

Our Lady of the Lake Roman Catholic School
Yearly Course Outline
Science
Sixth Grade
2026–2027

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Teacher's Room Number: [203]

Course Description

Design and Modeling: Design and modeling provide 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 6 – First day of school for 4th – 7th

Week	Standards	Objectives (The learner will . . .)	Instructional Materials	Assessments
1st Quarter				
Week 1 Aug. 10-14 8/14 Summer Reading Due	6-MS-Science and Engineering Practices 1-8	*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.	Technology: General Lab Safety Video Amoeba Sisters Flinn Scientific Lab Safety Video Worksheet: Flinn Scientific Lab Safety Procedures Handout	Quiz 1 – Flinn Scientific Lab Safety Quiz
Week 2 Aug. 17-21 8/18 PTCC Mtg 6pm	6-MS-PS1-1 6-MS-LS1-1 6-MS-LS1-2 6-MS-Science and Engineering Practices 1-8	CL: Students will work in groups to design, build, and test an AFO prototype that meets design requirement. Groups must document ideas, changes, and struggles during the process in their engineering notebook. a. Review design criteria/constraints and allow students to complete construction of their prototype using various materials. Day 3: Continue building and collaborating on the foot orthosis. Day 4: Continue building and collaborating on the foot orthosis	Materials: Masking Tape Bandage Rolls String Rubber bands Cardboard Additional building supplies Worksheet: Instant Design Challenge Rubric PLTW Gateway Notebook Technology: Instant Design Challenge Video	
Week 3 Aug. 24-28	6-MS-PS1-1 6-MS-LS1-1 6-MS-LS1-2 6-MS-Science and Engineering Practices 1-8	CL: Students will work in groups to design, build, and test an AFO prototype that meets design requirement. Groups must document ideas, changes, and struggles during the process in their engineering notebook. a. Review design criteria/constraints and allow students to complete	Materials: Masking Tape Bandage Rolls String Rubber bands Cardboard Additional building supplies Worksheet:	Quiz 2: Engineering Presentation Test 1: Foot Orthosis Project

		construction of their prototype using various materials. Day 3: Continue building and collaborating on the foot orthosis. Day 4: Continue building and collaborating on the foot orthosis	Instant Design Challenge Rubric PLTW Gateway Notebook Technology: Instant Design Challenge Video	
Week 4 Aug 31-Sept 4	6-MS-Science and Engineering Practices 1-8	Identify parts of the engineering design process. *Evaluate tests of engineering design solutions. *Use data from tests to compare engineering design solutions.	Technology: PLTW Website Resources: Design Process Reflection Table IXL Review; *Identify parts of the engineering design process. *Evaluate tests of engineering design solutions. *Use data from tests to compare engineering design solutions.	Test 2: Design Process Test
Week 5 Sept. 7-11 9/7 Labor Day No School	6-MS-Science and Engineering Practices 1-8	*When designing products, move fluidly among real world-isometric, and Multiview sketches. *Sketch and/or interpret perspective, isometric, and multi-view drawings with adequate attention to standards and critical annotation. *Create an accurate sketch, with or without dimensions, to communicate ideas.	Worksheets: Activity 1:2: A picture is Worth a Thousand Words Materials: Ruler $\frac{3}{4}$-cubic inch linking cubes Isometric graph paper	
Week 6 Sept. 14-18 Spirit Week 9/18 Pep Rally and Fun Run Kickoff	6-MS-Science and Engineering Practices 1-8	*Recognize perspective, thumbnail, isometric, and multiview sketches and the information they communicate. *Communicate information using engineering drawings.	Worksheets: Activity 1:2: A picture is Worth a Thousand Words Materials: Ruler	

