

Our Lady of the Lake Roman Catholic School
Yearly Course Outline
Science/PLTW
Seventh Grade
2024–2025

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Teacher's Room Number: 203

Course Description

Medical Detectives: In the Medical Detectives Unit, students play the role of real-life medical detectives as they analyze genetic testing to diagnose disease and study DNA evidence found at a "crime scene." They solve medical mysteries through hand-on projects and tabs, investigate how to measure and interpret vital signs, and learn how the systems of the human body work together to maintain health.

Magic of Electrons: In the Magic of Electrons Unit, students examine the behavior and parts of an atom as well as the impact of electricity on the world around them. They learn skills in basic circuitry design and use what they know to propose designs such as a burglar alarm for an art museum.

Computer Science for Innovators and Makers: Computer Science for Innovators and Makers teaches students that programming goes beyond the virtual world into the physical world. Students are challenged to creatively use sensors and actuators to develop systems that interact with the environment. Designing algorithms and using computational thinking practices, they code and upload programs to microcontrollers that perform a variety of authentic tasks. The unit broadens students' understanding of computer science concepts through meaningful application.

Integrated Science: The 7th 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 application

Instructional Materials

PLTW Gateway Online Resources
Engineering Notebook

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
---% Exams
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 8 – First day of school for 4th – 7th

Week	Standards	Objectives (The learner will . . .)	Instructional Materials	Assessments
1st Quarter				
Week 1 Aug. 12-16	7-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 - Lab Safety Quiz
Week 2 Aug. 19-23	7-MS-LS1-3 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8	<ul style="list-style-type: none"> *Analyze data and evidence to craft a conclusion supported by evidence. *Measure vital signs. *Communicate to meet the needs of the audience and be appropriate to the situation. *Explore a variety of careers related to engineering, biomedical sciences, and computer science 	<p>Technology: PLTW Online Course Resources</p> <p>Materials: Disposable thermometers Digital blood pressure and pulse monitor Stopwatch</p>	Quiz 2 – Activity 1.1 Conclusion Questions
Week 3 Aug. 26-30	7-MS-LS1-3 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8	<ul style="list-style-type: none"> *Solve a problem using analytical and critical thinking skills. *Design and conduct an experiment that investigates a question. *Collect and analyze medical evidence to draw conclusions. *Collaborate effectively on a diverse and multi-disciplinary team. *Communicate effectively for specific 	<p>Resources: Experimental Designs Pages Experimental Design Problems</p> <p>Materials: Stopwatch</p>	Test 1: Activity 1.1 Lab Report, Data Results, Analysis, and Reflection Questions

		purposes and settings.		
<p>Week 4 Sept. 3-6 9/2 Labor Day No School</p>	<p>7-MS-LS1-3 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS-Science and Engineering Practices 1-8</p>	<p>*Solve a problem using analytical and critical thinking skills. *Design and conduct an experiment that investigates a question. *Collect and analyze medical evidence to draw conclusions. *Collaborate effectively on a diverse and multi-disciplinary team. *Communicate effectively for specific purposes and settings.</p>	<p>Resources: Experimental Designs Pages Experimental Design Problems Materials: Independent/Dependent Variable Task Cards</p>	<p>Test 2: Experimental Design Process Test</p>
<p>Week 5 Sept. 9-13</p>	<p>7-MS-LS1-3 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS-Science and Engineering Practices 1-8</p>	<p>*Analyze data and evidence to craft a conclusion supported by evidence. *Develop an experimental protocol that includes a testable hypothesis, is repeatable, and produces reliable results. *Distinguish between the independent and dependent variables and define controls. *Perform necessary data calculations and draw logical conclusions from experimental data. *Interpret medical information to draw conclusions about a patient's health. *Describe and apply aseptic techniques for handling microbial samples.</p>	<p>Resources: Effectiveness of Antibiotics Experiment Activity 1.3 Disease Dictionary Materials: Antibiotic Sensitivity Experimental Design Kit Safety Goggles Gloves Laboratory Aprons</p>	<p>Test 3: Activity 1.3 Data Results, Analysis, and Reflection Questions</p>

