

Finite: Sets

ESTABLISHED GOALS:

Competencies:

- Students will demonstrate the ability to decontextualize (represent symbols) and contextualize (understand the meaning of quantities) by converting real-world situations into mathematical symbols for manipulation, and interpreting symbolic results back into practical contexts.
- Students will demonstrate application skills by using mathematical concepts and symbols to represent, analyze, and solve problems arising in everyday life, society, and the workplace.
- Students will demonstrate structural awareness by discerning patterns and functional relationships within complex mathematical concepts to simplify and solve problems.
- Students will demonstrate the ability to notice repetitive calculations or patterns, evaluate the reasonableness of results, and formulate general methods, formulas, or shortcuts while maintaining oversight of the process.
- Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials.
- Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences.
- Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style.

Content Standards:

- MP1 Make sense of problems and persevere in solving the
- MP2 Reason abstractly and quantitatively.
- MP4 Model with mathematics.
- MP5 Use appropriate tools strategically.
- MP7 Look for and make use of structure.
- MP8 Look for and express regularity in repeated reasoning.

Transfer

Students will be able to independently use their learning to make informed decisions by categorizing and connecting information.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that...

- set theory provides the necessary tools for determining the set of outcomes for any experiment.
- set theory provides the tools for counting the number of elements in a set, which is often more important than knowing what those outcomes are.

ESSENTIAL QUESTIONS

- Is it possible to study mathematics without considering sets?

Acquisition

Students will know...

- the theory of sets is the foundation for most of mathematics.
- that it is customary to use the same diagram for both subsets and proper subsets.
- that databases use sets.
- that spreadsheets can be used to represent Cartesian products.
- that once a decision algorithm is established, the additional and multiplication principles can be used to count the number of possible outcomes,

vocabulary: set, elements, subset, proper subset, empty set, Venn diagram, union, intersection, logical equivalences, complement, universal set, Cartesian products, cardinality, algorithm, permutation, combination, Boolean searches

Students will be skilled at...

- using set symbols.
- using roster and set-builder notations.
- describing sets of outcomes.
- using Venn diagrams to represent set relations.
- performing set operations.
- finding Cartesian products.
- calculating the cardinality of a union of sets.
- calculating the cardinality of the intersection of sets.
- calculating the cardinality of a complement
- calculating the cardinality of a Cartesian product.
- using the addition and multiplication principles
- performing permutations and combinations.

Content Area Literacy Standards	21st Century Skills
● RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. ● RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9-10 texts and topics</i>. ● RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	● <i>reason effectively</i> ● <i>use systems thinking</i> ● <i>solve problems</i> ● <i>access and evaluate information</i> ● <i>use and manage information</i> ● <i>be self-directed learners</i>

Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

<i>Summary of Key Learning Events and Instruction</i>		
Science Integration	College, Career, and Civic Life Integration	Technology Integration
District Materials	Distance Learning/Field Trips	Technology Resources