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*The mission of the Chardon Local Schools is high achievement  
for all students where learning is our most important work.*

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## **Course of Study — MATH**

*Revised November 2021*

### **MATH TOPICS for LIBERAL ARTS**

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## Course of Study — MATH — Revised November 2021

### Math Topics for Liberal Arts

#### Strand: Introduction to Graph Theory

##### Learning Standard:

- I can identify basic concepts such as walks, paths, circuits, complete graphs, subgraphs.
- I can use the 4-color map-coloring technique to color a map and problem solve a conflict map.
- I can explain how to solve the Konigsberg bridge problem.
- I can use Fleury's Algorithm to create a circuit sequence and an Euler circuit.
- I can determine whether a graph has an Euler circuit, a Hamilton circuit or neither.
- I can locate a minimum Hamilton circuit in a graph by inspection.
- I can use problem solving strategies such as Brute Force and Nearest Neighbor to determine a minimum Hamilton circuit.
- I can create a spanning tree graph and minimum spanning tree.

##### How Taught?

**Teaching activities may include, but are not limited to:**

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

##### Materials:

- Texas Instrument Graphing Calculator
- Chromebook
- AP Classroom

##### How Assessed?

**Assessments may include, but are not limited to:**

- Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)
- Formative Assessments (entry/exit slips, group work, reflections, discussions, writer's workshops,



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### Math Topics for Liberal Arts

	<p>homework/classwork, self and peer evaluations, observations, conferences, rubrics)</p> <ul style="list-style-type: none"><li>● Summative Assessments (formal essays, using rubrics; tests/exams, projects, creative assignments, presentations)</li></ul>
	<p><b>How Re-Taught?</b> <b>Re-teaching activities may include, but are not limited to:</b></p> <ul style="list-style-type: none"><li>● breaking down concept into smaller components</li><li>● presenting the information again in a different way</li><li>● Universal Design for Learning principles offering students opportunities to experience and engage material in new and different way</li><li>● practice activities such as computer tutorials, games, hands-on activities</li><li>● review sessions</li></ul>



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### Math Topics for Liberal Arts

#### Strand: Introduction to Formal Logic

##### Learning Standard:

- I can explain the differences between a statement, command, opinion, question, paradox.
- I can use the formal logic symbols when translating from English to logic.
- I can write a quantified statement as an if/then statement.
- I can negate a quantified statement.
- I can identify the truth value of a statement written with a negation, conjunction, disjunction or conditional connective(s).
- I can create a truth table for a statement written with a variety of logic connectives.
- I can write a conditional statement in other forms such as its converse, inverse and contrapositive.
- I can write conditional “If P, then Q” statements in alternate forms such as “Q if P”.
- I can analyze the validity of an argument using a truth table, Euler diagram, or by its structure.

##### How Taught?

**Teaching activities may include, but are not limited to:**

- Direct Instruction
- Cooperative Groups
- Stations
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- Scaffolding

##### Materials:

- Texas Instrument Graphing Calculator
- Chromebook

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### Math Topics for Liberal Arts

#### Strand: Introduction to Problem Solving

<p><b>Learning Standard:</b></p> <ul style="list-style-type: none"><li>• I can use inductive reasoning to determine number patterns and relationships.</li><li>• I can apply the successive differences strategy to a number sequence.</li><li>• I can identify figurate number sequences.</li><li>• I can utilize a variety of strategies to solve problems (i.e., using a chart, working backwards, trial and error, drawing a sketch, common sense).</li></ul>	<p><b>How Taught?</b> <b>Teaching activities may include, but are not limited to:</b></p> <ul style="list-style-type: none"><li>• Direct Instruction</li><li>• Cooperative Groups</li><li>• Stations</li><li>• Data Driven Instruction</li><li>• Scaffolding</li></ul>
<p><b>Materials:</b></p> <ul style="list-style-type: none"><li>• Texas Instrument Graphing Calculator</li><li>• Chromebook</li></ul>	<p><b>How Assessed?</b> <b>Assessments may include, but are not limited to:</b></p> <ul style="list-style-type: none"><li>• Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)</li><li>• Formative Assessments (entry/exit slips, group work, reflections, discussions, writer's workshops, homework/classwork, self and peer evaluations, observations, conferences, rubrics)</li><li>• Summative Assessments (formal essays, using rubrics; tests/exams, projects, creative assignments, presentations)</li></ul>
	<p><b>How Re-Taught?</b> <b>Re-teaching activities may include, but are not limited to:</b></p>



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- breaking down concept into smaller components
- presenting the information again in a different way
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#### Strand: Introduction to Cryptology

##### Learning Standard:

- I can conduct a letter frequency analysis on an English passage.
- I can analyze a coded message based on its letter frequency analysis.
- I can decode a coded message using letter frequency analysis and inductive reasoning.
- I can create a coded message using letter substitution.

##### How Taught?

Teaching activities may include, but are not limited to:

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

##### Materials:

- Texas Instrument Graphing Calculator
- Chromebook

##### How Assessed?

Assessments may include, but are not limited to:

- Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)
- Formative Assessments (entry/exit slips, group work, reflections, discussions, writer's workshops, homework/classwork, self and peer evaluations, observations, conferences, rubrics)
- Summative Assessments (formal essays, using rubrics; tests/exams, projects, creative assignments, presentations)

##### How Re-Taught?

Re-teaching activities may include, but are not limited to:

- breaking down concept into smaller components
- presenting the information again in a different way





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	<ul style="list-style-type: none"><li>• Universal Design for Learning principles offering students opportunities to experience and engage material in new and different way</li><li>• practice activities such as computer tutorials, games, hands-on activities</li><li>• review sessions</li></ul>
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### Math Topics for Liberal Arts

#### Strand: Introduction to Game Theory

<p><b>Learning Standard:</b></p> <ul style="list-style-type: none"><li>• I can read the directions and play a variety of games of skill, strategy, or pure luck.</li><li>• I can improve my reasoning skills as I play games such as Sudoku, MasterMind, Connect 4, Scrabble ( or other scrambled word games), Tower of Hanoi, Chess, Checkers, Magic Squares, etc</li></ul>	<p><b>How Taught?</b> <b>Teaching activities may include, but are not limited to:</b></p> <ul style="list-style-type: none"><li>• Direct Instruction</li><li>• Cooperative Groups</li><li>• Stations</li><li>• Data Driven Instruction</li><li>• Scaffolding</li></ul>
<p><b>Materials:</b></p> <ul style="list-style-type: none"><li>• Texas Instrument Graphing Calculator</li><li>• Chromebook</li></ul>	<p><b>How Assessed?</b> <b>Assessments may include, but are not limited to:</b></p> <ul style="list-style-type: none"><li>• Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)</li><li>• Formative Assessments (entry/exit slips, group work, reflections, discussions, writer's workshops, homework/classwork, self and peer evaluations, observations, conferences, rubrics)</li><li>• Summative Assessments (formal essays, using rubrics; tests/exams, projects, creative assignments, presentations)</li></ul> <p><b>How Re-Taught?</b> <b>Re-teaching activities may include, but are not limited to:</b></p> <ul style="list-style-type: none"><li>• breaking down concept into smaller components</li><li>• presenting the information again in a different way</li><li>• Universal Design for Learning principles offering students</li></ul>



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	<p>opportunities to experience and engage material in new and different way</p> <ul style="list-style-type: none"><li>● practice activities such as computer tutorials, games, hands-on activities</li><li>● review sessions</li></ul>
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