		*Identify the classes of pathogens that cause disease.		
Week 6 Sept. 16-20	7-MS-LS1-3 7-MS-LS1-6 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8	*Solve a problem using analytical and critical thinking skills. *Collect and analyze medical evidence to draw conclusions. *Analyze health and disease data to identify the source of a disease outbreak. *Communicate effectively for specific purposes and settings. *Identify the variety of careers related to engineering, biomedical sciences, and computer science.	Technology: PLTW Online Course Resources Materials: Disease Dictionary Engineering Notebook Diagnostic Detective Rubric Medical Case Resources	Quiz 3 – Viral v/s Bacterial Infection Disease Project
Week 7 Sept. 23-27 Spirit Week 9/27 Fun Run Kickoff	7-MS-LS1-3 7-MS-LS1-7 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8	*Create a model to describe the function of the central and peripheral nervous systems. *Explain how the nervous system passes signals to and from the brain and spinal cord. *Interpret how a breakdown in communication in the nervous system would impact the function of the human body.	Technology: PLTW Website Laptop Various applications to make a stop motion video Materials: Neuron Model Supplies Pipe Cleaners Straws Beads Modeling Clay Wax Sticks Straws Resources: Engineering Notebook	Quiz 4 – Neuron Model Stop Motion Activity
Week 8 Sept. 30- Oct. 3 10/3 Living Rosary	7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8	*Explain how the nervous system passes signals to and from the brain and spinal cord.	Various applications to make a stop motion video Materials: Neuron Model Supplies	Test 4: Functions of the Nervous System

10/4 – No School		*Interpret how a breakdown in communication in the nervous system would impact the function of the human body.	Pipe Cleaners Straws Beads Modeling Clay Wax Sticks Straws Resources: Engineering Notebook	
Week 9 Oct. 7-11 10/11 - ½ day (Fun Run)		6 th - 7 th – Middle School Exams		
2nd Quarter				
Week 10 Oct. 14-18	7-MS-LS1-3 7-MS-LS1-6 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8	*Solve a problem using analytical and critical thinking skills. *Collect and analyze medical evidence to draw conclusions. *Match regions of the brain with their primary function.	Technology: PLTW Online Course Resources Materials: Colored pencils Safety goggles Gloves Laboratory Apron Dissection pan Dissection tool set Preserved sheep brain related to your case	Quiz 1 – Parts of the Brain Labeling Diagram Test 1 – Sheep Brain Dissection Lab Report, Analysis, and Reflection
Week 11 Oct. 21-25 10/25 Fun Run Reward Day	7-MS-LS1-3 7-MS-LS1-7 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8	*Determine investigative questions for a case. *Interpret medical information to draw conclusions about a patient’s health. *Match regions of the brain with their primary function. *Devise and execute a plan to solve a problem. *Interpret how a breakdown in communication in the nervous system would impact the function of the human body.	Resources: Medical Case Resources Sheep Brain Tumor Dissection Guide Mystery Disease Rubric Engineering notebook Technology: PLTW Website	Test 2 – Dissection Plan, Diagnosis, and educational materials related to Activity 2.5
Week 12 Oct. 28-31 11/2-OLL Festival	7-MS-LS1-3 7-MS-LS1-7 7-MS-LS2-4 7-MS-LS2-5 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and	*Discover how calculating attack rate helps medical professionals determine the source of an outbreak.	Resources: Calculating Attack Rate Task Cards Technology: PLTW Website	Quiz 2 – Calculating attack rate

