation  
 dispersion  
 distribute  
 divergence  
 dominant  
 durable  
 ecosystem  
 elements  
 embryonic  
 equivalent  
 fossil fuels  
 gene

glucose  
 habitat  
 heterogeneous  
 heterotroph  
 homogenous  
 hormone  
 inherited  
 isolation  
 lipid  
 mean  
 meiosis  
 meiotic  
 metals  
 micrometer  
 mitochondria  
 mitochondrion  
 mitosis  
 mitotic  
 molecule  
 mutations  
 nanometer  
 native  
 non-metals  
 non-native  
 nucleotide base  
 nucleus  
 organelle  
 oxygenation  
 percent  
 phenotype  
 plausible  
 population  
 predation  
 primary consumer  
 producer  
 product  
 protein  
 protein synthesis

pyruvate  
radioactive decay  
rate  
reactant  
recessive  
recombination  
replication  
resistant

sediment  
selection  
silt  
starch  
stimuli  
turgor  
vacuole  
zygote