	Visual Art Curriculum Outline			
	Primary (K-2)	**Secondary (3-8)**	**Tertiary (9-11)**	
	understand how to use primary colors mixing to make other colors	use photoshop to cut characters from images	Demonstrate understanding of how to use AfterEffects to produce movie	
	create drawings from How to Draw books for people, vehicles, animals	use anime studio to bone rig ripped pictures		
	use Scratch to make geometric designs	use anime studio to animate a bone rigged character		
	compose painting using separate sheets for foreground, background	use anime studio to voice dub an animated character		
	construct sculpture using additive process with play dough	export anime studio scene for import into Unity or iMovie for production		
	construct sculpture used subtractive process with play dough			
	create sketch using layers use Sketchbook Pro			
	compose backgrounds that express moods, happy, excited, sad and			
	compose characters with facial expressions or body language for moods			
	be able to identify art by PIcasso, Monet, Matisse			
		make movie using digital video recording		
		produce movie using iMovie		
		demonstrate an understanding of light in selecting a filming location		
		demonstrate and understanding of the background when selecting a filming location		
		use anime studio to make video effects for movie, such as light saber, explosion and		
		film against a green screen and replace settings with an alternate setting		
		animate a 1-10 minute movie	animate a 30 minute movie	

	Story Telling Curriculum Outline			
	Primary (k-2)	**Secondary (3-8)**	**High (9-11)**	
	listens to Aesops Fables and can identify moral	reads Greek Mythology and can identify characters and plot	reads classic Greek Plays and observe play structure	
	listens to American Tall Tales and can identify exaggerations	reads Arthurian legends and can identify characters and plot	can tell a contemporary story based on a Greek Play	
	tells Knock, Knock jokes	reads BIble and can identify characters, plots	reads Shakespear's Plays and observes play structures	
	Can do accents like young, old, boy, girl	can appropriately classify story as: man versus nature, man versus machine, good versus evil, journey, quest, coming of age	can tell a contemporary story based on Shakespear play	
	tells true story with characters, setting, plot	watches movies like Harry Potter and can observe evidence of character development		
	tells make-believe story with characters, setting, plot	watches movies like Star Wars and can observe evidence of character development		
		Can do impersonations of iconic characters like Darth Vader	Can do impersonations of celebrities such as US President	
		Can do accents like British, French, Indian	Can do accents like Walken, Pacino, Connery	
		gets ideas from SNL, TED	gets ideas from Monty Python	
		tells story from someone else's perspective that is true		
		tells story from someone else perspective that is make-believe		
			AP Literature	
			AP Language	
			AP US History	
			AP Art History	
			AP European History	

	Music Curriculum Outline			
	Primary (k-2)	**Secondary (3-8)**	**High (9-11)**	
	sing songs with melody	sight reading for singing	write harmony for four voices	
	sing songs in round with harmony	sing duets	program custom synthesizer with ‘77	
	play drum in drum circle and copy rythmn	compose songs using sheet music	build kinetic sound sculpture	
	play drum in circle and maintain a track when others add tracks	complete Inside Music Music Composition Course	write music as a group	
	keep beat using hand claps	play instrument	perform original music as a group	
	hum or scat favorite songs from movies, video game or musicals	compose original music sounds from nature		
	understand the form of a song	record ambient sounds for sound effects using digital recorder		
	compose original melody and record using audio device	build music instruments from pvc		
	add tracks to original melody using loops	build thermion from lego robot		
	compose original music for moods like happy, excited, sad, scared	recognize popular music from John WIlliams, Beethoven, Bach, Motzart in movies, video games		
		improvisation		
		participate in solo recital		
		participate in group performance		
		learn a song from video tutorial		
		play popular songs by ear		
			AP Music Theory	

	Reasoning Curriculum Outline			
	Primary (k-2)	**Secondary (3-8)**	**High(9-11)**	
	set-up checkers board	chess game notation	learn rules of go	
	play checkers according to rules	discuss game strategy with opponent following game	learn basic principals of go from book or video and play Go to apply principals	
	recognize opportunities for double jump in checkers	solve three move check mate puzzles	play in online go tournaments to get rating	
	recognize even swap in jump in checkers	read chess books on openings and apply learning to games and document with notation	improve rating, over time, to goal of 1D	
	recognize when jump will lead to advantage checkers	watch chess videos on openings and apply learning to games and document with notation		
	play end game thoughtful in checkers	participate in online chess tournaments and in real-world tournaments to get rating		
	king queen check-mate in chess	improve rating, over time, to goal of 1600		
	king two rook check mate in chess			
	king queen pawn in chess			
	king two rook pawn in chess			
	two knights opening in chess			
	queen’s gambit opening in chess			
	play bug house in chess			
	gracefully accept loss in chess			
	gracefully reverse sides in board while practicing to develop better thinking			
	solving 1 move check mate puzzles			
	solve 2 move check mate puzzles			
	participate in chess tournament and make friends			
	1:1 with Coach	Self Directed for Lessons	Independent	

	Robot Design/Fabrication Curriculum Outline				
	Primary	**Elementary (3-5)**	**Middle (6-8)**	**Tertiary**	
	build solid lego structure	understand trade-offs in chassis design for the turning radius	demonstrate an understanding of biangular navigation	demonstrate an understanding in the use of omni-wheels	
	build strong lego structure	understand trade-offs in chassis design for clearance	demonstrate an understanding of error catching programming	demonstrate an understanding of how to break and form chains and set tension on a chain	
	build hollow lego structure	understand trade-offs in chassis design for speed	demonstrate an understanding in PID controls for behaviors such as line following	demonstrate an understanding of how to select sprockets for a chain system	
	build high lego structure	understand trade-offs in chassis design for accuracy/precision	demonstrate and understanding of use linear equations to set parameters for autonomous control.	demonstrate an understanding of omni wheel configurations, including 3 and 4 wheel design for straight line movements	
	build long lego structure	understand trade-offs in motor selection for size/power	demonstrate an understanding of how battery power can influence accuracy and precision in robot performance	demonstrate, with graphs and equations, an understanding of center of gravity and conditions where a robot would flip in operation	
	build lego vehicle using axles, wheels and tires	understand tade-offs in motor placement for stability/space	demonstrate an understanding of alternative energy sources to supply attachments, such as elastics and gravity	linear slide with 80/20 bars	
	build elastic powered lego vehicle	understand trade-offs in wheel size selection	demonstrate an understanding of how to build and use a scissors lift	measuring and cutting 80/20 aluminum bars	
	build gravity drop powered lego vehicle	understand trade-offs in tire selection	demonstrate an understanding of how to build and use a Vex Style 6 Bar lift	tapping and drilling aluminum bars with punch and metal drill bit or press	
	build lego machine that lifts objects using hand crank	understand diversity in gear-up choices	demonstrate and understanding of how to use pulleys to make an elevator style lift	measuring and cutting plastic sheets such as lexan and vinyl	
	build lego machine with gears that lifts objects using hand crank	understand diversity in speed/torque choices	demonstrate an understanding of how to use a gravity assit grabber	understanding when to use lactate on nuts and bolts	
	control robot using Scratch	understand diversity in accuracy/precision choices	demonstrate a detailed analysis of the risks/rewards for each mission on game	understand color coding system for hex wrenches	
		build and design mechanical circuit using axles and gears to direct mechanical energy	demonstrate a detailed analysis of which missions could be grouped together to be solved on the same run	understand how to assemble hubs onto axles including motor axle	
		understand diversity in turning mechanical energy	demonstrate a detailed analysis of the best runs for a team	understand how assembly sequence eases/complicates assembly	
		understanding trade-offs in placement of motor shafts for attachments	demonstrate a detailed analysis for the sequence of runs for a team	demonstrate an understanding of load forces on motors and determine if motors have sufficient power to perform a task	
		demonstrate an understanding of missions that should be completed with robot frame (push/pull)	demonstrate an understanding of pneumatic circuits	demonstrate and understanding of load forces on servos and determine if servos have sufficient power to perform a task	
		demonstrate and understanding of how to design, build, test and use an attachment to lift a game element	demonstrate an understanding of building a pneumatic engine	demonstrate an understanding of how to tune a servo	
		demonstrate and understanding of how to design, build, test and use an attachment to drop a game element	demonstrate an understanding of linear actuator	deposition sub-system with trigger	
		demonstrate and understanding of how to design, build, test and use an attachment to grab a game element	demonstrate an understanding of a pneumatic engine with at least 2 cylinders	collection sub-system with brushes, slides	
		demonstrate and understanding of how to navigate a game field with an ultra-sonic sensor	demonstrate an understanding of using a switch in a pneumatic circuit	demonstrate and understanding of how to place controllers on robot frame so that wires are accessible and out of danger	
		demonstrate and understanding of how to navigate a game with with a color sensor	demonstrate an understanding of pressure in a pneumatic circuit using diagrams and pressure gauges.	demonstrate an understanding of how to solder electrical connections	
		demonstrate and understanding of how to navigate a game with a touch sensor	demonstrate an understanding of independent suspension and dependent suspension	demonstrate an understanding of how to use wire cutters to strip wire	
		demonstrate an understanding of how to navigate a game field with a gyro sensor	demonstrate an understanding of rack and pinion steering in lego design	demonstrate an understanding of how to make a robot design use PTC Creo by making sub-assemblies	
			demonstrate an understanding of all wheel drive using differentials	demonstrate and understanding of how to identify constraints for the development of sub-systems	
			demonstrate an understanding of transmissions	demonstrate and understanding of how sub-systems will interact with one another	
			demonstrate an understanding of the importance of selection a starting position	develop a dialogue to effectively parter with other teams in competitions	
				develop multiple starting positions to mange different partnerships with other teams in competitions	
				developing plans to supports partnerships during tele-op phase	
				develop role to communicate with other teams at competitions	
				linear lift with 6 bar from VEX	
				linear actuators	
				custom build parts using PTC Creo and 3-D printers	
				custom weld robot frames or sub-assemblies using steel and mig welder	
				custom weld robot frames or sub-assemblies using aluminum and tig welder	
				AP Calculus	
				AP Physics	

	Management Curriculum Outline				
	Primary (K-2)	**Elementary(k-2)**	**Middle (k-2)**	**High (k-2)**	
Budget	sum items and determine if total is under budge	comparison shop in store to find lowest costs to keep items under budget	comparison shop online with shipping, reviews of items	direct interactions with vendors, maintain finance and budget documents, including receipts, invoices, etc.,.	optimize project to minimize costs
Timelines	daily	week	month	project (12-16 weeks)	project to business (26 weeks+)
Planning	goals	goals with strategies	goals with strategies and delegation	goals with strategies, delegation and measurable deliverables	b-plan with vision, mission
relative priorities	adjustments based on what is hard deadline	manage hard and soft deadlines	juggle various commitments and make arrangements when absence is necessary	conduct independent work to keep project moving forward outside of scheduled meeting times	
Documentation	documenting work with voice memo	observe notebook, sign notebook	keep notebook, coach signs notebook	maintain notebook independent	
	documenting work with digital photograph	integrate photos into notebook	integrate photos onto blog on webstie	podcast documentation	
	documenting with with digital movies		integrate videos onto blog on website		
Communication	develop appropriate questions for experts	document expert responses to questions	cite expert information appropriately in research poster		
		develop phone skills to make appointments or conduct interviews using phone	contact experts to arrange for interviews		
			1 minute elevator pitch video	make fundraising “pitch” in person to local businesses to get sponsorships	
			present project at community gathering, such as Maker Fair		
			collect and analyze community response to project		
			publish project results in media such as tv news, newspaper, blog and FLL event		
			run practice sessions with a format that includes time to revise plan, discuss goals, complete work and set goals for the next practice		
			refer to notebook when reflecting upon season		

	Leadership Curriculum Outline				
	Primary (k-2)	**Elementary(3-5)**	**Middle(6-8)**	**HIgh (9-11)**	
Decision Making	use consensus for decisions that effect all team members, majority for decisions that effect parts of the solution directed to decisions that are delegated by group to individual	use pros/cons to drive decisions	use risk/reward to drive decision	use costs/benefits to drive decisions	
Idea Generation	brain storm	SCAMPER	and then…	what if…	Why Not…
Conflict Resolution	take turns, share	how does that make them feel, use your words	understanding personality/roles	mediation with principals and interests	
Design Thinking					
Design Thinking Perspective	self	family	community	country	international
Design Thinking # Ideas	2-3	2-4	3-5	3-6	
Design Thinking-Aeathetic	Is it done, on time, under budget	does it work	is it robust	is it as simple as possible	is it beautiful
Decision Making	making decisions with majority vote	understand when to make decisions with majority, consensus or through direction			
	making decisions with consensus	unpack complex problem and break in into smaller pieces	successfully delegate tasks to pairs/groups to solve and integrate into whole		
Decision Chart	pros/cons	risk/reward	costs/benefits		

	Programming Curriculum Outline			
	Primary (k-2)	**Elementary(3-5)**	**Middle(6-8)**	**High(9-11)**
Game Programming	demonstrate that student can set-up scratch account		demonstrate that a student can set-up Unity Account, Apple Developer Account	
	demonstrate that student can search for an open scratch program		demonstrate ability to use Unity tutorial as template for game	
	demonstrate that a student can modify and save a scratch program		demonstrate that student can open and modify existing unity tutorial	
	demonstrate that a student can make a story board for a program	demonstrate that a student can make a story board that integrates user input and multiple character sprites and settings	demonstrate multi-level story board	
	demonstrate that a student can make a program that displays information automatically	demonstrate that student can make a program that displays information based on user input	demonstrate that student can make a game where character movement is controlled by the user and where scrabble elements are controlled by game controller including static elements and dynamic elements that can follow paths or move randomly	3-D, POV style games
	demonstrate that a student can make a short animation where a character does something automatically	demonstrate that a student can make a character do something based on user input	demonstrate that the character can move in multiple dimensions	demonstrate that character/objects interact in 3_D
	import sprite from anime studio to make character	demonstrate ability to change character's appearance based on user input	integrate animations/sprites to make character behaviors more interesting	
	important background from anime studio to make setting	demonstrate ability to change setting based on user input	demonstrate multiple levels based on user performance	
	import audio from garageband to make sounds	demonstrate ability to change sounds based on user input	demonstrate ability to import sounds from Unity store or to import record sounds and music from Garage Band or midi devices	demonstrates understanding of 3-D sound to signal proximity
		displays feedback to user, such as score	displays feedback to user, such as score	
			integrates social media into game for information usch as high scores to promote game	
Motors/Servos	use scratch to control WeDo motors to make robot drive forward	uses mindstorms to make robot move consistently, using both tank and steering blocks	optimizes robot performance by varying speed as a function of distance and accuracy from target	uses template programs in Android Studio to drive motors and Servos
	use scratch to control WeDo robot attachment to lift something	uses mindstorms to operate attachment correctly using both large and medium motor blocks		
	use Scratch to control WeDo robot to make attachment grab something			
Sensors		uses mindstorms to collect sensor data to make zig-zag line following program	uses mindstorms to make PID programs for operations such as line following	controls autonomous driving using sensors
		uses mindstorms to collect sensor data to stop robot at specific location	uses cases within loop to catch errors when using sensor data to stop robot at specific locations	manages interactions with other robots using sensors during autonomous phase
		uses mindstorms sensors to trigger motors to operate attachment at a specific location	uses cases within loop to catch errors when using sensor data to operate attachment at specific location	uses sensors to control scoring elements during autonomous phases
				uses sensors for error detection/ correction during autonomous phase
Control Flow	uses Scratch control blocks to control program	uses while statements with sensors to stop motors or to trigger motors		
		maps mission programs to brick buttons so that display is not needed to run programs	robot automatically senses and loads appropriate programs based on data collected while robot is running	demonstrates understanding of which operations should be mapped to which controller and which buttons to optimize human performance
Data		uses the sensor view mode to track changes in sensor values while operating the robot	uses variables, constants and wires with math blocks to display data on the brick while developing programs	
MyBlocks		creates myBLocks to contain the blocks for a specific mission	creates myBLocks with parameters for programs like PID line following	creates functions in C# for re-usable code