

Emerging Technologies 2022-23

Emerging Technologies is an introductory technology course that will study and utilize some of the newest technologies. Class topics include: Drones, Fabrication, Simulation: flight and gaming, AR/VR, Web Site Design and GPS. Students will learn about the history of technology as well as exploration of careers involving new technologies. Much of the course is designed to provide hands-on experience with the technologies while learning practical applications. Field trips and special guests will be utilized to see technology in real life application!

~~ Topics are a baseline of expected curriculum. Student interest and engagement will determine if a more in depth focus on any topic will occur. ~~

Title or Topics w/ NYS Standards	Essential Questions & Vocabulary	Content Skills (Activities to cover Essential Questions)	Major Assessments (Tests, Project, etc.)	Time Frame
<p>Class Expectations and Understanding of Teamwork ISTE 1.a, 2.c, 2.d, 6.a, 6.d</p>	<p>What are qualities of effective teamwork? What does it mean to work as a team? How can conflicts be resolved easily/peacefully?</p> <ul style="list-style-type: none"> • communicate • collaborate • analyze • cooperate • verbal/nonverbal communication • conflict resolution 	<p>Digital Break Out Room/Teambuilding & Problem Solving • work together to complete tasks required</p> <ul style="list-style-type: none"> • discuss solutions and what worked, what didn't <p>'Play' Telephone and Charades and Human Knot activity • How are we all connected?</p> <ul style="list-style-type: none"> • What does it mean to work as a team? 	<p>Class discussion and creation of a poster displaying qualities of effective teamwork</p>	<p>1 Week</p>
<p>History of Technology ISTE 1.a, 1.b, 1.d, 2.a, 2.b, 2.d, 3.a, 3.b, 3.c, 4.b, 5.b, 6.a, 6.d</p>	<p>How has technology changed over the years?</p> <ul style="list-style-type: none"> • analyze • investigate • contrast • evolve • predict • present 	<p>Select and research a specific piece of technology and be able to share with others (through a digital presentation) include information about:</p> <ul style="list-style-type: none"> • When was the original form of the device created (include a video/picture and description)? • Who created it? • What is the present day version of the device created (include a video/picture and description)? • What are at least three facts about the device? • How has the device been modified to make it function more efficiently? • What do you envision this device to be like in 15 years (How will it function? What will it look like? How will it be used?) 	<p>Students will work in pairs to create a video presentation about a specific piece of technology.</p>	<p>3 Weeks</p>

		<ul style="list-style-type: none"> View and analyze 'Back to the Future 2' (What are five things that have become real? What are five things that are not like the author imagined?) 		
Website Design ISTE 1.a-b, 2.a-d, 3.a-c, 4.a-d, 6.a-d	How is a website created? What does it mean to be a good digital citizen? <ul style="list-style-type: none"> digital citizenship advocate demonstrate digital footprint post link/hyperlink 	Learn the aspects of website design. Complete exercises that help the student to analyze their existing digital footprint. Students will explore the various attributes of the Google Sites application.	Maintain a Google Site as a digital portfolio for this course (beginning with the Home Page). The website will have all information and projects created in this class and assessed each semester.	2 Weeks
GPS/Geocaching ISTE 1.a-d, 2.a-d, 3.a-c, 4.a-b, 5.c, 6.a-d	What is GPS? How does a GPS work? What is Geocaching? <ul style="list-style-type: none"> Global Positioning System (GPS) <ul style="list-style-type: none"> North/East/South/West Positioning Waypoints Latitude/Longitude GLONASS EGNOS Navigation chart Cache Coordinates CITO Triangulation Geocaching Graphic Information System Mapping (GIS) 	Students participate in the curriculum form GPS-based STEM Curriculum to learn the History of GPS, how it works, review latitude and longitude, practice triangulation and learn about uses for GPS. Students will research (using the websites below) the definition of GPS and why it was originally developed, the three main components of GPS and how it is beneficial to the user, define Geocaching, history of geocaching, what event triggered the possibility of geocaching, details of the first geocache placed (who, when, where and what) different kinds of geocaching, define CITO (what is it and why is it beneficial for geocachers to adhere to this principal). http://geocaching.com http://www.beaglesoft.com/gpstechnology.htm http://www.dummies.com/how-to/content/getting-into-gps.html http://www.eso.org/public/outreach/eduoff/seospace/docs/navigation/navgps/ http://electronics.howstuffworks.com/gadgets/travel/gps.htm http://www.pbs.org/wgbh/nova/longitude/gps.html	Create a three stage geocaching activity to be executed by students in the 8 th grade STEAM classes .	3 Weeks

<p>AR/VR Technology (and Simulation) ISTE 1.a-d, 2.a-d, 3.a-b, 4.a-b, 5.a-d, 6.a-d</p>	<p>What is Augmented Reality? What is Virtual Reality? What are the controversies and differing opinions surrounding Artificial Intelligence? • augmented Reality</p> <ul style="list-style-type: none"> • virtual reality • simulation • immerse • integrate • Artificial Intelligence 	<p>Students will look at Virtual and Augmented Reality from both a scientific and design perspective</p> <p>Read/watch, answer guided questions and discuss: Articles: Do Augmented and Virtual Reality Have Real Educational Benefits? The Future is Here Pt. 1 of 3: Virtual Reality, The Beginning or the end of Society as We Know it?, The Future is Here Pt. 2 of 3: Augmented Reality, Gimmick or Game Changer?, The Future is Here, Part 3 of 3: Artificial Intelligence- Will Siri Rise Up Against Us? Videos: VR: What is Virtual Reality and How does it Work?, Virtual Reality Explained!, Head Tracking, Virtual Reality Explained with Some</p>	<p>Slide Show presentation for elementary students explaining AR/VR and support in introducing AR/VR goggles to the elementary students Participation in a variety of VR/AR experiences</p>	<p>8 Weeks</p>
--	--	---	---	----------------

		<p>Trippy Optical Illusions, What Does Oculus Rift Do To Your Brain?, Immersive Tech Explains-Virtual Reality, VR for Gaming AR: Augmented Reality. What is Augmented Reality?, Augmented Reality Demos, Microsoft Hololens, Augmented Reality Sandbox with Real-Time Water Flow Simulation, Try on Clothes in Augmented Reality, Google Glasses Street View AI: Intro to Artificial Intelligence with Neil Jacobstein, AI Unleashed: IBM's Watson, See Future of Artificial Intelligence in Mind Clones Right Now, Artificial Intelligence in the Movies</p>		
--	--	---	--	--

<p>Drone Technology (and flight simulation) ISTE 1.a-d, 2.a-d, 3.a-b, 4.a-d, 5.a-d, 6.a-d</p>	<p>What is first person piloting? How do you repair a drone? What is the difference between racing, recreational and commercial drones? How do you create videography from Drone footage? What do you have to do to become a licensed drone pilot?</p> <ul style="list-style-type: none"> • drone • anemometer • Certificate of Authorization (COA) • controlled airspace • controller • Federal Aviation Administration (FAA) • Federal Aviation Regulations (FARs) <ul style="list-style-type: none"> • Air Traffic Control (ATC) • First Person View (FPV) • flyaway • geofencing • gimbal <ul style="list-style-type: none"> • Geographic Navigation Satellite System (GNSS) • knot • manned/unmanned • model aircraft • Part 101/Part 107 <ul style="list-style-type: none"> • person manipulating the controls • Pilot in Command (PIC) • Pitch/Yaw/Roll • Ready to Fly (RTF) • regulated airspace • Temporary Flight Restriction (TFR) • Visual Line of Site (VLOS) • Visual Observer (VO) 	<p>Students will watch (and respond to guided questions) a variety of videos demonstrating the concepts of flight and regulations related to drone operation.</p> <p>Several Drone Pilots both recreational and commercial, along with racing drone pilots will be invited to visit to talk and share their enthusiasm with the students.</p> <p>Application of skills/vocabulary learned will be demonstrated through this unit via control and operation of both racing and recreational drones.</p> <p>Students will also learn to repair and assemble the drones that they will be using.</p>	<p>Students will help to instruct either students from STEAM 8, or a staff member, the basics of drone flight and how to fly drones.</p> <p>They will also participate in racing drones through a student designed course.</p>	<p>10 Weeks</p>
--	---	---	--	------------------------

<p>Fabrication ISTE 1.a-d, 2.a-d, 3.a-c, 4.a-d, 5.a-d, 6.a-d</p>	<p>How do you design for a 3D printer? What is a laser printer/engraver/cutter and how does it work? How is a Glowforge different than a 3d printer?</p> <ul style="list-style-type: none"> • Laser printer • 3d printer • Design program • filament • functional prototype • Fused Depositional Modeling (FDM) • G-Code • Polylactic Acid (PLA) • slicer 	<p>Students will first complete curriculum activities provided by SketchUp to learn how to design objects to be created in the 3d printers. Students will learn the names and functions of the parts on both the Glowforge and the 3d printers. Students will utilize the design program provided by Glowforge to design objects that will be created in the Glowforge. Students will research what materials can be used in the Glowforge and develop a list of materials/prices needed to complete their desired final project.</p>	<p>Each student will create 'something' that will benefit and be given to our school community.</p>	<p>5 Weeks</p>
<p>360° Cameras ISTE 1.a-d, 2.a-d, 3.a-b, 4.a-d, 5.a-d, 6.a-d</p>	<p>What is a 360° camera and what is it used for? How do you create a video from recording on a 360° camera? • AR/VR</p> <ul style="list-style-type: none"> • 360 Video • Monoscopic 360 video/playback • stereoscopic 360 video/playback • Stitching • special audio • 360 projection types • Field of View (FOV) • Compass 	<p>Students will participate in the 'Video School' activities found at: vimeo.com/blog/category/video-school/. Students will collect footage, based on their video content, and use the provided video stitching program, to create a 5-10 minute video to be shared with a larger audience. Video will be made available for use with the VR goggles and through our planetarium projection system.</p>	<p>Students will work with a partner to create a video, using a 360° camera to be shared with a larger audience</p>	<p>6 Weeks</p>
<p>Independent Project</p>		<p>Students will work either independently or in small groups, throughout the year. The topic is to be determined by each 'team' and will be ongoing while other topics are introduced and explored.</p>	<p>Completion and presentation of the technology explored and project outline from start to finish!</p>	<p>ongoing</p>