Unit 8: Sequences, Series, and Discrete Math

Content Area: **Mathematics**
Course(s): **Algebra 2H**
Time Period: **May**
Length: **3 weeks**
Status: **Published**

Unit Overview

- • Analyze change data represented in Normal distributions and other data representations.
- • Understand and use arithmetic and geometric sequences
- • Understand and use probabilities of independent and dependent events.

Enduring Understandings

- • a geometric sequence involves a common multiple
- • all repeating decimals can be written as
- • an arithmetic sequence involves a common difference
- • factorial is the multiplication of a given numbers and all numbers one less down to one
- • how data is represented in a normal distribution
- • not all data is representative of the truth
- • notation allows for a formula to be written in a condensed form
- • the difference between a combination and a permutation
- • the difference between an independent and dependent event / mutually exclusive and inclusive event

Essential Questions

- How is sampling used by product-based companies?
- What career benefits the most from the study of probability?
- What is the importance of studying geometric sequences/series?
- Where does the use of arithmetic sequences/series have application in the real world?

Student Learning Objectives

- SWBAT determine whether a sequence is arithmetic, geometric, or neither and to supply missing terms of a sequence
- SWBAT expand powers of binomials
- SWBAT find a formula for the nth term of a geometric sequence and to find specified terms of a geometric sequence
- SWBAT find a formula for the nth term of an arithmetic sequence and to find specified terms of arithmetic sequences

- SWBAT find sums of finite arithmetic and geometric sequences
- SWBAT identify series and to use sigma notation
- SWBAT use the binomial theorem to find a particular term of a binomial expansion

Lesson Titles

- Arithmetic Sequence
- Binomial Theorem
- Expanding Binomial Powers
- Geometric Sequence
- Sigma Notation
- Sums of Finite Sequences
- Types of Sequences

Standards

MA.K-12.1	Make sense of problems and persevere in solving them.
	Modeling Standards:
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.7	Look for and make use of structure.
MA.S-ID.C	Interpret linear models
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.S-IC	Making Inferences and Justifying Conclusions
	Functions may be used to describe data; if the data suggest a linear relationship, the relationship can be modeled with a regression line, and its strength and direction can be expressed through a correlation coefficient.

Indicators

MA.S-IC	Making Inferences and Justifying Conclusions
MA.S-IC.A.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
MA.S-IC.A.2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.
MA.S-IC.B.6	Evaluate reports based on data.

Career Readiness, Life Literacies & Key Skills

TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

TECH.9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
TECH.9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
TECH.9.4.2.DC.3	Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
TECH.9.4.2.TL.2	Create a document using a word processing application.
TECH.9.4.2.TL.3	Enter information into a spreadsheet and sort the information.

Inter-Disciplinary Connections

LA.RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
LA.W.9-10.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
9-12.HS-ETS1-4.5	Using Mathematics and Computational Thinking

Instructional Strategies/Learning Activities/Levels of Blooms

- Review quiz
- Review test
- students will be 5 questions. they will hand these problems in by the end of the period.
- Assessment
- Intro. Arithmetic Sequences
- Intro. binomial expansion theory
- Intro. determining if a sequence is arithmetic, geometric or neither
- Intro. Geometric Sequences
- Intro. infinite geometric series
- Intro. powers of binomials
- Intro. series and sigma notation
- Intro. sums of finite arithmetic series
- Intro. sums of finite geometric series
- Intro. types of sequences
- Intro. writing arithmetic sequences
- Intro. writing geometric sequences
- review 5 questions collect previous day.
- Review Anticipatory Set
- review game
- review hmwk

Modifications

ELL Modifications

- Assess ELL students continuously using formative assessment methods
- Be flexible with time frames and deadlines
- During Delsea One - one on one with a student who speaks the same language
- Intentional scheduling/grouping with student/teacher who speaks the same language if possible
- Khan Academy offers lesson in several languages https://es.khanacademy.org/
- Offer resources for specific topics in primary language (Youtube web resources)
- Repeat, reword, clarify
- Use google translator, especially for application problems
- Using technology, such as but not limited to: graphing calculator and desmos

IEP & 504 Modifications

- Allowing co-teaching with general education and special education teachers in the same classroom so that the special education teacher can re-teach students with special needs in a different way in a smaller group (pulled to the side)
- For assessments - allowing student to correct mistakes or answer wrong questions correctly for additional credit if failed the first test (another way to re-teach material)
- For assessments - rewording questions so that there are not higher level vocabulary within the question (you are testing for understanding of the content not the ability to understand the question)
- For assessments - students could use calculator and/or other math tools (x grids, chips, ect)
- If not in a co-teaching setting allowing time in the schedule for a special education teacher to consult with general education teachers on what specifically can be modified or how to paraphrase things in a different way specific to that lesson
- Khan Academy offers extra practice and examples in all areas. https://www.khanacademy.org/
- Modeling and showing lots of examples
- Non-verbal redirection of behaviors
- Providing study guides that don't lead the student to study too much extraneous information (less unnecessary details)/scaffolded study guides
- Scaffolded notes
- Speaking to students privately when redirecting behaviors
- Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

G & T Modifications

- Ask students' higher level questions that require students to look into causes, experiences, and facts

to draw a conclusion or make connections to other areas of learning

- Determine where students' interests lie and capitalize on their inquisitiveness. (Is there a Invite students to explore different points of view on a topic of study and compare the two. Specific career they are interested in? How would this apply to their interest?)
- Employ differentiated curriculum to keep interest high
- Encourage students to explore concepts in depth and encourage independent studies or investigations
- Encourage students to make transformations- use a common task or item in a different way
- Invite students to explore different points of view on a topic of study and compare the two
- Khan Academy offers extra practice and examples in all areas. https://www.khanacademy.org/
- Provide additional rigorous challenge problems for advanced students
- Refrain from having them complete more work in the same manner
- Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

At Risk Modifications

- Keep contact with parents/guardians and guidance counselor on progress
- Refer to Organizational Management
- Require Delsea One Tutoring

Formative Assessment

- Anticipatory Set
- Closure
- Partner activity
- Pass out of class
- Quiz on Binomial Theorem
- Quiz on Geometric and Arithmetic Sequences
- Quiz on Sigma Notation
- Warm Up

Summative Assessment

- Benchmark Assessment
- Marking Period Assessment
- Unit Test on Sequences

Resources & Materials

- Algebra and Trigonometry Book 2

- Establish a set of general strategies for student independence and self-evaluation
- Evoke student participation from their seats and at the board
- Independent/Cooperative learning explorations
- Mathispower4u math videos
- Powerpoint lessons
- Smartboard lessons
- Teacher Generated Worksheets
- Use youtube videos to introduce/demonstrate concepts in real-life situations.

Technology

- Chromebooks
- Desmos
- Equatio
- Graphing Calculators
- MathXLforschool.com

TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.2.12.A.CS3	The relationships among technologies and the connections between technology and other fields of study.