**Teacher(s):** Mrs. Breazeale & Ms. Streeter **Subject/Grade:** 7th /Grade Math **Week of: May 8, 2023**

**Domain:** Math Vocabulary & ALL Domains  **Lesson Plan Title:** Math Movie Project 2

|  | **Mississippi College and Career Readiness Standards for 7th Grade Mathematics** |
| --- | --- |
| **The Number System** | **7.NS. 1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.** |
| **Ratios & Proportions** | **7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.** |
| **Expressions & Equations** | **7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations.** |
| **Geometry** | **7.G Draw, construct, and describe geometrical figures and describe the relationships between them.** |
| **Statistics & Probability** | **7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if ...** |

**ESSENTIAL QUESTION:** How will I use mathematical vocabulary, skills, and strategies to create a mathematical skit for the Math Movie 2022-2023?

| **Date** | **Day** | **Focus Question** | **Objective** | **I will…** |
| --- | --- | --- | --- | --- |
| **5/8** | **M** | How can I incorporate math skills learned into a movie script? | TSW use thinking maps to brainstorm skit ideas for the 2023 math movie, write a script, and act. | Incorporate math skills learned into a movie script. |
| **5/9** | **T** | How will I use iReady to enhance my mathematical skills? | TSW choose a lesson on his/her/their path on iReady math and obtain at least one lesson passed and 45 minutes with 80% accuracy. | Use iReady math to enhance my mathematical skills. |
| **3/8** | **W** | 1) How will I examine and analyze my graded test to differentiate between silly mistakes and lack of knowledge?  2) How will I be responsible for my own learning using resources provided to me? | TSW compare their current MPT to the teacher’s guided notes and identify silly mistakes and gaps in learning. | 1) Examine and analyze my graded test to differentiate between silly mistakes and lack of knowledge.  2) Be responsible for my own learning using resources provided to me |
| **3/9** | **R** |  |  |  |
| **3/10** | **F** |  |  |  |

| **Students** | **REMEDIATION & ENRICHMENT** | **Days** |
| --- | --- | --- |
| **Positive 25** | Students will be partnered with a Bubble & Top 25 student to assist with guided practice.  TTW pull students to have conferences/data chats/math talks to clear up any misconceptions and offer support. | M, R, & F  W or R |
| **Bubbles** | During guided practice, these students will have a tutor (T25) and student (P25).  TTW pull students to have conferences/data chats/math talks to clear up any misconceptions and offer support. | M, R, & F  W or R |
| **Top 25** | Students will be partnered with one Bubble and one P25 student during guided practice and assist teaching unknown skills.  TTW pull students to have conferences/data chats/math talks to clear up any misconceptions and offer support. | M, R, & F  W or R |

**Monday: May 8, 2023 & Wednesday: May 11, 2023**

**Bell Ringer:** TSW grab notebook paper and pencil and wait for instructions.

**Anticipatory Set:**

**(Hook)** TTW ask students about their favorite movie. Discuss. **(Real-World Connection)** TTW ask them if they can remember a movie where the characters used math. Discuss. **(Overview)** TTW tell the students that they will be making a math movie as a class project. TTW pass out a rubric.

**Guided Instruction:**

*The teacher will…*

* Say, “Each homeroom will write a script based off the 5 domains we learn in math - The Number Sense, Ratios & Proportions, Equations & Expressions, Geometry, and Statistics & Probability.”
* We will come up with a concept together, and write it together.
* To get inspiration, let’s look at word problems.

**Direct Instruction:**

*The teacher will…*

* Say, I am about to show you a sample movie I have made in the past to get ideas.
* Show the 2020-2021 Math movie pausing at key points for students to write down ideas. (Talk about what we liked and didn’t like.)
* To get inspiration, let’s look at word problems.

**Guided Practice:**

*The student will…*

* Individually or in pairs come up with a concept for their math domain.
* As a class, we vote on the best concept.

**Independent Practice:**

*The student will…*

* Write a script for the math movie.
* Act out the script.

