ROCKWOOD ENGINEERING & TECHNOLOGY

Invention & Innovation 7th Grade

Lesson Plans Mr. Kush

Day 1

Invention & Innovation 7th Grade

OBJECTIVES: Introduction to the course

- ACTIVITIES: Welcome & Introduction Rules and Procedures Engineering Folder & Notebook distribution
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology:

Day 2 Invention & Innovation 7th Grade

OBJECTIVES:Students will be able to sketch and evaluate preliminary designs for the Golf Ball Tower
ChallengeACTIVITIES:Golf Ball Tower Challenge - Handout
Discuss challenge criteria, constraints, mathematical formula for 75% of the height,
presentation requirements, and grading rubric
Select groups – and group leader
Acquire materials
Begin sketching and evaluating designsEVALUATION:Formal assessment of 35 points for the combined challenge and group presentation
Informal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points

ENRICHMENT: Independent exploration and application of structures and their foundations

ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology: 3.1.7B, 3.1.7D, 3.2.7B, 3.2.7D, 3.6.7C, 3.7.7A, 3.7.7B

Day 3

Invention & Innovation 7th Grade

OBJECTIVES:	Students will be able to select a golf ball tower design from their sketches and build it using the provided materials.
ACTIVITIES:	Golf Ball Tower Challenge - Handout Review discussion challenge criteria, constraints, mathematical formula for 75% of the height, presentation requirements, and grading rubric Groups will build their structure and revise and adapt as necessary
EVALUATION:	Formal assessment of 35 points for the combined challenge and group presentation Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of structures and their foundations
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology:

3.1.7B, 3.1.7D, 3.2.7B, 3.2.7D, 3.6.7C, 3.7.7A, 3.7.7B

<mark>Day 4</mark>

OBJECTIVES:	Students will be able to conduct group presentations based on the Golf Ball Tower design challenge according to the criteria in the rubric.
ACTIVITIES:	Golf Ball Tower Challenge – rubric review Presentation of Designs and 75% of structure calculation
EVALUATION:	Formal assessment of 35 points for the combined challenge and group presentation Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of structures and their foundations
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology:

3.1.7B, 3.1.7D, 3.2.7B, 3.2.7D, 3.6.7C, 3.7.7A, 3.7.7B

Day 5

OBJECTIVES:	Students will be able to comply with the set expectations and procedures for this class. Students will be able to use a ruler and measure to the nearest $1/2''$ inch.
ACTIVITIES:	Introduction discussion of course Procedure / Policy Handout Distribute folder & Engineering Design Journal "Giant Inch" measuring review activity Begin "Measuring Practice" handout
EVALUATION:	Procedure / Policy / Student Expectation signature form is due tomorrow Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of measuring
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes

Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology: 3.1.10A, 3.1.7E, 3.2.7A, 3.6.10B, 3.7.10A

Day 6

Invention & Innovation 7th Grade

OBJECTIVES:Students will be able to comply with the set expectations and procedures for this class.
Students will be able to use a ruler and measure to the nearest 1/2" inch.

ACTIVITIES: CONTINUED: "Giant Inch" measuring review activity Begin "Measuring Practice" handout

- **EVALUATION**: Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
- **ENRICHMENT**: Independent exploration and application of measuring
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology: 3.1.10A, 3.1.7E, 3.2.7A, 3.6.10B, 3.7.10A

Day 7

OBJECTIVES:	Students will be able to use a ruler and measure to the nearest 1/16" inch.
ACTIVITIES:	Completion of the following measuring activity: "Measuring Practice" handout "Measuring Practice 1" handout – (Possibly complete for homework)
EVALUATION:	Informal assessment of completion of the measuring practice guides Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of measuring
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room

Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology: 3.1.10A, 3.1.7E, 3.2.7A, 3.6.10B, 3.7.10A

Day 8

Invention & Innovation 7th Grade

OBJECTIVES: Students will be able to use a ruler and proficiently and accurately measure to the nearest 1/16" inch. Students will be able to complete the measuring assessment. **ACTIVITIES:** Completion of the following measuring activities: "Measuring Practice 2" handout – review of answers Review measuring activity on the whiteboard Measuring Test 17 points **EVALUATION:** Informal assessment of completion of the measuring practice guide and measuring review activity Formal assessment of 17 point measuring test Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points **ENRICHMENT:** Independent exploration and application of measuring ACCOMMODATIONS: Students that score less than 70% may practice and retake the measuring test at another time Additional time to complete tasks / tests / guizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology: 3.1.10A, 3.1.7E, 3.2.7A, 3.6.10B, 3.7.10A

