



## Moscow School District #281

### Mastery Learning Map

#### 6<sup>th</sup> Grade Science

1. Competency Statements for Nature of Science

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will work collaboratively and individually to generate testable questions or define problems in terms of given constraints and criteria; plan and conduct investigations or apply engineering design practices to analyze and interpret data, and construct and communicate evidence-based explanations or possible optimal solutions.***

1. Students will be able to explain how observations and data are used as evidence on which to base scientific explanations and predictions.
2. Students will be able to use observations to make inferences.
3. Students will be able to use models to explain or demonstrate a concept.
4. Students will be able to make observations and predictions using the "Black Box" mystery activity.

National Standards

# Moscow School District #281

## Mastery Learning Map

6 <sup>th</sup> Grade Science	
<b>2. Competency Statements for Physical Science</b>	<b><i>Students will observe, predict, and analyze patterns in order to support claims about the structure and function of matter and molecules and their interactions</i></b>
<b><i>“Learning Targets”</i></b> <i>are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.</i>	<ol style="list-style-type: none"><li>1. Students will be able to compare and contrast the differences among elements, compounds and mixtures.</li><li>2. Students will be able to define the properties of matter.</li><li>3. Students will be able to compare densities of equal volumes of a solid, a liquid, or a gas.</li><li>4. Describe the effect of temperature on density.</li><li>5. Explain the nature of physical change and how it relates to physical properties (the distance between molecules as water changes from ice to liquid water, and to water vapor).</li><li>6. Describe the effects of different forces (gravity and friction) on the movement, speed, and direction of an object.</li></ol>
<b>National Standards</b>	

# Moscow School District #281

## Mastery Learning Map

6 <sup>th</sup> Grade Science	
<p><b>3. Competency Statements for Living Organisms</b></p> <p><i>“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.</i></p>	<p><b><i>Students will investigate and provide evidence that the cell is the basis of form and function for all living things using evidence to support claims and predictions</i></b></p> <p>1.</p>
National Standards	

# Moscow School District #281

## Mastery Learning Map

### 6<sup>th</sup> Grade Science

**4. Competency Statements for Scale, Proportion, and Quantity**

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will apply reasoning and modeling to determine the proportional relationships in observable and non-observable phenomena in terms of relative scale and quantity.***

1. Explain the interactions among the solid earth, oceans, atmosphere, and organisms.
2. Explain the water cycle and its relationship to weather and climate.
3. Identify cumulus, cirrus, and stratus clouds and how they relate to weather changes.

National Standards

# Moscow School District #281

## Mastery Learning Map

### 6<sup>th</sup> Grade Science

**5. Competency Statements for Systems and System Models**

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will investigate and analyze a natural or human designed system in order to develop and justify a model that accurately represents the system or aspects of the system (e.g., boundaries, inputs, outputs, interactions, and behaviors).***

1. Explain the water cycle and its relationship to weather and climate.
2. Identify cumulus, cirrus, and stratus clouds and how they relate to weather changes.

National Standards

# Moscow School District #281

## Mastery Learning Map

6 <sup>th</sup> Grade Science	
<p><b>6. Competency Statements for Energy and Matter Systems</b></p> <p><i>“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.</i></p>	<p><b><i>Students will analyze evidence (e.g., investigations, models, theories, scenarios) to predict and track changes in the cycling of matter and flow of energy within and between systems in order to identify their possibilities and limitations.</i></b></p> <ol style="list-style-type: none"> <li>1. Explain the interactions among the solid earth, oceans, atmosphere, and organisms.</li> <li>2. Explain the water cycle and its relationship to weather and climate.</li> <li>3. Using an experiment with colored water (heated and frozen), explore how temperature differentials can create currents and how this effects global climate.</li> <li>4. Observe, describe and graph cloud cover at different times of the day. Compare and contrast with the day’s temperature.</li> <li>5. Identify cumulus, cirrus, and stratus clouds and how they relate to weather changes.</li> <li>6. Identify issues for environmental studies.</li> <li>7. Describe how science and technology are part of our society.</li> <li>8. Describe how science and technology are interrelated.</li> <li>9. Explain the difference between renewable and nonrenewable resources.</li> </ol>
National Standards	

# Moscow School District #281

## Mastery Learning Map

### 6<sup>th</sup> Grade Science

**7. Competency Statements for Structure and Function**

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will analyze the relationship among structure and function of natural or human designed objects, using evidence to redesign or support claims about survival and/or improved performance***

1. Explain the water cycle and its relationship to weather and climate.

National Standards

# Moscow School District #281

## Mastery Learning Map

### 6<sup>th</sup> Grade Science

**8. Competency Statements for Stability and Change Systems**

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will analyze and evaluate the stability of natural and human designed systems in order to develop evidence-based explanations and predictions of changes over time.***

1. Explain the interactions among the solid earth, oceans, atmosphere, and organisms.
2. Explain the water cycle and its relationship to weather and climate.

