Unit 7: Weather and Patterns (Weather and Climate)

Content Area: **Science**
Course(s): **Science Gr 3**
Time Period: **MayJun**
Length: **29 Days**
Status: **Published**

Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Science: Grade 3

Unit 7: Weather and Patterns

Belleville Board of Education

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Board Approved: September 23, 2019

Unit Overview

Unit seven focuses on weather and patterns. Students will explore how weather is predicted and measured. Students will learn about the difference between weather and climate. Students will how to determine the impact of severe weather on society and nature.

(Reference HMH Science Dimensions, Unit 7)

Enduring Understanding

- Weather is what the air is like outside.
- Sunshine, wind, clouds, rain, snow are all parts of weather.
- Weather occurs in the atmosphere, which is the air around the Earth.
- If you measure weather over time and compare the data, you can see weather patterns.
- Weather is measureable and can be measure by amount of precipitation, the direction of the wind, and air temperature.
- Weather maps can be constructed show weather in a particular place and time, and variations of this weather across locations.
- Different types of weather data can be connected to real-life experiences.
- Changes in weather can be observed and analyzed over time.
- Average measurements help us see patterns in the weather and help us understand how weather changes over time.
- Different areas and locations are more prone to different types of severe weather conditions (Ex: Central part of the U.S. is called Tornado Alley).
- Meteorologists, scientists who study weather, collect data about weather that has already happened to help them predict future weather events.
- Engineers work to design solutions for events of severe weather.
- Climate is the normal weather in an area of a long period of time.

- Climate zones (Tropical, Temperate, Polar) have certain overall features.
- There is a great deal of variation in weather that can be measured and analyzed.

Essential Questions

- How is weather measured?
- How can we predict weather?
- What are some severe weather impacts?
- What are some types of climates?
- How can weather impact the livelihood of people in society?
- What role does data collection and meteorology play in the functioning of society?
- What are weather patterns that can be observed?

Exit Skills

By the end of Unit 7, students will be able to:

- Distinguish between different types of weather.
- Identify some of the tools used to measure weather conditions.
- Analyze different patterns to make weather predictions.
- Categorize hazardous weather.
- Examine solutions to problems caused by the weather.
- Analyze weather patterns from various parts of the world.
- Construct data tables and graphical displays to describe typical weather conditions expected during a particular season.
- Synthesize information to describe climates in different regions around the world.
- Justify the merit of a design solution that reduces the impacts of a weather-related hazard.

New Jersey Student Learning Standards (NJSLS-S) & NGSS

SEP - Analyzing and Interpreting Data

SEP - Obtaining, Evaluating, and Communicating Information

SEP - Engaging in Argument from Evidence

DCI - Weather and Climate

DCI - Natural Hazards

CCC - Patterns

CCC - Influence of Engineering, Technology, and Science on Society and the Natural World

CCC - Science is a Human Endeavor

CCC - Cause and Effect

NextGen Science Standards

3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.
3-ESS2-1.1.1	Patterns of change can be used to make predictions.
3-ESS2-2.1.1	Patterns of change can be used to make predictions.
3-ESS2-2.ESS2.D.1	Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.
3-ESS2-1.ESS2.D.1	Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.

Interdisciplinary Connections

Connections to Math:

- **MP.2** Reason abstractly and quantitatively
- **MP.3** Construct viable arguments and critique the reasoning of others.

LA.RI.3.1	Ask and answer questions, and make relevant connections to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
LA.RI.3.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
LA.RI.3.7	Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
LA.RI.3.10	By the end of the year, read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed.
LA.W.3.10	Write routinely over extended time frames (time for research, reflection, metacognition/self-correction and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
LA.SL.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
LA.SL.3.1.A	Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
LA.SL.3.1.B	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

LA.SL.3.1.C	Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.
LA.SL.3.1.D	Explain their own ideas and understanding in light of the discussion.
LA.SL.3.2	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
LA.SL.3.3	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
TECH.8.1.2	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.2.2	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Learning Objectives

In Unit 2, students will demonstrate the ability to:

Lesson 1: How is Weather Measured?

- Gather data to make inferences about different types of weather.
- Distinguish between types of tools to measure weather.
- Identify different types of weather.
- Read and record different types of measuring tools.

Lesson 2: How Can We Predict the Weather?

- Determine how location affects the weather.
- Interpret information from graphs to make predictions about weather.
- Analyze patterns in weather.

Lesson 3: What Are Some Severe Weather Impacts?

