Our Lady of the Lake Roman Catholic School
Yearly Course Outline
Science / PLTW
Seventh Grade
2023–2024

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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.

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.

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

Pearson Interactive Science Custom Integrated Edition
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)	3rd & 4th Quarters (No Exams taken)	Grading Scale
50% Tests	60% Tests	A: 100-94
20% Exams	---% Exams	B: 93-86
20% Quizzes	30% Quizzes	C: 85-78
10% Homework	10% Homework	D: 77-70
		U: 69 and below

Tentative Course Calendar

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

Week	Standards	Objectives (The learner will . . .)	Instructional Materials	Assessments
1st Quarter				
Week 1 ***Aug. 14-18*** 8/15 – Back-to-School Mass (7th) 8/18 Summer reading due	7-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** - Lab Safety Quiz
Week 2 ***Aug. 21-25***	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	*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	**Technology:** PLTW Online Course Resources **Materials:** Disposable thermometers Digital blood pressure and pulse monitor Stopwatch	**Quiz 2** – Activity 1.1 Conclusion Questions
Week 3 ***Aug. 28-01***	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	*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.	**Resources:** Experimental Designs Pages Experimental Design Problems **Materials:** Stopwatch	**Test 1:** Activity 1.1 Lab Report, Data Results, Analysis, and Reflection Questions
Week 4 ***Sept. 04-08*** 9/4 No School	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	*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	**Resources:** Experimental Designs Pages Experimental Design Problems **Materials:** Independent/Dependent Variable Task Cards	**Test 2**: Experimental Design Process Test

		diverse and multi-disciplinary team. *Communicate effectively for specific purposes and settings.		
Week 5 **Sept. 11-15** 9/13 – 7th Grade Retreat	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	*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. *Identify the classes of pathogens that cause disease.	**Resources:** Effectiveness of Antibiotics Experiment Activity 1.3 Disease Dictionary **Materials:** Antibiotic Sensitivity Experimental Design Kit Safety Goggles Gloves Laboratory Aprons	**Test 3**: Activity 1.3 Data Results, Analysis, and Reflection Questions
Week 6 ***Sept. 18-22***	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. 25-29*** Spirit Week 9/29 Fun Run Kickoff	7-MS-LS1-3 7-MS-LS1-7 7-MS-LS2-4 7-MS-LS3-2 7-MS-LS4-4	*Create a model to describe the function of the central and peripheral nervous systems.	**Technology:** PLTW Website Laptop	**Quiz 4** – Neuron Model Stop Motion Activity

	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. *Interpret how a breakdown in communication in the nervous system would impact the function of the human body.	Various applications to make a stop motion video **Materials:** Neuron Model Supplies Pipe Cleaners Straws Beads Modeling Clay Wax Sticks Straws **Resources:** Engineering Notebook	
Week 8 ***Oct. 02-06***	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. *Interpret how a breakdown in communication in the nervous system would impact the function of the human body.	Various applications to make a stop motion video **Materials:** Neuron Model Supplies Pipe Cleaners Straws Beads Modeling Clay Wax Sticks Straws **Resources:** Engineering Notebook	**Test 4**: Functions of the Nervous System
Week 9 ***Oct. 09-13*** 10/13 ½ day (Fun Run)		6-7th – Middle School Exams		
2nd Quarter				
Week 10 ***Oct. 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. *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. 23-27*** 10/27 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.	**Resources:** Medical Case Resources Sheep Brain Tumor Dissection Guide Mystery Disease Rubric Engineering notebook **Technology:**	Test 2 – Dissection Plan, Diagnosis, and educational materials related to Activity 2.5

