Unit 3: Grades 5 & 6 Talented & Gifted Science/Technology

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Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Talented and Gifted

Grades 5-6

Science/Technology

Belleville Board of Education

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Unit Overview

PHILOSOPHY

The philosophy of the Talented & Gifted Program for Belleville Public Schools is to recognize the unique talents and capabilities of all students. Students who demonstrate exceptional abilities require a challenging and a differentiated curriculum. We recognize that students learn in different ways and posses different experiences and levels of understanding. Students deserve an educational environment that is challenging, stimulating, individualized, and learner driven. The curriculum has been designed to maximize students' creative, cultural, and cognitive needs. The cornerstone belief of the Talented & Gifted program is that children learn best when they are actively engaged in the quest for knowledge.

PURPOSE

The purpose of the Belleville School District Talented & Gifted Program:

- Provides students with learning experiences to increase their cognitive and affective abilities through frequent applications of creative thinking, problem solving, critical thinking, exploration, discovery, and experimentation.
- This program will provide educational opportunities and activities to every student in his/her personal learning style, to include visual-spatial, musical, naturalist, bodily kinesthetic, interpersonal, intrapersonal, linguistic, verb-linguistic, and logical-mathematical.

- Students will be encouraged to develop and apply higher level thinking processes to become producers of information, as well as consumers of information.
- The program will enhance each student's level of understanding concepts, ideas, and issues in the areas of knowledge, comprehension, application, analysis, synthesis, and evaluation.
- The intellectual architecture of this unit will be fueled by teacher designed lessons that build upon identified students' strengths, interests, and talents.
- The program is designed to be student driven in which the teacher acts as a facilitator, guide, or resource for personal or small group inquiries and investigations.
- The three characteristics used for identifying students are above average ability, task commitment, and creativity.
- Provide a three-part model of learning activities which would include Tier One as whole group instruction in the classroom setting during the school day, Tier Two as small group instruction and planned activities in the classroom setting during the school day involving cross-curricular involvement, and Tier Three as a pull out enrichment program for students in grades Kindergarten through sixth who meet the established criteria.
- The students are identified based on unique talents, abilities, and interests to form a talent pool.

At the Kindergarten-2nd grade levels, enrichment is intended for all students. It will be available to encourage students, and give them additional opportunities to achieve their highest potential. A pull out program in grades seven and eight has been designed for those students who demonstrate exceptional ability, talent, and potential. Students chosen to participate in this program will be required to meet established acceptance criteria.

TALENTED & GIFTED PULL OUT PROGRAM GOALS

1. Provide a differentiated curriculum for students who demonstrate exceptional cabilities and potential.
2. Identify and support each student's personal style to promote academic, social, and emotional growth for potential success.
3. Provide opportunities for students to pursue long-term investigations of personal interests.
4. Provide activities that promote growth and stimulation in higher cognitive processes such interpretation, analysis, application, synthesis, and evaluation.
5. To engage students in rich academic experiences coupled with high expectations, which will afford them opportunities to make meaningful connections between their learning and the larger world.
6. Develop an understanding of their own talents and interests in order to select and pace learning experiences necessary to become more self-directed learners.

TALENTED & GIFTED PROGRAM OBJECTIVES

1. The student will participate in learning activities in which one or more of the following strategies for differentiated instruction will be employed: interest groups, independent projects, learning centers, and tiered assignments.
2. The students will be exposed to a personal interest survey to help them focus their questions for personal or small group inquiry and investigation in grades Kindergarten through second.
3. The students will participate in analysis and synthesis of information facilitated by, but not limited to,

real world problem solving, mentorship, product creation, presentation, and self-evaluation.
4. Students will select topics of personal interest that they will research, engage in problem solving, and create solutions that are tied to real world application.
5. The students will use technological resources to facilitate their investigations.

GUIDELINES FOR INSTRUCTIONAL ACTIVITIES

Activities will include but not be limited to:

1. Personal interest inventories, and investigations pursuing those interests.
2. Inquiry of questions related to or arising from regular classroom studies or those proposed by the instructor.
3. Exploratory activities.
4. Student opportunities to engage in new endeavors involving questioning and investigation to secure new knowledge.
5. Those that encourage students to question, make inferences, and find evidence to support generalizations.