Day 9

Invention & Innovation 7th Grade

OBJECTIVES:

Students will be able to identify specific elements of an Engineering Design Journal. Students will be able to conclude and develop reasons for the required elements of an Engineering Design Journal. **ACTIVITIES:** Students will use the "Journaling Like a Pro: The Thomas Edison Papers" handout as a guide to search the Edison Papers at Rutgers University to discover common elements of an Engineering Design Journal. Students will use the link on my website to access the Edison webpage. source page: http://edison.rutgers.edu/docsamp.html **EVALUATION:** Informal assessment of completion of the "Journaling Like a Pro" handout Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points ENRICHMENT: Independent exploration and application of The Thomas Edison Papers ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology: 3.1.7A, 3.1.4D, 3.2.4A, 3.7.4D, 3.8.4A

Day 10

CONTINUED: Students will be able to identify specific elements of an Engineering Design Journal Students will be able to conclude and develop reasons for the required elements of an Engineering Design Journal.
Students will use the "Journaling Like a Pro: The Thomas Edison Papers" handout as a guide to search the Edison Papers at Rutgers University to discover common elements of an Engineering Design Journal. Students will use the link on my website to access the Edison webpage. source page: <u>http://edison.rutgers.edu/docsamp.html</u> Students will review the answers to the handout
Formal assessment of completion of the "Journaling Like a Pro" handout 10 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
Independent exploration and application of The Thomas Edison Papers
Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology: 3.1.7A, 3.1.4D, 3.2.4A, 3.7.4D, 3.8.4A

Day 11

Invention & Innovation 7th Grade

OBJECTIVES: Students will be able to define and provide samples for the mathematical terms: Ratio, Proportion, Scale, Scale Drawing, and Scale of Reference. Students will be able to correctly develop ratios, proportions, scales, and scale drawings. Students will be able to identify a scale of reference in a drawing. **ACTIVITIES:** Students will use the handout "Scale Drawings" and the website www.harcourtschool.com/glossary/math_advantage/glossary6.html to answer questions. Students will access the website through my website portal. Students will use the "scale of Reference" PowerPoint with the YouTube videos "Scale of the Planets and Stars" and "Celestial Bodies". **EVALUATION:** Formal assessment of completion of the "Scale Drawings" handout - 10 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points **ENRICHMENT:** Independent exploration and application of mathematical terms and their relationship to design Additional time to complete tasks / tests / quizzes / assignments ACCOMMODATIONS: T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary

Modified Tests & Quizzes

PA STANDARDS for Science, Engineering, and Technology 3.1.4C, 3.1.4D, 3.1.7D, 3.1.10D, 3.2.4A, 3.7.4D

Breaking up larger assignments into smaller manageable pieces

Day 12

Invention & Innovation 7th Grade

OBJECTIVES:CONTINUED: Students will be able to define and provide samples for the mathematical terms:
Ratio, Proportion, Scale, Scale Drawing, and Scale of Reference.
Students will be able to correctly develop ratios, proportions, scales, and scale drawings.
Students will be able to identify a scale of reference in a drawing.ACTIVITIES:Students will use the handout "Scale Drawings" and the website
www.harcourtschool.com/glossary/math_advantage/glossary6.html
to answer questions.
Students will use the "scale of Reference" PowerPoint with the YouTube videos "Scale of the
Planets and Stars" and "Celestial Bodies".
Students will review the answers to the handout.

EVALUATION:Informal assessment of completion of the "Scale Drawings" handout
Informal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points

ENRICHMENT: Independent exploration and application of mathematical terms and their relationship to design

ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.1.4C, 3.1.4D, 3.1.7D, 3.1.10D, 3.2.4A, 3.7.4D

Day 13

OBJECTIVES:	The Great Pencil Invention Design Brief Students will understand the scope, expectations, and grading rubric of the design brief. Students will be able to brainstorm and create four different rough sketches of different pencil inventions. Students will be able to write annotations to explain the function and purpose for each of the designs.
	Students will be able to create a refined sketch that uses various aspects of the rough sketch designs.
ACTIVITIES:	Students will read the Wikipedia entry on the "Space Pen" and discuss its design and limitations. Students will use the handout "The Great Pencil Invention" to explore step by step procedure and expectations of the design challenge. Students will then review the grading rubric. Finally, students will begin the activity and document the designs in their Engineering Design Journal.
EVALUATION:	Formal assessment on the completion of the four different rough sketches with the appropriate documentation in the Engineering Design Journal for 16 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of engineering journal documentation
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 14