		*Interpret how a breakdown in communication in the nervous system would impact the function of the human body.	PLTW Website	
Week 12 ***Oct. 30-03***	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	*Discover how calculating attack rate helps medical professionals determine the source of an outbreak. *Introduce real life examples of Mendel's discoveries *Evaluate Mendel's experimental design and describe the results of his experiments. *Construct a scientific explanation based on evidence to describe the role of alleles in the inheritance of traits.	**Resources:** Calculating Attack Rate Task Cards **Technology:** PLTW Website	Quiz 2 – Calculating attack rate
Week 13 ***Nov. 06-10*** 11/6 No School (Formation Day) 11/7 Virtual (Senior Day) 11/10 Virtual (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 Engineering Practices 1-8	*Introduce real life examples of Mendel's discoveries *Evaluate Mendel's experimental design and describe the results of his experiments. *Construct a scientific explanation based on evidence to describe the role of alleles in the inheritance of traits.	**Resources:** Chapter 6 Lessons 1-3 Study Guide Textbook Punnett Square Worksheet	Quiz 3 – Calculating Probability using Punnett Squares Activity
Week 14 ***Nov. 13-17***	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	Introduce real life examples of Mendel's discoveries *Evaluate Mendel's experimental design and describe the results of his experiments. *Construct a scientific explanation based on evidence to describe the role of alleles in the inheritance of traits.	**Resources:** Chapter 6 Lessons 1-3 Study Guide Textbook Punnett Square Worksheet	Test 3 – Genetic Probability and Punnett Squares
Week 15 ***Nov. 27-30***	7-MS-PS1-2 7-MS-PS1-5	*Gather and synthesize information to describe the model of an atom. *Construct a scientific explanation based on evidence to describe what determines an element's chemistry	**Materials:** Color Coded Periodic Table Periodic Table Song	Quiz 4: Periodic Table Quiz
Thanksgiving Holidays ***Nov. 21-25***				

Week 16 ***Dec. 04-08*** 12/8 – Immaculate Conception School Mass and Nativity (7th)	7-MS-PS1-2 7-MS-PS1-4 7-MS-PS1-5	*Electron flow is created as electrons are transferred between atoms. *As engineers design electrical systems, they must understand a material's tendency toward being a conductor or insulator. *Current, voltage, and resistance are measurable quantities that are used to explain electron flow in an electrical system. *Magnets play an important role in creating electromotive force which is used to make and convert electricity. *Generators are used to convert mechanical energy into electrical energy, while motors convert electrical energy into mechanical energy.	**Technology:** PLTW Website **Resources:** Lewis Dot Diagram Worksheet	
Week 17 ***Dec. 11-15***	7-MS-PS1-2 7-MS-PS1-4 7-MS-PS1-5 7-MS-ESS 2-4	*Identify the roles of protons, neutrons, and electrons in an atom. *Explain how charges interact to hold an atom together. *Identify metals, metalloids, and non-metals on the periodic table. *Understand that within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.	**Resources:** Activity 1.2 Conductivity Activity UsingMultimeter.PPTX **Materials:** Material samples Digital Multimeter	Test 4 – Structure and characteristics of an atom
Week 18 ***Dec. 18-20*** 12/20 ½ day		6-7th – Middle School Exams		
Christmas Holidays ***Dec. 21-05***				
3rd Quarter				
Week 19 ***Jan. 08-12***	7-MS-PS1-2 7-MS-PS1-4 7-MS-PS1-5 7-MS-ESS2-5	*Explain the relationship between current, voltage, and resistance. *Describe how electron transfer between atoms and the flow of electricity are related. *Measure voltage and current using a multimeter. *Understand that a cause and effect relationship may be used to predict phenomena in natural or designed systems.	**Resources:** Activity 1.3: Static Electricity Lab Resources Activity 1.3 Conclusion Questions Lighting and Static Electricity Article **Materials:** Lemons Multimeter 2 leads with alligator clip	Quiz 1: Activity 1.3 Conclusion Questions

			Jumbo paperclip or galvanized nail Copper Wire LED Light	
Week 20 ***Jan. 15-19*** 1/15 No School	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5	*Describe the properties of a magnet including polarity and defining characteristics. *Explain the role of an electromagnet in the function of a DC motor and generator. *Demonstrate the characteristics and function of an electromagnet.	**Resources:** PLTW Website **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	Test 1: Activity 1.3 Basics of Electricity Test
Week 21 ***Jan. 22-26***	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5	*Identify the characteristics of series, parallel, and combination electrical circuits. *Sketch circuit diagrams using standardized schematic symbols.	Snap Circuits Components Board Voltage source Power Supply 3 Lights Various Sizes of Snap Wires **Resources:** Project 2.1 Circuit Design	Quiz 2: Circuit Diagram Sketches
Week 22 ***Jan. 29-02*** Catholic Schools Week, 2/2 Pep Rally	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5	*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.	**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	Test 2: Activity 2.2 Switches, Diodes, and LED Activity Conclusion Questions