UNIT THREE: SCIENCE/TECHNOLOGY

Unit Three of the T&G Enrichment Curriculum will focus on different aspects to broaden student's understanding of Science/Technology concepts.

Students create programs with loops, events, and conditionals and write algorithms for everyday tasks. They will investigate different problem-solving techniques and discuss the societal impacts of technology in the 21st Century. Topics have complexity and depth to provide students a rich and novel experience

Enduring Understandings

1. Students will understand the importance of becoming independent thinkers and problem solvers.

2. Students will understand how technology will enhance their creative work.

3. Students will understand that it is vital to use multiple resources when completing research.

4. Students will understand the importance of respect and collaboration when working with team members to solve problems.

5. Students will understand the importance of respecting team members' thoughts and opinions when completing a collaborative digital project.

6. Students will understand the importance of practicing legal and ethical behavior on the internet.

7. Students will understand coding is the use of sequence of demands to tell something what to do

Essential Questions

- How can we use algorithms in our daily lives?
- Is sequence important when writing programs?
- How can we make our programs more efficient?
- How can we stay safe while using technology?
- Can you use technology to create an animation, stories, or games?
- Why is it important to become an independent thinker?
- How does technology enhance our creative thought processes
- What thought stratgies are involved in choosing the right technological resource to complement your project?
- When completing research, why is it important to cross-reference different materials?
- How do we show respect for our peers with contrasting opinions?
- Why is it important to practice ethical behavior when using the internet as a resource?

Exit Skills

By the end of the unit,

- students create interactive games or stories they can share
- Code using different langauges depending on the technology (Ozobot, Sphero, LEGO Coding Express, Code.org, etc.)
- Use the Engieering Design Process
- Use prior knowledge to make inferences

Interdisciplinary Connections

The T&G Curriculum areas of divergent thinking, convergent thinking, visual/spatial perceptions, interpretive thinking, and problem solving are integrated with Language Arts, Math, Science, and other content areas.

New Jersey Student Learning Standards (NJSLS)

SCI.3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
SCI.3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
SCI.3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.2	Create a document (e.g., newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
TECH.8.1.8.A.3	Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.8.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.8.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.8.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.2.8.C.CS2	The application of engineering design.
TECH.8.2.8.D.1	Design and create a product that addresses a real world problem using a design process under specific constraints.

Learning Objectives

Students will be able to...

- Code using different languages depending on the technology (Ozobot, Sphero, LEGO Coding Express, Code.org, etc.)
- Create interactive games or stories they can share
- Use the Engineering Design Process
- Develop an idea to research independently and present their findings to peers

Students will be able to refine and broaden...

l. Divergent thinking (Core Standards: Reading: Informational Text; Reading Literature; Writing; Speaking and Listening; Language)

a. Creative thinking

b. Inventive thinking

2. Convergent thinking (Core Standards: Reading: Informational Text; Speaking and Listening)

a. Deductive thinking

b. Analytical thinking

c. Evaluative thinking

3. Interpretive thinking (Core Standards: Reading: Informational Text; Reading Literature; Writing; Speaking and Listening; Language, NJCCCS 5.2)

4. Problem solving (NJ CCCS 5.12, 6.6; Core Standards: Reading: Informational Text; Writing; Speaking and Listening)

5. Research Skills (Core Standards: Reading: Informational Text; Reading Literature; Writing; Speaking and Listening; Language)

In the area of divergent thinking students will:

a. use creative thinking to:

l. use fluent and flexible thinking to brainstorm ideas/solutions.

2. develop, produce, and dramatize.

3. adapt story versions.

4. illustrate interpretations.

5. use the five-step writing process to write original pieces.

6. create and construct original designs with a variety of manipulatives and aft supplies.

b. use inventive thinking to:

l. use fluent and flexible thinking to brainstorm ideas/solutions.

2. invent to solve a problem.

3. adapt items to be used for an alternate purpose.

In the area of convergent thinking students will:

a. use deductive thinking to:

l. formulate predictions/hypothesis.

2. determine varied ways to reach the same solution.

3. solve a variety of visual and geometric puzzles.

4. determine constructions of tangrams, polyhedrons, and tessellations.

