Technology and Library Media Department: Digital Literacy

School Committee May 8, 2018

Bedford Public Schools' Technology Vision

"Through the use of technology students will build their own personal learning networks, collaborate with others, and be producers of knowledge, content and creative expression."

The Bedford Public Schools believe in integrating technology in new and effective ways to enhance teaching and learning.

We want our students to be:

- Reflective learners
- Creators/curators of knowledge
- Critical thinkers and problem-solvers of real-world issues
- Digitally literate
- Good digital citizens

We promote:

- Inquiry-based, hands-on, minds-on learning
- Multi-modal means of learning and demonstrating understanding through creative expression
- Project-based learning
- Interdisciplinary learning that integrates digital literacy
- An emphasis on learning processes – i.e. engineering design process

2016 Massachusetts Digital Literacy and Computer Science (DLCS) Curriculum Framework - Overview

Bedford's Technology and Library Media Department's work is guided by the Massachusetts Digital Literacy and Computer Science Frameworks.

DESE's Vision – To engage students in digital literacy and computer science skills and concepts through the integration of practices, while making connections to what they know and the world they live in.

Framework designed to:

- Integrate practices necessary for success in a technological world
- Present coherent progressions of core concepts and practices from K – 12
- Complement other Massachusetts Curriculum Frameworks
  - Overlap with standards from other academic disciplines
  - Integrate core concepts and practices across the curriculum

DESE's Six Guiding Principles for Effective Digital Literacy and Computer Science Education

The goal of the Guiding Principles is to help educators create relevant, rigorous, and coherent programs that support student engagement, curiosity, computational thinking, and excitement for learning over time.

Guiding Principle 1: Learning
- Explores ideas in ways that stimulate curiosity, create enjoyment and develop depth of understanding.

Guiding Principle 2: Teaching
- Provides a carefully designed set of content standards that are clear, specific, focused, and articulated over time.

Guiding Principle 3: Equity
- Conveys high academic expectations for all students.

Guiding Principle 4: Literacy Across the Content Areas
- Builds upon and develops students' literacy skills and knowledge.

Guiding Principle 5: Assessment
- Uses regular assessment to inform student learning, guide instruction, and evaluate student progress.

Guiding Principle 6: Planning and Support
- Requires coherent district-wide planning and ongoing support for implementation.

2016 Massachusetts Digital Literacy and Computer Science (DLCS) Curriculum Framework - Strands

Computing and Society (***Digital Citizenship***)

- Principles of privacy, ethics, security, and copyright law influence digital safety and security, as well as interpersonal and societal relations.

Digital Tools and Collaboration (***Digital Literacy)***

- Digital tools are critical for conducting research, communicating, collaborating, and creating in social, work, and personal environments.

Computing Systems (***Digital Literacy***, ***Coding, Engineering Design)***

- Computer systems empower people to create, collaborate, and learn via human computer partnerships. The design of many computing systems empowers people to debug, extend and create new systems.

Computational Thinking (***Digital Literacy***, ***Coding, Engineering Design)***

- Computational thinking is a problem-solving process that requires people to think in new ways to enable effective use of computing to solve problems and create solutions.

Four Strands of DESE's Digital Literacy and Computer Science Frameworks

1. **Computing and Society (CAS)** – *Computing impacts all people and has global consequences on such things as communications, assistive technology, social networking, and the economy.*
   - **Safety and Security**: Understand and use safety & security concepts and security & recovery strategies.
   - **Ethics and Laws**: Demonstrate standards of conduct, fairness, and responsible use of the Internet, data, media, and computing devices. Understand principles and laws of software licenses, copyrights, and acceptable use policies.
   - **Interpersonal and Societal Impact**: Examine the impact of technology, assistive technology, technology proficiencies, and cybercrime in people's lives, commerce, and society.

2. **Digital Tools and Collaboration (DTC) –** *Digital tools are applications that produce, manipulate, or store data in a digital format, such as word processors, images, music and simulators. Digital tools are critical for conducting research, communicating, collaborating and creating in social, work/school, and personal environments.*
   - **Digital Tools**: Select and use 'best' digital tools or resources to create an artifact or solve a problem.
   - **Collaboration and Communication**: Use a variety of digital tools to work collaboratively anytime and anywhere.
   - **Research:** Use a variety of digital tools to conduct research, answer questions, and develop artifacts to facilitate learning and convey understanding.

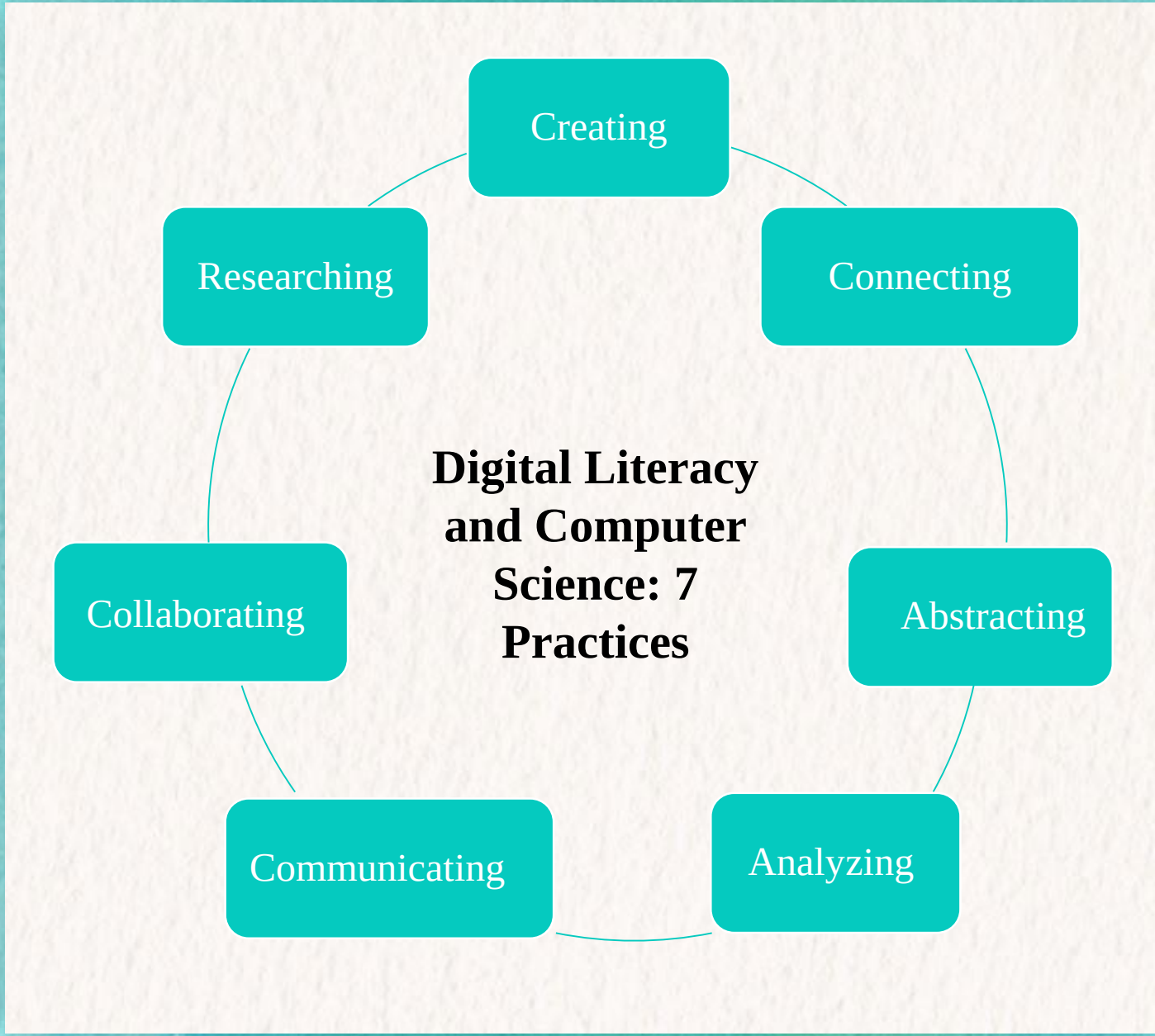
Four Strands of DESE's Digital Literacy and Computer Science Frameworks

