UPDATED 2022 8th Grade Math
Link Community Charter School

UNITS (7/7 SELECTED)	SUGGESTED DURATION
⬜ Unit 1: Scientific Notation, Exponents and Irrational Numbers	*24 lessons*
⬜ Unit 2: Rigid Motions and Congruent Figures	*22 lessons*
⬜ Unit 3: Dilations and Similar Figures	*17 lessons*
⬜ Unit 4: Linear Equations in One and Two Variables	*27 lessons*
⬜ Unit 5: Systems of Linear Equations	*14 lessons*
⬜ Unit 6: Functions and Bivariate Statistics	*25 lessons*
⬜ Unit 7: Irrational Numbers - Part 2 of Unit 1	*1 lessons*

Unit 1: Scientific Notation, Exponents and Irrational Numbers

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)

8.EE.A.3

Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.

8.EE.A.4

Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

National Common Core - Mathematical Practice

2.

Reason abstractly and quantitatively.

3.

Construct viable arguments and critique the reasoning of others.

6.

Attend to precision.

7.

Look for and make use of structure.

8.

Look for and express regularity in repeated reasoning.

Unit 1: Scientific Notation, Exponents and Irrational Numbers

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Established Goals
In Module 1, students' knowledge of operations on numbers is expanded to include operations on numbers in integer exponents. Module 1 also builds on students' understanding from previous grades with regard to transforming expressions. Students were introduced to exponential notation in Grade 5 as they used whole number exponents to denote powers of ten. In Grade 6, students expanded the use of exponents to include bases other than ten as they wrote and evaluated exponential expressions limited to whole-number exponents. Students made use of exponents again in Grade 7 as they learned formulas for the area of a circle and volume.

Transfer
Students will be able to independently use their learning to...   • Write an estimation of a large quantity by expressing it as the product of a singledigit number and a positive power of ten.   • Write an estimation of a very small quantity by expressing it as the product of a single-digit number and a negative power of ten.   • Compare quantities written as the product of a single-digit number and a power of ten.   • Solve operations (+, -, x, ÷) with two numbers expressed in scientific notation, including problems that include both decimals and scientific notation.   • Use scientific notation and choose units of appropriate size for very large or very small measurements.   • Interpret scientific notation that has been generated by technology.

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • nth roots and nth powers are inverse operations. • Very large and very small numbers are represented using a single digit times an integer power of 10 (scientific notation). • Powers can be used to shorten the representation of repeated multiplication. • Operations and properties of exponents are used	Students will keep considering... • How are properties of exponents used to simplify numerical expressions? • How is scientific notation used to represent numbers? • How are numbers compared and manipulated using scientific notation?

Meaning	
to determine the value and/or compare numbers in both decimal and scientific notation. • Numbers can be represented in scientific notation and still be manipulated using operations such as addition, subtraction, multiplication, and division.	

Acquisition	
Knowledge	**Skills**
Students will know... • The properties of integer exponents. • That positive powers of 10 represent very large quantities and negative powers of 10 represent very small quantities. • Scientific notation is the representation of a decimal as a product of a leading decimal and a power of 10. • Order of magnitude is the exponent in the power of 10 when that decimal is expressed in scientific notation.	Students will be skilled at... • Applying the properties of integer exponents to generate equivalent numerical expressions. • Comparing the magnitudes of numbers written in scientific notation. • Converting between scientific notation and standard notation.

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment • Weekly Exit Tickets • Performance Task • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets • Daily Exit Tickets • Station data • Informal checks for understanding

Unit 1: Scientific Notation, Exponents and Irrational Numbers

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Summary of Key Learning Events and Instruction:

<u>Week 1</u>: Topic A

- Lessons 1-4

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 2</u>: Topic A & Mid-Mod

- Lesson 5

- Daily Exit Tickets

- Topic A Review

- Mid-Module Assessment

<u>Week 3</u>: Topic B

- Lessons 7-11

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 4</u>: Topic B & End-of-Mod

- Lessons 12&13

- Daily Exit Tickets

- Topic B Review

- End-of-Module Assessment

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Special Education	ELLS
• Adhere to all modifications and health concerns stated in each IEP • Provide students a choice board, allowing students to pick assignments from different levels based on difficulty. Provide supportive strategies: ◦ Educator or para reading aloud text or tech read-aloud ◦ Develop or provide graphic organizers ◦ Small group and one-on-one instruction ◦ Easy to find information on Google Classroom ◦ Personal copies of anchor charts and notes ◦ Vocabulary list with visuals ◦ Extended time on assignments and assessments • Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing. • Provide tech support for recording oral or video answers • Provide breaks between tasks, use positive reinforcement, use proximity • Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives • Use any suggestions provided by the specific text for a curriculum	• Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction • During i-Ready lessons, click on "Español" to hear specific words in Spanish • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems • Utilize program translations (if available) for L1/ L2 students • Reword questions in simpler language • Make use of the ELL Mathematical Language Routines (click here for additional information) • Scaffolding instruction for ELL Learners • Use any suggestions provided by the specific text for a curriculum

Gifted and Talented	Students At Risk For Failure
• Elevated contextual complexity (use leveled books via tech resources such as NEWSELA) • Inquiry based or open ended assignments and projects • Add in inquiry-based questions and research opportunities to existing projects • More time to study concepts with greater depth through independent study or genius hour projects • Promote the synthesis of concepts and making real world connections • Provide students with enrichment opportunities and experiences suggested by the curriculum • Provide opportunities for competitions (math, science, writing, art, etc) • Alternative instruction pathways available	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum • Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Field Trips, Google Expeditions, Peer Support, one on one instruction • Assure constant parental/ guardian contact throughout the year with successes and challenges • Design and provide academic contracts to students and guardians with clear goals and deadlines • Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. • Always plan to address students at risk in your learning tasks, instructions, and directions. Try to anticipate where the needs will be and then address them prior to lessons. • Use the programs intended for remediation ancillary to the curriculum (i.e. IXL or iReady for math)

*Strategies for Students with 504 Plans

The goal of 504 plans is for students to be educated in regular classrooms along with the services, accommodations, or educational aids they might need. Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

· walk, breathe, eat, or sleep
· communicate, see, hear, or speak
· read, concentrate, think, or learn

· stand, bend, lift, or work

<u>General program accommodations/adjustments or services are always made on a case-by-case basis and individualized</u>. Accommodations are to be reasonable and are intended to provide persons with disabilities compensation for their functional limitation(s) due to a mental or physical impairment. Where Section 504 is concerned, accommodations are made to bring a student with a disability to the same starting point as a non-disabled student. Consequently, the accommodations defined in a Section 504 plan are those interventions that are not typically available to all students.