**Closure:** TTW review what all we have done so far.

**Assessment:** Informal Observation

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Tuesday: Mar 7, 2023**

**3 MPT will be given in the morning.**

**Bell Ringer:** TSW get notebook paper, pencil, calculator, and login to iReady.

**Independent Practice: (~50 minutes)**

*The student will…*

* Complete an iReady lesson on their path. (Most student are placed on 7th grade level.)
* Take notes of important vocabulary and at least 3 examples.
* Listen to the lesson out loud so the teacher knows they are listening.
* Pass at least one lesson and obtain 45 minutes.

**Teacher Interventions:**

*The teacher will…*

* NOT help students with the lesson.
* Only help students on their quiz if they have copied the necessary vocabulary and 3 examples from the lesson.

**Assessment:**  Completed iReady Lesson(s)

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Wednesday: Mar 8, 2023**

**Bell Ringer:** TSW grab an item analysis recording sheet and complete their credential at the top. (5 minutes)

**Independent Practice: (40 minutes)**

*The teacher will…*

* Compare their graded test to the teacher’s class set/guided notes and questions.
* Identify careless mistakes and correct them.
* Use the UNRAAVEL test taking strategy for math for questions not understood.
* Use the videos under the topic “Helpful Videos” in Google classroom recommended by the teacher for each question not understood.
* When finished, get on iReady or Math Prodigy and wait patiently to be called to the teacher’s desk to discuss the test and any misconceptions.

**Meanwhile…**

**Teacher Conferences:** TTW will invite individual students to her desk to discuss their most recent MPT and clear up any misconceptions and offer support. (40 minutes)

**Closure:** Staple analysis sheets on top of test and remind students these are due to be signed tomorrow. (1 minutes)

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Thursday: Mar 9, 2023**

**To Be Announced based on the most recent MPT Math data.**

| **Most Missed Standard(s)** | **Objective(s)** | **Activity** |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

**Meanwhile…**

**Teacher Conferences:** TTW will finish inviting individual students to her desk to discuss their most recent MPT and clear up any misconceptions and offer support. (30 minutes)

**Closure:** TTW

**Assessment:** Informal Observation

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Friday: Mar 10, 2023**

**Bell Ringer:** TSW

**Anticipatory Set:**

**(Hook)** TTW **(Real-World Connection)** TTW **(Importance/Relevance)** TTW **(Connect to Prior Learning & Review)** TTW

**Direct Instruction:**

*The teacher will…*

* Say,

**Guided Instruction:**

*The teacher will…*

* Say,

**Guided Practice:**

*The student will…*

* Complete

**Independent Practice:**

*The student will…*

* Complete

**Closure:** TTW

**Assessment:** Informal Observation

**Math Standards**

**The Number System:**

**7.NS. 1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

**7.NS.1a** Describe situations in which opposite quantities combine and make 0.

**7.NS.1b** Understand that p + q is the number located a distance from the absolute value of q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0. Interpret sums of rational numbers by describing real-world contexts.

**7.NS.1c** Understand subtraction of rational numbers as adding the additive inverse. Show that the distance between two rational numbers on a number line is the absolute value of their difference, and apply this principle in real-world contexts.

**7.NS.1d** Apply properties of operations as strategies to add and subtract rational numbers.

**7.NS.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

**7.NS.2a** Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

**7.NS.2b** Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then −p/q = (−p)/q = p/(−q). Interpret quotients of rational numbers by describing real-world contexts.

**7.NS.2c** Apply properties of operations as strategies to multiply and divide rational numbers.

**7.NS.2d** Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

**7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

**Ratios & Proportions:**

**7.RP** Analyze proportional relationships and use them to solve real-world and mathematical problems.

**7.RP.1** Compute unit rates associated with ratios and fractions, including ratios or lengths, areas and other quantities measured in like of different units.

**7.RP.2** Recognize and represent proportional relationships between quantities.

**7.RP.2a** Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

**7.RP.2b**. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

**7.RP.2c**. Represent proportional relationships by equations.

**7.RP.2d** . Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

**7.RP.3** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

**Expressions & Equations:**

**7.EE** Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

**7.EE.1**  Apply properties as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

**7.EE.2** Understand that rewriting an expression in different, yet equivalent, forms in a problem can show how the quantities in it are related.