3. **Computing Systems (CS) –** *Computing systems are comprised of components (i.e. software, devices) and networks that connect communities, devices, people, and services. They empower people to create, collaborate and learn via human-computer partnerships. The design of many computing systems empowers people to debug, extend, and create new systems.*
   - **Computing Devices**: Use a variety of computing devices and understand that computing devices take many forms, use a variety of input data, and run instructions to produce certain outputs.
   - **Human and Computer Partnerships**: Understand that some tasks are best done by computers, while other tasks are best done by humans although many tasks are done through human-computer partnerships.
   - **Networks**: Know the components, including hardware and software, carry out specific functions to connect computing devices, people, and services.
   - **Services**: Evaluate the benefits of using a service with respect to function and quality.

4. **Computational Thinking (CT) –** *Computational thinking is a problem solving process that requires people to think in new ways to enable effective use of computing to solve problems and create solutions.*
   - **Abstraction**: Create a new representation through generalization and decomposition.
   - **Algorithms**: Write and debug an efficient, clear, reusable, and accurate algorithms.
   - **Data**: Create, modify, and manipulate data structures, data sets, and data visualizations.
   - **Programming and Development**: Use an iterative design process to create an artifact or solve a problem.
   - **Modeling and Simulation**: Create models and simulations to formulate, test, analyze, and refine a hypothesis.

DESE Digital Literacy and Computer Science (DLCS) Curriculum Framework: Seven Practices

"Practices cultivate the internalization of dispositions and skills that students apply to solve digital literacy and computer science problems. Effective instruction couples practices with digital literacy and computer science content to provide a context for performance."



Seven Practices of DESE's Digital Literacy and Computer Science Frameworks

Creating - Students engage in the creative aspects of computing by designing and developing interesting computational artifacts and by applying techniques to creatively solve problems.

Connecting - Students study their effects and draw connections between different computing concepts.

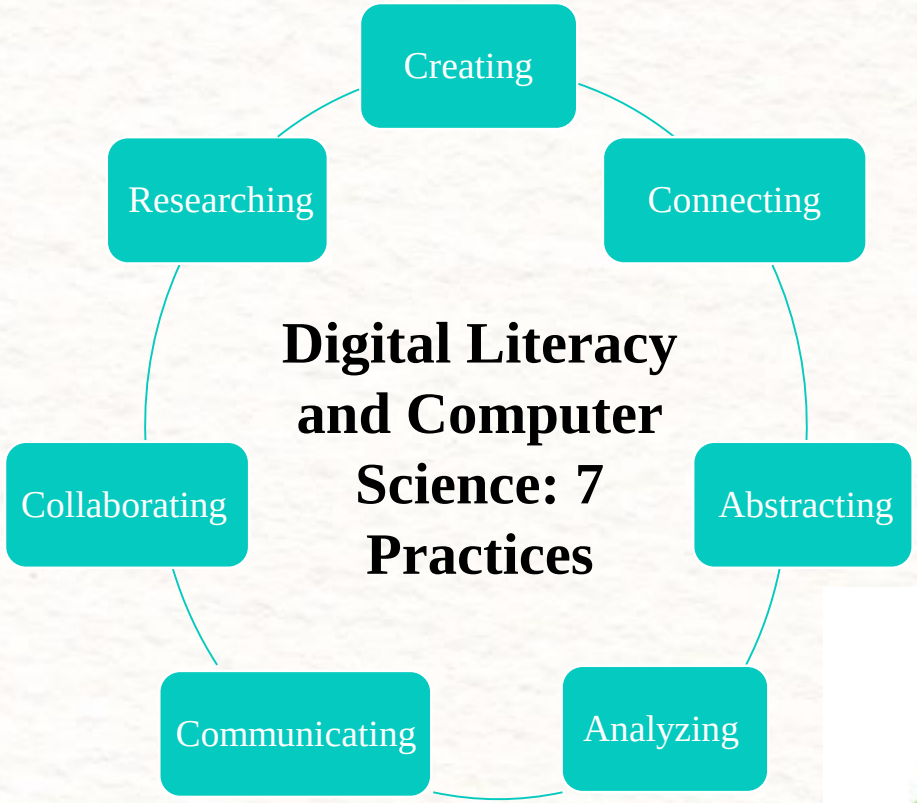
Abstracting - Students use abstraction to develop models and to classify and manage information.

