

Week	Marking Period 1	Week	Marking Period 3
1	Course introduction /Project discussions	21	
2	Technology Shop Safety	22	
3	Introduction to Problem Solving and Critical Thinking	23	
4	Introduction to first project format	24	
5	Introduction to measuring and hand tool usage and hand tool safety	25	
6	Katapultos Project construction	26	
7	Katapultos project construction	27	
8	Katapultos project construction	28	
9	Project testing /competition	29	
10	Project competition and evaluation	30	
Week	Marking Period 2	Week	Marking Period 4
11	Review /discuss Measuring	31	
12	Review /discuss Hand Tools usage and safety	32	
13	Introduce air powered race car	33	
14	Race car design , specifications and racing format, compressed air , Laws of Motion	34	
15	Air car design , fabrication shaping and weighing	35	
16	Air car final assembly and evaluation	36	
17	Air car racing	37	
18	Intro to lego mindstorms robotics problem	38	
19	Design/construction of Bunyan Bot	39	
20	Testing and evaluation of Bunyan Bot	40	

Time Frame	September-Week 1&2						
Topic							
Course Intro/ safety							
Essential Questions							
<ul style="list-style-type: none"> • What are the teacher expectations for shop safety? • What are the student requirements for shop safety? • What facilities are available as resources? • What are the emergency procedures for the technology shop? 							
Enduring Understandings							
<ul style="list-style-type: none"> • Student Safety • Student responsibility • Teacher responsibility 							
Alignment to NJCCCS							
8.2.8.A.5							
Key Concepts and Skills							
<ul style="list-style-type: none"> • Technology Shop Safety • Technology shop Classroom Procedures 							
Learning Activities							
<ul style="list-style-type: none"> • Facility tour and explanation of power tools • Q&A period for students 							
Assessments							
<ul style="list-style-type: none"> • General Shop Safety Test • General Hand Tool Safety Test 							
21st Century Skills							
	Creativity		Critical Thinking	x	Communication	x	Collaboration
	Life & Career Skills	x	Information Literacy		Media Literacy		
Interdisciplinary Connections							
Test Taking strategies							
Technology Integration							

Time Frame	Week 3		
Topic			
Measuring Systems			
Essential Questions			
<ul style="list-style-type: none"> • What two measuring systems are used world wide? • What are the standard units of measure • What are the Metric units of measure? • What is the importance of measuring accuracy? • What is the history of developed measuring systems? 			
Enduring Understandings			
<ul style="list-style-type: none"> • Identifying the two distinct measuring systems • Understanding units of measure 			
Alignment to NJCCCS			
8.2.8.A.2			
Key Concepts and Skills			
<ul style="list-style-type: none"> • Measuring accurately to the 1/16th of an inch • Identifying standard units of measure • Identifying lineal measuring 			
Learning Activities			
<ul style="list-style-type: none"> • Making a personal measuring device • Dividing a one inch segment into 16 parts • Identifying inches , 1/2s,1/4s,1/8 and 1/16 on a ruler 			
Assessments			
<ul style="list-style-type: none"> • Measuring with a personal measuring • Reviewing fractions and division skills • Measuring Tests 1, 2, and 3 			
21st Century Skills			
Creativity	x	Critical Thinking	Communication
Life & Career Skills	x	Information Literacy	Media Literacy
Interdisciplinary Connections			
<ul style="list-style-type: none"> • Fractions • Division by 2 			
Technology Integration			
<ul style="list-style-type: none"> • Measuring Accuracy 			

Time Frame	Week 4-5						
Topic							
Problem Solving /Critical Thinking							
Essential Questions							
<ul style="list-style-type: none"> • What skills are necessary for solving technology problems? • What is elementary engineering? • What is the problem solving wheel? 							
Enduring Understandings							
<ul style="list-style-type: none"> • The design/engineering process is essential in solving problems 							
Alignment to NJCCCS							
8.2.8.C.4							
Key Concepts and Skills							
<ul style="list-style-type: none"> • Identify the seven steps in the problem solving process • Identify the continuity of the problem solving steps • Identify the testing and fixing steps as the trial and error method in engineering 							
Learning Activities							
<ul style="list-style-type: none"> • Paper Tower Activity Assemble and build the tallest freestanding paper tower possible from 4 sheets of paper and 24 inches of tape 							
Assessments							
<ul style="list-style-type: none"> • Measuring completed towers with a standard measuring tape while standing 							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
	Life & Career Skills		Information Literacy		Media Literacy		
Interdisciplinary Connections							
<ul style="list-style-type: none"> • Measuring accuracy,estimating 							
Technology Integration							
<ul style="list-style-type: none"> • Building technology - foundations and free standing structures 							

Time Frame	Week6-10						
Topic							
<ul style="list-style-type: none"> • Problem Solving /Critical Thinking 							
Essential Questions							
<ul style="list-style-type: none"> • What skills will students use to analyze the problem? • What is the trial and error method? 							

Enduring Understandings

- The steps in the problem solving process are essential to complete the activity
- Problem solving is a cooperative activity

Alignment to NJCCCS

8.2.8.C.2

Key Concepts and Skills

- Read and understand the the guidelines for the catapult project from the worksheet
- Utilize the problem solving steps and perform each as necessary
- Utilize the trial and error method
- Utilize the critical thinking process

Learning Activities

- Katapoultos project
- Review project and worksheet requirements

Assessments

- Catapult fabrication grade from a teacher made rubric
- Catapult testing and performance grade
- Catapult shooting for accuracy competition

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

- Math calculations for mean, median and mode

Technology Integration

- Data collection and interpretation

Time Frame | Week11

Topic

- Hand tool review

Essential Questions

- What hand tools are used to layout , cut and shape an air powered race car?
- What hand tool skills are necessary to shape a race car into its final design shape

Enduring Understandings

Hand tools can be use in the problem solving process

Alignment to NJCCCS

8.2.8.D.3

Key Concepts and Skills

- Understanding mass as a factor in determining car speed
- Weighing the unfinished car as the design progresses
- Changing and adjusting finished car design shapes as time permits

Learning Activities

- Sketching 2 different full size drawings as a design solution
- Cut drill and shape a finished race car body with a low mass
- Assemble the various race car parts for racing competition
- Paint, decorate or wood burn the final race car design

Assessments

- Teacher made grading rubric
- Side by side racing competition

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills		Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Symmetry as part of the finished design

Technology Integration

- Videos of side by side racing competition in slow motion

Time Frame | **Week 12-16**

Topic

- Air powered race car

Essential Questions

- What are the key factors that affect the performance of an air powered race car?
- What skills are necessary to fabricate a finished race car design?

Enduring Understandings

- The design process is a key factor in a successful finished race car

Alignment to NJCCCS

8.2.8.D.3

Key Concepts and Skills

- Reviewing and discussing the race car specifications is essential for successful project completion
- Using appropriate hand tools in car fabrication

- Understanding compressed air
- Define friction
- Define aerodynamics

Learning Activities

- Sketching 2 different full size drawings of race car designs
- Cut out and shape a wedge shaped car blank
- Assemble all race hardware and wheels and axles
- Test and analyze the completed

Assessments

- Evaluate the finished project from a teacher made grading rubric
- Side by side racing competition

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication		Collaboration
	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

- Race car symmetry
- Race car aerodynamics
- Race car weight

Technology Integration

- Student produced video in slow motion of side by side racing using cell phone technology

Time Frame	Week 18-20
Topic	
<ul style="list-style-type: none"> • Lego Mindstorms :Intro to Mobile Robotics 	
Essential Questions	
<ul style="list-style-type: none"> • What is robotics ? • What are the functions robots can perform? • What machines and mechanisms are necessary for assembling robots 	
Enduring Understandings	
<ul style="list-style-type: none"> • The design/ engineering process is essential in understanding how robots perform 	
Alignment to NJCCCS	
8.2.8.D.2 8.2.8.D.3	
Key Concepts and Skills	
<ul style="list-style-type: none"> • Simple computer programming 	

Learning Activities

- Assembling a motorized functioning robot
- Programming a lego robot for a teacher developed movement problem “The Bunyan Bot”

Assessments

- Teacher made grading rubric for the completed Bunyan Bot task

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

- Computer programming

Technology Integration

- Computer programming of motors and mechanisms