



SPRINGFIELD PUBLIC SCHOOLS
ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Springfield Public Schools Springfield, New Jersey 07081

Discrete Math

Curriculum Guide

2022

This curriculum may be modified through varying materials, techniques and strategies, as per a student's IEP.

*Springfield Board of Education
Approved on June 6, 2022*



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**Springfield Public Schools
Springfield, New Jersey**

**Dr. Rachel Goldberg
Superintendent of Schools**

**Erica Scudero
Assistant Superintendent**

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*Springfield Board of Education
PO Box 210
Springfield, New Jersey 07081*

"Cultivating compassionate and extraordinary learners"

Rachel Goldberg
Superintendent of Schools
(973) 376-1025

Michelle Calas
School Business Administrator/
Board Secretary
(973) 376-1025

Resolution: Buildings and Grounds
Introduced By: Vice President Saha
Seconded By: Mr. Miller
Adopted: June 6, 2022

Curriculum

At the recommendation of the Superintendent, to approve the following revised courses:

- a. AP English Language and Composition
- b. Creative Writing and Poetry
- c. DCA Freshman English (Writing/Research was incorporated into this course)
- d. Drama 1 (Modified the description to be combined with Drama II)
- e. Film as Literature
- f. Journalism
- g. Senior Seminar
- h. Yearbook
- i. Kindergarten Mathematics
- j. Grade 1 Mathematics
- k. Grade 2 Mathematics
- l. Grade 3 Mathematics
- m. Grade 4 Mathematics
- n. Grade 5 Mathematics
- o. Algebra II
- p. Calculus
- q. Discrete Math
- r. Financial Algebra
- s. Geometry
- t. Geometry Honors
- u. Pre-Algebra Grade 7
- v. Pre-Calculus
- w. Pre-Calculus Honors

I, Michelle Calas, School Business Administrator/Board Secretary of the Springfield Board of Education, hereby certify that the extract from the minutes of a meeting of the Board of Education duly called and held on June 6, 2022 has been compared by me with the original minute book of said Board of Education, and is a true, complete and exact copy therefor, as far as the same relates to the subject matter referred to said contract.

IN WITNESS THEREOF, I have hereunto set my hand and seal of the Springfield Board of Education, this 7th of June 2022.

SEAL



Michelle Calas
School Business Administrator/Board Secretary



Unit Overview Template

Content Area: Math **Grade Level:** 12 **Unit Title:** Collecting and Interpreting Data; Descriptive Statistics, Data & Patterns

Unit Summary: This unit will deal with properly collecting data, then displaying correctly and recognizing distortion of graphs.

Primary Interdisciplinary Connections: *Statistics, Science and Engineering*

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy
☐ Information Literacy ☒ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy

Unit Rationale: The ability to collect data and correctly display and analyze it is an important tool in today's society.

Career Readiness (Standard 9):

- 9.1.12.CFR.3: Research companies with corporate governance policies supporting the common good and human rights.
- 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
- 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Learning Targets

Standards: S-ID; S-IC

Content Statements: Summarize, represent, and interpret data on a single count or measurement variable; Summarize, represent, and interpret data on two categorical and quantitative variables; Understand and evaluate random processes underlying statistical experiments; Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

CPI#:	Cumulative Progress Indicator (CPI):
S-ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
S-ID.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
S-ID.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
S-ID.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.



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S-ID.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
S-ID.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
S-IC.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
S-IC.2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?
S-IC.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
S-IC.4	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
S-ID.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.
RST.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms
RST.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
SEL.PK-12.2.2	Recognize the skills needed to establish and achieve personal and educational goals.
SEL.PK-12.4.1	Develop, implement and model effective problem-solving, and critical thinking skills.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Unit Essential Questions:

- How can we collect accurate, unbiased data?
- How can we find and use measures of central tendency and spread?
- How can we accurately display data?
- How can we interpret data?
- How can we recognize when data has been distorted?