Analyzing - Students use critical thinking and analytical skills to locate, evaluate, and analyze information, information sources, their own computational artifacts, and the computational artifacts others have produced.

Communicating – Effective communication is accurate, clear, concise, persuasive, and responsible.

Collaborating - Effective collaboration draws on diverse perspectives, skills, knowledge, and dispositions to address complex and open-ended problems or goals.

Researching - Students apply digital tools to gather, evaluate, and use information in a legal, safe, and ethical manner.

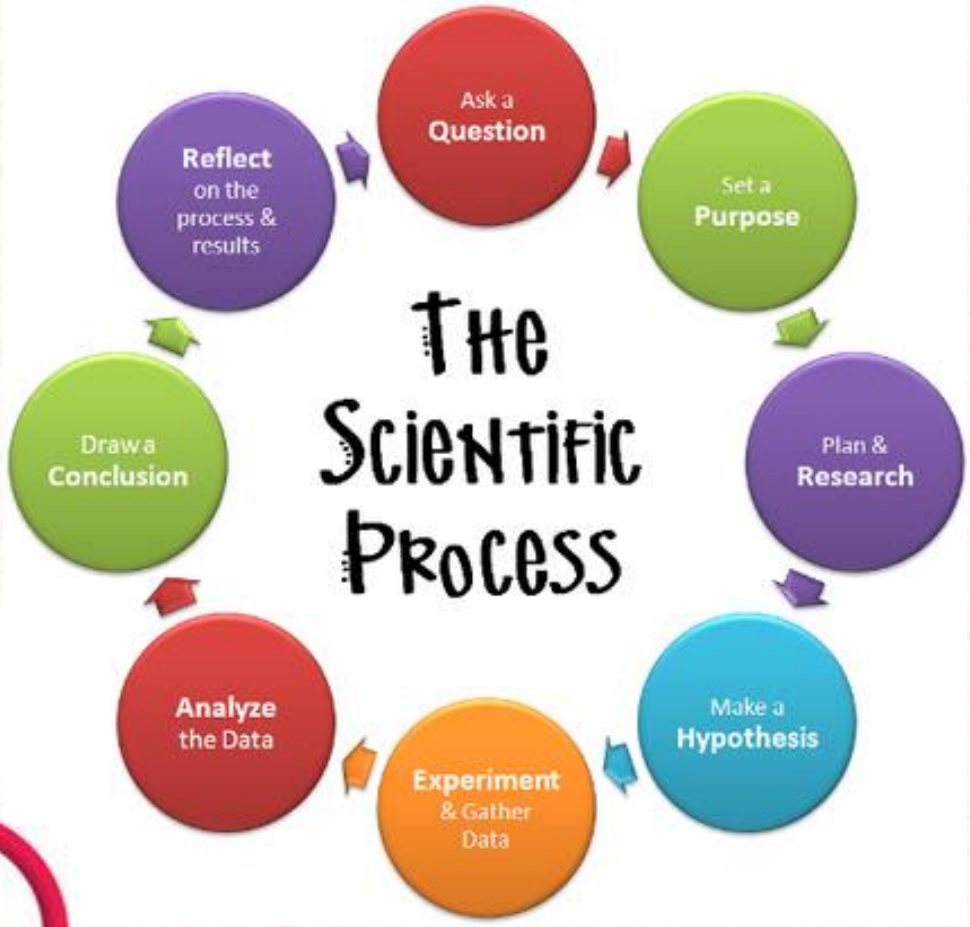


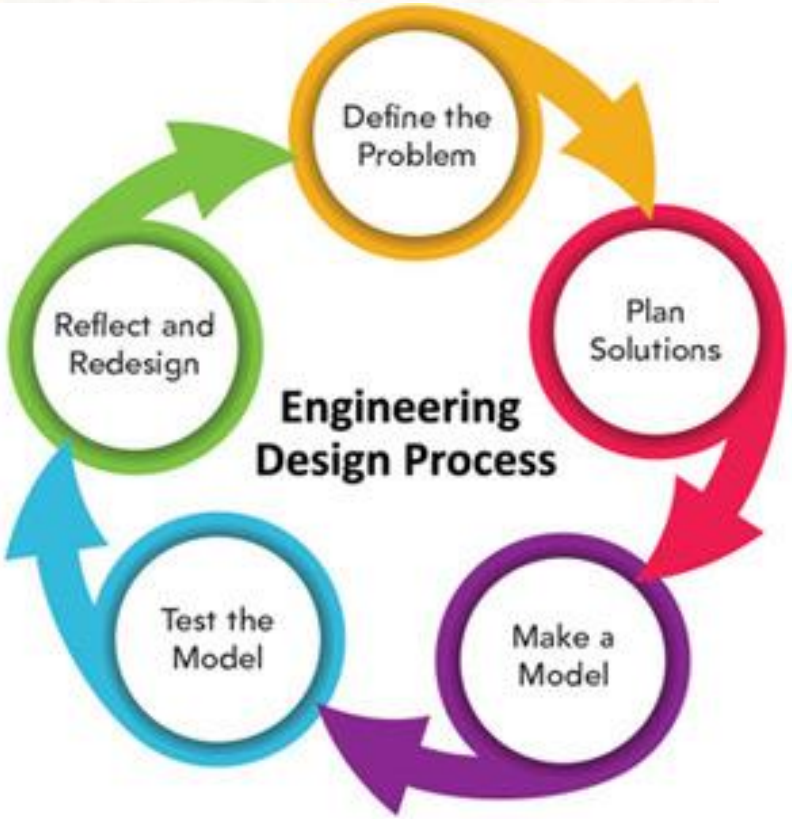
Inquiry-Based

Literacy

Critical Thinking

Creativity





Multi-Modal

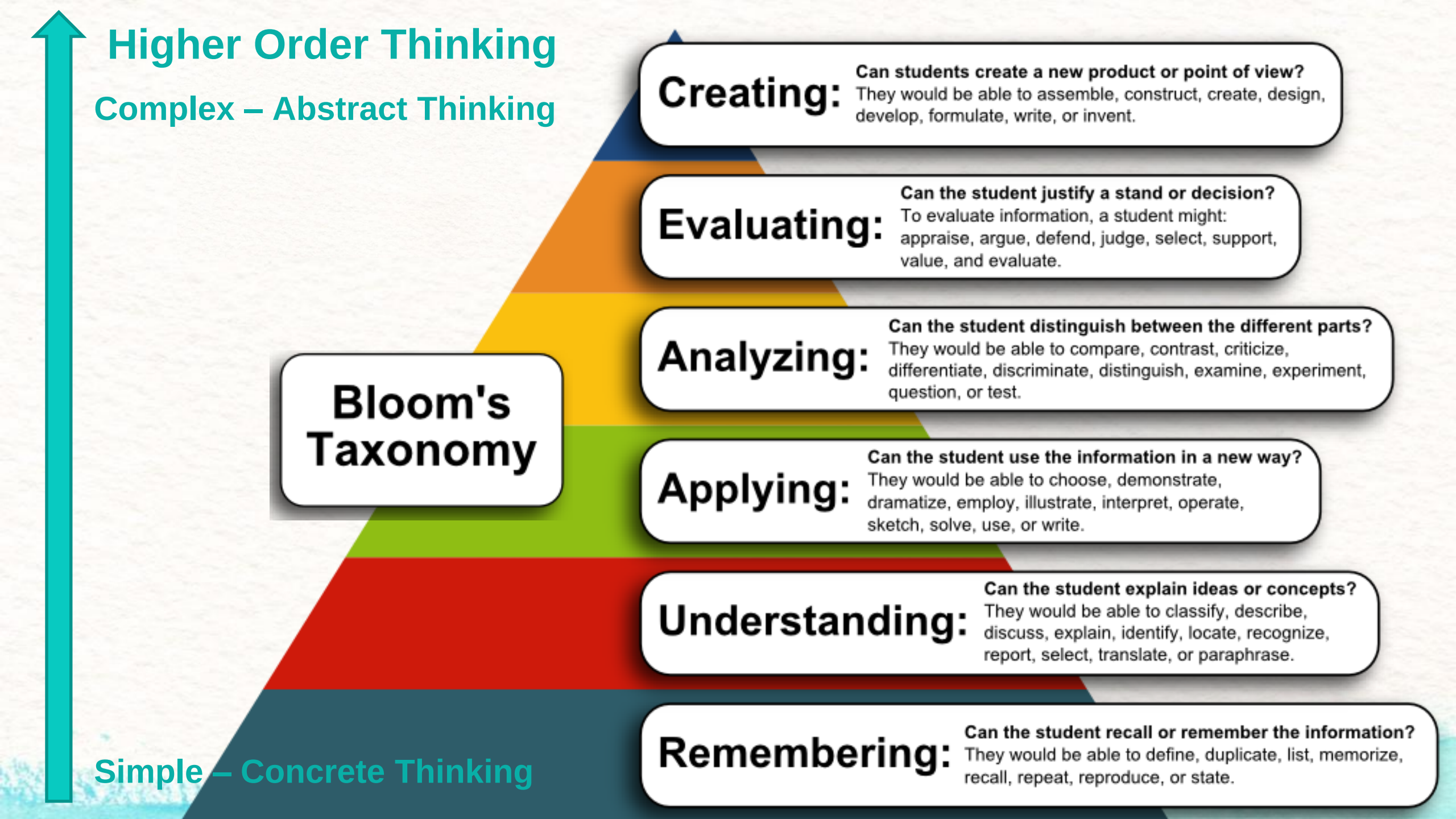
Hands-on & Minds-on

Performance-Based

Interdisciplinary

Problem-Solving

Reflection


Higher Order Thinking
Complex – Abstract Thinking
Bloom's Taxonomy
Creating:
Can students create a new product or point of view?
They would be able to assemble, construct, create, design, develop, formulate, write, or invent.
Evaluating:
Can the student justify a stand or decision?
To evaluate information, a student might: appraise, argue, defend, judge, select, support, value, and evaluate.
Analyzing:
Can the student distinguish between the different parts?
They would be able to compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, or test.
Applying:
Can the student use the information in a new way?
They would be able to choose, demonstrate, dramatize, employ, illustrate, interpret, operate, sketch, solve, use, or write.
Understanding:
Can the student explain ideas or concepts?
They would be able to classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, or paraphrase.
Remembering:
Can the student recall or remember the information?
They would be able to define, duplicate, list, memorize, recall, repeat, reproduce, or state.
Simple – Concrete Thinking

Digital Literacy and Computer Science (DLCS) Overview

Vision
Digital Literacy and Computer Science (DLCS) knowledge, reasoning, and skills are essential both to prepare students for personal and civic efficacy in the twenty-first century and to prepare and inspire a much larger and more diverse number of students to pursue the innovative and creative careers of the future. The abilities to effectively use and create technology to solve complex problems are the new and essential literacy skills of the twenty-first century.

Learning Progression

Grade Spans	*Digital Citizenship*	*Digital Literacy*	Strands	*Digital Literacy, Coding, Engineering Design*
K-2 3-5 6-8 9-12	**CAS: Computing and Society** a. Safety and Security b. Ethics and Laws c. Interpersonal and Societal Impact	**DTC: Digital Tools and Collaboration** a. Digital Tools b. Collaboration and Communication c. Research	**CS: Computing Systems** a. Computing Devices b. Human and Computer Partnerships c. Networks d. Services	**CT: Computational Thinking** a. Abstraction b. Algorithms c. Data d. Programming and Development e. Modeling and Simulation

Practices: Connecting, Creating, Abstracting, Analyzing, Communicating, Collaborating, Research

CAS: Computing and Society (Digital Citizenship)

Topics:

a. Safety and Security

b. Ethics and Laws

c. Interpersonal and Societal Impact

Grade Span	*Grade Span Integration*
Davis School: K-2	· Davis Library program · Reinforced by classroom teachers
Lane School: Grades 3-5	· Lane Library program · Reinforced by classroom teachers
JGMS: Grades 6-8	· JGMS health curriculum · JGMS Tech Ed and digital art classes · Reinforced by classroom teachers
High School: Grades 9-12	· High School health curriculum · High School Tech Ed and digital art classes · Reinforced by classroom teachers

Examples of Standards:

K-2

a. Use and care for electronic devices safely and appropriately.
b. Explain that digital artifacts have owners and the importance of giving owners/creators credit when using their work.
c. Identify and describe how people use many types of technologies in their daily work and personal lives.

Grades 3-5

a. Identify appropriate and inappropriate uses of technology and tell a responsible adult if you encounter any inappropriate content.
b. Describe the purpose of copyright and the possible consequences for inappropriate use of digital artifacts.
c. Use critical thinking to explain how access to technology helps empower individuals and groups.