5. organize clues and eliminate unrelated clues to determine a solution.

b. use analytical thinking to:

l. analyze story elements.

2. compare and contrast story elements/manipulatives/interpretations.

3. interpret visual representations.

4. determine constructions of tangrams, polyhedrons, and tessellations.

5. use a variety of manipulatives and calculators to solve mathematical functions.

6. conclude results through the scientific method process.

c. use evaluative thinking to:

1. judge character traits and motivation.

2. compare, rate, rank, revise, and eliminate information.

3. determine cause and effect.

4. make conclusions about given information.

5. defend and validate perspectives.

6. exercise metacognition through KWL charts and reflective writing.

7. decide assessment criteria in rubric form.

8. self-assess using set criteria.

In the area of interpretive thinking students will:

a. use shared inquiry to:

l. build awareness of interpretive issues in a story.

2. analyze character motivation and development.

3. find and use supporting evidence for opinions.

4. present clear, persuasive arguments.

In the area of problem solving students will:

a. use the creative problem solving process to:

1. Fact Find - sort out what facts are relevant to the problem and what information is lacking.

2. Determine Problem - analyze the situation and define the "real problem."

3. Find Solutions - think of creative ways to solve the problem.

4. Select Criteria - generate criteria to help decide the best solution.

5. Judging Ideas - use criteria to select the best idea.

6. Determine Plan of Action - plan how to implement the selected solution.

In the area of research skills students will:

a. determine purpose, goals, and activities of self-selected independent study projects

b. access and select meaningful information using the Internet, books, videos, and other media.

c. use the five-step writing process of prewriting, drafting, editing, conferencing, and publishing for a variety of audiences and purposes.

d use a variety of computer software to record research.

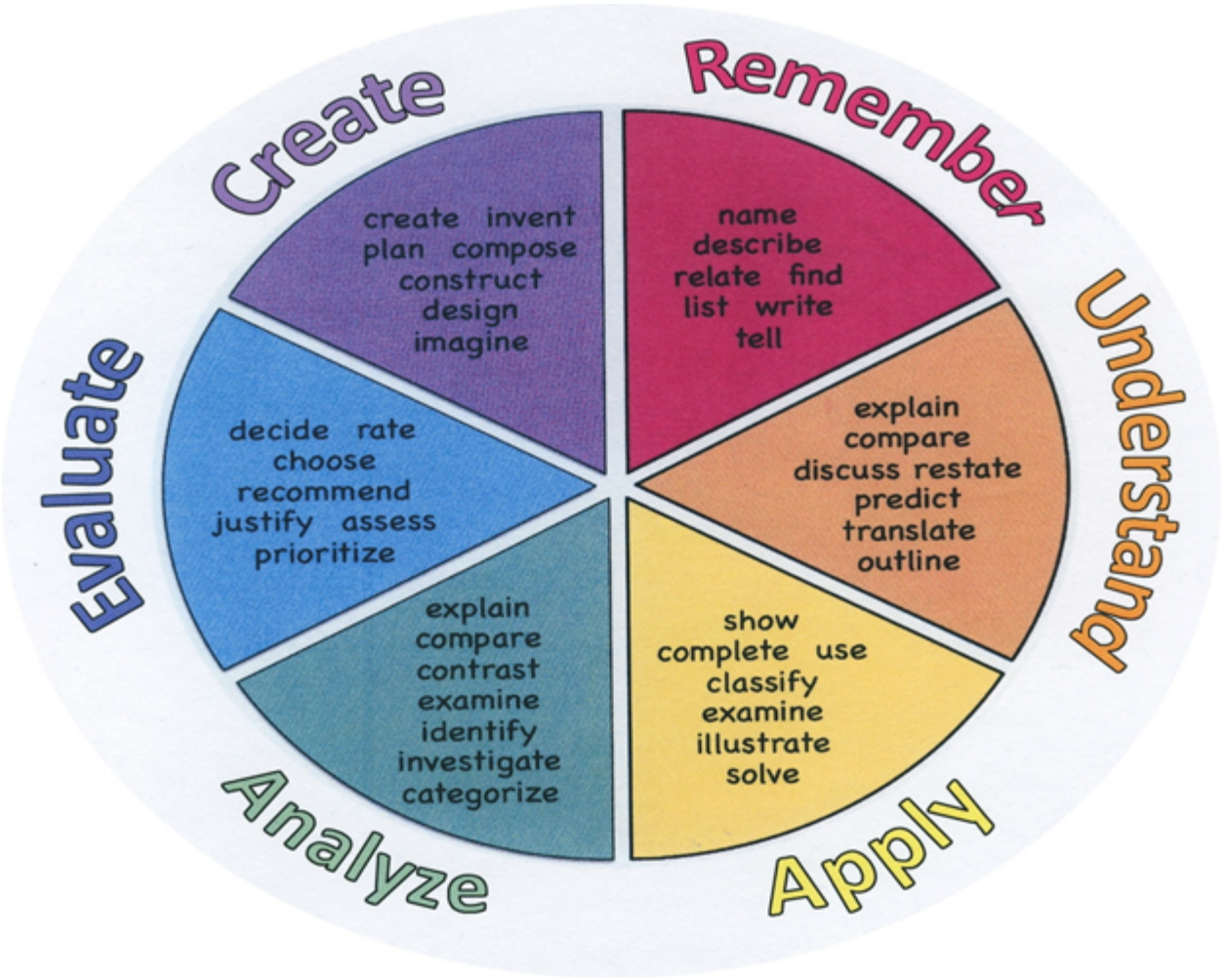
e. synthesize knowledge of a topic into self-selected culminating activities.