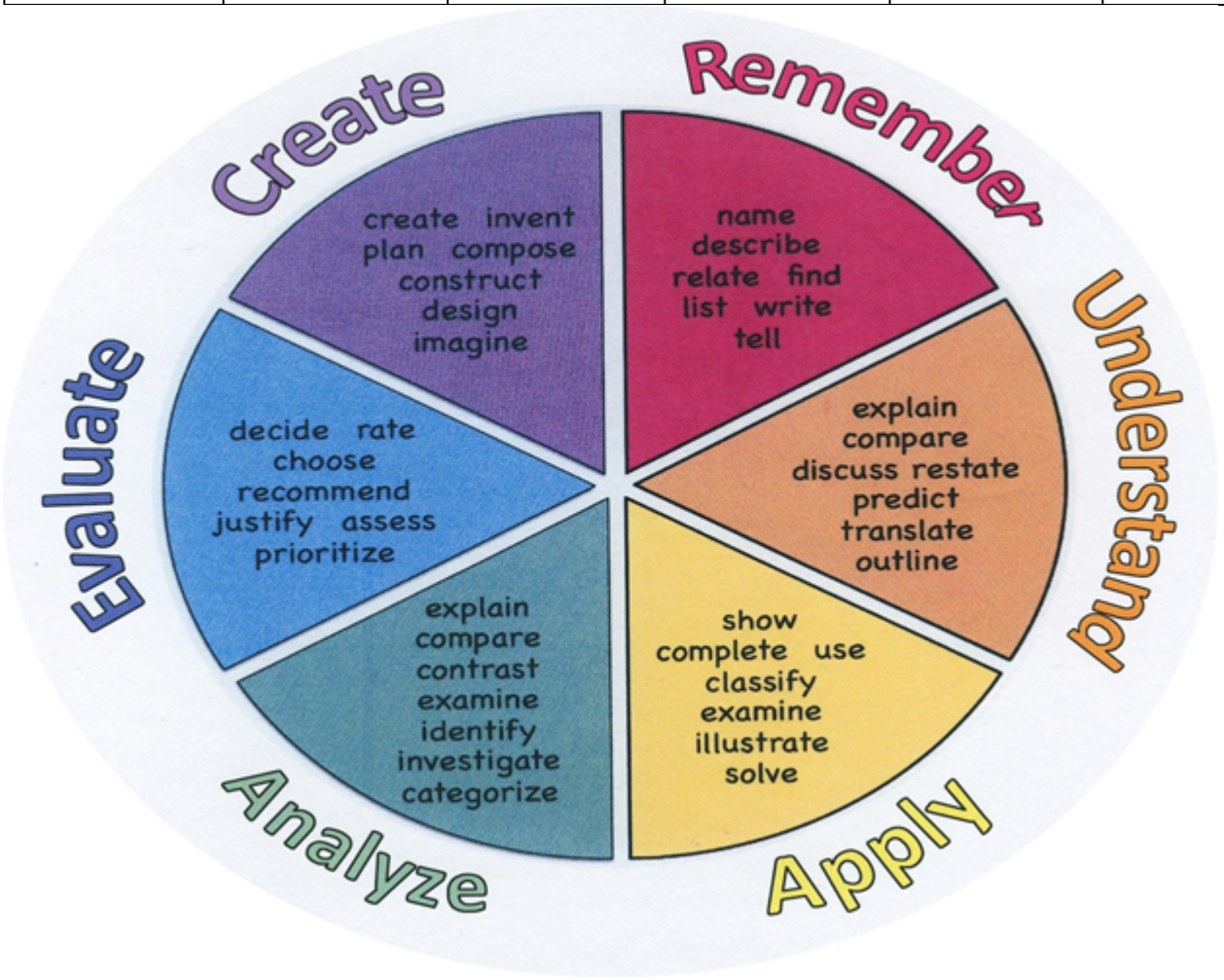
- Determine the effects caused by different natural disasters.
- Distinguish between different severe weather measuring tools.
- Analyze data to determine how meteorologist predict severe weather.

Lesson 4: What Are Some Types of Climates?

- Analyze data tables to determine the climate type.
- Interpret data to make predictions about the climate.
- Identify and define various types of climate.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize

Memorize Name Omit Recite Select State Count Draw Outline Point Quote Recall Recognize Repeat Reproduce	Give Examples Illustrate Indicate Interrelate Interpret Infer Match Paraphrase Represent Restate Rewrite Select Show Summarize Tell Translate Associate Compute Convert Discuss Estimate Extrapolate Generalize Predict	Prepare Produce Select Show Sketch Solve Use Add Calculate Change Classify Complete Compute Discover Divide Examine Graph Interpolate Manipulate Modify Operate Subtract	Point out Select Subdivide Survey Arrange Breakdown Combine Detect Diagram Discriminate Illustrate Outline Point out Separate	Contrast Critique Determine Grade Justify Measure Rank Rate Support Test	Invent Make Originate Organize Plan Produce Role Play Drive Devise Generate Integrate Prescribe Propose Reconstruct Revise Rewrite Transform