		*Sketch and/or interpret perspective, isometric, and multi-view drawings with adequate attention to standards and critical annotation. *Differentiate between two-dimensional and three-dimensional models including the strengths and limitations of each. *Draw sketches of 3 different multi-dimensional shapes of their choice made with linking cubes. They will draw a thumbnail, isometric, and multiview sketch of each and properly format them in their engineering notebook.	$\frac{3}{4}$-cubic inch linking cubes Isometric graph paper Cartesian graph paper	
Week 7 Sept. 21-25 9/25 Birthday Brunch (July, Aug, Sept)	6-MS-Science and Engineering Practices 1-8	*Sketch and/or interpret perspective, isometric, and multi-view drawings with adequate attention to standards and critical annotation. *Summarize the reasoning for using sketching as a communication tool.	Worksheets: Activity 1.2 conclusion questions Materials: Ruler $\frac{3}{4}$-cubic inch linking cubes Isometric graph paper Cartesian graph paper	Assessment: Quiz 3 – Activity 1.2 Quiz Test 3 -Activity 1.2 Concept Sketching Activity Click here for the grading rubric
Week 8 Sept.28- Oct. 2 10/2 – Fun Run 10/2 - $\frac{1}{2}$ day dismissal	6-MS-Science and Engineering Practices 1-8	*Identify the proper tool to use to measure and dimension with accuracy and precision. *Measure and present values appropriate to standards of accuracy and precision.	Technology: PLTW: Design and Modeling Video All Systems Go Customary Units Materials: US Customary ruler Various Objects Vocabulary: Accuracy Precision Dial Caliper Dimensions	Quiz 4 – Dimensioning Project Quiz Test 4 – Activity 1.3: Measuring Matters Test

			Area Surface Area Volume	
Week 9 Oct. 5-9 10/6-10/8 – Middle School Exams 10/8 End of 1 st Qtr 10/9 No School 10/9-10/11 Festival of the Lake	Exams	Exams	Exams	
2nd Quarter				
Week 10 Oct. 12-16 10/13 Living Rosary 10/15 CFR Reward Day 10/15 - ½ Day 10/15 - Parent Teacher Conferences 10/16 – No School	6-MS-Science and Engineering Practices 1-8	Persistently apply an iterative process to solve a problem or create an opportunity that can be justified. *Define a problem and justify the pursuit of a solution to the problem. Persistently design and develop the solution. *Describe the importance of involving prospective users early and often during the design process. *Students use digital tools to plan and manage a design process that considers design constraints and calculated risks. *Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	Materials: Foam Puzzle Cube Camera Isometric Graph Paper Dial Caliper Engineering Notebook	
Week 11 Oct. 19-23	6-MS-Science and Engineering Practices 1-8	Persistently apply an iterative process to solve a problem or create an opportunity that can be justified. *Define a problem and justify the pursuit of a solution to the problem. Persistently design and develop the solution. *Describe the importance of involving prospective users early and often during the design process.	Materials: Foam Puzzle Cube Camera Isometric Graph Paper Dial Caliper Engineering Notebook	Test 1: Investigate the Inside Project

		*Students use digital tools to plan and manage a design process that considers design constraints and calculated risks. *Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.		
Week 12 Oct. 26-30 <i>Red Ribbon Week</i>	6-MS-Science and Engineering Practices 1-8	*Learn to transfer a two-dimensional representation to a three-dimensional solid model with technology. *Learn how to use a computer-aided design application to create solid models of various objects and designs.	Resources: Activity 2.1 Study Guide Technology: Nearpod Tinkercad Software	Test 2: Investigate the Inside Test
Week 13 Nov. 2-6	6-MS-Science and Engineering Practices 1-8	*Learn Cad Software tools. * Construct a solid model with CAD software. *Construct a prototype based on design requirements. *Measure and present values appropriate to standards of accuracy and precision.	Resources: Activity 2.1-2.3 Conclusion Questions PLTW Website Technology: Tinkercad Software	Quiz 1: 3D Printing Project
Week 14 Nov. 9-13 <i>11/11 Veterans Day Prayer Service</i>	6-MS-Science and Engineering Practices 1-8	*Work in groups to use the design process to design and build a puzzle cube that is appropriate for a middle-school age child. (6 Day Project) Day 1: Review the Puzzle Design Brief and decide the level of difficulty for the puzzle. Students will brainstorm ideas for puzzle parts for the plastic linking cubes. Students must keep in mind the design requirements when creating each puzzle piece. Day 2: Students create thumbnail, isometric, and Multiview sketches of each puzzle piece.		Quiz 2: Tinkercad Quiz

		Day 3: Students will create 3D models of their puzzle pieces using Tinkercad software. Day 4: CL: Students will build their prototypes using wooden blocks and paint. The puzzle parts should match their design sketches. Day 5: CL: Students will build their prototypes using wooden blocks and paint. The puzzle parts should match their design sketches.		
Week 15 Nov. 16-20 St. Nick's Workshop	6-MS-Science and Engineering Practices 1-8	*Work in groups to use the design process to design and build a puzzle cube that is appropriate for a middle-school age child. (6 Day Project) Day 1: Review the Puzzle Design Brief and decide the level of difficulty for the puzzle. Students will brainstorm ideas for puzzle parts for the plastic linking cubes. Students must keep in mind the design requirements when creating each puzzle piece. Day 2: Students create thumbnail, isometric, and Multiview sketches of each puzzle piece. Day 3: Students will create 3D models of their puzzle pieces using Tinkercad software. Day 4: CL: Students will build their prototypes using wooden blocks and paint. The puzzle parts should match their design sketches. Day 5: CL: Students will build their prototypes using wooden blocks and paint. The puzzle parts		Test 3: Puzzle Design Project Quiz 3: Puzzle Design Presentation