	Engineering Practices 1-8	<p>*Introduce real life examples of Mendel's discoveries</p> <p>*Evaluate Mendel's experimental design and describe the results of his experiments.</p> <p>*Construct a scientific explanation based on evidence to describe the role of alleles in the inheritance of traits.</p>		
<p>Week 13 Nov. 4-8 11/6 - 11/7 Saints Alive</p>	<p>7-MS-LS1-3 7-MS-LS1-7 7-MS-LS2-4 7-MS-LS2-5 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8</p>	<p>*Introduce real life examples of Mendel's discoveries</p> <p>*Evaluate Mendel's experimental design and describe the results of his experiments.</p> <p>*Construct a scientific explanation based on evidence to describe the role of alleles in the inheritance of traits.</p>	<p>Resources: Chapter 6 Lessons 1-3 Study Guide Textbook Punnett Square Worksheet</p>	<p>Quiz 3 – Calculating Probability using Punnett Squares Activity</p>
<p>Week 14 Nov. 11-15</p>	<p>7-MS-LS1-3 7-MS-LS1-7 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4 7-MS-LS4-5 7-MS- Science and Engineering Practices 1-8</p>	<p>Introduce real life examples of Mendel's discoveries</p> <p>*Evaluate Mendel's experimental design and describe the results of his experiments.</p> <p>*Construct a scientific explanation based on evidence to describe the role of alleles in the inheritance of traits.</p>	<p>Resources: Chapter 6 Lessons 1-3 Study Guide Textbook Punnett Square Worksheet</p>	<p>Test 3 – Genetic Probability and Punnett Squares</p>
<p>Week 15 Nov. 18-22</p>	<p>7-MS-PS1-2 7-MS-PS1-5</p>	<p>*Gather and synthesize information to describe the model of an atom.</p> <p>*Construct a scientific explanation based on evidence to describe</p>	<p>Materials: Color Coded Periodic Table Periodic Table Song</p>	<p>Quiz 4: Periodic Table Quiz</p>

		what determines an element's chemistry		
Thanksgiving Holidays Nov. 25-29				
Week 16 Dec. 2-6	7-MS-PS1-2 7-MS-PS1-4 7-MS-PS1-5	<p>*Electron flow is created as electrons are transferred between atoms.</p> <p>*As engineers design electrical systems, they must understand a material's tendency toward being a conductor or insulator.</p> <p>*Current, voltage, and resistance are measurable quantities that are used to explain electron flow in an electrical system.</p> <p>*Magnets play an important role in creating electromotive force which is used to make and convert electricity.</p> <p>*Generators are used to convert mechanical energy into electrical energy, while motors convert electrical energy into mechanical energy.</p>	<p>Technology: PLTW Website</p> <p>Resources: Lewis Dot Diagram Worksheet</p>	
Week 17 Dec. 9-13	7-MS-PS1-2 7-MS-PS1-4 7-MS-PS1-5 7-MS-ESS 2-4	<p>*Identify the roles of protons, neutrons, and electrons in an atom.</p> <p>*Explain how charges interact to hold an atom together.</p> <p>*Identify metals, metalloids, and non-metals on the periodic table.</p> <p>*Understand that within a natural or designed system, the transfer of energy</p>	<p>Resources: Activity 1.2 Conductivity Activity UsingMultimeter.PPTX</p> <p>Materials: Material samples Digital Multimeter</p>	Test 4 – Structure and characteristics of an atom

		drives the motion and/or cycling of matter.		
Week 18 Dec. 16-20 12/20 - ½ day		6 th - 7 th – Middle School Exams		
Christmas Holidays Dec. 21 – Jan. 5				
3rd Quarter				
Week 19 Jan. 6-10	7-MS-PS1-2 7-MS-PS1-4 7-MS-PS1-5 7-MS-ESS2-5	<p>*Explain the relationship between current, voltage, and resistance.</p> <p>*Describe how electron transfer between atoms and the flow of electricity are related.</p> <p>*Measure voltage and current using a multimeter.</p> <p>*Understand that a cause and effect relationship may be used to predict phenomena in natural or designed systems.</p>	<p>Resources: Activity 1.3: Static Electricity Lab Resources Activity 1.3 Conclusion Questions Lighting and Static Electricity Article</p> <p>Materials: Lemons Multimeter 2 leads with alligator clip Jumbo paperclip or galvanized nail Copper Wire LED Light</p>	Quiz 1: Activity 1.3 Conclusion Questions
Week 20 Jan. 13-17	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5	<p>*Describe the properties of a magnet including polarity and defining characteristics.</p> <p>*Explain the role of an electromagnet in the function of a DC motor and generator.</p> <p>*Demonstrate the characteristics and function of an electromagnet.</p>	<p>Resources: PLTW Website</p> <p>Building Materials: ¾ in. x 1½ in. x 6 in. pine board Ruler or tape measure Drill and 3/32 in., 1/16 in., 1/8 in. bits Glue gun with glue 78 in. of 22-gauge magnetic wire 20D nail Two jumbo (1¾ in.) paperclips Two #8 x ½ in. pan head screws Two 3 x ¼ in. rubber bands (similar sizes will work) D cell battery Sandpaper</p>	Test 1: Activity 1.3 Basics of Electricity Test