Environmental Strategies
- Provide a structured learning environment
- Make separate "space" for different types of tasks
- Possible adapting of non-academic times such as lunch, recess, and physical education
- Change student seating
- Utilize a study carrel
- Alter location or personal or classroom supplies for easier access or to minimize distraction
- Provide sensory breaks
- Provide a written or picture schedule

Organizational Strategies
- Model and reinforce organizational systems (i.e. color-coding)
- Write out homework assignments, check student's recording of assignments
- Tailor homework assignments toward student strengths
- Set time expectations for assignments
- Provide clues such as clock faces indicating beginning and ending times
- Teach study/organizational skills
- Schedule before or after school tutoring/homework assistance

Behavioral Strategies
- Use behavioral management techniques consistently within a classroom and across classes
- Implement behavioral/academic contracts
- Utilize positive verbal and/or nonverbal reinforcements
- Utilize logical consequences
- Confer with the student's parents (and student as appropriate)
- Establish a home/school communication system for behavior monitoring
- Post rules and consequences for classroom behavior
- Put student on daily/weekly progress report/contract
- Reinforce self-monitoring and self-recording of behaviors

Presentation Strategies
- Record lessons so the student can listen to them again; allow students to record lessons
- Use computer-aided instruction and other audiovisual equipment
- Select alternative digital/audio textbooks, workbooks, or provide books
- Highlight main ideas and supporting details in the book
- Provide copied material for extra practice (i.e. outlines, study guides)
- Prioritize drill and practice activities for relevance

- Vary the method of lesson presentation using multi-sensory techniques:

  a) lecture plus overhead/board demonstration support
  b) small groups required to produce a written product
  c) large groups required to demonstrate a process
  d) computer-assisted instruction
  e) peer tutors or cross-age tutors
  f) demonstrations, simulations
  g) experiments
  h) games

- Ask student to repeat/paraphrase context to check understanding
- Arrange for a mentor to work with student in his or her interest area or area of greatest strength
- Provide peer tutoring
- Simplify and repeat instructions about in-class and homework assignments
- Vary instructional pace
- Reinforce the use of compensatory strategies, i.e. pencil grip, mnemonic devices, "spell check"
- Vary kind of instructional materials used
- Assess whether the student has the necessary prerequisite skills.
- Reinforce study skill strategies (survey, read, recite, review)
- Introduce definition of new terms/vocabulary and review to check for understanding
- Be aware of student's preferred learning style and provide matching instruction materials
- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material

Assignments
- Modify the amount of homework
- Use written directions to supplement oral directions
- Reduce paper and pencil tasks
- Allow for assignments to be word processed
- Lower reading level of assignments
- Break assignments into a series of smaller assignments
- Use highlighted texts

Evaluation Methods
- Limit amount of material presented on a single page
- Provide a sample or practice test
- Provide for oral testing
- Provide tests in segments so that student hands in one segment before receiving the
- next part
- Provide personal copy of test tools and allow for color-coding/highlighting
- Adjust time for completion
- Modify weights of tests when grading

[*Adapted from Orange Public Schools Curriculum Guide](#)

Unit 2: Rigid Motions and Congruent Figures

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)
8.G.A.1
Verify experimentally the properties of rotations, reflections, and translations:
8.G.A.1.a
Lines are transformed to lines, and line segments to line segments of the same length.
8.G.A.1.b
Angles are transformed to angles of the same measure.
8.G.A.1.c
Parallel lines are transformed to parallel lines.
8.G.A.2
Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.A.5
Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.
8.G.B.6
Explain a proof of the Pythagorean Theorem and its converse.
8.G.B.7
Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
National Common Core - Mathematical Practice
2.
Reason abstractly and quantitatively.

3.
Construct viable arguments and critique the reasoning of others.
5.
Use appropriate tools strategically.
6.
Attend to precision.

Unit 2: Rigid Motions and Congruent Figures

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Established Goals
In this module, students learn about translations, reflections, and rotations in the plane and, more importantly, how to use them to precisely define the concept of congruence. Up to this point, congruence has been taken to mean, intuitively, same size and same shape. Because this module begins with a serious study of geometry, this intuitive definition must be replaced by a precise definition. This module is a first step; its goal is to provide the needed intuitive background for the precise definitions that are introduced in this module for the first time.

Transfer
Students will be able to independently use their learning to...   • Verify by measuring and comparing the properties of rotated, reflected or translated geometric figures.   • Verify that corresponding lines and line segments remain the same length.   • Verify that corresponding angles have the same measure.   • Verify that corresponding parallel lines remain parallel.   • Explain that a two-dimensional figure is congruent to another if the second figure can be made from the first by rotations, reflections and translations.   • Describe a sequence of transformations that shows the congruence between two figures.   • Informally prove that the sum of any triangle's interior angles will be the same measure as a straight angle (180 degrees).   • Informally prove that the sum of any polygon's exterior angles will be 360 degrees.   • Estimate the relationships and measurements of the angles created when two parallel lines are cut by a transversal.   • Use the Pythagorean Theorem to determine if a given triangle is a right triangle.   • Apply the Pythagorean Theorem to find an unknown side length of a right triangle.

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • Congruent figures can be formed by a series of transformations.	Students will keep considering... • Why does one need to perform transformations on figures?

Meaning	
• Similar figures can be formed by a series of transformations. • Understand angle relationships in one and two-dimensional figures. • Rotations, reflections, and translations take: -lines to lines -line segments to line segments of the same length -angles to angles of the same measure -parallel lines to parallel lines. • A two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. • A two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations. • There are relationships between the interior and exterior angles of a triangle. • When two angles of one triangle are congruent to two angles of another triangle, the third angles are also congruent.	• How does knowing two figures are congruent or similar help one to solve problems? • How can you use models of one and two-dimensional figures to show congruent figures? • How can you use models of one and two-dimensional figures to show similar figures?

Acquisition	
Knowledge	**Skills**
Students will know... • A transformation is angle preserving if, for any given angle, the angle measure of the image is equal to the measure of the original angle. • A basic rigid motion is a rotation, reflection, or translation on a plane that is distance-preserving. • A congruence is a finite composition of basic rigid	Students will be skilled at... • Stating the properties of translations, reflections, and rotations. • Determining whether two figures are congruent by mapping one onto another with transformations. • Using the Angle-Sum Theorem to determine missing interior angle measures of a triangle.

Unit 2: Rigid Motions and Congruent Figures

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Acquisition
motions on a plane. • Two figures on a plane are congruent if there exists a congruence that maps one figure onto the other. • A transformation is distance preserving if the distance between the images of two points is always equal to the distance between the original two points. • A sequence of transformations is a transformation that is a sequence of two or more transformations given by applying the first transformation followed by applying the next transformation in the sequence to the image of the first transformation, and so on. • Given a pair of lines ?? and ?? in a plane, a third line ?? is a transversal if it intersects ?? at a single point and intersects ?? at a single but different point. • A vector is a directed line segment.	• Determining measures of angles created when two parallel lines are cut by a transversal. • Applying the Pythagorean Theorem to find the missing sides of right triangles.

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment • Weekly Exit Tickets • Performance Task • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets • Daily Exit Tickets • Station data • Informal checks for understanding

Unit 2: Rigid Motions and Congruent Figures

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Summary of Key Learning Events and Instruction:

<u>Week 1</u>: Topic A

- Lessons 1-4

- Daily Exit Tickets

- Friday Flex: Show What You Know!

-START STRONG TESTING-

<u>Week 2</u>: Topic A & B

- Lesson 5-6

- Lessons 7-9

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 3</u>: Topic B & Mid-Mod

- Lesson 10

- Daily Exit Tickets

- Topic A&B Review

- Mid-Module Assessment

<u>Week 4</u>: Topic C

- Lessons 11-14

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 5</u>: End-of-Mod

- Topic C Review

- End-of-Module Assessment

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Special Education	ELLS
• Adhere to all modifications and health concerns stated in each IEP • Provide students a choice board, allowing students to pick assignments from different levels based on difficulty. Provide supportive strategies: ◦ Educator or para reading aloud text or tech read-aloud ◦ Develop or provide graphic organizers ◦ Small group and one-on-one instruction ◦ Easy to find information on Google Classroom ◦ Personal copies of anchor charts and notes ◦ Vocabulary list with visuals ◦ Extended time on assignments and assessments • Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing. • Provide tech support for recording oral or video answers • Provide breaks between tasks, use positive reinforcement, use proximity • Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives • Use any suggestions provided by the specific text for a curriculum	• Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction • During i-Ready lessons, click on "Español" to hear specific words in Spanish • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems • Utilize program translations (if available) for L1/ L2 students • Reword questions in simpler language • Make use of the ELL Mathematical Language Routines (click here for additional information) • Scaffolding instruction for ELL Learners • Use any suggestions provided by the specific text for a curriculum

Gifted and Talented	Students At Risk For Failure
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The goal of 504 plans is for students to be educated in regular classrooms along with the services, accommodations, or educational aids they might need. Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

· walk, breathe, eat, or sleep
· communicate, see, hear, or speak
· read, concentrate, think, or learn

· stand, bend, lift, or work

<u>General program accommodations/adjustments or services are always made on a case-by-case basis and individualized</u>. Accommodations are to be reasonable and are intended to provide persons with disabilities compensation for their functional limitation(s) due to a mental or physical impairment. Where Section 504 is concerned, accommodations are made to bring a student with a disability to the same starting point as a non-disabled student. Consequently, the accommodations defined in a Section 504 plan are those interventions that are not typically available to all students.