Unit Enduring Understandings:

- Understanding data and statistics is an integral part of mathematics



Unit Learning Targets:

Students will....

- Students will be able to collect data using unbiased samples.
- Students will be able to compute measures of central tendency and spread.
- Students will be able to summarize a set of data numerically and visually.
- Students will be able to create and interpret graphs that display and compare data.
- Students will be able to determine which types of graphs are appropriate for representing various types of data.
- Students will be able to recognize the way graphs distort information.

Evidence of Learning

Summative Assessment: Chapter Test (with differentiated levels)

Equipment Needed: Graphing calculator, laptop, Google Sheets, graph paper

Teacher Resources: Projector, laptop

Formative Assessments:

- Homework check
- Lesson opener or daily quiz
- Guided practice exercises
- Closure discussion

Lesson Plans

Lesson	Time Frame
Lesson 1 Collecting Data Using Unbiased Samples	1 day
Lesson 2 Compute Measures of Spread	1 day
Lesson 3 Creating and Interpreting Graphs	1 day

Teacher Notes:

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

<https://www.codecademy.com/learn/discrete-math>

<https://tasks.illustrativemathematics.org/content-standards>

<https://desmos.com>



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Lesson Plan 1 Template

Content Area: Math Lesson Title: Collecting Data Using Unbiased Samples Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Collect data using random sampling techniques	Lesson Sequence - Homework Check/Review - Break students into groups of three. Ask students to discuss what an unbiased sample is. - Ask for volunteers to share. Then give each group a series of examples to determine if the sample is unbiased. - Work through examples collecting data using random sampling techniques. Give guided practice facilitated exercises. - Closure discussion.	- Homework review - Lesson opener or daily quiz - Guided practice facilitated exercises - Closure discussion
Differentiation: Audio and visual instruction; sample Google Sheets files		
Resources Provided: Example samples		



Lesson Plan 2 Template		
Content Area: Math	Lesson Title: Compute Measures of Spread	Time Frame: 1 day
Lesson Components		
<u>21st Century Themes</u>		
☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy ☒ Civic Literacy ☐ Health Literacy		
<u>21st Century Skills</u>		
☐ Creativity and Innovation ☐ Critical Thinking and Problem Solving ☐ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy		
Interdisciplinary Connections: Statistics, Science and Engineering		
Integration of Technology: Graphing calculators, Google Sheets, Google Docs, Desmos		
Equipment Needed: Graphing calculator, laptops		

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Compute range • Compute standard deviation by hand • Compute standard deviation on Google Sheets	Lesson Sequence 1. Homework check / review. 2. Ask students to calculate the range of a dataset. 3. Discuss the meaning of the standard deviation. Show students how to calculate it. 4. Then, have students copy a sample Google Sheets dataset and calculate the standard deviation using Google Sheets. 5. Give guided practice facilitated exercises. 6. Closure discussion.	• Homework review • Lesson opener or daily quiz • Guided practice facilitated exercises • Closure discussion
Differentiation: Break down the formula on Google Sheets.		
Resources Provided: • Textbook • Dataset		



Lesson Plan 3 Template

Content Area: Math Lesson Title: Creating and Interpreting Graphs Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☐ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Create a bar graph on Google Sheets • Create a line graph on Google Sheets • Create a pie chart on Google Sheets	Lesson Sequence 1. Homework check / review 2. Break students into small groups. Ask students to discuss what kinds of data would be most appropriate for a bar, line, and pie graph. Ask students to hand draw an example of each. 3. Ask volunteers to share. 4. Give students the Google Sheets dataset, and work through how to create bar, line, and pie graphs on Google Sheets. 5. Give guided practice facilitated exercises. 6. Closure discussion.	• Homework review • Lesson opener or daily quiz • Guided practice facilitated exercises • Closure discussion
Differentiation: Audio and visual instruction, sample Google Sheets files		
Resources Provided: • Laptop with Google Sheets • Datasets		



