

Our Lady of the Lake Roman Catholic School
Yearly Course Outline
Science/PLTW
Sixth Grade
2025–2026

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Teacher's Room Number: [203]

Course Description

Design and Modeling: Design and modeling provides students opportunities to apply the design process to creatively solve problems. Students are introduced to the unit problem in the first activity and are asked to make connections to the problems through the lessons in the unit. Students learn and utilize methods for communicating design ideas through sketches, models and mathematical models. Students work in teams to identify design requirements, research the topic, and engage stakeholders.

Automation and Robotics: Automation and Robotics allows students to trace the history, development, and influence of automation and robotics as they learn about mechanical systems, energy transfer, machine automation, and computer control systems. Students use the VEX Robotics platform to design, build, and program real-world objects such as traffic lights, toll booths, and robotic arms.

Flight and Space: The exciting world of aerospace comes alive through Flight and Space. Students explore the science behind aeronautics and use their knowledge to design, build, and test an airfoil. Custom-built simulation software allows students to experience space travel.

Integrated Science: The 6th grade science program also introduces students to the basic concepts of life, earth, and physical science. This program integrates a wide range of hands-on experiences, critical thinking opportunities and real-world applications.

Instructional Materials

PLTW Gateway Online Resources

Methods of Assessment and Distribution

All test, quiz, and homework grades will be posted on PowerSchool (www.ollpowerschool.org). Please check for postings frequently. Each quarter, four test- and four quiz-weighted assessments will be administered.

1st & 2nd Quarters
(Exams taken)

50% Tests
20% Exams
20% Quizzes
10% Homework

3rd & 4th Quarters
(No Exams taken)

60% Tests
30% Quizzes
10% Homework

Grading Scale

A: 100-94
B: 93-86
C: 85-78
D: 77-70
U: 69 and below

Tentative Course Calendar

**** Dates and course content are subject to change at discretion of teacher or administration. ****

Aug 7 – First day of school for 4th – 7th

Week	Standards	Objectives (The learner will . . .)	Instructional Materials	Assessments
1st Quarter				
Week 1 Aug. 11-15	6-MS-Science and Engineering Practices 1-8	<ul style="list-style-type: none"> *Review lab safety procedures and understand the basic lab safety rules. *Understand and practice procedures. *Design and conduct investigations to demonstrate understanding of lab safety. 	<p>Technology: General Lab Safety Video Amoeba Sisters Flinn Scientific Lab Safety Video</p> <p>Worksheet: Flinn Scientific Lab Safety Procedures Handout</p>	Quiz 1 – Flinn Scientific Lab Safety Quiz
Week 2 Aug. 18-22	6-MS-PS1-1 6-MS-LS1-1 6-MS-LS1-2 6-MS-Science and Engineering Practices 1-8	<ul style="list-style-type: none"> *Participate in an instant design challenge to create an optimal solution to a given problem and apply what they learn to understand the importance of using the design process. *Apply an iterative process to solve a problem or create an 1. Ruler 2. ¾ -cubic-inch linking cubes. 3. Basic classroom or household object 4. Isometric graph paper 5. Cartesian graph paper 1. Ruler 2. ¾ -cubic-inch linking cubes. 3. Basic classroom or household object 4. Isometric graph paper 5. Cartesian graph paper opportunity that can be justified. *Create a physical model or prototype. *Collaborate effectively on a diverse and multi-disciplinary team. *Describe the role, connections between disciplines, and impact of engineering, biomedical 	<p>Materials:</p> <ol style="list-style-type: none"> 1. Ankle foot orthosis supplies 2. Instant design challenge Rubric 3. Design process reflection table 4. Gateway Notebook 	Quiz 2: Foot Orthosis Initial Sketch