Invention & Innovation 7th Grade

OBJECTIVES: The Great Pencil Invention Design Brief Students will be able to write annotations to explain the function and purpose for each of the designs. Students will be able to create a refined sketch that uses various aspects of the rough sketch designs. Students will be able to develop a scale of reference, specific measurements, and a title for the invention. Students will be able to develop an appropriate and aesthetically pleasing color scheme with markers and colored pencils. **ACTIVITIES:** students will make a refined sketch in their Engineering Design Journal with a scale of reference, annotations, title, date, and witnesses. **EVALUATION:** Formal assessment on the completion of the refined sketch with the appropriate documentation in the Engineering Design Journal for 5 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points **ENRICHMENT:** Independent exploration and application of design brainstorming and sketching ACCOMMODATIONS: Additional time to complete tasks / tests / guizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary **Modified Tests & Quizzes** Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.1.10D, 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 15

Invention & Innovation 7th Grade

OBJECTIVES:

The Great Pencil Invention Design Brief

Students will be able to create a final sketch with color based on the refined sketch from the Engineering Design Journal.

Students will be able to develop a scale of reference, specific measurements, annotations, and a title for the invention.

	Students will be able to develop an appropriate and aesthetically pleasing color scheme with markers and colored pencils.
ACTIVITIES:	Based on the refined sketch in the Engineering Design Journal, students will make a final sketch on white paper with a scale of reference, annotations, title, date, and witnesses.
EVALUATION:	Formal assessment on the completion of the final sketch with the appropriate documentation on white paper for 30 points
	Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of design ideation and development
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students
	Option for students to take formal assessments taken in the Learning Support room Option for preferential seating
	Option for individual guidance
	Verbal presentation of reading material by aid when present
	Additional time to complete assignments as necessary
	Modified Tests & Quizzes
	Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 16

OBJECTIVES:	The Great Pencil Invention Design Brief Students will be able to develop a brief presentation based on their pencil invention and the criteria from the grading rubric.
ACTIVITIES:	Students will develop a presentation for their pencil invention. Students will present their invention o the class and explain its function, features, and purpose.
EVALUATION:	Formal assessment on the completion of the final sketch with the appropriate documentation on white paper for 30 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of simple student inventions
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

Day 17

Invention & Innovation 7th Grade

OBJECTIVES:	The Great Pencil Invention Design Brief CONTINUED: Students will be able to develop a brief presentation based on their pencil invention and the criteria from the grading rubric.
ACTIVITIES:	Students will develop a presentation for their pencil invention. Students will present their invention o the class and explain its function, features, and purpose.
EVALUATION:	Formal assessment on the completion of the final sketch with the appropriate documentation on white paper for 30 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of simple student inventions
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 18

OBJECTIVES:	The Great Pencil Invention Design Brief CONTINUED: Students will be able to develop a brief presentation based on their pencil invention and the criteria from the grading rubric.
ACTIVITIES:	Students will develop a presentation for their pencil invention. Students will present their invention o the class and explain its function, features, and purpose.
EVALUATION:	Formal assessment on the completion of the final sketch with the appropriate documentation on white paper for 30 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of simple student inventions

ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 19

Invention & Innovation 7th Grade

- OBJECTIVES:Students will be able to identify their three most famous inventors of all time, their inventions,
and how the invention may have impacted the way people lived, worked, or produced things.
Students will be able to, identify the attributes or personal characteristics of the people cited
that made them successful inventors
- ACTIVITIES: "Famous Inventors" handout Students will use prior know information and research PBS Who Made America – Inventors http://www.pbs.org/wgbh/theymadeamerica/whomade/innovators_hi.html, Enchanted Learning – US and Canadian Inventors and Inventions http://www.enchantedlearning.com/inventors/us.shtml, American Inventors: Great Inventors: Titans of American Innovation <u>http://www.american-inventor.com/great-inventors.aspx</u> to find information on their three most favorite inventors to answer questions from handout. Students will work independently on his activity. In a discussion format, students will answer questions and share their results with the class.
- EVALUATION:Formal assessment on the completion of the handout. 10 pointsInformal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points
- **ENRICHMENT**: Independent exploration and application of famous inventors
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B



Invention & Innovation 7th Grade

- OBJECTIVES:DAY 2 Students will be able to identify their three most famous inventors of all time, their
inventions, and how the invention may have impacted the way people lived, worked, or
produced things.
Students will be able to, identify the attributes or personal characteristics of the people cited
that made them successful inventors
- ACTIVITIES: "Famous Inventors" handout Students will use prior know information and research PBS Who Made America – Inventors <u>http://www.pbs.org/wgbh/theymadeamerica/whomade/innovators_hi.html</u>, Enchanted Learning – US and Canadian Inventors and Inventions <u>http://www.enchantedlearning.com/inventors/us.shtml</u>, American Inventors: Great Inventors: Titans of American Innovation <u>http://www.american-inventor.com/great-inventors.aspx</u> to find information on their three most favorite inventors to answer questions from handout. Students will work independently on his activity. In a discussion format, students will answer questions and share their results with the class.
- EVALUATION:Formal assessment on the completion of the handout. 10 pointsInformal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points
- **ENRICHMENT**: Independent exploration and application of famous inventors
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 21

Invention & Innovation 7th Grade

 OBJECTIVES:
 DAY 3 Students will be able to identify their three most famous inventors of all time, their inventions, and how the invention may have impacted the way people lived, worked, or produced things.

 Students will be able to, identify the attributes or personal characteristics of the people cited that made them successful inventors

ACTIVITIES: "Famous Inventors" handout Students will use prior knowledge information and research PBS Who Made America – Inventors

http://www.pbs.org/wgbh/theymadeamerica/whomade/innovators hi.html , Enchanted Learning – US and Canadian Inventors and Inventions http://www.enchantedlearning.com/inventors/us.shtml , American Inventors: Great Inventors: Titans of American Innovation http://www.american-inventor.com/great-inventors.aspx to find information on their three most favorite inventors to answer questions from handout. Students will work independently on his activity. In a discussion format, students will answer questions and share their results with the class. **EVALUATION:** Formal assessment on the completion of the handout. 10 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points Independent exploration and application of famous inventors **ENRICHMENT**: ACCOMMODATIONS: Additional time to complete tasks / tests / guizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary **Modified Tests & Quizzes** Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 22

OBJECTIVES:	Students will be able to note and realize truths about invention and innovation and their relationship with developing technology.
	Students will be able to compare and contrast the difference between invention and innovation.
ACTIVITIES:	PowerPoint presentation / discussion: Introduction to Invention & Innovation Students will fill in the blanks with their "Unit 1 Notes Page" handout for 5 points
EVALUATION:	Formal assessment on the completion of the "Unit 1 Notes Page" handout 5 points Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of inventions and innovation relationship with technology
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 23

Invention & Innovation 7th Grade

- **OBJECTIVES**: **DAY 1** Students will be able to select a vignettes and identify the needs or desires that were satisfied by the invention, identify some of the materials that were needed to make the invention and identify some of the tools that were used to make the invention.
- ACTIVITIES: "Great Thinkers and Their Inventions" vignettes Handout As a class we will read the four vignettes, and then students will pick one of the vignettes to think about. They will then answer questions pertaining to the concepts in relation to their vignette.
- EVALUATION:Formal assessment on the completion of the handout "Great Thinkers and Their Inventions"
vignettes for 10 points
Informal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points
- **ENRICHMENT**: Independent exploration and application of invention & innovation histories
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 24

Invention & Innovation 7th Grade

OBJECTIVES: **DAY 2** Students will be able to select vignettes and identify the needs or desires that were satisfied by the invention, identify some of the materials that were needed to make the invention, and identify some of the tools that were used to make the invention.

ACTIVITIES: "Great Thinkers and Their Inventions" vignettes - Handout As a class, we will read the four vignettes, and then students will pick one of the vignettes to think about. They will then answer questions pertaining to the concepts in relation to their vignette.

- EVALUATION:Formal assessment on the completion of the handout "Great Thinkers and Their Inventions"
vignettes for 10 points
Informal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points
- **ENRICHMENT**: Independent exploration and application of invention & innovation histories
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 25

Invention & Innovation 7th Grade

OBJECTIVES:	Students will be able to identify and describe a "bad or useless" invention.
ACTIVITIES:	Students will use the website the Time Magazine, "50 Worst Inventions" <u>http://www.time.com/time/specials/packages/completelist/0,29569,1991915,00.html</u> to select two of their favorite worst inventions. Students may watch the associated video and conduct further research at Wikipedia. Students will then briefly present to the class their favorite worst inventions.
EVALUATION:	Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration of "bad or useless" inventions
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B



Invention & Innovation 7th Grade

OBJECTIVES: CONTINUED: Students will be able to identify and describe a "bad or useless" invention.

- ACTIVITIES: Students will use the website the Time Magazine, "50 Worst Inventions" <u>http://www.time.com/time/specials/packages/completelist/0,29569,1991915,00.html\</u> to select two of their favorite worst inventions. Students may watch the associated video and conduct further research at Wikipedia. Students will then briefly present to the class their favorite worst inventions.
- **EVALUATION**: Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
- **ENRICHMENT**: Independent exploration of "bad or useless" inventions
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 27

OBJECTIVES:	Students will be able to identify and note the Engineering Design Process as a cyclical method for solving design problems.
	Students will be able to formulate that the design process is a set of steps that can be performed in a different sequence and repeated as necessary.
ACTIVITIES:	Note the Engineering Design Process in their Engineering design notebooks Discuss the acronym K.I.S.S.
EVALUATION:	Informal assessment of participation and completion of class activities, group participation, and cleanup activities for participation points
ENRICHMENT:	Independent exploration and application of the Engineering Design Process
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance

Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.2.4A, 3.2.10D, 3.7.4A, 3.8.4B, 3.8.12B

Day 28

Technology Systems 8th Grade

 OBJECTIVES:
 Students will be able to understand and follow basic laboratory safety rules.

 Students will be aware and know the appropriate behaviors and expectations for laboratory activities.

ACTIVITIES:Students will take a tour of the lab facilities to review locations of safety equipment
"Basic Safety Rules"- Handout
Students will read and discuss the handout.
Quiz 28 points "Engineering & Technology Basic Safety Rules Test"

EVALUATION:Formal assessment on the completion of the 34 point quiz "Engineering & Technology Basic Safety
Rules Test"
Informal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points

ENRICHMENT: Independent exploration and application of laboratory safety practices

ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.7.10A, 3.7.10B

Day 29

Technology Systems 8th Grade

- OBJECTIVES:
 CONTINUED: Students will be able to understand and follow basic laboratory safety rules.

 Students will be aware of and know the appropriate behaviors and expectations for laboratory activities.
 Students will be aware of and know the appropriate behaviors and expectations for laboratory activities.
- ACTIVITIES:Students will take a tour of the lab facilities to review the locations of safety equipment
"Basic Safety Rules"- Handout
Students will read and discuss the handout.
Quiz 28 points "Engineering & Technology Basic Safety Rules Test"

- EVALUATION:Formal assessment on the completion of the 34 point quiz "Engineering & Technology Basic Safety
Rules Test"
Informal assessment of participation and completion of class activities, group participation, and
cleanup activities for participation points
- **ENRICHMENT**: Independent exploration and application of laboratory safety practices
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science, Engineering, and Technology 3.7.10A, 3.7.10B

Day 30

Students will be able to identify the criteria and constraints for the "Gumball Dispenser" design brief.
Students will be able to demonstrate using a "check register" for tracking the "purchase" of materials.
Students will be able to select a group of two.
Discussion of the directions and expectations for the Bean Dispenser" design brief Discussion and demonstration of using "money" and the "check register" Select cooperative groups of two – Gumball Dispenser design brief 1.Identify the Problem
Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
Independent exploration of problem-solving within constraints
Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

Day 31

Invention & Innovation 7th Grade

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7.Build the Prototype 8.Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 32

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief
	1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach
	4. Sketch a Design 5. Refine the Design 6. Select Materials
	7.Build the Prototype 8.Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity
	Formal assessment of solution at the completion of the project
	Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints

ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 33

Invention & Innovation 7th Grade

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7.Build the Prototype 8.Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 34

Invention & Innovation 7th Grade

OBJECTIVES:

Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.

ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7.Build the Prototype 8.Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 35

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief
	1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach
	4. Sketch a Design 5. Refine the Design 6. Select Materials
	7.Build the Prototype 8.Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity
	Formal assessment of solution at the completion of the project
	Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments
	T /F Safety tests read to all students
	Option for students to take formal assessments taken in the Learning Support room
	Option for preferential seating
	Option for individual guidance
	Verbal presentation of reading material by aid when present
	Additional time to complete assignments as necessary
	Modified Tests & Quizzes

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 36

Invention & Innovation 7th Grade

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7.Build the Prototype 8.Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 37

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design <mark>5. Refine the Design 6. Select Materials</mark> 7. Build the Prototype 8. Test the Prototype 9. Befine the Prototype
EVALUATION :	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project

Assessment of daily clean-up

ENRICHMENT: Independent exploration of problem-solving within constraints

ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 38

Invention & Innovation 7th Grade

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1.Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7.Build the Prototype 8.Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 39

Invention & Innovation 7th Grade

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1. Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7. Build the Prototype 8. Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 40

OBJECTIVES:	Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time.
ACTIVITIES:	Cooperative groups of two – Gumball Dispenser design brief 1. Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design <mark>5. Refine the Design 6. Select Materials 7. Build the Prototype</mark> 8. Test the Prototype 9. Refine the Prototype
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students

Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 41

Invention & Innovation 7th Grade

OBJECTIVES: Continued: Students will be able to use the Engineering Design Process to "invent" a Gumball dispenser using a variety of provided materials according to the given criteria/constraints. Students will be able to document their daily progress in the Engineering Design Journal. Students will be able to design and construct the device to dispense 4-10 beans at a time. **ACTIVITIES:** Cooperative groups of two – Gumball Dispenser design brief 1. Identify the Problem 2. Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7. Build the Prototype 8. Test the Prototype 9. Refine the Prototype Assessment of group cooperation / productivity EVALUATION: Formal assessment of solution at the completion of the project Assessment of daily clean-up **ENRICHMENT:** Independent exploration of problem-solving within constraints ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 42

Invention & Innovation 7th Grade

ACTIVITIES:

OBJECTIVES: Students will be able to complete all required documentation.

- Cooperative groups of two Gumball Dispenser design brief
 - 1. Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach
 - 4. Sketch a Design 5. Refine the Design 6. Select Materials

7. Build the Prototype 8. Test the Prototype 9. Refine the Prototype 10. Complete documentation: Engineering Design Journal entries, list of design changes from initial sketch to final design, sales poster

- **EVALUATION**: Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
- **ENRICHMENT**: Independent exploration of problem-solving within constraints
- ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 43

OBJECTIVES:	Students will be able to coordinate responsibilities for the final class presentation and testing.
ACTIVITIES:	 Cooperative groups of two – Gumball Dispenser design brief 1. Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7. Build the Prototype 8. Test the Prototype 9. Refine the Prototype 10. Complete documentation: Engineering Design Journal entries, list of design changes from initial sketch to final design, sales poster 11. Coordinate responsibilities for the final presentation using the grading rubric as a checklist
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 44

Invention & Innovation 7th Grade

OBJECTIVES:	Students will be able to present their final machine design and test its function for the class.
ACTIVITIES:	 Cooperative groups of two – Gumball Dispenser design brief 1. Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach 4. Sketch a Design 5. Refine the Design 6. Select Materials 7. Build the Prototype 8.Test the Prototype 9. Refine the Prototype 10. Complete documentation: Engineering Design Journal entries, list of design changes from initial sketch to final design, sales poster 11. Coordinate responsibilities for the final presentation using the grading rubric as a checklist 12. Final class presentation with a functional test of the machine operating
EVALUATION:	Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project Assessment of daily clean-up
ENRICHMENT:	Independent exploration of problem-solving within constraints
ACCOMMODATIONS:	Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B

Day 45

Invention & Innovation 7th Grade

OBJECTIVES: Students will be able to present their final machine design and test its function for the class.

- ACTIVITIES: Cooperative groups of two Gumball Dispenser design brief

 Identify the Problem 2.Brain Storm for Solutions 3. Select an Approach
 Sketch a Design 5. Refine the Design 6. Select Materials
 Build the Prototype 8.Test the Prototype 9. Refine the Prototype 10. Complete
 documentation: Engineering Design Journal entries, list of design changes from initial sketch to
 final design, sales poster 11. Coordinate responsibilities for the final presentation using the
 grading rubric as a checklist 12. Final class presentation with a functional test of the machine
 operating
- **EVALUATION**: Assessment of group cooperation / productivity Formal assessment of solution at the completion of the project

Assessment of daily clean-up

ENRICHMENT: Independent exploration of problem-solving within constraints

ACCOMMODATIONS: Additional time to complete tasks / tests / quizzes / assignments T /F Safety tests read to all students Option for students to take formal assessments taken in the Learning Support room Option for preferential seating Option for individual guidance Verbal presentation of reading material by aid when present Additional time to complete assignments as necessary Modified Tests & Quizzes Breaking up larger assignments into smaller manageable pieces

PA STANDARDS for Science and Technology:

3.1.7B, 3.1.7D, 3.1.7B, 3.6.7C, 3.7.7A, 3.7.7B, 3.7.7C, 3.7.7D, 3.8.7B