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Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson *Strongly*, *Moderately* or *Weakly* meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	☒	☐	☐
Allow for student choice	☒	☐	☐
Provide scaffolding for acquiring targeted knowledge/skills	☐	☒	☐
Integrate global perspectives	☒	☐	☐
Integrate 21st century skills	☒	☐	☐
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills	☒	☐	☐
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills	☒	☐	☐
Are varied to address different student learning styles and preferences	☐	☒	☐
Are differentiated based on student needs	☒	☐	☐
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	☒	☐	☐
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	☒	☐	☐
Provide opportunities for student reflection and self- assessment	☐	☒	☐
Provide data to inform and adjust instruction to better meet the varying needs of learners	☐	☒	☐

Curriculum Design Template

Content Area: Math **Grade Level:** 12 **Unit Title:** Collecting and Interpreting Data;
 Descriptive Statistics, Data & Patterns

Created: 2022

Board Approved on:



Unit Overview Template

Content Area: Math **Grade Level:** 12 **Unit Title:** Probability and Inferential Statistics

Unit Summary: This unit includes finding probabilities of simple and complex events. Students will also determine odds and find expected value. Finally, normal distributions will be introduced and used to determine the percentage of sample sizes.

Primary Interdisciplinary Connections: *Statistics, Science and Engineering*

21st Century Themes ☒ Creativity and Innovation ☐ Critical Thinking and Problem Solving ☐ ICT Literacy
☐ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy

Unit Rationale: The ability to calculate probabilities and use normal distributions to analyze data are important tools in today's society for data analysis and interpretation.

Career Readiness (Standard 9):

9.1.12.CFR.3: Research companies with corporate governance policies supporting the common good and human rights.

9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).

9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Learning Targets

Standards: S-ID; S-IC; S-CP

Content Statements: Summarize, represent, and interpret data on a single count or measurement variable; Understand and evaluate random processes underlying statistical experiments; Understand independence and conditional probability and use them to interpret data; Use the rules of probability to compute probabilities of compound events in a uniform probability model.

CPI#:	Cumulative Progress Indicator (CPI):
S-ID.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
S-IC.2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?
S-CP.1	Describe events as subsets of a sample space (the set of outcomes) using



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	characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).
S-CP.2	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
S-CP.3	Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
S-CP.4	Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.
S-CP.5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.
S-CP.6	Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A, and interpret the answer in terms of the model.
S-CP.7	Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.
S-CP.8	Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B A) = P(B)P(A B)$, and interpret the answer in terms of the model.
S-CP.9	Use permutations and combinations to compute probabilities of compound events and solve problems.
RST.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms
RST.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
SEL.PK-12.2.2	Recognize the skills needed to establish and achieve personal and educational goals.
SEL.PK-12.4.1	Develop, implement and model effective problem-solving, and critical thinking skills.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.



Unit Essential Questions:

- How can we compute probabilities?
- How can we use expected values?
- How can we determine odds in favor or against an event?
- How can we use normal distributions to find percentages of data?
- How can we use normal distributions to find confidence intervals and margins of error?

Unit Enduring Understandings:

- Understanding data and statistics is an integral part of mathematics
- Understanding probabilities and odds are an integral part of mathematics

Unit Learning Targets:

Students will....

- Students will be able to compute probabilities of events in situations in which all outcomes have the same chance of occurring.
- Students will be able to compute probabilities when partial information is available.
- Students will be able to use expected values to find the true cost of lottery tickets, insurance premiums, and similar items.
- Students will be able to determine odds in favor or against an event.
- Students will be able to calculate measures of central tendency and dispersion that help describe data sets.
- Students will be able to calculate margin of error and know why it usually accompanies reports such as those on polling data.