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- Provide a structured learning environment
- Make separate "space" for different types of tasks
- Possible adapting of non-academic times such as lunch, recess, and physical education
- Change student seating
- Utilize a study carrel
- Alter location or personal or classroom supplies for easier access or to minimize distraction
- Provide sensory breaks
- Provide a written or picture schedule

Organizational Strategies
- Model and reinforce organizational systems (i.e. color-coding)
- Write out homework assignments, check student's recording of assignments
- Tailor homework assignments toward student strengths
- Set time expectations for assignments
- Provide clues such as clock faces indicating beginning and ending times
- Teach study/organizational skills
- Schedule before or after school tutoring/homework assistance

Behavioral Strategies
- Use behavioral management techniques consistently within a classroom and across classes
- Implement behavioral/academic contracts
- Utilize positive verbal and/or nonverbal reinforcements
- Utilize logical consequences
- Confer with the student's parents (and student as appropriate)
- Establish a home/school communication system for behavior monitoring
- Post rules and consequences for classroom behavior
- Put student on daily/weekly progress report/contract
- Reinforce self-monitoring and self-recording of behaviors

Presentation Strategies
- Record lessons so the student can listen to them again; allow students to record lessons
- Use computer-aided instruction and other audiovisual equipment
- Select alternative digital/audio textbooks, workbooks, or provide books
- Highlight main ideas and supporting details in the book
- Provide copied material for extra practice (i.e. outlines, study guides)
- Prioritize drill and practice activities for relevance

- Vary the method of lesson presentation using multi-sensory techniques:

  a) lecture plus overhead/board demonstration support
  b) small groups required to produce a written product
  c) large groups required to demonstrate a process
  d) computer-assisted instruction
  e) peer tutors or cross-age tutors
  f) demonstrations, simulations
  g) experiments
  h) games

- Ask student to repeat/paraphrase context to check understanding
- Arrange for a mentor to work with student in his or her interest area or area of greatest strength
- Provide peer tutoring
- Simplify and repeat instructions about in-class and homework assignments
- Vary instructional pace
- Reinforce the use of compensatory strategies, i.e. pencil grip, mnemonic devices, "spell check"
- Vary kind of instructional materials used
- Assess whether the student has the necessary prerequisite skills.
- Reinforce study skill strategies (survey, read, recite, review)
- Introduce definition of new terms/vocabulary and review to check for understanding
- Be aware of student's preferred learning style and provide matching instruction materials
- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material

Assignments
- Modify the amount of homework
- Use written directions to supplement oral directions
- Reduce paper and pencil tasks
- Allow for assignments to be word processed
- Lower reading level of assignments
- Break assignments into a series of smaller assignments
- Use highlighted texts

Evaluation Methods
- Limit amount of material presented on a single page
- Provide a sample or practice test
- Provide for oral testing
- Provide tests in segments so that student hands in one segment before receiving the
- next part
- Provide personal copy of test tools and allow for color-coding/highlighting
- Adjust time for completion
- Modify weights of tests when grading

*Adapted from Orange Public Schools Curriculum Guide

Unit 3: Dilations and Similar Figures

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)
8.G.A.3
Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.A.4
Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
8.G.A.5
Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.
8.G.B.6
Explain a proof of the Pythagorean Theorem and its converse.
8.G.B.7
Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
National Common Core - Mathematical Practice
3.
Construct viable arguments and critique the reasoning of others.
4.
Model with mathematics.
6.
Attend to precision.
8.
Look for and express regularity in repeated reasoning.

Unit 3: Dilations and Similar Figures

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Established Goals

In Module 3, students learn about dilation and similarity and apply that knowledge to a proof of the Pythagorean theorem based on the angle-angle criterion for similar triangles. The module begins with the definition of dilation, properties of dilations, and compositions of dilations. The instruction regarding dilation in Module 3 is structured similarly to the instruction regarding concepts of basic rigid motions in Module 2. One overarching goal of this module is to replace the common idea of "same shape, different sizes" with a definition of similarity that can be applied to geometric shapes that are not polygons, such as ellipses and circles.

Transfer

Students will be able to independently use their learning to...

- Describe the changes to the x- and y-coordinates of a figure after either dilation, translation, rotation or reflection.
- Explain how transformation can be used to prove that two figures are similar.
- Describe a sequence of transformations that either prove or disprove that two figures are similar.
- Informally prove that the sum of any triangle's interior angles will be the same measure as a straight angle (180 degrees).
- Estimate the relationships and measurements of the angles created when two parallel lines are cut by a transversal.
- Use the Pythagorean Theorem to determine if a given triangle is a right triangle.
- Apply the Pythagorean Theorem to find an unknown side length of a right triangle or the distance between two points on a coordinate grid.

Meaning

Big Ideas & Understandings	Essential Questions
Students will understand that... • Congruence of corresponding angles determines similarity only for triangles. • You must show that there is a sequence of similarity transformations that map one	Students will keep considering... • How can transformations be used to determine congruence and similarity? • What effects do dilations have on two-dimensional geometric figures?

Unit 3: Dilations and Similar Figures

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Meaning	
figure to the other. Sequences of geometric transformations can be used to create similar shapes. • Slope can be represented as a unit rate, and the knowledge of right triangles can be applied to represent slope. • The concept of slope can be represented visually as a set of right triangles that are similar for each line.	• What is the meaning of the slope of a line, in the context of the situation? • How is slope connected to similarity of triangles?

Acquisition	
Knowledge	**Skills**
Students will know... • Dilation is enlarging or shrinking a figure on a plane by a scale factor *r*. • A scale drawing is an image that shows an original figure with accurate sizes reduced or enlarged by a certain amount (the scale factor *r*). • Two figures in a plane are similar if there exists a similarity transformation taking one figure onto the other figure. • A congruence is a similarity with scale factor 1. • A transversal is a line that crosses a series of other lines, creating various types of angle relationships.	Students will be skilled at... • Describing the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. • Determining whether two figures are similar to one another. • Finding the measures of angles by using the angle relationships in a transversal. • Explaining a proof of the Pythagorean Theorem and its converse. • Applying the Pythagorean Theorem to determine unknown side lengths in right triangles.

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment • Weekly Exit Tickets • Performance Task • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets • Daily Exit Tickets • Station data • Informal checks for understanding

Unit 3: Dilations and Similar Figures

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Summary of Key Learning Events and Instruction:

Week 1: Topic A

- Lessons 1-4

- Daily Exit Tickets

- Friday Flex: Show What You Know!

Week 2: Topic A & Mid-Mod

- Lesson 5-7

- Daily Exit Tickets

- Topic A Review

- Mid-Module Assessment

Week 3: Topic B

- Lessons 8-12

- Daily Exit Tickets

- Friday Flex: Show What You Know!

Week 4: Topic B & End-of-Mod

- Topic B Review

- End-of-Module Assessment

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Special Education	ELLS

• Adhere to all modifications and health concerns stated in each IEP
• Provide students a choice board, allowing students to pick assignments from different levels based on difficulty.
 	
Provide supportive strategies:
 	
  ◦ Educator or para reading aloud text or tech read-aloud
  ◦ Develop or provide graphic organizers
  ◦ Small group and one-on-one instruction
  ◦ Easy to find information on Google Classroom
  ◦ Personal copies of anchor charts and notes
  ◦ Vocabulary list with visuals
  ◦ Extended time on assignments and assessments
 	
• Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing.
• Provide tech support for recording oral or video answers
• Provide breaks between tasks, use positive reinforcement, use proximity
• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives
• Use any suggestions provided by the specific text for a curriculum
	• Use manipulatives to promote conceptual understanding and enhance vocabulary usage
	• Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction
	• During i-Ready lessons, click on "Español" to hear specific words in Spanish
	• Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information
	• Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems
	• Utilize program translations (if available) for L1/ L2 students
	• Reword questions in simpler language
	• Make use of the ELL Mathematical Language Routines (click here for additional information)
	• Scaffolding instruction for ELL Learners
	• Use any suggestions provided by the specific text for a curriculum

Gifted and Talented	Students At Risk For Failure
• Elevated contextual complexity (use leveled books via tech resources such as NEWSELA) • Inquiry based or open ended assignments and projects • Add in inquiry-based questions and research opportunities to existing projects • More time to study concepts with greater depth through independent study or genius hour projects • Promote the synthesis of concepts and making real world connections • Provide students with enrichment opportunities and experiences suggested by the curriculum • Provide opportunities for competitions (math, science, writing, art, etc) • Alternative instruction pathways available	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum • Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Field Trips, Google Expeditions, Peer Support, one on one instruction • Assure constant parental/ guardian contact throughout the year with successes and challenges • Design and provide academic contracts to students and guardians with clear goals and deadlines • Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. • Always plan to address students at risk in your learning tasks, instructions, and directions. Try to anticipate where the needs will be and then address them prior to lessons. • Use the programs intended for remediation ancillary to the curriculum (i.e. IXL or iReady for math)

*Strategies for Students with 504 Plans

The goal of 504 plans is for students to be educated in regular classrooms along with the services, accommodations, or educational aids they might need. Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn

· stand, bend, lift, or work

General program accommodations/adjustments or services are always made on a case-by-case basis and individualized. Accommodations are to be reasonable and are intended to provide persons with disabilities compensation for their functional limitation(s) due to a mental or physical impairment. Where Section 504 is concerned, accommodations are made to bring a student with a disability to the same starting point as a non-disabled student. Consequently, the accommodations defined in a Section 504 plan are those interventions that are not typically available to all students.

Environmental Strategies
- Provide a structured learning environment
- Make separate "space" for different types of tasks
- Possible adapting of non-academic times such as lunch, recess, and physical education
- Change student seating
- Utilize a study carrel
- Alter location or personal or classroom supplies for easier access or to minimize distraction
- Provide sensory breaks
- Provide a written or picture schedule

Organizational Strategies
- Model and reinforce organizational systems (i.e. color-coding)
- Write out homework assignments, check student's recording of assignments
- Tailor homework assignments toward student strengths
- Set time expectations for assignments
- Provide clues such as clock faces indicating beginning and ending times
- Teach study/organizational skills
- Schedule before or after school tutoring/homework assistance

Behavioral Strategies
- Use behavioral management techniques consistently within a classroom and across classes
- Implement behavioral/academic contracts
- Utilize positive verbal and/or nonverbal reinforcements
- Utilize logical consequences
- Confer with the student's parents (and student as appropriate)
- Establish a home/school communication system for behavior monitoring
- Post rules and consequences for classroom behavior
- Put student on daily/weekly progress report/contract
- Reinforce self-monitoring and self-recording of behaviors

Presentation Strategies
- Record lessons so the student can listen to them again; allow students to record lessons
- Use computer-aided instruction and other audiovisual equipment
- Select alternative digital/audio textbooks, workbooks, or provide books
- Highlight main ideas and supporting details in the book
- Provide copied material for extra practice (i.e. outlines, study guides)
- Prioritize drill and practice activities for relevance

- Vary the method of lesson presentation using multi-sensory techniques:

  > a) lecture plus overhead/board demonstration support
  > b) small groups required to produce a written product
  > c) large groups required to demonstrate a process
  > d) computer-assisted instruction
  > e) peer tutors or cross-age tutors
  > f) demonstrations, simulations
  > g) experiments
  > h) games

- Ask student to repeat/paraphrase context to check understanding
- Arrange for a mentor to work with student in his or her interest area or area of greatest strength
- Provide peer tutoring
- Simplify and repeat instructions about in-class and homework assignments
- Vary instructional pace
- Reinforce the use of compensatory strategies, i.e. pencil grip, mnemonic devices, "spell check"
- Vary kind of instructional materials used
- Assess whether the student has the necessary prerequisite skills.
- Reinforce study skill strategies (survey, read, recite, review)
- Introduce definition of new terms/vocabulary and review to check for understanding
- Be aware of student's preferred learning style and provide matching instruction materials
- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material

Assignments
- Modify the amount of homework
- Use written directions to supplement oral directions
- Reduce paper and pencil tasks
- Allow for assignments to be word processed
- Lower reading level of assignments
- Break assignments into a series of smaller assignments
- Use highlighted texts

Evaluation Methods
- Limit amount of material presented on a single page
- Provide a sample or practice test
- Provide for oral testing
- Provide tests in segments so that student hands in one segment before receiving the
- next part
- Provide personal copy of test tools and allow for color-coding/highlighting
- Adjust time for completion
- Modify weights of tests when grading

*Adapted from Orange Public Schools Curriculum Guide

Unit 4: Linear Equations in One and Two Variables

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)

8.EE.B.5

Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

8.EE.B.6

Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.

8.EE.C.7

Solve linear equations in one variable.

8.EE.C.7.a

Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).

8.EE.C.7.b

Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

8.EE.C.8

Analyze and solve pairs of simultaneous linear equations.

8.EE.C.8.a

Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

8.EE.C.8.b

Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.

8.EE.C.8.c

Unit 4: Linear Equations in One and Two Variables

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

National Common Core - Mathematical Practice
1.
Make sense of problems and persevere in solving them.
2.
Reason abstractly and quantitatively.
3.
Construct viable arguments and critique the reasoning of others.
4.
Model with mathematics.
7.
Look for and make use of structure.

Unit 4: Linear Equations in One and Two Variables

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Established Goals
In Module 4, students extend what they already know about unit rates and proportional relationships to linear equations and their graphs. Students understand the connections between proportional relationships, lines, and linear equations in this module. Also, students learn to apply the skills they acquired in Grades 6 and 7 with respect to symbolic notation and properties of equality to transcribe and solve equations in one variable and then in two variables.

Transfer
Students will be able to independently use their learning to...   • Graph proportional relationships, interpreting the unit rate as the slope of the graph.   • Explain that an equation in the form of $y = mx$ will represent the graph of a proportional relationship with a slope of m and y-intercept of 0.   • Explain that an equation in the form of $y = mx + b$ represents the graph of a linear relationship with a slope of m and a y-intercept of b.   • Solve linear equations in one variable.   • Simplify a linear equation by using the distributive property and combining like terms.   • Give examples of linear equations with one solution, infinitely many solutions or no solutions.   • Analyze and solve pairs of simultaneous linear equations.   • Explain solutions to a system of two linear equations in two variables as the point of intersection of their graph.   • Solve a system of two equations (linear) in two unknowns algebraically.   • Identify cases in which a system of two equations in two unknowns has no solution or an infinite number of solutions.   • Solve real-world and mathematical problems leading to two linear equations in two variables.

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that...	Students will keep considering...

Unit 4: Linear Equations in One and Two Variables

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Meaning	
• The slope of a line is a constant rate of change and represents the steepness of the line • A proportional relationship has a constant rate of change (or unit rate), known as the slope. • Equations for proportional relationships are linear equations of the form y=mx, where m is the unit rate or slope. • Equations for linear relationship are of the form y=mx, where m is the unit rate or slope and goes through the origin or y=mx+b for a line intercepting the vertical axis at b.	• How can the value of an unknown variable be found? • What is the significance of the slope and y-intercept in a linear equation? • Why is "Order of Operations" important to know and understand when solving an equation? • Why is it useful to graph two linear equations to find a solution for x? • How can real world situations be modeled by systems?

Acquisition	
Knowledge	**Skills**
Students will know... • The average speed of an object in a given time frame is the distance traveled divided by the time interval. • A horizontal line is the x-axis or any line parallel to the x-axis. • A vertical line is either the ?-axis or any other line parallel to the ?-axis. • A linear equation is an equation in which both expressions are linear expressions. • The slope of a non-vertical line that passes through two different points is the number given by the change in ?-coordinates divided by the corresponding change in the ?-coordinates. • The point-slope equation of a non-vertical line that passes through point (?1, ?1) and has slope ?	Students will be skilled at... • Calculating the slope of a non-vertical line when given a graph, equation, or two points. • Solving linear equations in one variable. • Determining whether an equation in one variable has one solution, no solution, or infinitely many solutions. • Analyzing and solving systems of equations. • Solving equations in two variables.

Acquisition

is $? - ?_1 = ?(? - ?_1)$. • The slope-intercept equation of a non-vertical line with slope $?$ and $?$-intercept $?$ is $? = ?x + b$. • A system of linear equations is a set of two or more linear equations. • A solution to a system of two linear equations in two variables is an ordered pair of numbers that is a solution to both equations. • A linear equation in two variables $??$ and $??$ is in standard form if it is of the form $?x + ?y = c$. • An $?$-intercept point is the coordinate point where the graph intersects the $?$-axis. • A $?$-intercept of a graph is the $?$-coordinate of a point where the graph intersects the $?$-axis.	

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment • Weekly Exit Tickets • Performance Task • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets • Daily Exit Tickets • Station data • Informal checks for understanding

Unit 4: Linear Equations in One and Two Variables

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Summary of Key Learning Events and Instruction:

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- Lessons 1-5

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 2</u>: Topic A

- Lesson 6-9

- Daily Exit Tickets

- Friday Flex: Show What You Know!

-WINTER BREAK-

<u>Week 3</u>: Topic B

- Lesson 10-14

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 4</u>: Mid-Mod & Topic C

- Topic A&B Review

- Mid-Module Assessment

- Lesson 15-17

- Daily Exit Tickets

<u>Week 5</u>: Topic C

- Lesson 18-22

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 6</u>: Topic C & Topic D

- Lesson 23

- Lesson 24-27

- Daily Exit Tickets

- Friday Flex: Show What You Know!

Week 7: Topic D & End-of-Mod

- Lesson 28-29

- Lesson 30 (optional)

- Daily Exit Tickets

- Topic D Review

- End-of-Module Assessment

Unit 4: Linear Equations in One and Two Variables

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

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- Modify weights of tests when grading

[*Adapted from Orange Public Schools Curriculum Guide](#)

Unit 5: Systems of Linear Equations

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)

8.F.A

Define, evaluate, and compare functions.

8.F.A.1

Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1

8.F.A.2

Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.

8.F.A.3

Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.

8.G.C.9

Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

National Common Core - Mathematical Practice

2.

Reason abstractly and quantitatively.

6.

Attend to precision.

8.

Look for and express regularity in repeated reasoning.

DESIRED RESULTS

Established Goals

In Module 5, Topic A, students learn the concept of a function and why functions are necessary for describing geometric concepts and occurrences in everyday life. The module begins by explaining the important role functions play in making predictions. For example, if an object is dropped, a function allows us to determine its height at a specific time. To this point, student work has relied on assumptions of constant rates; here, students are given data that show that objects do not always travel at a constant speed. Once the concept of a function is explained, a formal definition of function is provided. A function is defined as an assignment to each input, exactly one output. Students learn that the assignment of some functions can be described by a mathematical rule or formula. With the concept and definition firmly in place, students begin to work with functions in real-world contexts. For example, students relate constant speed and other proportional relationships to linear functions. Next, students consider functions of discrete and continuous rates and understand the difference between the two. For example, students are asked to explain why they can write a cost function for a book, but they cannot input 2.6 into the function and get an accurate cost as the output.

Transfer

Students will be able to independently use their learning to...
- Define a function as a rule, where for each input there is exactly one output.
- Show the relationship between inputs and outputs of a function by graphing them as ordered pairs on a coordinate grid.
- Determine the properties of a function given the inputs and outputs in a table.
- Compare the properties of two functions that are represented differently (as equations, tables, graphs, or given verbally).
- Explain why the equation $y = mx+b$ represents a linear function and then find the slope and y-intercept in relation to the function.
- Give examples of relationships and create a table of values that can be defined as a non-linear function.
- Create a function to model a linear relationship between two quantities.
- Determine the rate of change and initial value of the function from decryption of the relationship of two (x,y) values, including reading a table or graph.
- Find the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.
- Match the graph of a function to a given situation.
- Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
- State and apply the formulas for the volumes of cones, cylinders and spheres.

Unit 5: Systems of Linear Equations

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Transfer

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • Recognize linear and nonlinear patterns from verbal descriptions, tables, and graphs and describe those patterns using words and equations. • Write equations to express linear patterns appearing in tables, graphs and verbal context. • The definition of a function and what its graph represents. • Properties of functions and their graphs are similar but not identical. • Slope-intercept form is an easy way of graphing functions. • Formulas for finding the areas of polygons, such as rectangles, squares, triangles as well as circles, can be used to find the surface areas of cylinders, cones and spheres. • Finding the volume of a cylinder is an extension of finding the volume of a rectangular prism. The volume of a rectangular prism is the product of the area of it base and its height. Similarly, the volume of a cylinder is equal to the product of the area of its circular base and its height. • The volume of a cone is the volume of the cylinder given that the bases have the same radius and the heights are the same. The	Students will keep considering... • What are the key variables in this situation • What is the pattern relating the variables? • What is a function? • How are functions represented? • What can a relationship between numbers tell about a problem? • Are properties of functions and graphs the same for all functions? • How do we use formulas to solve problems involving volumes of cones, cylinders, and spheres? • How do we select the correct formula for a given problem? • How do you make meaning of formulas, involving volumes of cones, cylinders?

Meaning	
formula for the volume of a cone is v= 1/3Bh , where B is the area of its circular base and h is the height of the cone.	

Acquisition	
Knowledge	**Skills**
Students will know... • A function is a correspondence between a set (whose elements are called inputs) and another set (whose elements are called outputs) such that each input corresponds to one and only one output. • The graph of a linear function represented by the equation ? = ? + ? is the set of ordered pairs (?, ?) for inputs ? and outputs ? that make the equation true. • A linear function is a function whose inputs and outputs are real numbers such that each output is given by substituting an input into a linear expression and evaluating. • A cone is a solid three-dimensional object that has a circular base joined to a point by a curved side. • A cylinder is a solid three-dimensional object that has two parallel (usually circular) bases connected by a curved surface.	Students will be skilled at... • Determining whether a relation is a function (each input has exactly one output). • Recognizing characteristics of functions in different representations (equations, graphs, tables, mapping diagrams). • Giving examples of functions that are linear and not linear. • Evaluating functions for given input or output values. • Apply formulas to find the volume of cones, cylinders, and spheres.

Acquisition	
• A sphere is a solid three-dimensional object shaped like a ball; every point on the surface is the same distance (*r*) from the center.	

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment • Weekly Exit Tickets • Performance Task • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets • Daily Exit Tickets • Station data • Informal checks for understanding

Unit 5: Systems of Linear Equations

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Summary of Key Learning Events and Instruction:

<u>Week 1</u>: Topic A

- Lessons 1-5

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 2</u>: Topic A & Mid-Mod

- Lesson 6-8

- Daily Exit Tickets

- Topic A Review

- Mid-Module Assessment

<u>Week 3</u>: Topic B & End-of-Mod

- Lessons 9-11

- Daily Exit Tickets

- Topic B Review

- End-of-Module Assessment

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Special Education	ELLS
• Adhere to all modifications and health concerns stated in each IEP • Provide students a choice board, allowing students to pick assignments from different levels based on difficulty. Provide supportive strategies: ◦ Educator or para reading aloud text or tech read-aloud ◦ Develop or provide graphic organizers ◦ Small group and one-on-one instruction ◦ Easy to find information on Google Classroom ◦ Personal copies of anchor charts and notes ◦ Vocabulary list with visuals ◦ Extended time on assignments and assessments • Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing. • Provide tech support for recording oral or video answers • Provide breaks between tasks, use positive reinforcement, use proximity • Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives • Use any suggestions provided by the specific text for a curriculum	• Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction • During i-Ready lessons, click on "Español" to hear specific words in Spanish • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems • Utilize program translations (if available) for L1/ L2 students • Reword questions in simpler language • Make use of the ELL Mathematical Language Routines (click here for additional information) • Scaffolding instruction for ELL Learners • Use any suggestions provided by the specific text for a curriculum

Gifted and Talented	Students At Risk For Failure
• Elevated contextual complexity (use leveled books via tech resources such as NEWSELA) • Inquiry based or open ended assignments and projects • Add in inquiry-based questions and research opportunities to existing projects • More time to study concepts with greater depth through independent study or genius hour projects • Promote the synthesis of concepts and making real world connections • Provide students with enrichment opportunities and experiences suggested by the curriculum • Provide opportunities for competitions (math, science, writing, art, etc) • Alternative instruction pathways available	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum • Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Field Trips, Google Expeditions, Peer Support, one on one instruction • Assure constant parental/ guardian contact throughout the year with successes and challenges • Design and provide academic contracts to students and guardians with clear goals and deadlines • Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. • Always plan to address students at risk in your learning tasks, instructions, and directions. Try to anticipate where the needs will be and then address them prior to lessons. • Use the programs intended for remediation ancillary to the curriculum (i.e. IXL or iReady for math)

*Strategies for Students with 504 Plans

The goal of 504 plans is for students to be educated in regular classrooms along with the services, accommodations, or educational aids they might need. Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

· walk, breathe, eat, or sleep
· communicate, see, hear, or speak
· read, concentrate, think, or learn

· stand, bend, lift, or work

<u>General program accommodations/adjustments or services are always made on a case-by-case basis and individualized</u>. Accommodations are to be reasonable and are intended to provide persons with disabilities compensation for their functional limitation(s) due to a mental or physical impairment. Where Section 504 is concerned, accommodations are made to bring a student with a disability to the same starting point as a non-disabled student. Consequently, the accommodations defined in a Section 504 plan are those interventions that are not typically available to all students.

Environmental Strategies

- Provide a structured learning environment
- Make separate "space" for different types of tasks
- Possible adapting of non-academic times such as lunch, recess, and physical education
- Change student seating
- Utilize a study carrel
- Alter location or personal or classroom supplies for easier access or to minimize distraction
- Provide sensory breaks
- Provide a written or picture schedule

Organizational Strategies

- Model and reinforce organizational systems (i.e. color-coding)
- Write out homework assignments, check student's recording of assignments
- Tailor homework assignments toward student strengths
- Set time expectations for assignments
- Provide clues such as clock faces indicating beginning and ending times
- Teach study/organizational skills
- Schedule before or after school tutoring/homework assistance

Behavioral Strategies

- Use behavioral management techniques consistently within a classroom and across classes
- Implement behavioral/academic contracts
- Utilize positive verbal and/or nonverbal reinforcements
- Utilize logical consequences
- Confer with the student's parents (and student as appropriate)
- Establish a home/school communication system for behavior monitoring
- Post rules and consequences for classroom behavior
- Put student on daily/weekly progress report/contract
- Reinforce self-monitoring and self-recording of behaviors

Presentation Strategies

- Record lessons so the student can listen to them again; allow students to record lessons
- Use computer-aided instruction and other audiovisual equipment
- Select alternative digital/audio textbooks, workbooks, or provide books
- Highlight main ideas and supporting details in the book
- Provide copied material for extra practice (i.e. outlines, study guides)
- Prioritize drill and practice activities for relevance

- Vary the method of lesson presentation using multi-sensory techniques:

  a) lecture plus overhead/board demonstration support
  b) small groups required to produce a written product
  c) large groups required to demonstrate a process
  d) computer-assisted instruction
  e) peer tutors or cross-age tutors
  f) demonstrations, simulations
  g) experiments
  h) games

- Ask student to repeat/paraphrase context to check understanding
- Arrange for a mentor to work with student in his or her interest area or area of greatest strength
- Provide peer tutoring
- Simplify and repeat instructions about in-class and homework assignments
- Vary instructional pace
- Reinforce the use of compensatory strategies, i.e. pencil grip, mnemonic devices, "spell check"
- Vary kind of instructional materials used
- Assess whether the student has the necessary prerequisite skills.
- Reinforce study skill strategies (survey, read, recite, review)
- Introduce definition of new terms/vocabulary and review to check for understanding
- Be aware of student's preferred learning style and provide matching instruction materials
- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material

Assignments
- Modify the amount of homework
- Use written directions to supplement oral directions
- Reduce paper and pencil tasks
- Allow for assignments to be word processed
- Lower reading level of assignments
- Break assignments into a series of smaller assignments
- Use highlighted texts

Evaluation Methods
- Limit amount of material presented on a single page
- Provide a sample or practice test
- Provide for oral testing
- Provide tests in segments so that student hands in one segment before receiving the
- next part
- Provide personal copy of test tools and allow for color-coding/highlighting
- Adjust time for completion
- Modify weights of tests when grading

*Adapted from Orange Public Schools Curriculum Guide

Unit 6: Functions and Bivariate Statistics

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)

8.F.B.4

Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

8.F.B.5

Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

8.SP.A.1

Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

8.SP.A.2

Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g. line of best fit) by judging the closeness of the data points to the line.

8.SP.A.3

Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.

8.SP.A.4

Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

National Common Core - Mathematical Practice

Unit 6: Functions and Bivariate Statistics

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

2.
Reason abstractly and quantitatively.
4.
Model with mathematics.
6.
Attend to precision.
7.
Look for and make use of structure.

Unit 6: Functions and Bivariate Statistics

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Established Goals
In Grades 6 and 7, students worked with data involving a single variable. This module introduces students to bivariate data. Students are introduced to a function as a rule that assigns exactly one value to each input. In this module, students use their understanding of functions to model the relationships of bivariate data. This module is important in setting a foundation for students' work in Algebra I. Topic A examines the relationship between two variables using linear functions. Linear functions are connected to a context using the initial value and slope as a rate of change to interpret the context. Students represent linear functions by using tables and graphs and by specifying rate of change and initial value. Slope is also interpreted as an indication of whether the function is increasing or decreasing and as an indication of the steepness of the graph of the linear function. Nonlinear functions are explored by examining nonlinear graphs and verbal descriptions of nonlinear behavior.

Transfer
Students will be able to independently use their learning to... • Create a function to model a linear relationship between two quantities. • Determine the rate of change and initial value of the function from decryption of the relationship of two (x,y) values, including reading a table or graph. • Match the graph of a function to a given situation. • Sketch a graph that exhibits the qualitative features of a function that has been described verbally. • Plot ordered pairs on a coordinate grid representing the relationship between two data sets. • Describe patterns such as clustering, outliers, positive or negative association, linear association and nonlinear association. • Recognize if the data plotted on a scatter plot has a linear association. • Draw a straight line of best fit to approximate the linear relationship between the plotted points of two data sets. • Determine the equation of a trend line that approximates the linear relationships between the plotted points of two data sets. • Interpret the y-intercept and slope of an equation based on collected data. • Create and explain a two-way table to record the frequencies of bivariate categorical values. • Determine the relative frequencies for rows and/or columns of a two-way table. • Use relative frequencies and the context of a problem to describe possible associations between two sets

Unit 6: Functions and Bivariate Statistics

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Transfer
of data.

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • A scatter plot is a representation of data points plotted on a graph. • We use a scatter plot to describe patterns such as correlation, clustering and outliers. If an association exists, you can make a conjecture about different values. • A line of best fit is a straight line that comes closest to the points on a scatter plot. The line of best fit assists in the predictions of data. • Slope is a measure of the steepness of a line on a graph; the rise divided by the run. • Relative frequency is the ratio of the value of a subtotal to the value of the total. You can make conclusions about the data sets based on the relative frequencies.	Students will keep considering... • How does graphing data between two quantities help us determine the relationship, if any, between them? • What are the advantages of using a graph and a two-way table? • How, why and when is a line of best fit useful? • How does the linear model help us solve problems in the context of data?

Acquisition	
Knowledge	**Skills**
Students will know... • A bivariate data set is an ordered list of ordered	Students will be skilled at... • Constructing functions to model relationships

Unit 6: Functions and Bivariate Statistics

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Acquisition

pairs of data values (called data points).
- An association is a relationship between the two variables of a bivariate data set.
- A variable is a symbol (such as a letter) that is a placeholder for a data value from a specified set of data values.
- A scatter plot is a graph of a numerical bivariate data set.
- A two-way frequency table is a rectangular table used to summarize data on two categorical variables of a bivariate data set. The rows of the table correspond to the possible categories for one of the variables, and the columns correspond to the possible categories for the other variable. Entries in the cells of the table indicate the number of times that a particular category combination occurs in the data set; the value is the frequency for that combination.
- In a two-way table, a column relative frequency is a cell frequency divided by the column total for that cell.
- In a two-way table, a row relative frequency is the number given by dividing the cell frequency by the row total for that cell.

between two variables.
- Constructing and interpreting scatter plots to analyze bivariate data.
- Creating a line of best fit to analyze the trends between two variables in a scatter plot.
- Finding patterns of association in bivariate categorical data.

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment • Weekly Exit Tickets • Performance Task • Mid-Module Assessment • End-of-Module Assessment
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Unit 6: Functions and Bivariate Statistics

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Summary of Key Learning Events and Instruction:

<u>Week 1</u>: Topic A

- Lessons 1-5

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 2</u>: Topic B

- Lessons 6-9

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 3</u>: Mid-Mod & Topic C

- Topic A&B Review

- Mid-Module Assessment

- Lesson 10-12

- Daily Exit Tickets

<u>Week 4</u>: Topic D & End-of-Mod

- Lessons 13-14

- Daily Exit Tickets

- Topic C&D Review

- End-of-Module Assessment

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

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- Provide for oral testing
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- Provide personal copy of test tools and allow for color-coding/highlighting
- Adjust time for completion
- Modify weights of tests when grading

*Adapted from Orange Public Schools Curriculum Guide

Unit 7: Irrational Numbers - Part 2 of Unit 1

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)

8.NS.A

Know that there are numbers that are not rational, and approximate them by rational numbers.

8.NS.A.1

Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

8.NS.A.2

Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.

8.EE.A.2

Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

8.G.B.6

Explain a proof of the Pythagorean Theorem and its converse.

8.G.B.7

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.B.8

Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

8.G.C.9

Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

National Common Core - Mathematical Practice

6.

Attend to precision.
7.
Look for and make use of structure.
8.
Look for and express regularity in repeated reasoning.

DESIRED RESULTS

Established Goals
The module begins with work related to the Pythagorean theorem and right triangles. Before the lessons of this module are presented to students, it is important that the lessons in Modules 2 and 3 related to the Pythagorean theorem are taught (i.e., Module 2 Lessons 15 and 16 and Module 3 Lessons 13 and 14). In Modules 2 and 3, students used the Pythagorean theorem to determine the unknown side length of a right triangle. In cases where the side length was an integer, students computed the length. When the side length was not an integer, students left the answer in the form of $x^2=c$, where c was not a perfect square number. Those solutions are revisited and are the motivation for learning about square roots and irrational numbers in general.

Transfer
Students will be able to independently use their learning to... • Show that every number has a decimal. • Change every repeating decimal into a rational number. • Show that the decimal expansion eventually repeats for rational numbers. • Change a repeating decimal expansion into a rational number. • Use rational approximations of irrational numbers to compare the size of irrational numbers, locate, and plot them approximately on a number line diagram, and then estimate the value of the expressions. • Use estimate values to compare two or more irrational numbers. • Use square and cube root symbols to represent solutions to equations of the form $x^2=p$ and $x^3=p$, where p is a positive rational number. • Use the Pythagorean Theorem to determine if a given triangle is a right triangle. • Draw a diagram and use the Pythagorean Theorem to solve real world problems involving right triangles. • Apply the Pythagorean Theorem to find an unknown side length of a right triangle or the distance between two points on a coordinate grid. • State and apply the formulas for the volumes of cones, cylinders and spheres.

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • A rational number is a number (value) within the real number system that can be	Students will keep considering... • What strategies can you use to compare and order rational and irrational numbers on a

Meaning

expressed as a fraction, a/b where a and b are integers and b ≠ 0). Rational numbers consist of fractions that either terminate or repeat.

- An irrational number is a number (value) within the real number system that cannot be expressed as a fraction, a/b, where a and b are integers. An irrational number is a decimal that never terminates or repeats.

- Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real world, solution exactly.

- The Pythagorean Theorem can be used to determine if a triangle is a right triangle and to find the missing side length of a triangle.

- If a triangle has a length such that, the triangle is a right triangle.

- The Pythagorean Theorem and its converse can be used to solve real-world problems that involve right triangles. Both can be used to determine the unknown leg lengths of a right triangle, or to identify or verify whether a triangle is a right triangle.

- The Pythagorean Theorem can be used to find the distance between any two points on a coordinate plane by drawing a line to connect the points as the hypotenuse of the right triangle where the leg are the horizontal and vertical distances.

number line?

- How can you distinguish between rational and irrational numbers?

- How are the lengths of the sides of a right triangle related?

- How does the Pythagorean Theorem relate the side lengths of a right triangle?

- How can you determine if a triangle is a right triangle?

- What kind of problems can be solved using the Pythagorean Theorem?

- How can you use the Pythagorean Theorem to find the distance between two points?

Unit 7: Irrational Numbers - Part 2 of Unit 1

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Meaning	

Acquisition	
Knowledge	**Skills**
Students will know... • A cube root of the number ? is a number whose cube is ?. • An irrational number is a real number that cannot be expressed as a fraction. • A perfect square is a number that is the square of an integer. • A real number is a number that can be represented by a point on the number line. • A square root of the number ?? is a number whose square is ?.	Students will be skilled at... • Distinguishing between rational and irrational numbers. • Approximating irrational numbers. • Expressing the decimal expansion of both rational and irrational numbers. • Evaluating square roots and cube roots. • Applying the Pythagorean Theorem to find the distance between two points on a coordinate grid. • Finding the volumes of cones, cylinders, and spheres by applying their respective formulas.

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment • Weekly Exit Tickets • Performance Task • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets • Daily Exit Tickets • Station data • Informal checks for understanding

Unit 7: Irrational Numbers - Part 2 of Unit 1

UPDATED 2022 8th Grade Math - *Last Updated on July 13, 2022*

Summary of Key Learning Events and Instruction:

<u>Week 1</u>: Topic A

- Lessons 1-5

- Daily Exit Tickets

- Friday Flex: Show What You Know!

-SPRING BREAK-

<u>Week 2</u>: Topic B

- Lessons 6-10

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 3</u>: Topic B & Mid-Mod

- Lesson 11-14

- Topic A&B Review

- Mid-Module Assessment

<u>Week 4</u>: Topic C

- Lessons 15-18

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 5</u>: Topic D

- Lessons 19-23

- Daily Exit Tickets

- Friday Flex: Show What You Know!

<u>Week 6</u>: End-of-Mod

- Topic C&D Review

- End-of-Module Assessment

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Special Education	ELLS
• Adhere to all modifications and health concerns stated in each IEP • Provide students a choice board, allowing students to pick assignments from different levels based on difficulty. Provide supportive strategies: ◦ Educator or para reading aloud text or tech read-aloud ◦ Develop or provide graphic organizers ◦ Small group and one-on-one instruction ◦ Easy to find information on Google Classroom ◦ Personal copies of anchor charts and notes ◦ Vocabulary list with visuals ◦ Extended time on assignments and assessments • Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing. • Provide tech support for recording oral or video answers • Provide breaks between tasks, use positive reinforcement, use proximity • Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives • Use any suggestions provided by the specific text for a curriculum	• Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction • During i-Ready lessons, click on "Español" to hear specific words in Spanish • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems • Utilize program translations (if available) for L1/ L2 students • Reword questions in simpler language • Make use of the ELL Mathematical Language Routines (click here for additional information) • Scaffolding instruction for ELL Learners • Use any suggestions provided by the specific text for a curriculum

Gifted and Talented	Students At Risk For Failure
• Elevated contextual complexity (use leveled books via tech resources such as NEWSELA) • Inquiry based or open ended assignments and projects • Add in inquiry-based questions and research opportunities to existing projects • More time to study concepts with greater depth through independent study or genius hour projects • Promote the synthesis of concepts and making real world connections • Provide students with enrichment opportunities and experiences suggested by the curriculum • Provide opportunities for competitions (math, science, writing, art, etc) • Alternative instruction pathways available	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum • Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Field Trips, Google Expeditions, Peer Support, one on one instruction • Assure constant parental/ guardian contact throughout the year with successes and challenges • Design and provide academic contracts to students and guardians with clear goals and deadlines • Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. • Always plan to address students at risk in your learning tasks, instructions, and directions. Try to anticipate where the needs will be and then address them prior to lessons. • Use the programs intended for remediation ancillary to the curriculum (i.e. IXL or iReady for math)

*Strategies for Students with **504 Plans**

The goal of 504 plans is for students to be educated in regular classrooms along with the services, accommodations, or educational aids they might need. Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

· walk, breathe, eat, or sleep
· communicate, see, hear, or speak
· read, concentrate, think, or learn

· stand, bend, lift, or work

<u>General program accommodations/adjustments or services are always made on a case-by-case basis and individualized</u>. Accommodations are to be reasonable and are intended to provide persons with disabilities compensation for their functional limitation(s) due to a mental or physical impairment. Where Section 504 is concerned, accommodations are made to bring a student with a disability to the same starting point as a non-disabled student. Consequently, the accommodations defined in a Section 504 plan are those interventions that are not typically available to all students.

Environmental Strategies

- Provide a structured learning environment
- Make separate "space" for different types of tasks
- Possible adapting of non-academic times such as lunch, recess, and physical education
- Change student seating
- Utilize a study carrel
- Alter location or personal or classroom supplies for easier access or to minimize distraction
- Provide sensory breaks
- Provide a written or picture schedule

Organizational Strategies

- Model and reinforce organizational systems (i.e. color-coding)
- Write out homework assignments, check student's recording of assignments
- Tailor homework assignments toward student strengths
- Set time expectations for assignments
- Provide clues such as clock faces indicating beginning and ending times
- Teach study/organizational skills
- Schedule before or after school tutoring/homework assistance

Behavioral Strategies

- Use behavioral management techniques consistently within a classroom and across classes
- Implement behavioral/academic contracts
- Utilize positive verbal and/or nonverbal reinforcements
- Utilize logical consequences
- Confer with the student's parents (and student as appropriate)
- Establish a home/school communication system for behavior monitoring
- Post rules and consequences for classroom behavior
- Put student on daily/weekly progress report/contract
- Reinforce self-monitoring and self-recording of behaviors

Presentation Strategies

- Record lessons so the student can listen to them again; allow students to record lessons
- Use computer-aided instruction and other audiovisual equipment
- Select alternative digital/audio textbooks, workbooks, or provide books
- Highlight main ideas and supporting details in the book
- Provide copied material for extra practice (i.e. outlines, study guides)
- Prioritize drill and practice activities for relevance

- Vary the method of lesson presentation using multi-sensory techniques:

  a) lecture plus overhead/board demonstration support
  b) small groups required to produce a written product
  c) large groups required to demonstrate a process
  d) computer-assisted instruction
  e) peer tutors or cross-age tutors
  f) demonstrations, simulations
  g) experiments
  h) games

- Ask student to repeat/paraphrase context to check understanding
- Arrange for a mentor to work with student in his or her interest area or area of greatest strength
- Provide peer tutoring
- Simplify and repeat instructions about in-class and homework assignments
- Vary instructional pace
- Reinforce the use of compensatory strategies, i.e. pencil grip, mnemonic devices, "spell check"
- Vary kind of instructional materials used
- Assess whether the student has the necessary prerequisite skills.
- Reinforce study skill strategies (survey, read, recite, review)
- Introduce definition of new terms/vocabulary and review to check for understanding
- Be aware of student's preferred learning style and provide matching instruction materials
- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material

Assignments
- Modify the amount of homework
- Use written directions to supplement oral directions
- Reduce paper and pencil tasks
- Allow for assignments to be word processed
- Lower reading level of assignments
- Break assignments into a series of smaller assignments
- Use highlighted texts

Evaluation Methods
- Limit amount of material presented on a single page
- Provide a sample or practice test
- Provide for oral testing
- Provide tests in segments so that student hands in one segment before receiving the
- next part
- Provide personal copy of test tools and allow for color-coding/highlighting
- Adjust time for completion
- Modify weights of tests when grading

[*Adapted from Orange Public Schools Curriculum Guide](#)