		science, and computer science on society.		
Week 3 Aug. 25-29	6-MS-Science and Engineering Practices 1-8	<p>*Persistently apply an iterative process to solve a problem or create an opportunity that can be justified.</p> <p>*Sketch and/or interpret perspective, isometric, and multi-view drawings with adequate attention to standards and critical annotations.</p>	<p>Resources: Activity 1.2 Rubric</p> <p>Materials:</p> <ol style="list-style-type: none"> 1. Ruler 2. $\frac{3}{4}$ -cubic-inch linking cubes. 3. Basic classroom or household object 4. Isometric graph paper 5. Cartesian graph paper 	Test 1: Foot Orthosis Design Challenge
Week 4 Sept. 1-5 9/1 Labor Day No School	6-MS-Science and Engineering Practices 1-8	<p>*Differentiate between two-dimensional and three-dimensional models including the strength and weaknesses of each one.</p> <p>*Sketch and/or interpret perspective, isometric, and multi-view drawings with adequate attention to standards and critical annotations.</p>	<p>Resources: Activity 1.2 Rubric</p> <ol style="list-style-type: none"> 1. Ruler 2. $\frac{3}{4}$ -cubic-inch linking cubes. 3. Basic classroom or household object 4. Isometric graph paper 5. Cartesian graph paper 	Test 2: Design Process Test
Week 5 Sept. 8-12	6-MS-Science and Engineering Practices 1-8	<p>*Introduce U.S. Customary and metric systems.</p> <p>*Use a ruler to measure accurately.</p> <p>*Read dimensions on a sketch.</p>	<p>Materials: Activity 1.3 Measuring Matters Skimmer Activity Various Building Materials Ruler Engineering Notebook</p>	Quiz 3: Measuring using metric/standard units
Week 6 Sept. 15-19 Spirit Week 9/19 Fun Run Kickoff	6-MS-Science and Engineering Practices 1-8	<p>*Identify the proper tool to use to measure and dimension with accuracy and precision.</p> <p>*Measure and present values appropriate to standards of accuracy and precision.</p>	<p>Materials: US Customary and metric ruler Engineering Design Notebook 3D Linking Cubes Dial Caliper</p>	Quiz 4: Measuring with a dial caliper quiz

		*Understand why accurate dimensioning, and thorough documenting are necessary for both mechanical dissection and creative problem		
Week 7 Sept. 22-26		*Define and apply statistical concepts of center and spread. *Read and interpret a box and whisker graph. *Construct a box and whisker graph to visually represent data. *Consider how statistical analysis can inform the design process. and creative problem	Materials: US Customary and metric ruler Engineering Design Notebook 3D Linking Cubes Dial Caliper	Test 3: Measuring Matters Skimmer Activity with Conclusion Questions
Week 8 Sept.29- Oct. 3 10/2 – Fun Run 10/2 - ½ day dismissal 10/3 – Faculty Inservice	6-MS-Science and Engineering Practices 1-8	*Use a dial caliper to measure a 3D object. *Add dimensions to a Multiview sketch.	Materials: US Customary and metric ruler Engineering Design Notebook 3D Linking Cubes Dial Caliper	Test 4: Activity 1.5 Test
Week 9 Oct. 6-10 10/10 - ½ day		6 th – 7 th Grade Exams		
2nd Quarter				
Week 10 Oct. 13-17	6-MS-Science and Engineering Practices 1-8	*Perform a mechanical dissection of an object to understand its design. *Use sketching to document and communicate designs with accuracy.	Materials: Activity 1.6 Project Information *PLTW Website *Foam puzzle cube *Camera *Isometric graph paper *Dial Caliper	Test 1: Project 1.6 Investigate the Inside
Week 11 Oct. 20-24 10/24 Faculty Inservice 10/24-26 OLL Festival	6-MS-Science and Engineering Practices 1-8	*Use the proper tool to measure with accuracy and precision. *Add or interpret dimensions on a sketch following the guidelines of dimensioning.	Materials: Activity 1.6 Project Information *PLTW Website *Foam puzzle cube *Camera	Test 2 - Investigate the Inside Test