Evidence of Learning

Summative Assessment: Chapter Test (with differentiated levels), SAT data project

Equipment Needed: Graphing calculator, laptop, Google Sheets, graph paper

Teacher Resources: Projector, laptop

Formative Assessments:

- Homework check
- Lesson opener or daily quiz
- Guided practice exercises
- Closure discussion



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Lesson Plans

Lesson	Time Frame
Lesson 1 Computing Probabilities in Multistage Experiments	<i>1 day</i>
Lesson 2 Compute Expected Value and Odds	<i>1 day</i>
Lesson 3 Application of Normal Distributions	<i>1 day</i>

Teacher Notes:

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

<https://www.codecademy.com/learn/discrete-math>

<https://tasks.illustrativemathematics.org/content-standards>

<https://desmos.com>



Lesson Plan 1 Template

Content Area: Math Lesson Title: Computing Probabilities in Multistage Experiments Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☐ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Compute probabilities in multistage experiments	Lesson Sequence 1. Homework Check/Review 2. Ask students to get in pairs to work out sample multistage experiments. 3. Ask students to make a conjecture about their dataset. 4. Discuss how to properly compute the probabilities. 5. Give guided practice exercises. 6. Closure discussion.	• Homework review • Lesson opener or daily quiz • Guided practice exercises • Closure discussion
Differentiation: Audio and visual instruction; the choice of making probabilities trees to compute the probabilities		
Resources Provided: • Textbook • Datasets		



Lesson Plan 2 Template

Content Area: Math Lesson Title: Compute Expected Values and Odds Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:
 Statistics, Science and Engineering

Integration of Technology:
 Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:
 Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Compute expected value • Compute odds • Compare odds to probability	Lesson Sequence 1. Homework check / review 2. Discuss the expected value. 3. Ask student volunteers to describe what odds are. 4. Pair students to work on the Desmos activity discovering how to work with expected values. 5. Give guided practice exercises. 6. Closure discussion - how do odds compare to probability?	• Homework review • Lesson opener or daily quiz • Guided practice exercises • Closure discussion
Differentiation: Audio and visual instruction		
Resources Provided: • Textbook • Dataset • Desmos activity		



Lesson Plan 3 Template

Content Area: Math Lesson Title: Application of Normal Distribution Time Frame: 1 day

Lesson Components

21st Century Themes

- ☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Use normal distribution to find percents of data	Lesson Sequence - Homework check / review - Ask students to discuss what a distribution is. - Discuss the normal distribution (bell curve). - Have student pairs work through the Desmos activity on finding percentages from the normal distribution. - Give guided practice exercises. - Closure discussion.	- Homework review - Lesson opener or daily quiz - Guided practice exercises - Closure discussion
Differentiation: Audio and visual instruction		
Resources Provided: - Textbook - Datasets		



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Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson *Strongly, Moderately* or *Weakly* meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	☒	☐	☐
Allow for student choice	☒	☐	☐
Provide scaffolding for acquiring targeted knowledge/skills	☒	☐	☐
Integrate global perspectives	☐	☒	☐
Integrate 21st century skills	☒	☐	☐
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills	☒	☐	☐
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills	☐	☒	☐
Are varied to address different student learning styles and preferences	☐	☒	☐
Are differentiated based on student needs	☐	☒	☐
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	☐	☒	☐
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	☒	☐	☐
Provide opportunities for student reflection and self- assessment	☒	☐	☐
Provide data to inform and adjust instruction to better meet the varying needs of learners	☐	☒	☐

Curriculum Design Template

Content Area: Math
Statistics

Grade Level: 12

Unit Title: *Probability and Inferential*

Created: 2022

Board Approved on:



Unit Overview Template

Content Area: Math **Grade Level:** 12 **Unit Title:** Graph Theory

Unit Summary: This unit includes describing and analyzing networks. Students will discover how the problem of finding an efficient path through a network can be solved. Students will discover several theorems and algorithms used to find such minimum weight spanning trees, shortest paths and shortest routes. Theorems and algorithms include: Euler's Theorem, Kruskal's and Dijkstra's Algorithms, Nearest Neighbor Algorithm. Students will learn how to find the chromatic number of a graph, and use the chromatic number to solve a real life conflict example.