National Standards





## Moscow School District #281

### Mastery Learning Map

#### 7<sup>th</sup> Grade Science

**1. Competency Statements for Cell Structure and Function**

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will be able to conduct an investigation to provide evidence for and explain how living things are made of cells and how the parts contribute to the whole on a cellular level.***

1. Students will be able to use science specific language to characterize living things.
2. Students will be able to describe the needs of living things.
3. Students will be able to conduct an investigation and provide evidence that a living thing is made of cells, and differentiate between living and nonliving things.
4. Students will be able to develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
5. Students will be able to show conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions.
6. Students will be able to identify the parts of specialized plant and animal cells.
7. Students will be able to explain the role of photosynthesis in the cycling of matter and flow of energy through organisms.
8. Students will be able to explain the role of respiration in the cycling of matter and flow of energy through organisms.
9. Students will be able to describe how energy stored in food is primarily derived from the Sun through photosynthesis.
10. Student will be able to differentiate between elements and chemical compounds, and explain the key roles of the five major compounds cells need. (carbohydrates, lipids, proteins, nucleic acids, water)

National Standards

# Moscow School District #281

## Mastery Learning Map

### 7<sup>th</sup> Grade Science

#### 2. Competency Statements for Ecology and the Environment

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will be able to construct explanations about small systems as parts of a whole and the energy flow through ecosystems.***

1. Students will be able to describe the biotic and abiotic factors of an ecosystem and determine how they contribute to the function of the whole.
2. Students will be able to analyze relationships that might challenge or benefit the survival of an organism.
3. Students will be able to critically analyze adaptations and how these adaptations impact their survival, reproduction, and therefore natural selection.
4. Students will be able to explain and provide evidence for ways and reasons an organism might join or leave a population.
5. Students will be able to explain how energy enters food chains and food webs through autotrophs/producers and transfers between organisms as they are consumed for food.
6. Students will be able to analyze and interpret data to show how the amount of energy passed along in a food chain or web is lost.
7. Students will be able to differentiate between producers and consumers, and furthermore differentiate between different kinds and levels of consumers(1st level, 2nd level, herbivore, omnivore, carnivore.)

National Standards

# Moscow School District #281

## Mastery Learning Map

### 7<sup>th</sup> Grade Science

#### 3. Competency Statements for Heredity and Genetics

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will be able to construct a scientific explanation based on evidence, and use models to show how environmental and genetic factors influence organisms.***

1. Students will be able to classify cell division (mitosis) into a three stage process that models how it produces two new identical cells from one original cell, including identical genetic material (chromosomes). The purpose for this is growth repair or reproduction.
2. Students will be able to describe heredity as the passing of traits from parents to offspring.
3. Students will be able to differentiate between genotype and phenotype and show how different patterns of inheritance affect the phenotype.
4. Students will be able to explain how, in sexual reproduction, the passing of traits is accomplished by paired alleles and how in each pair one random allele comes from each parent.
5. Students will be able to construct an explanation of meiosis and describe how it produces unpaired chromosomes that can be matched to produce a variety of combinations that will present as genetic traits.

National Standards

# Moscow School District #281

## Mastery Learning Map

### 7<sup>th</sup> Grade Science

#### 4. Competency Statements for Diversity of Life

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will be able to analyze and interpret data regarding genetic variations of traits in a population and engage in argumentation with evidence of how natural selection impacts genetic variations and may increase some individuals probability to survive.***

1. Students will be able to form an argument based on evidence and scientific reasoning to explain the variety of living things on this planet.
2. Students will be able to describe and show evidence as to how the variety of living things on the planet is a result of change over time due to species adapting to their environment.
3. Students will be able to reflect on and demonstrate how genetic variation is the passing down of desirable traits or adaptations from parents to offspring.

National Standards

# Moscow School District #281

## Mastery Learning Map

### 7<sup>th</sup> Grade Science

#### 5. Competency Statements for Scientific Processes

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

1. Students will be able to use observations to make defensible inferences
2. Students will be able to identify controls and variables used in scientific investigations.
3. Students will be able to evaluate data in order to form conclusions.
4. Students will be able to use evidence and critical thinking to accept or reject a hypothesis.
5. Students will be able to communicate and defend scientific procedures and explanations.
6. Students will be able to make metric measurements using appropriate tools.

National Standards



## Moscow School District #281

### Mastery Learning Map

#### 8<sup>th</sup> Grade Science

1. Competency  
Statements for  
Matter

*“Learning Targets”  
are models of what  
educators may see in  
performance tasks  
when students  
demonstrate their  
increasing  
understanding and  
use of the  
competencies.*

***Students will analyze evidence (e.g., investigations, models, theories, scenarios) to predict and track changes in the cycling of matter and flow of energy within and between systems in order to identify their possibilities and limitations.***

1. Students will be able to create, analyze and interpret data on the properties of substances.
2. Students will be able to predict and describes changes in states of matter when energy is added or removed.
3. Students will be able to recognize and create instances when thermal energy is being released or absorbed.
4. Students will be able to develop models to explain concepts or systems.
5. Students will be able to analyze technical writing, graphs, charts, and diagrams.
6. Students will be able to describe the properties, function, and location of protons, neutrons, and electrons.
7. Students will be able to describe the characteristics of isotopes.
8. Students will be able to state the basic electrical properties of matter.
9. Students will be able to understand the trends within the periodic table and use the trends to explain how the elements will interact with each other.
10. Students will be able to describe how synthetic materials are formed from natural resources and their impact on society.
11. Students will be able to determine when an atom becomes an ion.
12. Students will be able to explain the processes of fission and fusion.
13. Students will be able to explain how chemical reactions may release or consume energy while the quantity of matter remains constant.
14. Students will be able to develop models to describe the atomic composition of molecules.
15. Students will be able to analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
16. Students will be able to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

National Standards	MS-PS1-1, MS-PS1-2, MS-PS1-3, MS-PS1-4, MS-PS1-6

# Moscow School District #281

## Mastery Learning Map

### 8<sup>th</sup> Grade Science

#### 2. Competency Statements for Energy in Systems

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will work collaboratively and individually to generate testable questions or define problems in terms of given constraints and criteria; plan and conduct investigations or apply physical science practices to analyze and interpret data, and construct and communicate evidence-based explanations or possible optimal solutions.***

1. Students will be able to explain that energy can be transformed but cannot be created nor destroyed.
2. Students will be able to classify energy as potential and/or kinetic.
3. Students will be able to construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
4. Students will be able to develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
5. Students will be able to construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
6. Students will be able to explain motion using Newton Laws of Motion.
7. Students will be able to create and read graphical displays of information to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
8. Students will be able to plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object. (Balanced/Unbalanced forces)
9. Students will be able to explain that gravitational interactions are determined by the mass of an object and the distance between those objects.
10. Students will be able to apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.
11. Students will be able to construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
12. Students who demonstrate understanding can apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
13. Students who demonstrate understanding can plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the



particles as measured by the temperature of the sample.

14. Students will be able to explain that energy can be contained in a field.

15. Students will be able to describe the relationships between magnetism and electricity.

16. Students will be able to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

17. Students will be able to determine the factors that affect the strength of electric and magnetic forces using data.

18. Students will be able to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

19. Students will be able to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

20. Students will be able to describe that waves are reflected, absorbed, or transmitted through various materials.

21. Students will be able to reflect on the progression of communication and data transfer using waves.

National Standards

MS-PS2-1, MS-PS2-2, MS-PS2-3, MS-PS2-4, MS-PS2-5, MS-PS3-1, MS-PS3-2, MS-PS3-3, MS-PS3-4, MS-PS3-5, MS-PS4-1, MS-PS4-2, MS-PS4-3

# Moscow School District #281

## Mastery Learning Map

8 <sup>th</sup> Grade Science	
<p><b>3. Competency Statements for Science Concepts</b></p> <p><i>“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.</i></p>	<p style="text-align: center;"><b><i>Students will demonstrate and describe the use of the metric system, appropriate tools for measuring during lab investigations that will be used for gathering data which they will evaluate and analyze to formulate conclusions based on their evidence.</i></b></p> <ol style="list-style-type: none"> <li>1. Students will be able to use observations and data as evidence on which to base scientific explanations.</li> <li>2. Students will be able to measure changes that can occur in and among systems.</li> <li>3. Students will be able to measure and calculate using the metric system.</li> <li>4. Students will be able to use appropriate technology and mathematics to make investigations.</li> <li>5. Students will be able to select and use appropriate tools and equations to collect information.</li> </ol>
National Standards	8-9.PS.1.2.1, 8-9.PS.1.3.1, 8-9.PS.1.3.3, 8-9.PS.1.6.3

# Moscow School District #281

## Mastery Learning Map

### 8<sup>th</sup> Grade Science

**4. Competency Statements for Stability and Change Systems**

*“Learning Targets” are models of what educators may see in performance tasks when students demonstrate their increasing understanding and use of the competencies.*

***Students will analyze and evaluate the stability of natural and human designed systems in order to develop evidence-based explanations and predictions of changes over time.***

1.

National Standards

Insert Standards



Moscow School District #281  
Mastery Learning Map

8<sup>th</sup> Grade Accelerated Science

1. Competency  
Statements for  
Matter

*“Learning Targets”  
are models of what  
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***Students will analyze evidence (e.g., investigations, models, theories, scenarios) to predict and track changes in the cycling of matter and flow of energy within and between systems in order to identify their possibilities and limitations.***

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4. Students will be able to develop models to explain concepts or systems.
5. Students will be able to analyze technical writing, graphs, charts, and diagrams.
6. Students will be able to describe the properties, function, and location of protons, neutrons, and electrons.
7. Students will be able to describe the characteristics of isotopes.
8. Students will be able to state the basic electrical properties of matter.
9. Students will be able to understand the trends within the periodic table and use the trends to explain how the elements will interact with each other.
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11. Students will be able to determine when an atom becomes an ion.
12. Students will be able to explain the processes of fission and fusion.
13. Students will be able to explain how chemical reactions may release or consume energy while the quantity of matter remains constant.
14. Students will be able to develop models to describe the atomic composition of molecules.
15. Students will be able to analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
16. Students will be able to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.



# Moscow School District #281

## Mastery Learning Map

### 8<sup>th</sup> Grade Accelerated Science

#### 2. Competency Statements for Energy in Systems

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4. Students will be able to develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
5. Students will be able to construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
6. Students will be able to explain motion using Newton Laws of Motion.
7. Students will be able to create and read graphical displays of information to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
8. Students will be able to plan an investigation to provide evidence that the change in an objects motion depends on the sum of the forces on the object and the mass of the object. (Balanced/Unbalanced forces)
9. Students will be able to explain that gravitational interactions are determined by the mass of an object and the distance between those objects.
10. Students will be able to apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.
11. Students will be able to construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
12. Students who demonstrate understanding can apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
13. Students who demonstrate understanding can plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

14. Students will be able to explain that energy can be contained in a field.
15. Students will be able to describe the relationships between magnetism and electricity.
16. Students will be able to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.
17. Students will be able to determine the factors that affect the strength of electric and magnetic forces using data.
18. Students will be able to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.
19. Students will be able to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
20. Students will be able to describe that waves are reflected, absorbed, or transmitted through various materials.
21. Students will be able to reflect on the progression of communication and data transfer using waves.
22. Students will be able to identify questions and concepts that guide scientific investigations.
23. Students will be able to utilize the components of scientific problem solving to design, conduct, and communicate results of investigations.
24. Students will be able to use appropriate technology and mathematics to make investigations.
25. Students will be able to formulate scientific explanations and models using logic and evidence.
26. Students will be able to analyze alternative explanations and models.
27. Students will be able to communicate and defend a scientific argument.
28. Students will be able to explain the differences among observations, hypotheses, and theories.
29. Students will be able to analyze technical writing, graphs, charts, and diagrams.

National Standards

MS-PS2-1, MS-PS2-2, MS-PS2-3, MS-PS2-4, MS-PS2-5, MS-PS3-1, MS-PS3-2, MS-PS3-3, MS-PS3-4, MS-PS3-5, MS-PS4-1, MS-PS4-2, MS-PS4-3