<p>Week 21 Jan. 21-24 1/20 - No School</p>	<p>7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5</p>	<p>*Identify the characteristics of series, parallel, and combination electrical circuits. *Sketch circuit diagrams using standardized schematic symbols.</p>	<p>Snap Circuits Components Board Voltage source Power Supply 3 Lights Various Sizes of Snap Wires Resources: Project 2.1 Circuit Design</p>	<p>Quiz 2: Circuit Diagram Sketches</p>
<p>Week 22 Jan. 27-31 Catholic Schools Week 1/31 - Pep Rally</p>	<p>7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5</p>	<p>*Understand that a variety of electronic components are incorporated into electrical circuits by engineers to achieve specific functions. *Construct and test physical electrical circuits based upon circuit diagrams. Integrate DC sources, lamps, switches, diodes, light-emitting diodes, resistors, and capacitors into electrical circuits to achieve specific functions.</p>	<p>Materials: Snap Circuit Components Board, voltage source, and power supply Motor Fan blade Various sizes of snap wires Slide switch Push-button switch 6V/0.5A Light Technology: PLTW Website Project 2.1 Rubric</p>	<p>Test 2: Activity 2.2 Switches, Diodes, and LED Activity Conclusion Questions</p>
<p>Week 23 Feb. 3-7</p>	<p>7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5</p>	<p>*Sketch circuit diagrams using standardized schematic symbols. *Identify the characteristics of series, parallel, and combination electrical circuits.</p>	<p>Resources: Circuit Schematics Task Cards Materials: Engineering Notebooks</p>	<p>Quiz 3: Project 2.1 and 2.2 Snap Circuits</p>
<p>Week 24 Feb. 10-14</p>	<p>7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4</p>	<p>*Integrate DC sources, lamps, switches, diodes, light-emitting diodes, resistors, and capacitors into electrical circuits to achieve specific functions. *Determine the value of a fixed resistor based upon the color codes on those resistors.</p>	<p>Resources: Activity 2.3 Resistance Activity Guide Materials: Multimeter Snap Circuits Components</p>	<p>Test 3: Activity 2.1 & 2.2 Test</p>