Primary Interdisciplinary Connections: *Statistics, Science and Engineering*

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ ICT Literacy

☐ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy

Unit Rationale: The ability to recognize and analyze networks are important tools in today's society for finding efficiencies in systems.

Career Readiness (Standard 9):

9.1.12.CFR.3: Research companies with corporate governance policies supporting the common good and human rights.

9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12.prof.CR2b, 2.2.12.LF.8).

9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12.prof.CR3.a).

Learning Targets

Standards: S-IC

Content Statements: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

CPI#:	Cumulative Progress Indicator (CPI):
S-IC.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
RST.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms
RST.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
SEL.PK-12.2.2	Recognize the skills needed to establish and achieve personal and educational goals.
SEL.PK-12.4.1	Develop, implement and model effective problem-solving, and critical thinking



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	skills.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Unit Essential Questions:

- How can we find a minimum weight spanning tree?
- How can we find the shortest path from A to B?
- How can we find the shortest route from A and back to A?
- How can we use graphs to create groups without conflicts?

Unit Enduring Understandings:

- Understanding networks is an integral part of mathematics

Unit Learning Targets:

Students will....

- Students will be able to use Euler's Theorem to find the paths and circuits in a graph.
- Students will be able to use Kruskal's Algorithm to find a minimum weight spanning tree in a graph.
- Students will be able to use Dijkstra's Algorithm to find the shortest path.
- Students will be able to use the Nearest Neighbor Algorithm to find the shortest route.
- Students will be able to find the chromatic number of a graph to minimize conflicts.



Evidence of Learning

Summative Assessment: Chapter Test (with differentiated levels), Conflict Graph Project

Equipment Needed: Graphing calculator, laptop, Google Sheets, graph paper

Teacher Resources: Projector, laptop

Formative Assessments:

- Homework check
- Lesson opener or daily quiz
- Guided practice exercises
- Closure discussion



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Lesson Plans

Lesson	Time Frame
Lesson 1 Introduction to Networks & Graphs	1 day
Lesson 2 Minimum Weight Spanning Trees	1 day
Lesson 3 Finding Chromatic Number	1 day

Teacher Notes:

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

<https://www.codecademy.com/learn/discrete-math>

<https://tasks.illustrativemathematics.org/content-standards>

<https://desmos.com>



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Lesson Plan 1 Template

Content Area: Math Lesson Title: Introduction To Network & Graphs Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☐ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ Information Literacy
☐ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Discover degrees, edges and vertices of a graph	Lesson Sequence - Homework Check/Review - Lesson opener - SPROUTS game. - Use graphs created with the game to identify parts of a graph. - Guided Practice - identify parts. - Closure discussion.	- Homework review - Lesson opener - Guided practice exercises - Closure discussion
Differentiation: Audio and visual instruction; different number of vertices for different types of graphs		
Resources Provided: - Calculators - Textbook - SPROUTS game		



Lesson Plan 2 Template

Content Area: Math Lesson Title: Minimum Weight Spanning Trees Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Find a minimum weight spanning tree - Use Kruskal's Algorithm to find minimum weight spanning tree	Lesson Sequence - Homework check / review. - Lesson opener - Muddy City Problem. - The teacher introduces Kruskal's Algorithm. Discuss how to apply the algorithm. - Guided Practice: use Kruskal's Algorithm to find minimum weight spanning trees. - Closure discussion.	- Homework review - Lesson opener or daily quiz - Guided practice exercises - Closure discussion
Differentiation: Audio and visual instruction; finding spanning trees - pencils, highlighters, on whiteboard or worksheets		
Resources Provided: - Textbook - Worksheets - Muddy City and other examples		



Lesson Plan 3 Template

Content Area: Math Lesson Title: Finding Chromatic Number Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:
 Statistics, Science and Engineering

Integration of Technology:
 Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:
 Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Find the chromatic number of a graph	Lesson Sequence - Homework check / review - Lesson opener - Colorful houses in tourist towns. - Introduce chromatic numbers using graph coloring. - Guided practice exercises - practice finding chromatic number of graphs. - Closure discussion.	- Homework review - Lesson opener or daily quiz - Guided practice exercises - Closure discussion
Differentiation: Audio and visual instruction; different size graphs to find chromatic number		
Resources Provided: - Textbook - Colorful houses activity		