Suggested Activities & Best Practices

HMH Science Dimensions, Unit 7 - Lesson 1:

- **Engage:** "Can You Solve It?" lesson
- **Explore/Explain:** "What's It Like Out?", "Weather Gadgets", "Weather Everywhere" lessons and hands-on activity (Exploration 1, 2, 3)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 7 - Lesson 2:

- **Engage:** "Can You Solve It?" lesson
- **Explore/Explain:** "Time and Temperature", "A Year of Change", "Predicting Weather" lessons and hands-on activity (Exploration 1, 2, & 3)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 7 - Lesson 3:

- **Engage:** "Can You Solve It?" lesson and hands-on activity
- **Explore/Explain:** "Cause and Effect Weather", Using the Data", "Reducing Risk" lessons and hands-on activity (Exploration 1, 2, & 3)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 7 - Lesson 4:

- **Engage:** "Can You Solve It?" lesson and hands-on activity
- **Explore/Explain:** "Out of Place", "Something Different" lessons and hands-on activity (Exploration 1, 2)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 7 - Performance Task (A New Job?):

- Define the Goal
- Research
- Brainstorm/Discuss
- Make Forecasts
- Track Forecasts
- Communicate

HMH Science Dimensions, Unit 7 - Unit Project (Safety Plan):

- Research and Plan
- Analyze Results
- Restate Question

- Claims, Evidence, and Reasoning

Assessment Evidence - Checking for Understanding (CFU)

- Admit Tickets
- Anticipation Guide
- Compare & Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- HMH End-of-Year Test (Benchmark)
- HMH Mid-Year Test (Benchmark)
- HMH Performance-based Assessment (Alternative)
- Illustration
- Journals
- KWL Chart
- Learning Center Activities
- Multimedia Reports
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes (Formative)
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Surveys
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share

- Top 10 List
- Unit review/Test prep
- Unit tests (Summative)
- Web-Based Assessments
- Written Reports

Primary Resources & Materials

HMH Science Dimensions: Teacher Edition, Student workbooks, online resources

HMH Equipment & Safety Kits

HMH Science Dimensions S&E Leveled Readers

- On Level: How Can We Describe Weather?
- Extra Support: How Can We Describe Weather?
- Enrichment: Double Danger: Thunderstorms and Tornadoes

Ancillary Resources

- National Geographics (Natural Disasters)
- Nonfiction books (weather patterns)
- Scholastic (Predicting the Weather)
- https://ngss-assessment.portal.concord.org/