		should match their design sketches.		
Thanksgiving Holidays Nov. 23-27				
Week 16 Nov 30-Dec 4 12/4 Birthday Brunch (Oct, Nov, Dec)	6-MS-PS2-3 6-MS-PS 2-5 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Review VEX safety procedures and understand the basic VEX safety rules. *Understand and practice procedures. *Design and conduct investigations to demonstrate understanding of lab safety.	Technology: Safety Rules and Scenarios PPTX Activity: Safety rule task cards Worksheet: Safety Scenarios Activity	Quiz 4: VEX Safety Quiz
Week 17 Dec. 7-11	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Describe the purpose of automation and robotics and its effect on society. *Summarize ways that robots are used in today's world and the impact of their use on society. *Describe positive and negative effects of automation and robotics in terms of safety and economics. *Provide examples of STEM careers and the need for those professionals in our society.	Technology: Automation and Robotics Presentation Teacher Notes Worksheets: Activity 1.2 What Do We Use Robots For? Activity description and rubric	Test 4: Automation and Robotics Test
Week 18 Dec. 14-18 12/15-12/17 – Middle School Exams 12/18 - ½ day End of 2nd Qtr	Exams	Exams	Exams	
Christmas Holidays Dec. 21 – Jan. 4				
3rd Quarter				
Week 19 Jan. 4-8 ¼ - No School	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Analyze the structure and functionality of a program. *Identify and describe the high-level structures of a program, such as user interface components, data components, event handlers, and procedures. *Create programs by developing and testing code in modular, incremental approach.	Materials: Activity 1.1-1.3 Study Guide Resources: PLTW Website VEXcode Software VEX Kit Build Guides	Quiz 1: Robot Presentation

		*Create appropriate event handlers to respond to runtime events.		
Week 20 Jan. 12-16	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Apply the design process to create a solution. *Identify appropriate design requirements. *Analyze the structure and functionality of a program. *Create programs by developing and testing code in a modular, incremental approach	VEX Code Software Kit VEX Kit	
Week 21 Jan. 18-22 1/18 – MLK Day No School 1/22 Birthday Brunch (Jan, Feb, Mar)	6-MS-PS4-1 6-MS-PS4-2 6-MS-ESS3-4 6-MS-Science and Engineering Practices 1-8	*Identify the inputs and the outputs of a system. *Apply the design process to create a solution. *Identify appropriate design requirements. *Analyze the structure and functionality of a program. *Create programs by developing and testing code in a modular, incremental approach.	VEX Code Software Kit VEX Kit	Test 1: Activity 1.2-1.4 Test
Week 22 Jan. 25-29 1/29 - Pep Rally 1/29 – Eve Parade	6-MS-Science and Engineering Practices 1-8	*Understand how engineers and technologists design mechanisms to change energy by transferring direction, speed, type of movement, and force or torque. *Use the characteristics of 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.	Materials: Design Brief Template Decision Matrix Template Design Process Solution Engineering Design Notebook Vex Kits Worksheet: Project 1.2-1.4 Rubric	Quiz 2: Activity 1.2-1.4 Building Project
Week 23 Feb. 1-5 Catholic Schools Week 2/5 Grandparents Day 2/5 – ½ Day	6-MS-Science and Engineering Practices 1-8	*Understand how engineers and technologists design mechanisms to change energy by transferring direction, speed, type of movement, and force or torque. *Use the characteristics of a specific mechanism to evaluate its purpose and applications.	Materials: Design Brief Template Decision Matrix Template Design Process Solution Engineering Design Notebook Vex Kits	Test 2: Activity 1.6: Switching Gears