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Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson *Strongly*, *Moderately* or *Weakly* meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	☒	☐	☐
Allow for student choice	☒	☐	☐
Provide scaffolding for acquiring targeted knowledge/skills	☒	☐	☐
Integrate global perspectives	☐	☒	☐
Integrate 21st century skills	☐	☒	☐
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills	☒	☐	☐
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills	☐	☐	☐
Are varied to address different student learning styles and preferences	☒	☐	☐
Are differentiated based on student needs	☒	☐	☐
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	☐	☒	☐
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	☒	☐	☐
Provide opportunities for student reflection and self- assessment	☐	☒	☐
Provide data to inform and adjust instruction to better meet the varying needs of learners	☐	☒	☐

Curriculum Design Template

Content Area: Math	Grade Level: 12	Unit Title: Graph Theory
Created: 2022	Board Approved on:	



Unit Overview Template

Content Area: Math **Grade Level:** 12 **Unit Title:** Voting Methods & Fair Division

Unit Summary: This unit includes four different common voting methods that are generally used for common elections. The voting methods are: Plurality, Borda Count, Plurality with Elimination, and Pairwise comparison. Students will learn how to apply all four methods, then practice using them all to calculate winners of several election examples. This chapter also includes the flaws of voting, and how different candidates can win based on the voting method used. Students will learn to identify the flow in each of the four types of methods learned. Finally, this unit also focuses on methods of fair division. Students will learn and practice using methods that will divide things of monetary or sentimental value and how to make fair division "envy free."

Primary Interdisciplinary Connections: *Statistics, Science and Engineering*

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ ICT Literacy
☐ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy

Unit Rationale: The ability to recognize and analyze networks are important tools in today's society to understand voting methods and how they relate to our voting system.

Career Readiness (Standard 9):

- 9.1.12.CFR.3: Research companies with corporate governance policies supporting the common good and human rights.
- 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
- 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Learning Targets

Standards: N-VM; S-IC

Content Statements: Perform operations on matrices and use matrices in applications; Understand and evaluate random processes underlying statistical experiments; Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

CPI#:	Cumulative Progress Indicator (CPI):
N-VM.6	Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
S-IC.2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?
S-IC.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.



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S-IC.4	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
S-IC.5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
S-IC.6	Evaluate reports based on data.
RST.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms
RST.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
SEL.PK-12.2.2	Recognize the skills needed to establish and achieve personal and educational goals.
SEL.PK-12.4.1	Develop, implement and model effective problem-solving, and critical thinking skills.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Unit Essential Questions:

- How can we use more than one method for voting in elections?
- How can we determine the fairness of each voting method?
- How can we fairly divide monetary or sentimental value among a group of interested people?
- How can we make fair divisions "envy free"?

Unit Enduring Understandings:

- Understanding voting methods is an integral part of mathematics
- Understanding fair division is an integral part of mathematics

Unit Learning Targets:

Students will....

- Students will be able to use some common ways in which winners of elections and other selection processes are determined.
- Students will be able to understand how the selection process may have flaws that can lead to unusual and unexpected results, or can be manipulated to gain advantage.
- Students will be able to understand how selection processes may or may not satisfy commonly accepted fairness and properties.
- Students will be able to determine winning and losing voting coalitions.
- Students will be able to use methods that mathematicians have developed to fairly divide things of monetary or sentimental value among a group of interested people.
- Students will be able to make such fair divisions "envy free."