**7.EE.3** Write an expression from a real world context possibly involving sales tax, tip, discount, gratuity, markup, selling price, perimeter, area, and angle measures of a triangle. • Evaluate an expression given a value for the variable. • Translate a verbal expression into an algebraic expression. • Use manipulatives such as algebra tiles to factor expressions.

**7.EE.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

**7.EE.4a**  Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

**7.EE.4b** Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

**Geometry:**

**7.G** Draw, construct, and describe geometrical figures and describe the relationships between them.

**7.G.1** Solve problems involving geometric figures, including actual lengths and area of a scale drawing.

**7.G.2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

**7.G.3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

**7.G.4** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

**7.G.5**. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

**7.G.6** Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

**Statistics & Probability:**

**7.SP.1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

**7.SP.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

**7.SP.3** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

**7.SP.4** Use measures of center and measures of variability (i.e. inter-quartile range) for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.

**7.SP.5** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

**7.SP.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.

**7.SP.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

**7.SP.7a** Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.

**7.SP.7b.** Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land opened down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?

**7.SP.8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

**7.SP.8a** Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

**7.SP.8b** Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

**7.SP.8c** Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?

**ELA Standards**

**Reading Literature**

**CCR.R.4:** Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

**RL.7.4** Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choice (e.g., alliteration) on meaning and tone.

**CCR.R.9:** Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

**RL.7.9** Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history.

**CCR.R.10:** Read and comprehend complex literary and informational texts independently and proficiently.

**RL.7.10** By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6- 8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

**Reading Informational Text**

**CCR.R.1:** Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

**RI.7.1** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

**CCR.R.7:** Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

**RI.7.7** Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium's portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words)

**CCR.R.9:** Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

**RI.7.9** Analyze how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts.

**CCR.R.10** Read and comprehend complex literary and informational texts independently and proficiently.

**RI.7.10** By the end of the year, read and comprehend literary nonfiction in the grades 6-8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

**Writing**

**CCR.W.1:** Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

**W.7.1a** Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.

**W.7.1b** Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

**W.7.1c** Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence

**CCR.W.2**: Write informative /explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

**W.7.2a** Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.

**W.7.2b** Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

**W.7.2c** Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.

**W.7.2d** Use precise language and domain-specific vocabulary to inform about or explain the topic.

**W.7.2e** Establish and maintain a formal style.

**W.7.2f** Provide a concluding statement or section that follows from and supports the information or explanation presented.

**W.7.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

**W.7.10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

**Speaking & Listening**

**CCR.SL.1**: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others’ ideas and expressing their own clearly and persuasively.

**SL.7.1a** Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under **SL.7.1b** Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.scussion.

**SL.7.1c** Pose questions that elicit elaboration and respond to others’ questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.

**SL.7.1d** Acknowledge new information expressed by others and, when warranted, modify their own views.

**CCR.SL.5:** Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

**SL.7.5** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

**SL.7.6** Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**Language**

**CCR.L.1:** Demonstrate command of the conventions of standard English grammar and usage when writing (printing, cursive, or keyboarding) or speaking.

**L.7.1b** Choose among simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas.

**CCR.L.2:** Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

**L.7.2b** Spell correctly.

**CCR.L.4:** Determine or clarify the meaning of unknown or multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

**L.7.4a** Use context (e.g., the overall meaning of a sentence or paragraph; a word’s position or function in a sentence) as a clue to the meaning of a word or phrase.

**L.7.4b** Use common, grade appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., belligerent, bellicose, rebel).

**L.7.4c** Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**L.7.4d** Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

**CCR.L.6:** Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**L.7.6** Acquire and use accurately grade-appropriate general academic and domain specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**Early World History Standards**

**Civics**

**7C.1** Understand the various roles and expectations of citizens throughout the world and apply that understanding to their role as a citizen of their community, state, and nation.

**4.** Develop understanding of basic human rights and liberties that are at the core of American culture

**7C.2** Examine the challenges of civic engagement in the contemporary world. Compare those rights to those listed in the Universal Declaration of Human Rights.

**1.** Compare the positive and negative impacts of changing technologies on expanding the role of citizens throughout the world and the challenges posed by new media sources to obtaining reliable information upon which to make decisions.

**Science**

**Ecology and Interdependence**

**Conceptual Understanding:** The emphasis is on predicting consistent patterns of interactions among different cycling systems in terms of the relationships between organisms and abiotic components within ecosystems. Rearrangement of food molecules through chemical processes in cellular respiration and photosynthesis is an important part of energy cycling in all life systems. Preservation of biodiversity and consideration of human impacts are themes in maintaining ecosystem services.

**L.7.3** Students will demonstrate an understanding of the importance that matter cycles between living and nonliving parts of the ecosystem to sustain life on Earth.

**L.7.3.1** Analyze diagrams to provide evidence of the importance of the cycling of water, oxygen, carbon, and nitrogen through ecosystems to organisms.

**L.7.3.2** Analyze and interpret data to explain how the processes of photosynthesis, and cellular respiration (aerobic and anaerobic) work together to meet the needs of plants and animals.

**L.7.3.3** Use models to describe how food molecules (carbohydrates, lipids, proteins) are processed through chemical reactions using oxygen (aerobic) to form new molecules.

**L.7.3.4** Explain how disruptions in cycles (e.g., water, oxygen, carbon, and nitrogen) affect biodiversity and ecosystem services (e.g., water, food, and medications) which are needed to sustain human life on Earth.

**L.7.3.5** Design solutions for sustaining the health of ecosystems to maintain biodiversity and the resources needed by humans for survival (e.g., water purification, nutrient recycling, prevention of soil erosion, and prevention or management of invasive species).\*

**Earth’s Systems & Cycles**

**Conceptual Understanding**: Complex patterns in the movement of air and water in the atmosphere are major determinants of local weather. Global movements of water and its changes in form are propelled by sunlight and gravity. Variations in temperature drive a global pattern of interconnected currents. Interactions between sunlight, oceans, atmosphere, ice, landforms, and living things vary with latitude, altitude, and local and regional geography. Weather is difficult to predict; however, large-scale patterns and trends in global climate, such as the gradual increase in average temperature, are more easily observed and predicted.

**E.7.9A** Students will demonstrate an understanding of how complex changes in the movement and patterns of air and water molecules caused by the sun, winds, landforms, ocean temperatures, and currents in the atmosphere are major determinants of local and global weather patterns.

**E.7.9A.1** Analyze and interpret weather patterns from various regions to differentiate between weather and climate.

**E.7.9A.2** Analyze evidence to explain the weather conditions that result from the relationship between the movement of water and air masses.

**E.7.9A.3** Interpret atmospheric data from satellites, radar, and weather maps to predict weather patterns and conditions.

**E.7.9A.4** Construct an explanation for how climate is determined in an area using global and surface features (e.g. latitude, elevation, shape of the land, distance from water, global winds and ocean currents).

**E.7.9A.5** Analyze models to explain the cause and effect relationship between solar energy and convection and the resulting weather patterns and climate conditions.

**E.7.9A.6** Research and use models to explain what type of weather (thunderstorms, hurricanes, and tornadoes) results from the movement and interactions of air masses, high and low pressure systems, and frontal boundaries.

**E.7.9A.7** Interpret topographic maps to predict how local and regional geography affect weather patterns and make them difficult to predict.

**Conceptual Understanding:** The tilt of Earth’s spin axis with respect to the plane of its orbit around the sun is important for a habitable Earth. The Earth’s spin axis is tilted 23.5 degrees. Earth’s axis points in the same direction in space no matter where Earth is in relation to the sun. The seasons are a result of this tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. E.7.9C Students will demonstrate an understanding that the seasons are the direct result of the Earth’s tilt and the intensity of sunlight on the Earth’s hemispheres.

**E.7.9C** Students will demonstrate an understanding that the seasons are the direct result of the Earth’s tilt and the intensity of sunlight on the Earth’s hemispheres.

**E.7.9C.1** Construct models and diagrams to illustrate how the tilt of Earth’s axis results in differences in intensity of sunlight on the Earth’s hemispheres throughout the course of one full revolution around the Sun.

**E.7.9C.2** Investigate how variations of sunlight intensity experienced by each hemisphere (to include the equator and poles) create the four seasons.