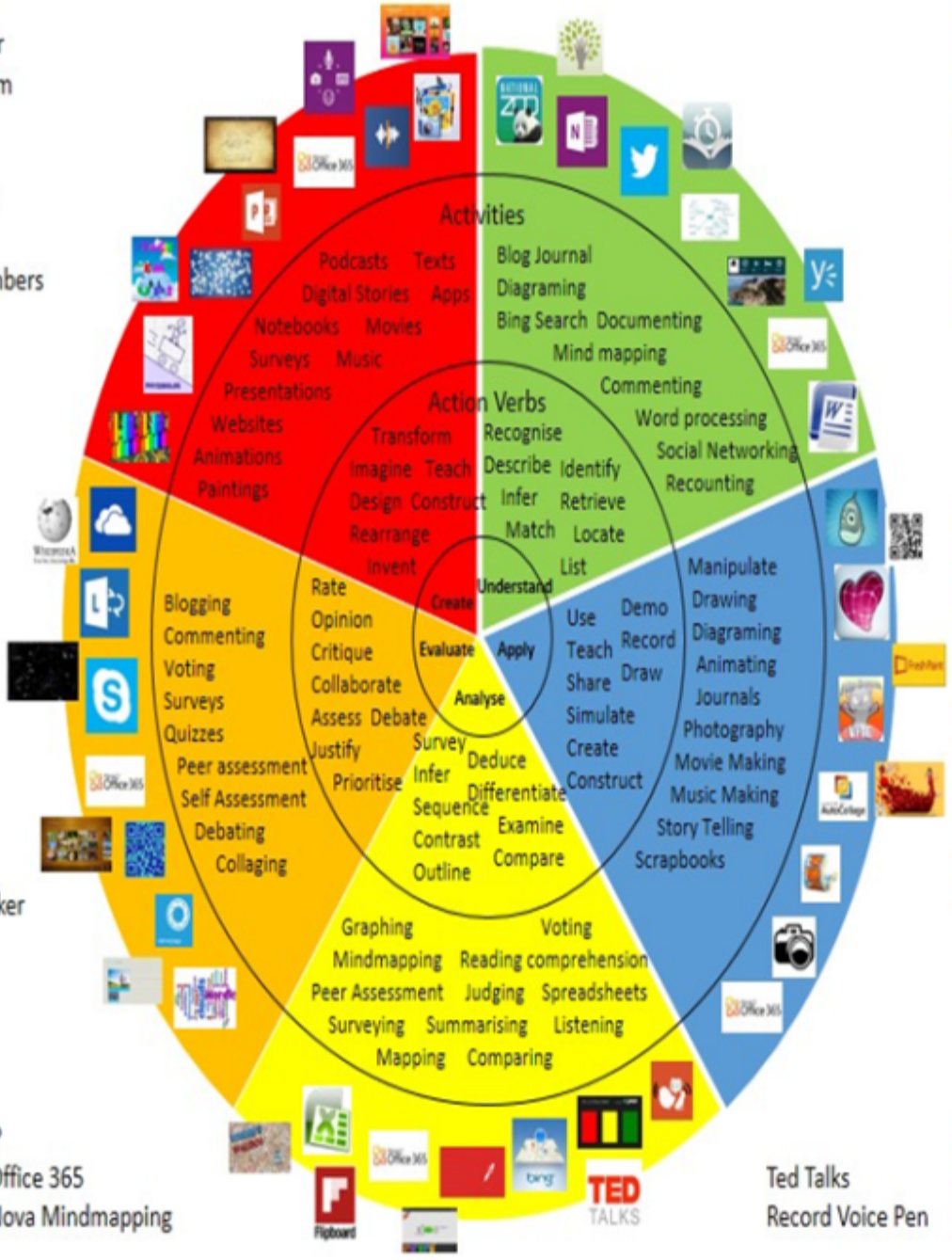
Technology Infusion

- HMH Science Dimensions Digital Components
- StudyJams! (Weather and Climate)
- YouTube video (weather prediction)

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
Photostory 3
Kid Story Builder
Music Maker Jam
Paint A Story
Office 365
MS PowerPoint
Stack 'Em Up
NqSquared Numbers
Physamajig
Xylophone 8

Wikipedia
Skydrive
Lync
SkyMap
Skype
Office 365
Puzzle Touch
Easy QR
Memorylage
Life Moments
Word Cloud Maker



Where's Waldo?
MS Excel
Flipboard
Office 365
Nova Mindmapping

Ted Talks
Record Voice Pen

Originally taken from http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Alignment to 21st Century Skills & Technology

21st Century Skills & Technology:

- English Language Arts
- Technology
- Mathematics

CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP5.1	Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

21st Century Skills/Interdisciplinary Themes

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving

- Information Literacy

21st Century Skills

- Environmental Literacy
- Global Awareness

Differentiation

The following differentiation strategies will be utilized:

- As needed, provide more instruction that is on level or below grade level for the students who are struggling.
- Monitor progress, reteach as needed, and extend student thinking.
- Utilize multiple intelligences teaching strategies.

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

Special Education Learning (IEP's & 504's)

The following strategies will be employed for students with IEP's and 504's:

- Provide modifications as dictated in the student's IEP/504 plan.
- Check work frequently for understanding.

- Extended time on tests/quizzes

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multi-sensory presentation
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

English Language Learning (ELL)

The following strategies will be employed for English Language Learners:

- Decreasing the amount of work presented or required.
- Using videos, illustrations, pictures, and drawings to explain or clarify.
- Allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning.

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards,

charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;

- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

At Risk

The following strategies will be employed for At Risk Learners:

- Decreasing the amount of work presented or required.
- Teaching key aspects of a topic. Eliminate nonessential information.
- Tutoring by peers.

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

The following Talented and Gifted adaptations will be employed:

- Higher order, critical & creative thinking skills, and discovery.
- Flexible skill grouping within a class or across grade level for rigor.
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities.

- Above grade level placement option for qualified students
- Advanced problem-solving
- Allow students to work at a faster pace
- Cluster grouping
- Complete activities aligned with above grade level text using Benchmark results
- Create a blog or social media page about their unit
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Flexible skill grouping within a class or across grade level for rigor
- Higher order, critical & creative thinking skills, and discovery
- Multi-disciplinary unit and/or project
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge

Sample Lesson

Unit Name: Chapter 1-

NJSLS: See Link Below

Interdisciplinary Connection: See Link Below

Statement of Objective:

Anticipatory Set/Do Now:

Learning Activity:
Student Assessment/CFU's:

Materials:

21st Century Themes and Skills:

Differentiation/Modifications:

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Integration of Technology: