Winslow Township Middle School

Science Curriculum Abstract

Grade 8 Science

Course Description

The students in the eighth grade Science course will develop a conceptual understanding of Science topics using hands-on instruction, interactive notebooking, observations of and interactions with natural phenomena and the use of engineering and design processes to identify problems, plan, test and revise possible solutions. In Science Processes, students will explore Engineering Design Processes, Scientific Processes, Sustainability and Vertical Gardening. In Life Science, students will explore the vast diversity of life on earth and how organisms grow and reproduce. In Physical Science they will explore how forces affect the movement of objects on Earth and across the universe, as well as how and why objects are attracted to or repelled by one another. In Earth Science, students will explore the role that water and energy play in our ocean and climate systems.

Science Curriculum Overview-Grade 8

Science Processes	**Scientific Inquiry** Chapter NOS Connections to Nature of Science Interactive Notebooking Scientific Literacy/Informational Text **STEM-Science, Technology, Engineering and Math** NGSS: Engineering Design Engineer's Design Process STEM/STEAM Activities MakerSpace MS-ETS1-1,2,3,4 **Sustainability** Sustainability Vertical Gardening NGSS Standards: MS-LS1-**6,7;** MS-ESS3-**2,3,4**
Physical Science	**Forces and Interactions** Chapter 2 NGSS Standards:MS-PS2-**1,2** NGSS: Forces and Interactions **Waves and Electromagnetic Radiation** Chapter 4 NGSS Standards: MS-PS4-**1,2,3** NGSS: Waves and Electromagnetic Radiation **Chemical Reactions** Chapters 6,7,8,9,10 NGSS Standards:MS-PS1-**2,5,6** NGSS: Chemical Reactions

MS-LS1-6 MS-LS1-7 MS-ESS3-2 MS-ESS3-3 MS-ESS3-4 MS-ETS1-3 MS-ETS1-2 MS-ETS1-3 MS-ETS1-4	Developing and using models Planning and carrying out investigations Obtaining, Evaluating and Communicating Information Engaging in argument from evidence	Systems and System Models Patterns Cause and Effect	LS1.B Growth and Development of Organisms ESS 3.B Human Impacts on Earth Systems

Interdisciplinary Connections	
ELA	RST.6-8.1, RST.6-8.7,WHST.6-8.1,WHST.6-8.7, WHST.6-8.8
Math	7.EE.B.4, 7.RP.A.2, MP.2
English Language Development	WIDA Standard 4
21st Century Themes	Global Awareness
21st Century Skills	Critical Thinking and Problem Solving Communication and Collaboration Life and Career Skills Information Literacy
Integration of Technology	Chromebooks iPads Infiniview Digital Microscopes Compound Light Microscopes

Formative Assessments	Laboratory Investigations, Warm-up Activities, Exploratory Writing, Class Discussion, Student participation, Teacher observations, Close Reading Annotations
Summative Assessments	Quizzes, tests, authentic assessments, Engineer's Design Challenges
Resources	McGraw-Hill Education I-Science; Leopard Edition ; ISBN: 978-0-07-888006 Understanding Sustainability, Two-Week Unit for Life, Physical and Earth Science Sustainability for Earth, Life and Physical Science, A standards-based supplement for middle school science Tower Garden Growing Systems Greenhouse Projects and Curriculum Manual National Action Plan for Educating for Sustainability BrainPop: www.brainpop.com StudyJams: http://studyjams.scholastic.com/studyjams/index.htm Scholastic Science World Magazines: www.scholastic.com/scienceworld Page Keeley Science Probes NEWSELA: https://newsela.com/ Read Works: https://www.readworks.org/ PhET simualtions: https://phet.colorado.edu/

Modifications, Accommodations and Enrichment for Science

Intervention Students:
text-to-speech platforms (Google/NewsELA), levels informational texts via Newsela, extended time, assist w/ organization, use of computer, emphasize/highlight key concepts, recognize success, frequent check-in about progress, verbalize before writing, make sure understands directions, copy of class notes, graphic organizer, read directions aloud.

Enrichment/Gifted:
Extensions for scientific investigations as well as opportunities to elaborate and dive deeper into the project topics. Student-generated inquiries can be further explored beyond the essential questions. Tiered graphic organizers to add complex layers, raise levels of intellectual demands, differentiate content, process, or product, according to student's readiness, interests, and/or learning styles, expended open-ended abstract questions.

ELL Students: WIDA Strategies, Repeated Reading Strategy, Graphic Organizers, Background knowledge work, Vocabulary Work, Fluency Strategies. If/Then Resource
Special Education: Students will be provided with all IEP accommodations and modifications, extra time as needed, repeated directions, graphic organizers, additional scaffolds as deemed necessary, modified assignments, additional vocabulary work, Guided Reading

Sustainability

Standards	Essential Questions	Objectives	Activities	Resources	Assessments
MS-ESS3-2 MS-ESS3-3 MS-ESS3-4 MS-ETS1-1 MS-ETS1-2 MS-ETS1-3 MS-ETS1-4	What is sustainability? Why is sustainability important? How do the actions of one generation affect future generations?	Students will be able to define sustainability as the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs. These actions will allow students to activate their vision of a sustainable future, and develop a plan for achieving it. Students will explore their	View the video "Introduction to Sustainability" followed by a class discussion. Create a table in the interactive notebook outlining the 3 Pillars of Sustainability. Create a Google Slideshow demonstrating the 3 Pillars of Sustainability. Use the Engineer's Design	Video: Introduction to Sustainability Defining Sustainability Understanding Sustainability Sustainability for Earth, Life and Physical Science If the World Were 100 People Lessons: 1)Life Cycle of Electronic Devices or/	Teacher-created assessments Open-Ended Response rubric Google Suite for Education Assessment Tools (Google Docs, Google Slides)

RST.6-8.1 RST.6-8.7 WHST.6-8. WHST.6-8.7 WHST.6-8.8		current understandings of sustainability, sustainable development and examine what this definition implies about meeting human needs now and in the future.	Process to investigate the life cycle of a product and discover ways to combat waste.	2)Break the Cycle: Water Bottle Life Cycle Engineer's Design Challenge or/ 3)Cycle of Materials Design Challenge	Student Participation Engineer's Design Challenges
Classroom Gardening					
Standards	**Essential Questions**	**Objectives**	**Activities**	**Resources**	**Assessments**
MS-LS1-6 MS-LS1-7 MS-ETS1-2 MS-ETS1-3	What can students learn about sustainability from vertical gardening?	Students will compare and contrast vertical farming to traditional farming methods. Students will explain the botanical and geographical origin of the plants they choose to grow in the Tower Garden. Students will plan, design and plant an indoor vertical garden using hydroponics and aeroponics and transfer to the outside garden.	Design and build a working hydroponic vertical farm. Plant, label and record observations of seeds and plugs that are placed into small pots in the Tower Garden.	Hydroponic Vertical Farming Tower Garden Plant Systems Tower Garden Design Challenge Fertilization:	Teacher-created assessments Interactive Notebook Garden Journal Observations and Reflections Google Suite for Education Assessment Tools (Google Docs, Google Slides) Student Participation
MS-LS1-6 MS-LS1-7 MS-ETS1-2 MS-ETS1-3	What can students learn about sustainability from the outdoor classrooms? How can we reduce	Students will plan and design the outdoor gardens using the plants from the GrowLab© container and Greenhouse and transfer to the outside garden. Use composting as an opportunity to discuss	September-October: Harvesting ● Garden Clean-up ● New Garden Preparation ● Fall Planting ● Composting November-December: Planning Spring Planting ● Choose Crops for Spring planting ● Develop planting schedule January:	Growing a School Garden Planning an Edible Garden	Teacher-created assessments Google Suite for Education Assessment Tools (Google Docs, Google Slides) Student Participation Interactive Notebook Garden Journal Observations and

	waste from the Greenhouse by composting? How can we use the Greenhouse to maintain the plants that will be grown in the Vertical Garden©?	decomposition and sustainable practices. Students will plan and design the outdoor gardens using the plants from the Greenhouse Greenhouse and transfer them to the Vertical Garden. Students will transplant material from the Greenhouse to the Vertical Garden.	• Begin planting in the Tower Garden System February-March: • Continue harvesting the plants in the Tower Garden. • Plan and prepare for the Vertical Garden Showcase in Aprll. April-May: • Transplant indoor Grow Lab© plants and Greenhouse plants to the Bernzomatic Garden • Vertical Garden Showcase (April) June • Summer maintenance Greenhouse Manager Engineer's Design Project.	Greenhouse Manual	Reflections Vertical Garden Showcase (April)

Skills:

Critical thinking

Collaboration

Outreach to school community

Overview	Science Processes: Science Inquiry and Engineering
Summary	Students provide a mechanistic account for how cells provide a structure for the plant process of photosynthesis in the movement of matter and energy needed for the cell. Students use conceptual and physical models to explain the transfer of energy and cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems. They construct scientific explanations for the cycling of matter in organisms and the interactions of organisms to obtain matter and energy from an ecosystem to survive and grow. They understand that sustaining life requires substantial energy and matter inputs, and that the structure and functions of organisms contribute to the capture, transformation, transport, release, and elimination of matter and energy.

Standards	Science and Engineering Practices	Crosscutting Concepts	Disciplinary Core Ideas
MS-LS2-2 MS-LS2-5	Constructing Explanations and Designing Solutions Engaging in Argument from Evidence	Patterns Stability and Change	LS2.A: Interdependent Relationships in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans ETS1.B: Developing Possible