			*Isometric graph paper *Dial Caliper	
Week 12 Oct. 27-31 10/31 – Fun Run Reward Day	6-MS-Science and Engineering Practices 1-8	*Demonstrate creativity and courage to take risks in proposing designs and describe the value of unique attributes or approaches. *Analyze problems or artifacts when developing solutions. *Create a physical model or prototype. *Demonstrate the ability to manage multiple resources throughout a project. (11 days)	Materials: Isometric graph paper CAD Application Fabrication Materials Puzzle Cube Design Brief Project 2.4 Rubric Puzzle Cube Data Sheet	Quiz 1: Activity 2.1 Project Tinkercad 3-D Printed Keychain
Week 13 Nov. 3-7	6-MS-Science and Engineering Practices 1-8	*Demonstrate creativity and courage to take risks in proposing designs and describe the value of unique attributes or approaches. *Analyze problems or artifacts when developing solutions. *Create a physical model or prototype. *Demonstrate the ability to manage multiple resources throughout a project. (11 days)	Materials: Isometric graph paper CAD Application Fabrication Materials Puzzle Cube Design Brief Project 2.4 Rubric Puzzle Cube Data Sheet	Quiz 2: Tinkercad and Solid Modeling Quiz
Week 14 Nov. 10-14	6-MS-Science and Engineering Practices 1-8	*Follow a design process to effectively develop a design solution. *Use a CAD application to create a 3D model of a design solution. *Create a prototype to test a solution. *Construct a box and whiskers graph to visually represent and analyze data.	Materials: Activity 2.4 Project Information Sheets 27 plastic linking cubes Isometric graph paper Dial Caliper Stopwatch Prototype supplies	Test 3: Activity 2.4: Puzzle Cube Design Challenge
Week 15 Nov. 17-21	6-MS-Science and Engineering Practices 1-8	*Describe the purpose of automation and robotics and its effect on society.	Resources: *Activity 1.2 What do We Use	Quiz 3: VEX Robotics Safety Quiz

		<p>*Summarize ways that robots are used in today's world and the impact of their use on society.</p> <p>*Describe positive and negative effects of automation and robotics in terms of safety and economics.</p> <p>*Provide examples of STEM careers and the need for those professionals in our society.</p>	<p>Robotics For Lesson 1 Key Terms Crossword</p> <p>*Automation and Robotics Presentation Teacher Notes</p> <p>*Vex structure and motion pieces</p> <p>*Storage Bags</p>	<p>Quiz 4: Types of Robots Presentation</p>
Thanksgiving Holidays Nov. 24-28				
<p>Week 16 Dec. 1-5</p>	<p>6-MS-PS2-3 6-MS-PS 2-5 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8</p>	<p>*Calculate gear ratios,</p> <p>*Explain the relationship between torque and speed in a gear train.</p> <p>*Analyze the speed, torque, and movement through a gear train.</p> <p>*Identify the four types of movement in mechanisms.</p>	<p>Materials:</p> <p>Activity 2.1 Study Guide</p> <p>Nearpod</p> <p>Mechanisms Toy Box Presentation</p>	<p>Test 4: Activity 2.1 Test</p>
<p>Week 17 Dec. 8-12</p>	<p>6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8</p>	<p>*Build and test models of mechanisms.</p> <p>*Describe the function of different mechanisms.</p> <p>*Identify real-world examples of the use of mechanisms.</p>	<p>Resources:</p> <p>Activity 2.2</p> <p>Project Pages</p> <p>VEX kits</p>	
<p>Week 18 Dec. 15-19 12/19 - ½ day</p>		<p>6th – 7th Grade Exams</p>		
Christmas Holidays Dec. 22 – Jan. 4				
3rd Quarter				
<p>Week 19 Jan. 5-9</p>	<p>6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8</p>	<p>*Build and test models of mechanisms.</p> <p>*Describe the function of different mechanisms.</p> <p>*Identify real-world examples of the use of mechanisms.</p>	<p>Resources:</p> <p>Activity 2.2</p> <p>Project Pages</p> <p>VEX kits</p>	<p>Quiz 1: Activity 2.2 Mechanical Build Questions</p>
<p>Week 20 Jan. 12-16</p>	<p>6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8</p>	<p>*Build and test models of mechanisms.</p> <p>*Describe the function of different mechanisms.</p> <p>*Identify real-world examples of the use of mechanisms.</p>	<p>Resources:</p> <p>Activity 2.2</p> <p>Project Pages</p> <p>VEX kits</p>	<p>Test 1: Activity 2.2: Types of Mechanisms Test</p>

<p>Week 21 Jan. 19-23 1/19 – MLK Day No School</p>	<p>6-MS-PS4-1 6-MS-PS4-2 6-MS-ESS3-4 6-MS-Science and Engineering Practices 1-8</p>	<p>*Apply knowledge of gear ratios and mechanisms to design, build, and test design solutions. *Use sketching to communicate ideas. *Collaborate within a team.</p>	<p>Resources: Project 2.3: Wind Turbine Construction Project Resources VEX Kits</p>	<p>Quiz 2: Wind Turbine Project Build</p>
<p>Week 22 Jan. 26-30 Catholic Schools Week 1/30 - Pep Rally</p>	<p>6-MS-Science and Engineering Practices 1-8</p>	<p>*Use the characteristics for a specific mechanism to evaluate its purpose and applications. *Apply knowledge of mechanisms to solve a unique problem for speed, torque, force, or type of motion. (12 Day Activity)</p>	<p>Resources: Project 2.4 pull Toy Construction Grading Rubric Various Vex Parts</p>	<p>Test 2: Project 2.4 Pull Toy/Survival Challenge</p>
<p>Week 23 Feb. 2-6</p>	<p>6-MS-Science and Engineering Practices 1-8</p>	<p>*Use the characteristics for a specific mechanism to evaluate its purpose and applications. *Apply knowledge of mechanisms to solve a unique problem for speed, torque, force, or type of motion. (12 Day Activity)</p>	<p>Resources: Project 2.4 pull Toy Construction Grading Rubric Various Vex Parts</p>	<p>Quiz 3: Testbed Coding Quiz</p>
<p>Week 24 Feb. 9-13 2/13– ½ Day Grandparents Day</p>	<p>6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8</p>	<p>*Design, build, wire, and program both open-and closed-loop systems. *Use motors and sensors appropriately to solve robotic problems. (12 day activity)</p>	<p>Resources: *Vex Parts *Computer with ROBOTC program installed. *Computer with a CAD software installed *Problem Sheets *Activity 3.4 Programming Lab Sheets *Activity 3.4 Automation Task Check Off</p>	<p>Quiz 4: Sensors and Motors Quiz</p>
<p>Mardi Gras Holiday February 16-20</p>				
<p>Week 25 Feb. 23-27</p>	<p>6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and</p>	<p>*Design, build, wire, and program both open-and closed-loop systems.</p>	<p>Resources: *Vex Parts</p>	<p>Test 3: Activity 3.3 Automation Through</p>

	Engineering Practices 1-8	*Use motors and sensors appropriately to solve robotic problems. (12 day activity)	*Computer with ROBOTC program installed. *Computer with a CAD software installed *Problem Sheets *Activity 3.4 Programming Lab Sheets *Activity 3.4 Automation Task Check Off	Programming Project
Week 26 March 2-6	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Design, build, wire, and program both open-and closed-loop systems. *Use motors and sensors appropriately to solve robotic problems. (12 day activity)	Resources: *Vex Parts *Computer with ROBOTC program installed. *Computer with a CAD software installed *Problem Sheets *Activity 3.4 Programming Lab Sheets *Activity 3.4 Automation Task Check Off	
Week 27 March 9-13 3/13 – ½ Day	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Design, build, wire, and program both open-and closed-loop systems. *Use motors and sensors appropriately to solve robotic problems. (12 day activity)	Resources: *Vex Parts *Computer with ROBOTC program installed. *Computer with a CAD software installed *Problem Sheets *Activity 3.4 Programming Lab Sheets *Activity 3.4 Automation Task Check Off	Test 4: Robot C Review Test

4th Quarter				
Week 28 March 16-20	6-MS-LS2-1	<p>*Gather and synthesize information to identify skills scientists use to learn about the world.</p> <p>*Construct an explanation based on evidence for why scientists use a standard measurement system.</p> <p>*Use mathematical representations to identify the SI units of measure for length, mass, volume, density, time, and temperature.</p>	<p>Resources: Notes, supplemental readings, worksheets, diagrams, labs/lab reports, selected websites, Interactive Science Notebook</p>	Quiz 1: Metric Unit Conversion Activity
Week 29 March 23-27 3/26 – Passion Play	6-MS-LS2-1 6-MS-LS2-2 6-MS-LS2-3	<p>*Apply scientific ideas to describe the math skills scientists use in collecting data and making measurements.</p> <p>*Gather and synthesize information to describe what math skills scientists use to analyze their data.</p> <p>*Construct a scientific explanation based on evidence for how adaptations help an organism survive.</p> <p>*Apply scientific ideas to describe competition and predation.</p> <p>*Gather and synthesize information to identify the three types of symbiosis.</p>	<p>Resources: Notes, supplemental readings, worksheets, diagrams, labs/lab reports, selected websites, Interactive Science Notebook</p>	Test 1: Tools of Science Test
Week 30 Mar 30 - Apr 3 No Bus Service 4/3 – Good Friday	6-MS-Science and Engineering Practices 1-8	<p>*Explore the history of flight and space travel.</p> <p>*Investigate what is currently happening in space and flight travel.</p>	<p>Resources: Explorers of the Universe Trivia Game Tracking Sheet</p>	Quiz 2 – History of Space Flight Research Project Test 2: History of Flight and Space
Easter Holiday April 3-10				
Week 31 April 13-17	6-MS-Science and Engineering Practices 1-8 6-MS-PS2-1 6-MS-PS2-2 6-MS-PS3-1 6-MS-PS3-2	<p>*Explore how flight is possible.</p> <p>*Investigate Newton’s three laws of motion.</p> <p>*Examine the four forces of flight.</p>	<p>Resources: Activity 1.2 Study Guide Paper Glider Nearpod I-Movie</p>	Quiz 3: Calculating force, mass, and acceleration

Week 32 April 20-24	6-MS-Science and Engineering Practices 1-8 6-MS-PS2-1 6-MS-PS2-2 6-MS-PS3-1 6-MS-PS3-2	*Explore how flight is possible. *Investigate Newton's three laws of motion. *Examine the four forces of flight.	Resources: Activity 1.2 Study Guide Paper Glider Nearpod I-Movie	Quiz 4: Newton's Law's Presentation
Week 33 April 27 - May 1 5/1 - Field Day ½ Day	6-MS-ESS1-1 6-MS-ESS1-2 6-MS-ESS1-3 6-MS-ESS3-4 6-MS-PS1-1 6-MS-PS2-1 6-MS-PS2-2 6-MS-PS2-3 6-MS-PS2-4 6-MS-PS2-5 6-MS-PS3-1 6-MS-PS3-2 6-MS-Science and Engineering Practices	*Explore lift-off. *Investigate propulsion systems. *Determine how the amount of fuel a rocket uses impacts its travel distance. *Compare how different types of fuel affect the distance a spacecraft travels.	Resources: Activity 2.1 3-2-1 Liftoff Optional Extension Activity: Fuel Mass	Test 3: Forces of Flight Test
Week 34 May 4-8 5/5 May Crowning 5/7 - 7 th Graduation	6-MS-ESS1-1 6-MS-ESS1-2 6-MS-ESS1-3 6-MS-ESS3-4 6-MS-PS1-1 6-MS-PS2-1 6-MS-PS2-2 6-MS-PS2-3 6-MS-PS2-4 6-MS-PS2-5 6-MS-PS3-1 6-MS-PS3-2 6-MS-Science and Engineering Practices	*Explore lift-off. *Investigate propulsion systems. *Determine how the amount of fuel a rocket uses impacts its travel distance. *Compare how different types of fuel affect the distance a spacecraft travels.	Resources: Activity 2.1 3-2-1 Liftoff Optional Extension Activity: Fuel Mass	
Week 35 May 11-15	6-MS-ESS1-1 6-MS-ESS1-2 6-MS-ESS1-3 6-MS-ESS3-4 6-MS-PS1-1 6-MS-PS2-1 6-MS-PS2-2 6-MS-PS2-3 6-MS-PS2-4 6-MS-PS2-5	*Explore lift-off. *Investigate propulsion systems. *Determine how the amount of fuel a rocket uses impacts its travel distance. *Compare how different types of fuel affect the distance a spacecraft travels.	Resources: Activity 2.1 3-2-1 Liftoff Optional Extension Activity: Fuel Mass	Test 4: Rocket Propulsion Project

	6-MS-PS3-1 6-MS-PS3-2 6-MS-Science and Engineering Practices			
<p>Week 36 May 18-21 5/21 ½ day</p>	6-MS-ESS1-1 6-MS-ESS1-2 6-MS-ESS1-3 6-MS-ESS3-4 6-MS-PS2-1 6-MS-PS2-2 6-MS-PS2-3 6-MS-PS2-4 6-MS-PS2-5 6-MS-PS3-1 6-MS-PS3-2 6-MS-PS4-1 6-MS-PS4-2 6-MS-Science and Engineering Practices 1-8	<p>*Examine the balance of forces needed for an aircraft to orbit a body and escape space. *Examine the layers of Earth’s atmosphere, including where human-made satellites orbit. *Explore the phases of the Apollo 11 mission. *Describe the techniques for landing a spacecraft.</p>	<p>Resources: Activity 2.3 All Systems Go Mapping Orbits Worksheet Optional Extension Activities: Clocking a Trip Getting a Boost</p>	