f. cite references.

g. present/share research to others

: Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

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



Suggested Activities & Best Practices

- Introduce coding using different technology such as Ozobot, Sphero, and/or LEGO Coding Express.
- Complete an independent study project.
- Create experiments involving ramps, catapults, etc. made by students
- Assemble circuits using play dough
- Design a solution to a real world problem using the Design Cycle.

Assessment Evidence - Checking for Understanding (CFU)

Teacher Observation Checklist (Formative)

Lab Journals (Formative)

Presentations of findings (Summative)

Multimedia presentations (Alternative)

- Admit Tickets
- Anticipation Guide
- Common Benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Learning Center Activities
- Multimedia Reports
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- 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
- Web-Based Assessments
- Written Reports

Primary Resources & Materials

Osmo Activity Guide
Ozobots

Sphero Mini

HMH Science Dimensions Series

Ancillary Resources

www.discoveryeducation.com

www.mysteryscience.com

Brain Pop

Osmo Coding

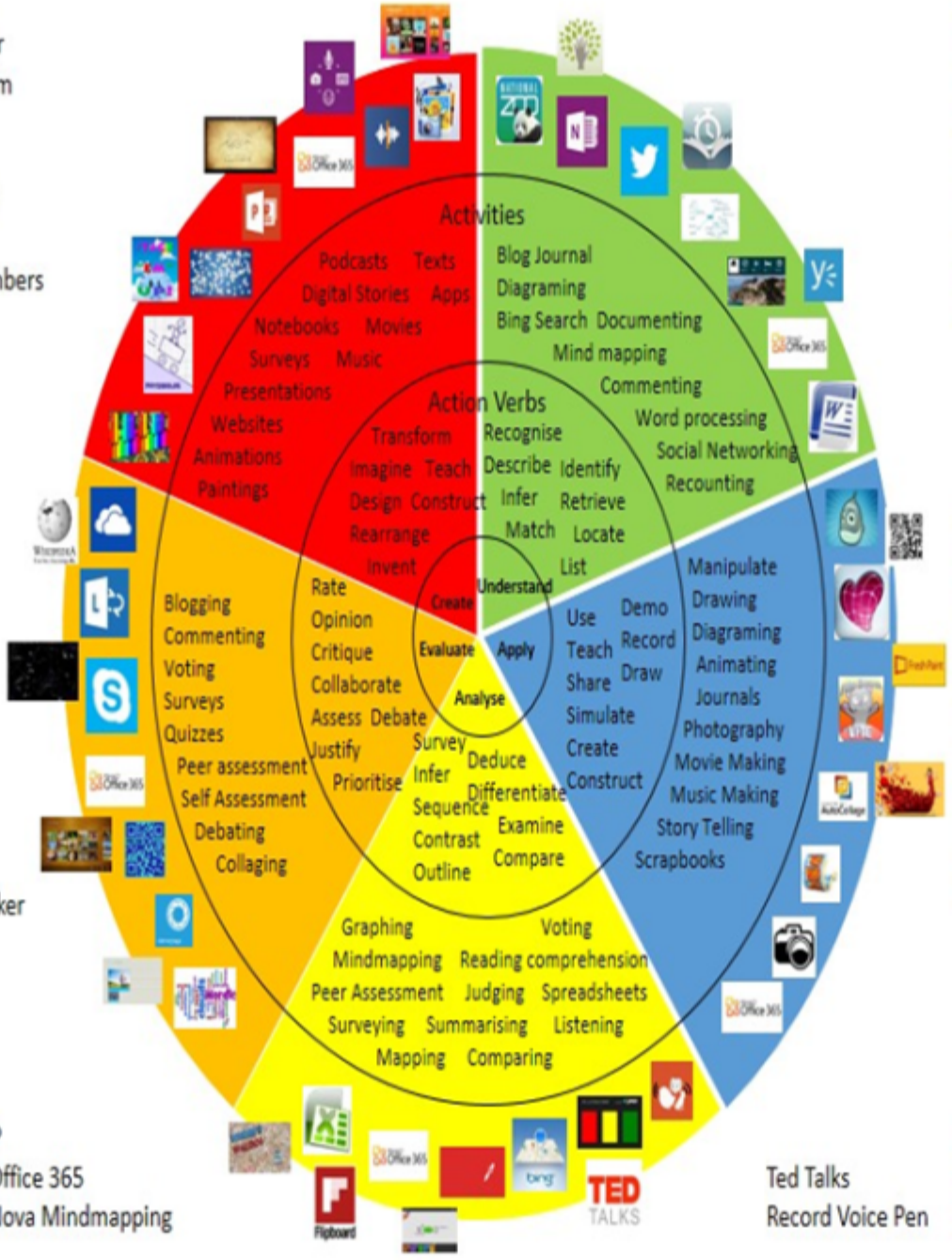
Technology Infusion

- SMARTtv
- Google Suite Applications
- Chromebooks
- multimedia pressentations
- online resources
- wiki site
- Osmo for Schools
- Ozobots\

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 Office 365
Flipboard 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

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21st century.

Key subjects include:

- English, reading or language arts
- World languages
- Arts
- Mathematics
- Science
- Geography
- History
- Government and Civics

21st Century Skills/Interdisciplinary Themes

Please list only the **21st Century/Interdisciplinary Themes** that will be incorporated into this unit.

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

Please list only the **21st Century Skills** that will be incorporated into this unit.

- Civic Literacy
- Environmental Literacy

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

Differentiation

T&G students will be identified through multiple measurable assessments (DRA, Envision, teacher recommendation, etc.).

Tier 1- At this tier, ALL students are serviced. Enrichment opportunities will be offered through various classroom experiences.

Tier 2 - At this tier, flexible groups are formed based on concept mastery. Extended learning opportunities will be offered in order for students to transfer complex thinking processess to a higher level.

Tier 3- At this tier, identified students in Language Arts and/or Mathmatics will be engaged in culminating activities in an after school enrichment program. This guide addresses identified T&G students enrolled in this program.

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)

Guidelines for students with IEP's and 504's will be followed.

Work will be checked frequently to check for student's understanding.

- 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)

Use translation devices and applications to assist in language barrier

- 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)
- decreasing the amount of workpresented or required

- having peers take notes or providing a copy of the teacher's notes
- reducing or omitting lengthy outside reading assignments
- tutoring by peers
- using computer word processing spell check and grammar check features

At Risk

Tutoring by peers will be used.

Students may correct errors when they occur.

- 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
- 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
- reducing or omitting lengthy outside reading assignments
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

Provide enrichment articles and assignments

Allow students to complete independent study assignments

- 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

Using the template below, please develop a **Sample Lesson** for the first unit only.

Unit Name:

NJSLS:

Interdisciplinary Connection:

Statement of Objective:

Anticipatory Set/Do Now:

Learning Activity:

Student Assessment/CFU's:

Materials:

21st Century Themes and Skills:

Differentiation/Modifications:

Integration of Technology: