COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Lego's Problem Solving	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

STATE STANDARDS:	UNIT OBJECTIVES:
3.6.10-C: Apply physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems **3.7.10-A**: Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions. **3.7.10-B**: Apply appropriate instruments and apparatus to examine a variety of objects and processes. **3.8.10-A**: Analyze the relationship between societal demands and scientific and technological enterprises. **3.8.10-B**: Analyze how human ingenuity and technological resources satisfy specific human needs and improve the quality of life. **3.8.10-C**: Evaluate possibilities consequences and impacts of scientific and technological solutions.	• Experiment with manual Legos. To learn the correct procedures to assemble a model car. • Understand the differences, advantages, and disadvantages of pulleys, gears and chain drive systems. • Students explore cooperative learning.
ACTIVITIES: • Build three cars: one chain drive, one gear drive, one pulley drive. • List advantages and disadvantages. • Have instructor check completed assignments on check sheet. • Worksheet day 1 card 8-15. • Students work in cooperative learning groups **RESOURCES:**	**ASSESSMENTS:** • Completed cars checked on check sheet and evaluate lists. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Gear Train	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Build a tug of war car • Compete with other teams for the championship • Worksheet day 1 **RESOURCES:**	**ASSESSMENTS:** • Round Robin tournament • Teacher assessment of gear train and drive train **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Lego Experimentation	

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ACTIVITIES: • Experiment with Legos • List names of Lego parts **RESOURCES:**	**ASSESSMENTS:** Instructor will monitor class progress and check lists. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Gear Reduction	

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ACTIVITIES: • Build project card 14 – change speed, yellow and red dots, add gears. • Build cam and value train from picture . **RESOURCES:**	**ASSESSMENTS:** Instructor to evaluate completed project and sign worksheet. **REMEDIATION:** **ENRICHMENT:** Add four gears

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Changing Gears and Speed	

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ACTIVITIES: • Build transmission and merry go round. **RESOURCES:**	**ASSESSMENTS:** • Instructor to evaluate completed project and sign worksheet. **REMEDIATION:** **ENRICHMENT:** • 290° Changes of direction

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Hoping and Walking Machines	

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ACTIVITIES: • Build a hoping bunny. • Build a walking robot • Change gears to change speed of machine **RESOURCES:**	**ASSESSMENTS:** • Instructor to evaluate completed project and sign worksheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Multi Stacked Gears	

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ACTIVITIES: • Build a drill gear set. • Change torque on gear set. • Build drill model . **RESOURCES:**	**ASSESSMENTS:** • Instructor to evaluate completed project and sign worksheet **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Lifting 5 lb. Weight	

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ACTIVITIES: • Students attempt to lift a 5 lb. Weight using only parts from kit. **RESOURCES:**	**ASSESSMENTS:** • Instructor to evaluate completed project and sign worksheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Clutch	

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ACTIVITIES: • Build a clutch capable of starting and stopping the steam locomotive drive wheel. **RESOURCES:**	**ASSESSMENTS:** • Instructor to evaluate completed project and sign worksheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Cooperative Lego's	

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ACTIVITIES: • Use 2-3 kits to make a machine capable of moving a Lego block up a ramp and across a flat surface **RESOURCES:**	**ASSESSMENTS:** • Instructor to evaluate completed project and sign worksheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Ramp Climbing	

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ACTIVITIES: • Build an automobile capable of climbing a 45° ramp. **RESOURCES:**	**ASSESSMENTS:** Instructor to evaluate completed project and sign worksheet. **REMEDIATION:** **ENRICHMENT:** This is an enrichment ob

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Lego Logo	

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ACTIVITIES: • Learn computer language. • Build greenhouse. • Program robot to open when hot and close when cold. **RESOURCES:**	**ASSESSMENTS:** • Instructor to evaluate completed project and sign worksheet **REMEDIATION:** **ENRICHMENT:** • Enrichment objective

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Introduction to Four Stroke Engines	

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ACTIVITIES: • Lecture on engine basics. • Set cooperative learning teams • Work Sheet questions. • Students work in cooperative learning groups. **RESOURCES:**	**ASSESSMENTS:** Teacher assessment of worksheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Safety and Tools	

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ACTIVITIES: • Lecture on safety rules • Lecture on tools and rules **RESOURCES:**	**ASSESSMENTS:** Teacher assessment of student progress **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Procedure To Disassemble Engine	

NATIONAL STANDARDS:
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ACTIVITIES: • Students will use worksheet and parts manual to assist in the removal and replacement of engine parts. • Students will use torque wrench to replace head-bolts. • Students will be able to name all parts. • Students will reassemble engine. • Students will run engine. • **RESOURCES:**	**ASSESSMENTS:** • Teacher assessment of student progress. • Completion of worksheet. • Run engine. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Engine Enrichment	

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ACTIVITIES: • Lectures on: ICEP, gasoline alternative fuels, fuel injection and carburetion, alternators, magnetic batteries, amps, volts, and sparks. **RESOURCES:**	**ASSESSMENTS:** - Pretest and Post test **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Car Builder Computer Program	

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ACTIVITIES: • Students will decide on engine transmission size and shape, to design the fastest and slowest auto they can build. **RESOURCES:**	**ASSESSMENTS:** Teacher assessment of completed program. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Travel Requirements	

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ACTIVITIES: • Students will complete a worksheet on: terminology, trip planning and cost. • Map design. **RESOURCES:**	**ASSESSMENTS:** - Teacher assessment - Completed work sheets **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing Introduction	

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ACTIVITIES: • Demonstration on tools and procedures to squared paper. • Students will draw plans in perspective. • Students will write cap alphabet and fraction work sheet. **RESOURCES:**	**ASSESSMENTS:** - Pre test - Post test. - Instructor evaluation of completed worksheet and drawing. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing L's and Measuring	

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ACTIVITIES: • Plate 1-2-3 allow students to learn border and name plates. • Students will learn to use instruments to draw plates. • Students will use L45-90 and L 30-60-90 triangles. • Students will place correct dimension drawings. **RESOURCES:**	**ASSESSMENTS:** Instructor assessment of completed drawings **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing Circles	

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ACTIVITIES: • Plates: 4-5-6-7 allow students to practice use of compass to draw circles and construct decagon. **RESOURCES:**	**ASSESSMENTS:** Instructor assessment of completed drawings **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing Three View Orthographic	

NATIONAL STANDARDS:
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ACTIVITIES: • Plate 8, 9, 10, 11, 12, 13. Allow student to practice three view drawing and extension lines. **RESOURCES:**	**ASSESSMENTS:** Instructor assessment of completed drawings **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing Isometric Construction	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

STATE STANDARDS:	UNIT OBJECTIVES:
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ACTIVITIES: • Plates 14-21 will allow students to center and construct isometric drawings. **RESOURCES:**	**ASSESSMENTS:** Instructor assessment of completed drawings. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing Enrichment #1	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

STATE STANDARDS:	UNIT OBJECTIVES:
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ACTIVITIES: • Plates 8, 9, 10, 11, 12, 13 will be converted from orthographic to isometric. **RESOURCES:**	**ASSESSMENTS:** - Instructor assessment of completed drawings. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing Enrichment #1	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Students will use plates 9, 10, 11, 12, 13 to construct three dimensional paper models. **RESOURCES:**	**ASSESSMENTS:** - Instructor assessment of completed plans. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing Architectural	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Students will be given criteria and encouraged to design a house. **RESOURCES:**	**ASSESSMENTS:** - Instructor assessment of completed house plans. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Mechanical Drawing	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Students will use the skill learned in mechanical drawing to construct four drawings to be used in wood construction. **RESOURCES:**	**ASSESSMENTS:** - Instructor assessment of completed drawings. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology Safety	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Teacher lecture and discussion of safety, including hand and power tools, safety zones, and emergency power switch. **RESOURCES:**	**ASSESSMENTS:** • Pre and post test • Class discussion • Instructor observation. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology Hand Tools	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Teacher lecture and demonstration. • Students will independently experiment with hand tools. • Students will call tools by correct name **RESOURCES:**	**ASSESSMENTS:** • Teacher assessment of student progress. • Pre test post test **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	**GRADES: 9-12**
UNIT: Wood Technology Radial Arm Saw	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

STATE STANDARDS:	**UNIT OBJECTIVES:**
3.6.10-C: Apply physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems **3.7.10-A**: Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions. **3.7.10-B**: Apply appropriate instruments and apparatus to examine a variety of objects and processes. **3.8.10-A**: Analyze the relationship between societal demands and scientific and technological enterprises. **3.8.10-B**: Analyze how human ingenuity and technological resources satisfy specific human needs and improve the quality of life. **3.8.10-C**: Evaluate possibilities consequences and impacts of scientific and technological solutions.	• Students will become familiar with the safe use of this machine. • Students will show knowledge of safety and proper use of machine.
ACTIVITIES: • Demonstrate safety and proper use of machine safety test. • Hands-on demonstration with instructor present. **RESOURCES:**	**ASSESSMENTS:** • Pre test • Instructor signs safety work-use sheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology Compound Miter Saw	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Demonstrate safety and proper use of machine safety test. • Hands-on demonstration with instructor present. **RESOURCES:**	**ASSESSMENTS:** • Pre test • Instructor signs safety work-use sheet . **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	**GRADES: 9-12**
UNIT: Wood Technology – Band Saw	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Demonstrate safety and proper use of machine safety test. • Hands-on demonstration with instructor present. **RESOURCES:**	**ASSESSMENTS:** • Demonstrate safety and proper use of machine safety test. • Hands-on demonstration with instructor present. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	**GRADES: 9-12**
UNIT: Wood Technology Drill Press	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

STATE STANDARDS:	**UNIT OBJECTIVES:**
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ACTIVITIES: • Demonstrate safety and proper use of machine safety test. • Hands-on demonstration with instructor present. **RESOURCES:**	**ASSESSMENTS:** • Pre test • Instructor signs safety work-use sheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology Scroll Saw	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Demonstrate safety and proper use of machine safety test. • Hands-on demonstration with instructor present. **RESOURCES:**	**ASSESSMENTS:** • Pre test • Instructor signs safety work-use sheet. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology Belt Sander	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Demonstrate safety and proper use of machine safety test. • Hands-on demonstration with instructor present. **RESOURCES:**	**ASSESSMENTS:** • Pre test • Instructor signs safety work-use sheet **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Students will learn procedures to glue and clamp wood. **RESOURCES:**	**ASSESSMENTS:** • Instructor evaluation of glued project. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology Model Construction	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Students will assemble a model car using machines, hand tools and glue. • Model car will be built to sizes indicated in plans **RESOURCES:**	**ASSESSMENTS:** - Instructor assessment of completed model car. **REMEDIATION:** **ENRICHMENT:**

COURSE: Design and Problem Solving	GRADES: 9-12
UNIT: Wood Technology Enrichment #1, #2, #3	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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ACTIVITIES: • Students will design and draw plans to aid in construction of projects. • Students will cut, glue and build projects. **RESOURCES:**	**ASSESSMENTS:** - Instructor assessment of finished projects. **REMEDIATION:** **ENRICHMENT:**