<p>Week 25 Feb. 17-21 2/21 - Eve Parade</p>	<p>7-MS- Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4</p>	<p>*Understand a variety of electronic components are incorporated into electrical circuits to achieve specific functions. *When building or diagnosing circuits, it is important to be able to measure voltage, current and resistance. *Determine the value of a fixed resistor based upon the color codes on the resistors.</p>	<p>Materials: Various loose resistors Sap circuits components Board, voltage source, and power supply Photoresistor Thermistor Lamp various sizes of snap wires Resources: More Resistors.PPTX</p>	<p>Quiz 4: Activity 2.3 Resistance Color Code Activity</p>
<p>Week 26 Feb. 24-28 2/28 – ½ Day Grandparents Day</p>	<p>7-MS- Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4</p>	<p>*When building or diagnosing circuits, it is important to be able to measure voltage, current, and resistance. *Ohm’s Law explains the mathematical relationship between voltage, current and resistance.</p>	<p>Resources: Ohm’s Law Data Table Materials: Snap Circuit Components</p>	
<p>Mardi Gras Holiday March 3-7</p>				
<p>Week 27 March 10-14 3/14 – ½ Day</p>	<p>7-MS- Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4</p>	<p>*Integrate DC sources, lamps, switches, diodes, light-emitting diodes, resistors, and capacitors into electrical circuits to achieve specific functions.</p>	<p>Resources: Capacitor PowerPoint Materials: Electrolytic capacitors Snap Circuits Components</p>	<p>Test 4: Activity 2.4 Ohm’s Law Data Table</p>
<p>4th Quarter</p>				
<p>Week 28 March 17-21</p>	<p>7-MS- Science and Engineering Practices 1-8</p>	<p>*Demonstrate creativity and courage to take risks in proposing designs. *Apply user-centered design principles when creating a solution. *Analyze the implications of computing in society.</p>	<p>Technology: PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming Resources: Interactions Rubric Wiring Diagram</p>	<p>Quiz 1 – Innovators/Makers Vocabulary Quiz Test 1 – Create a flowchart based on a logarithm</p>

<p>Week 29 March 24-28</p>	<p>7-MS- Science and Engineering Practices 1-8</p>	<p>*Apply user-centered design principles when creating a solution. *Collect, process, and analyze real or simulated data. *Analyze and create algorithms. *Describe the hardware components of an electronic device and how they interact with software and the environment.</p>	<p>Technology: PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming Resources: LED Grid Practice Exercise</p>	<p>Quiz 2 – Microbit Parts Identification Test 2 – LED Grid Practice Exercises</p>
<p>Week 30 March 31 - Apr 4</p>	<p>7-MS- Science and Engineering Practices 1-8</p>	<p>*Recognize that computational thinking can be applied in multiple disciplines. *Design and develop a program by breaking a large plan into smaller modules using procedures and event handlers.</p>	<p>Technology: PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming Materials: Output Device Images Engineering Notebook MultiOutputEX.hex</p>	<p>Quiz 3 – Lesson 1 Assessment</p>
<p>Week 31 April 7-11</p>	<p>7-MS- Science and Engineering Practices 1-8</p>	<p>*Apply an iterative process to solve a problem or create an opportunity that can be justified. *Justify decisions and provide rationales when making trade-offs between resources.</p>	<p>Technology: PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming Materials: 2.4 Secrets and Safes Rubric Wiring Diagram Wire</p>	<p>Test 3– The Blinking Message Project</p>
<p>Week 32 April 14-17 4/17 Passion Play 4/18 Good Friday</p>	<p>7-MS- Science and Engineering Practices 1-8</p>	<p>*Identify ethical considerations that must be considered when creating solutions or opportunities. *Consider accessibility and equity when</p>	<p>Technology: PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming Resources:</p>	<p>Quiz 4 – Review of Input/Output devices</p>

		designing products, creating solutions, and collaborating with others. *Identify the variety of careers related to engineering, biomedical sciences, and/or computer science.	Interactions Rubric Wiring Diagram	
Easter Holiday April 21-25				
Week 33 April 28- May 2 5/2 - Field Day ½ Day	7-MS- Science and Engineering Practices 1-8	*Identify ethical considerations that must be considered when creating solutions or opportunities. *Consider accessibility and equity when designing products, creating solutions, and collaborating with others. *Identify the variety of careers related to engineering, biomedical sciences, and/or computer science.	PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming Resources: Interactions Rubric Wiring Diagram	Test 4 – Secrets and Safes Project and Wiring Diagram
Week 34 May 5-9 5/6 May Crowning 5/8 7 th Grade Closing Ceremony	7-MS- Science and Engineering Practices 1-8 7-MS-ESS2-6 7-MS-ESS3-5	*Identify ethical considerations that must be considered when creating solutions or opportunities. *Consider accessibility and equity when designing products, creating solutions, and collaborating with others.	Resources: PearsonRealize Earth Science: Climate and Climate Change Reading Web: The Climates and Water Cycle of Africa & the Congo River	