			Project 2.1 Rubric	
Week 23 ***Feb. 05-09*** 2/9 ½ day (Grandparents Day)	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5	*Sketch circuit diagrams using standardized schematic symbols. *Identify the characteristics of series, parallel, and combination electrical circuits.	**Resources:** Circuit Schematics Task Cards **Materials:** Engineering Notebooks	Quiz 3: Project 2.1 and 2.2 Snap Circuits
Mardi Gras Holidays Feb. 12-16				
Week 24 ***Feb. 19-23***	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4	*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.	**Resources:** Activity 2.3 Resistance Activity Guide **Materials:** Multimeter Snap Circuits Components	Test 3: Activity 2.1 & 2.2 Test
Week 25 ***Feb. 26-01***	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4	*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.	**Materials:** Various loose resistors Sap circuits components Board, voltage source, and power supple Photoresistor Thermistor Lamp various sizes of snap wires **Resources:** More Resistors.PPTX	Quiz 4: Activity 2.3 Resistance Color Code Activity
Week 26 ***Mar. 04-08***	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4	*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.	**Resources:** Ohm's Law Data Table **Materials:** Snap Circuit Components	
Week 27 ***March 11-15***	7-MS-Science and Engineering Practices 1-8 7-MS-PS1-2 7-MS-PS1-5 7-MS-PS 3-4	*Integrate DC sources, lamps, switches, diodes, light-emitting diodes, resistors, and capacitors into electrical circuits to achieve specific functions.	**Resources:** Capacitor PowerPoint **Materials:** Electrolytic capacitors Snap Circuits Components	Test 4: Activity 2.4 Ohm's Law Data Table
4th Quarter				
Week 28 ***March 18-22*** 3/21 – Passion Play	7-MS-Science and Engineering Practices 1-8	*Demonstrate creativity and courage to take risks in proposing designs.	**Technology:** PLTW Online Course Resources Microcontroller USB cable	Quiz 1 – Innovators/Makers Vocabulary Quiz

		*Apply user-centered design principles when creating a solution. *Analyze the implications of computing in society.	Microsoft Make Code Programming **Resources:** Interactions Rubric Wiring Diagram	Test 1 – Create a flowchart based on a logarithm
Week 29 ***March 25-29*** 3/29 No School (Good Friday)	7-MS-Science and Engineering Practices 1-8	*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.	**Technology:** PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming **Resources:** LED Grid Practice Exercise	Quiz 2 – Microbit Parts Identification Test 2 – LED Grid Practice Exercises
Easter Holidays ***March 29-05***				
Week 30 ***April 08-12***	7-MS-Science and Engineering Practices 1-8	*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.	**Technology:** PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming **Materials:** Output Device Images Engineering Notebook MultiOutputEX.hex	Quiz 3 – Lesson 1 Assessment
Week 31 ***April 15-19***	7-MS-Science and Engineering Practices 1-8	*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.	**Technology:** PLTW Online Course Resources Microcontroller USB cable Microsoft Make Code Programming **Materials:** 2.4 Secrets and Safes Rubric Wiring Diagram Wire	Test 3– The Blinking Message Project
Week 32 ***April 22-26***	7-MS-Science and Engineering Practices 1-8	*Identify ethical considerations that must be considered when creating solutions or opportunities.	**Technology:** PLTW Online Course Resources Microcontroller USB cable	Quiz 4 – Review of Input/Output devices

		*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.	Microsoft Make Code Programming **Resources:** Interactions Rubric Wiring Diagram	
Week 33 ***April 29-03*** 5/3 Field 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 06-10*** 5/6 – May Crowning 5/9 – 7th 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	