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Evidence of Learning

Summative Assessment: Chapter Test (with differentiated levels), Voting Methods Project, Fair Division Project

Equipment Needed: Graphing calculator, laptop, Google Sheets, graph paper

Teacher Resources: Projector, laptop

Formative Assessments:

- Homework check
- Lesson opener or daily quiz
- Guided practice exercises
- Closure discussion



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Lesson Plans

Lesson	Time Frame
Lesson 1 Introduction to Voting Methods	2 days
Lesson 2 Continuous Fair Division	1 day
Lesson 3 Fairness Criteria	1 day

Teacher Notes:

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

<https://www.codecademy.com/learn/discrete-math>

<https://tasks.illustrativemathematics.org/content-standards>

<https://desmos.com>



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Lesson Plan 1 Template

Content Area: Math Lesson Title: Introduction to Voting Methods Time Frame: 2 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ Information Literacy
☐ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Use four methods of voting to determine a winner in an elections	Lesson Sequence - Homework Check/Review - Lesson opener - vote on a class topic to introduce the plurality method. - Introduce all four voting methods. - Guided Practice - practice using voting methods to vote on one out of four candidates. - Closure Activity - pick your "favorite" method.	- Homework review - Lesson opener - Guided practice exercises - Closure discussion
Differentiation: Audio and visual instruction		
Resources Provided: Textbook		



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Lesson Plan 2 Template

Content Area: Math Lesson Title: Continuous Fair Division Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos, Google Slides

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Use continuous fair division to divide items	Lesson Sequence - Homework check / review. - Lesson opener - use divide and choose method to cut a brownie in half. - Introduce continuous fair division methods on Google Slides. - Guided Practice: Use methods of continuous fair division to work on examples. - Closure discussion.	- Homework review - Lesson opener or daily quiz - Guided practice exercises - Closure discussion
Differentiation: Audio and visual instruction, differentiated examples of fair division		
Resources Provided: Textbook		



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Lesson Plan 3 Template

Content Area: Math Lesson Title: Fairness Criteria Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections:

Statistics, Science and Engineering

Integration of Technology:

Graphing calculators, Google Sheets, Google Docs, Desmos

Equipment Needed:

Graphing calculator, laptops

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Determine whether certain voting methods are "fair" or "unfair" and why	Lesson Sequence - Homework check / review. - Ask students to work in groups to research several voting methods used in the world. - As a class, discuss the different voting systems. - Complete the Desmos activity with scenarios to determine fairness. - Guided practice exercises - practice determining fairness for each voting method used. - Closure discussion.	- Homework review - Lesson opener or daily quiz - Guided practice exercises - Closure discussion
Differentiation: Audio and visual instruction; differentiated scenarios on Desmos		
Resources Provided: Desmos activity		



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Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson *Strongly*, *Moderately* or *Weakly* meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	☒	☐	☐
Allow for student choice	☒	☐	☐
Provide scaffolding for acquiring targeted knowledge/skills	☒	☐	☐
Integrate global perspectives	☐	☒	☐
Integrate 21st century skills	☒	☐	☐
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills	☐	☒	☐
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills	☐	☒	☐
Are varied to address different student learning styles and preferences	☐	☒	☐
Are differentiated based on student needs	☒	☐	☐
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	☐	☒	☐
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	☒	☐	☐
Provide opportunities for student reflection and self- assessment	☐	☒	☐
Provide data to inform and adjust instruction to better meet the varying needs of learners	☐	☐	☐

Curriculum Design Template

Content Area: Math	Grade Level: 12	Unit Title: Voting Methods & Fair Division
Created: 2022		Board Approved on:



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GLOBAL SKILLS**

IEP AND 504 ACCOMMODATIONS AND MODIFICATIONS FOR EARLY CHILDHOOD AND ELEMENTARY SCHOOL STUDENTS:

Large print textbooks
Textbooks for at-home use
Additional time for assignments
Review of directions
Use of mnemonics
Have student restate information
Concrete examples
Adaptive writing utensils
Support auditory presentations with visuals
Use of a study carrel
Assistance in maintaining uncluttered space
Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
Space for movement or breaks
Study sheets and teacher outlines
Extra visual and verbal cues and prompts
Math sheets with highlighted instructions
Graph paper to assist in organizing or lining up math problems
Use of computers and calculators
Books on tape
Graphic organizers
Quiet corner or room to calm down and relax when anxious
Preferential seating
Alteration of the classroom arrangement
Reduction of distractions
Answers to be dictated
Hands-on activities
Use of manipulatives
No penalty for spelling errors or sloppy handwriting
Follow a routine/schedule
Alternate quiet and active time
Teach time management skills
Rest breaks
Verbal and visual cues regarding directions and staying on task
Agenda book and checklists
Adjusted assignment timelines
Visual daily schedule



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**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Untimed tests
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book tests
Read test and directions to student
Provide study outline prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator and/or number line for math tests
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS MODIFICATIONS:



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GLOBAL SKILLS**

Breaks between tasks
Cue expected behavior
Daily feedback to student
Have contingency plans
Use de-escalating strategies
Use positive reinforcement
Use proximity/touch control
Use peer supports and mentoring
Model expected behavior by adults
Have parent sign homework
Have parent sign behavior chart
Set and post class rules
Chart progress and maintain data



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GLOBAL SKILLS**

IEP AND 504 ACCOMODATIONS AND MODIFICATIONS FOR MIDDLE AND HIGH SCHOOL STUDENTS:

Large print textbooks
Textbooks for at-home use
Additional time for assignments
A locker with adapted lock
Review of directions
Review sessions
Use of mnemonics
Have student restate information
Provision of notes or outlines
Concrete examples
Adaptive writing utensils
Support auditory presentations with visuals
Weekly or bi-weekly home-school communication
Space for movement or breaks
Study sheets and teacher outlines
Extra visual and verbal cues and prompts
Lab and math sheets with highlighted instructions
Graph paper to assist in organizing or lining up math problems
Use of tape recorder for lectures
Use of Interactive notebook
Use of a scribe
Use of computers and calculators
Books on tape
Graphic organizers
Quiet corner or room to calm down and relax when anxious
Preferential seating
Alteration of the classroom arrangement
Reduction of distractions
Answers to be dictated
Hands-on activities
Ability to type all assignments
Follow a routine/schedule
Teach time management and organizational skills
Rest breaks
Verbal and visual cues regarding directions and staying on task
Agenda book and checklists
Daily check-in with case manager or special education teacher
Adjusted assignment timelines
Visual daily schedule



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**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book or open-note tests
Read test and directions to student
Provide study guides prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Pace long-term projects
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Allow outlining, instead of writing for an essay or major project
Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator for math tests
Film or video supplements in place of reading text
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands



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**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Pass/no pass option
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS FOR STUDENTS:

- Breaks between tasks
- Cue expected behavior
- Daily feedback to student
- Have contingency plans
- Use de-escalating strategies
- Use positive reinforcement
- Use proximity/touch control
- Use peer supports and mentoring
- Model expected behavior by adults
- Have parent sign homework
- Set and post class rules
- Chart progress and maintain data



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ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS

Accommodations and Modifications for ESL Students

- Give tests orally
- Give instructions/directions in writing and orally
- Assign a peer tutor, same language or English speaking
- Allow use of bilingual/translation dictionary
- Provide summaries of text or study guides of particular chapters
- Allow errors in speaking
- Allow errors in writing
- Accept writing in first language
- Highlight key vocabulary
- Reduce amount of work required
- Assess comprehension through demonstration or other alternative means (gestures, drawings)
- Rephrase questions, directions, and explanations
- Reduce multiple choices on assessments
- Provide study guides and/ or outlines
- Shorten reading assignments
- Allow extended time for test/project completion
- Use of audio books
- Use of graphic organizers
- Use reduced text, so that print is not dense
- Use visuals/pictures throughout lesson/unit/assignment
- Adapt homework to reflect language proficiency/home support
- Adapt homework to reflect home support
- Provide hands-on activities and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Use of translation dictionaries to locate words in the native language
- Use anecdotal records and portfolio of work as forms of assessment
- Use story retellings to assess comprehension