		*Apply knowledge of mechanisms to solve a unique problem for speed, torque, force, or type of motion.	Worksheet: Project 1.2-1.4 Rubric	
Mardi Gras Holiday February 8-12				
Week 24 Feb. 15-19	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Apply the design process to create a solution. *Understand a system by examining the connections between the parts that compose the entirety of the system.	Resources: Activity 1.8: Optional Extension Activity	Quiz 3: Activity 1.7&1.8 Build and Conclusion Questions
Week 25 Feb. 22-26	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Follow a design process to effectively develop a design solution. *Use a decision matrix to evaluate potential solutions. *Evaluate how well a design solution meets design requirements. *Explore careers in automation and robots.	Resources: PLTW Website Activity 1.9: Purposeful Design Activity 1.9 Project Pages and Rubric Materials: VEX Supplies Coding Computers	Test 3: Structural and Electronic Components Test
Week 26 March 1-5 Book Fair	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Follow a design process to effectively develop a design solution. *Use a decision matrix to evaluate potential solutions. *Evaluate how well a design solution meets design requirements. *Explore careers in automation and robots.	Resources: PLTW Website Activity 1.9: Purposeful Design Activity 1.9 Project Pages and Rubric Materials: VEX Supplies Coding Computers	Quiz 4: Purposeful Design Conclusion Questions
Week 27 March 8-12 3/12 – ½ Day End of 3 rd Qtr	6-MS-PS2-3 6-MS-PS3-1 6-MS-Science and Engineering Practices 1-8	*Follow a design process to effectively develop a design solution. *Use a decision matrix to evaluate potential solutions. *Evaluate how well a design solution meets design requirements. *Explore careers in automation and robots.	Resources: PLTW Website Activity 1.9: Purposeful Design Activity 1.9 Project Pages and Rubric Materials: VEX Supplies Coding Computers	Test 4: Purposeful Design Project
4th Quarter				
Week 28 March 15-19 3/18 - Passion Play	6-MS-LS1-3 6-MS-LS1-4 6-MS-LS1-5 6-MS-LS2-1	*Interpret data to determine the results of a scientific experiment.	Technology: Nearpod presentation	Test 1: Science of Flight Test

		*Interpret a scientific article and form conclusions based on data and graphs.		
Week 29 March 22-26 3/26 - Good Friday	6-MS-LS2-1 6-MS-LS2-2 6-MS-LS2-3	*Devise and execute a plan to solve a problem. *Collect, display, analyze, and interpret data to draw a conclusion. *Decompose a problem into smaller parts. *Create and execute a plan to manage and use resources.	Resources: Activity 1.1 Instant Design Challenge Design Brief *Data Chart *Design Process Reflection Table Materials: 8.5 x 11 paper Scissors Tape Paper clips Measuring Tape Landing Target	Test 2: Activity 1.2 Instant Design Challenge
Easter Holiday March 26 – April 2				
Week 30 April 5-9	6-MS-Science and Engineering Practices 1-8	*Explore the history of flight and space travel. *Investigate what is currently happening in space and flight travel.	Resources: Explorers of the Universe Trivia Game Tracking Sheet	
Week 31 April 12-16	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 1: Calculating force, mass, and acceleration Quiz 2: Flying Machine Presentation
Week 32 April 19-23 4/23 Birthday Brunch (Apr, May, June)	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 3: Newton’s Law’s Presentation
Week 33 April 26 - 30 4/30 - Field Day ½ Day	6-MS-ESS1-1 6-MS-ESS1-2 6-MS-ESS1-3 6-MS-ESS3-4	*Explore lift-off. *Investigate propulsion systems.	Resources: Activity 2.1 3-2-1 Liftoff	Test 3: Forces of Flight Test

	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	*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.	Optional Extension Activity: Fuel Mass	
Week 34 May 3-7 5/4 May Crowning 5/6 – 7 th Closing Ceremony	6-MS-ESS1-1 6-MS-ESS1-2 6-MS-ESS1-3 6-MS-ESS3-4 6-MS-ESS2-1 6-MS-ESS2-2 6-MS-ESS2-3 6-MS-ESS2-4 6-MS-ESS3-1 6-MS-ESS3-2 6-MS-ESS3-3 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	Quiz 4: Straw Jet Project
Week 35 May 10-14	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	*Read through Activity 1.5: Flight Plan to learn how to: *Use symbols and visual cues to read a map. *Explore sectional aeronautical charts.	Resources: Activity 2.1 3-2-1 Liftoff Optional Extension Activity: Fuel Mass	Test 4: Activity 1.3: Test Flight Test
Week 36 May 17-21 5/19 – Grades Due	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	*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.	Resources: Activity 2.3 All Systems Go Mapping Orbits Worksheet	

	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	*Explore the phases of the Apollo 11 mission. *Describe the techniques for landing a spacecraft.	Optional Extension Activities: Clocking a Trip Getting a Boost	
Week 37 May 24-25 5/25 – ½ Day				