Grades 6-8

a. Describe and use safe, appropriate, and responsible practices (netiquette) when posting to the Internet.
b. Explain possible consequences of violating intellectual property law and plagiarism.
c. Evaluate how media and technology can be used to distort, exaggerate, and misrepresent information.

Grades 9-12

a. Apply strategies for managing negative peer pressure and encouraging positive peer pressure.
b. Identify computer-related laws and analyze their impact on digital privacy, security, intellectual property, network access, contracts, and consequences of sexting and harassment.
c. Analyze the beneficial and harmful effects of computing innovations (i.e. social networking, delivery of news).

DTC: Digital Tools and Collaboration (Digital Literacy)

Topics:

a. Digital Tools

b. Collaboration and Communication

c. Research

Grade Span	*Grade Span Integration*
Davis School: K-2	· Integrated into curricula/classroom work · Davis Library program
Lane School: Grades 3-5	· Integrated into curricula/classroom work · Lane Library program
JGMS: Grades 6-8	· Integrated into curricula/classroom work · JGMS Tech Ed and digital art classes · JGMS Library Design Lab
High School: Grades 9-12	· Integrated into curricula/classroom work · High School Tech Ed and digital art classes · High School Library Inquiry Lab

Examples of Standards:

K-2

a. Create a simple digital artifact.
b. Use a variety of digital tools to present information to others.
c. Create an artifact individually and collaboratively that answers a research question, while clearly expressing thoughts and ideas.

Grades 3-5

a. Use digital tools to manipulate and publish multimedia artifacts.
b. Communicate key ideas and details individually or collaboratively in a way the informs, persuades, and/or entertains using digital tools and media-rich resources.
c. Evaluate digital sources for accuracy, relevancy, and appropriateness.

Grades 6-8

a. Integrate information from multiple file formats into a single artifact.
b. Demonstrate ability to communicate appropriately through various online tools (i.e. email, blogs, Google Docs)
c. Evaluate quality of digital sources for reliability, including currency, relevancy, authority, accuracy, and purpose of digital information.

Grades 9-12

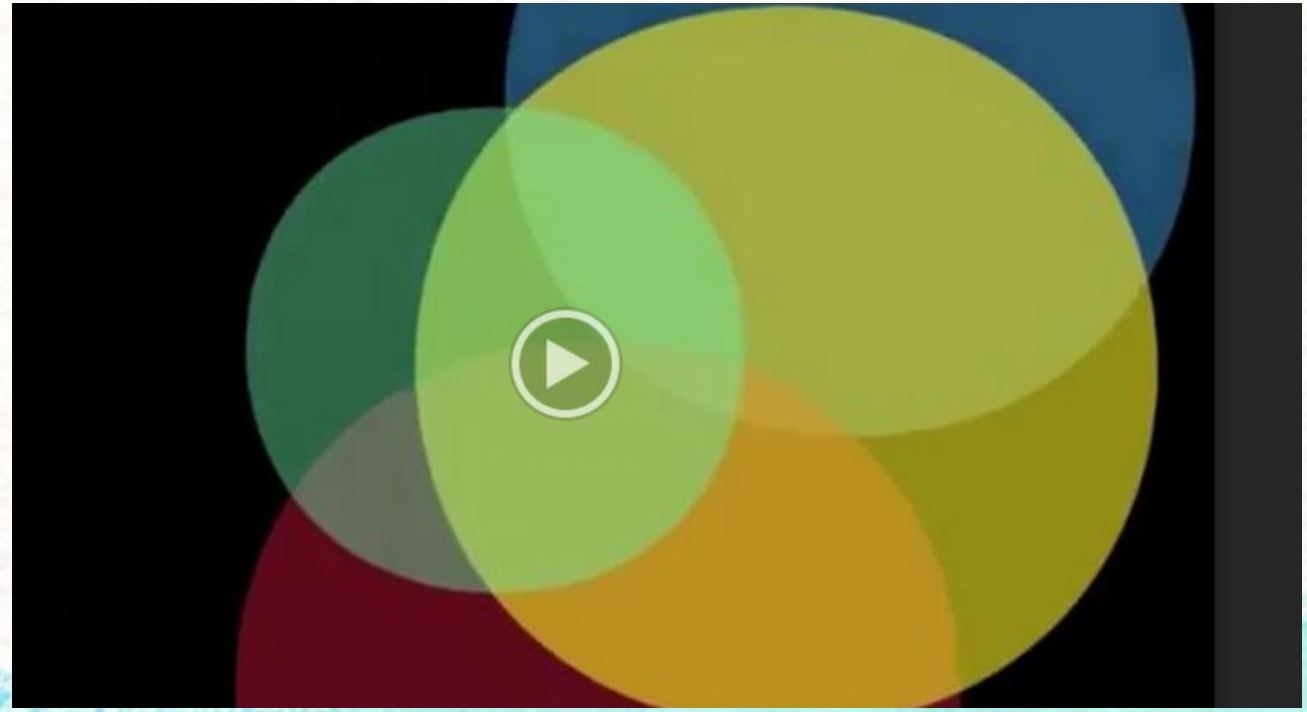
a. Use digital tools to design and develop a significant digital artifact (i.e. multipage website, simulation)
b. Communicate and publish key ideas and details to a variety of audiences using digital tools and media-rich resources.
c. Evaluate digital sources needed to solve a given problem (i.e. reliability, point of view, bias)

Digital Artifacts

How to be a professional at eating ice cream

By Isaak

Humanities EOY Animation



CS: Computing Systems (Digital Literacy, Engineering Design)

Topics:

a. Computing Devices

b. Human and Computer Partnerships

c. Networks

d. Services

Grade Span	*Grade Span Integration*
Davis School: K-2	· Some in the Davis Library program · Reinforced by some curricula/classroom content
Lane School: Grades 3-5	· Some in the Lane Library program · Reinforced by some curricula/classroom content
JGMS: Grades 6-8	· JGMS Tech Ed classes · Reinforced by some curricula content · Some in JGMS Library Design Lab
High School: Grades 9-12	· High School Tech Ed classes · Reinforced by some curricula content · Some in High School Library Inquiry Lab

Examples of Standards:

K-2

a. Operate a variety of computing systems (i.e. turn on, log off, use input/output devices, such as mouse, keyboard, touch screen; find, navigate, launch a program)

b. Recognize that different tools can solve the same problem (i.e. pen and paper, calculator, apps can all be used to solve simple mathematical problems).

c. Explain that networks link computers and devices so people can access and communicate information.

d. No standards for this grade span.

Grades 3-5

a. Describe the differences between hardware and software.

b. Explain how hardware and applications can enable everyone, including people with disabilities, to do things they could not do otherwise.

c. Recognize that there are many sources of and means for accessing information within a network (i.e. websites, email).

d. Identify common services (i.e. driving direction apps that access remote map services).

Grades 6-8

a. Identify and describe the function of the main internal parts of a basic computing device (i.e. hard drive, motherboard).

b. Explain why some problems can be solved more easily by computers based on a general understanding of types of tasks.

c. Model the components of a network, including devices, routers, switches, cables and wires.

d. Identify capabilities of devices that are enabled through services (i.e. wearable device that stores fitness date in the cloud).

Grades 9-12

a. Explain and demonstrate how specialized computing devices can be used for problem solving, decision making and creativity in all subject areas.

b. Identify a problem that cannot be solved by humans or machines along and design a solution for it by decomposing the tasks into sub-problems suited for a human or machine to accomplish (i.e. forecasting weather, piloting airplanes).

c. Examine the issues that impact network functionality (i.e. bandwidth, firewalls).

d. Compare the value of using an existing service versus building the equivalent functionality (i.e. using a reference search engine versus creating a database of references for a project).

CT: Computational Thinking (Digital Literacy, Coding, Engineering Design)

Topics:

a. Abstraction
b. Algorithms
c. Data
d. Programming and Development
e. Modeling and Simulation

Grade Span	*Grade Span Integration*
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High School: Grades 9-12	· High School Tech Ed classes · Reinforced by some curricula/classroom work · High School Library Inquiry Lab

Examples of Standards:

K-2

a. List the attributes of a common object (i.e. cars: color, type, size).
b. Define an algorithm as a sequence of defined steps and present the algorithm in a visual medium (i.e. pictures, manipulative materials).
c. Propose a solution to a problem or question based on analysis of information.
d. Create a simple program using visual instructions or tools that do not require a textual programming language (i.e. "unplugged" activities).
e. Describe how models represent a real-life system (i.e. globe, weather map).

Grades 3-5

a. Use numbers or letters to represent information in another form (i.e. abbreviations).
b. Use logical reasoning to predict outcomes of an algorithm and create an algorithm to solve a problem (i.e. move an object through a maze).
c. Collect and manipulate data to answer a question using a variety of computer methods (i.e. sorting, totaling) and tools (i.e. spreadsheet) to collect, organize, graph, and analyze data.
d. Create, test and modify a program in a graphical environment (i.e. block-based visual programming).
e. Create a simple model of a system (i.e. water cycle, solar system) and explain what the model shows and does not show.

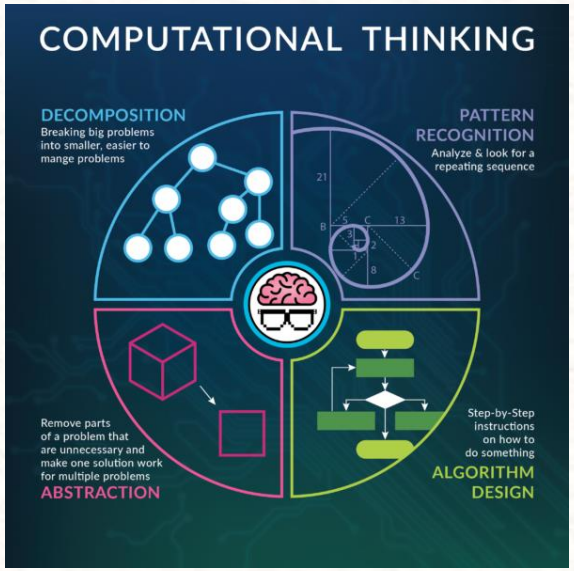
Grades 6-8

a. Use decomposition to define and apply a hierarchical classification scheme to a complex system (i.e. human body, animal classification).
b. Recognize that more than one algorithm can solve a given problem.
c. Create, modify, and use a database to analyze data and propose solutions for a task/problem.
d. Implement problem solutions using a programming language including the following: looping behavior, conditional statements, variables, and functions.
e. Use and modify simulations to analyze and illustrate a concept in depth (i.e. light rays, genetic variation).

Grades 9-12

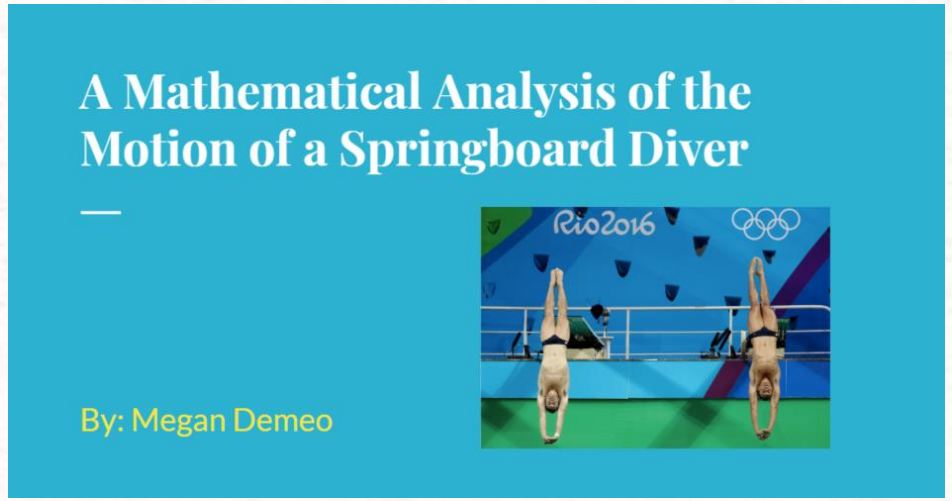
a. Discuss and give an example of the value of generalizing and decomposing aspects of a problem in order to solve it more effectively.
b. Describe that there are ways to characterize how well algorithms perform and that two algorithms can perform differently for the same task.
c. Create, evaluate and revise data visualization for communication and knowledge.
d. Use appropriate looping and conditional structures in a programs (i.e. IF-THEN, IF-THEN-ELSE).
e. Create models and simulations to help formulate, test and refine hypotheses.

Computational Thinking



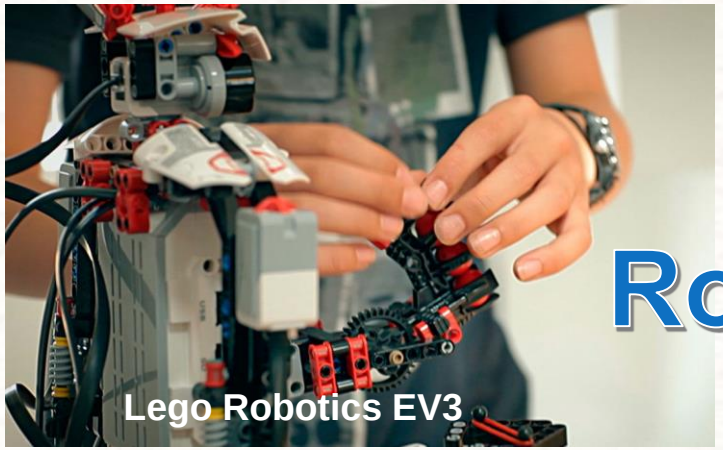
Computational thinking involves solving problems, designing systems, and understanding human behavior, by drawing on the concepts fundamental to computer science, including using abstraction and decomposition when attacking complex tasks or designing complex systems.

Data Analysis

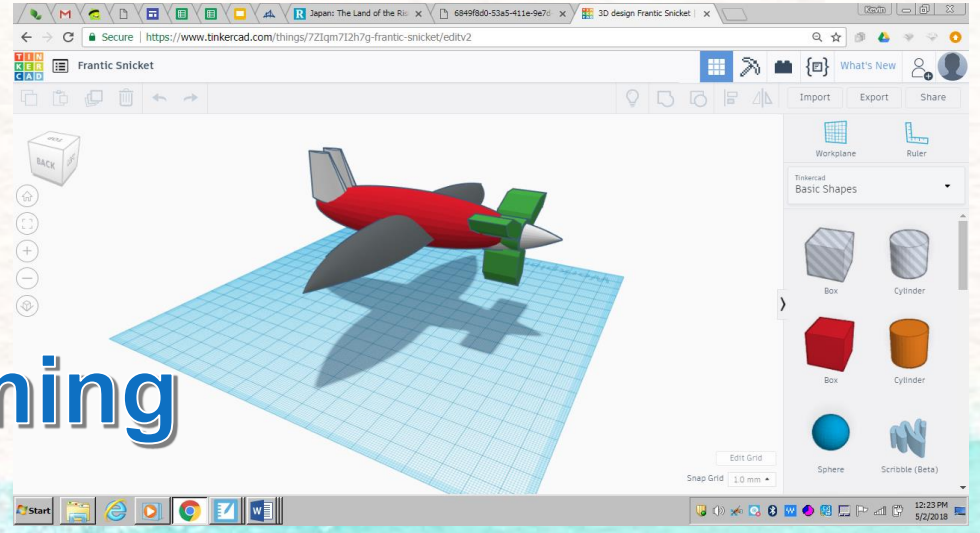


Code.org

Robotics



3D Design



Block-based programming

Focus on Digital Tools and Collaboration and Computational Thinking

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Focus on Digital Tools and Collaboration and Computational Thinking

- Libraries as laboratories of change
- Library programs to promote digital literacy skills
- K-5 library programs incorporate a Makerspace model
- Added Makerspace components to JGMS and High School Libraries
  - JGMS Design Lab
  - High School Inquiry Lab

Makerspace

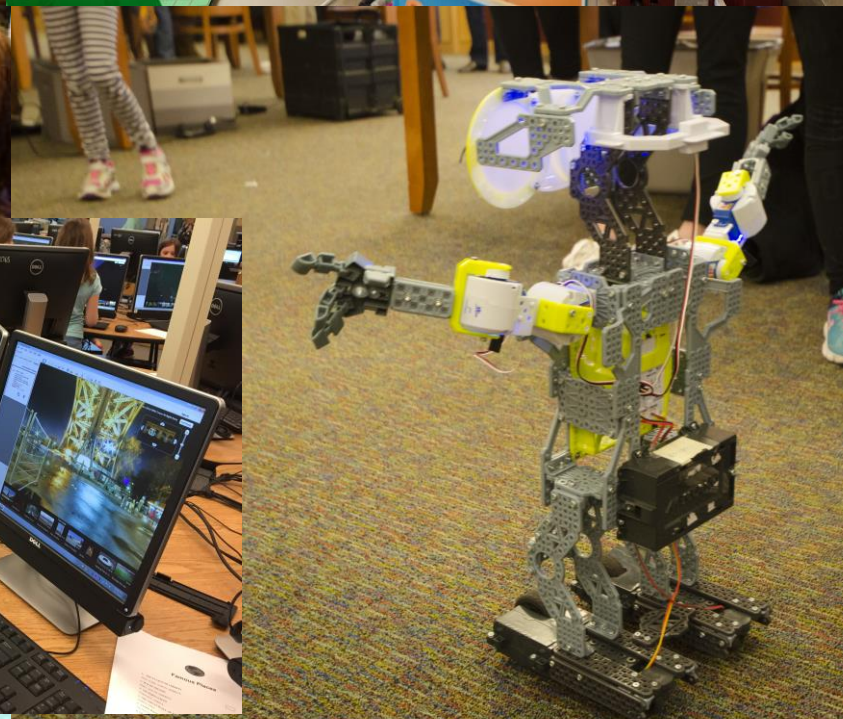
"Educational makerspaces are built upon the foundation of constructionism, which is the application of constructivist learning principles to a hands-on learning environment through building things. Maker education views learning as a highly personal endeavor requiring the student, rather than the teacher, to initiate the learning process. In this philosophy of learning, teachers act as guides for inquiry-based approaches to the development of knowledge and thinking processes."

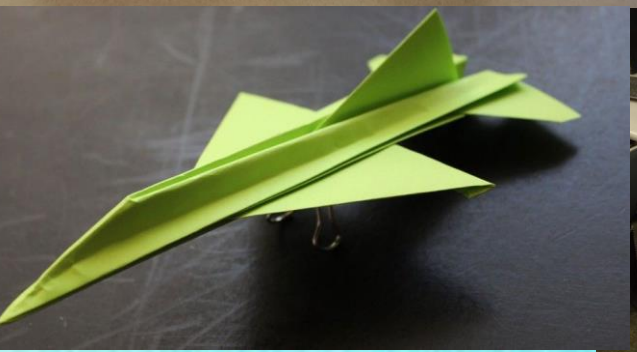
The Journal for School Library Professionals

Benefits of STEAM Learning

- Inspire student-centered learning
- Promote creativity
- Foster collaboration
- Invite project-based learning
- Support STEAM
- Encourages inquiry-based learning
- Foster hands-on and minds-on learning
- Support academic risk-taking
- Celebrate unique solutions
- Engage students
- Invite curiosity
- Inspire wonder
- Promote computational thinking
- Encourages playfulness
- Celebrate unique solutions
- Promote perseverance

K-5 Library Programs: STEAM Learning





JGMS Design Lab and High School Inquiry Lab: STEAM Learning

K-5 Library Programs to Better Support Classroom Curricula

- Davis School - Grade level integrated units of study
- Met with each grade level team
- Provided grade level PD on available technologies to support integrated units of study

- Grade One Essential Questions - **How do people solve problems?**
  - How do individuals effectively work together?
  - How do scientists use tools to help them understand our world?
  - What patterns can we observe in nature that help us to predict how things will react in the future?
  - How do seasonal changes affect the environment and living things?
  - How can following the engineering design process assist engineers in solving problems?
  - What information can be gathered from maps and globes?
  - How do you represent space on a map?

- Activities and Technologies
  - Neighborhood Map Machine
  - Code.org unplugged and plugged in
  - Google Earth

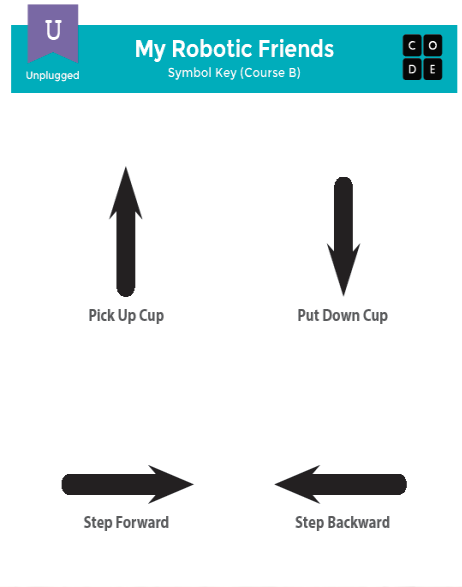
- Osmo
- Minecraft EDU
- SeeSaw reflection

- Reflection after each activity – **How could *code.org* be implemented into a first grade classroom?**
- Reflection in SeeSaw - **How do people solve problems?**
- Instructional Technology Specialist outreach and support

Code.org *Programming* Unplugged: My Robotic Friends

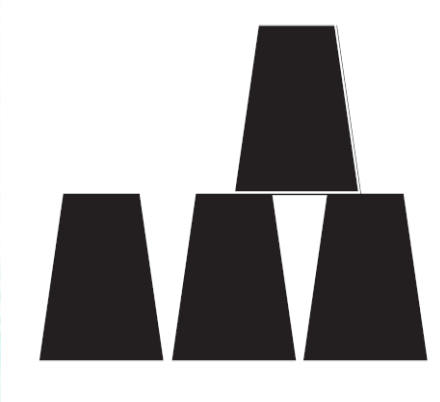
How do people solve problems?

The goal is to use a set of symbols to instruct a "robot" to stack cups in different patterns.



As you work, consider these questions:

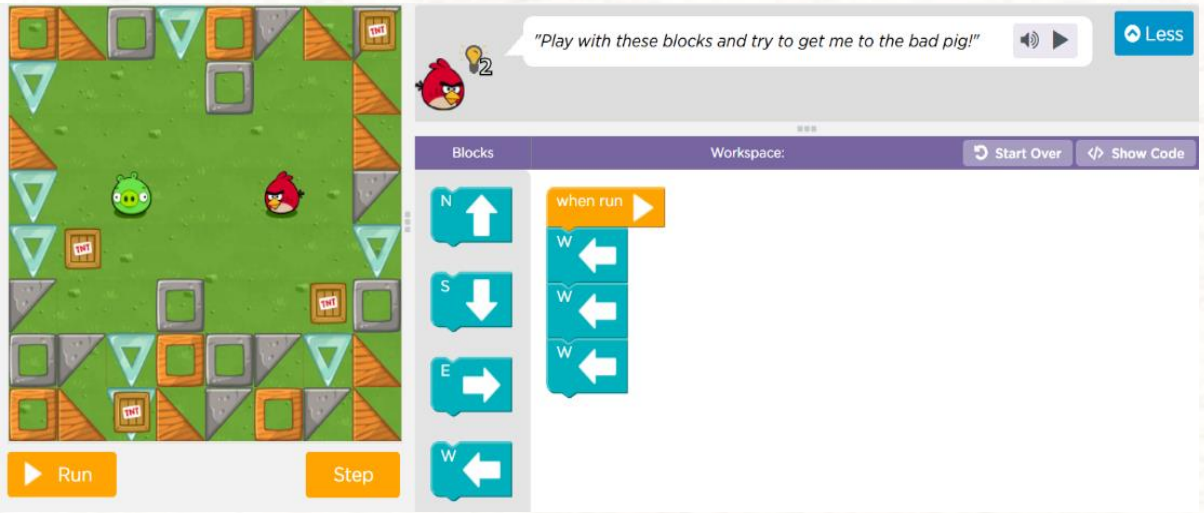
- How can you describe your ***program*** in words?
  - Can you describe your ***program*** using the words up, down, right and left?
  - Can you describe your ***program*** using the words north, south, east and west?
- What skills are you using to find solutions to problems encountered in this activity?
- What was the most difficult part of coming up with the instructions?
- Did anyone find a ***bug*** in your instructions once your robot was following them?
  - What was the ***bug***?
  - Why do you think you didn't notice it when you were writing the ***program***?
- When you were the robot, what was the hardest part of following your partner's instructions?
- How is this activity related to mapping?
- How can students benefit from this type of learning?

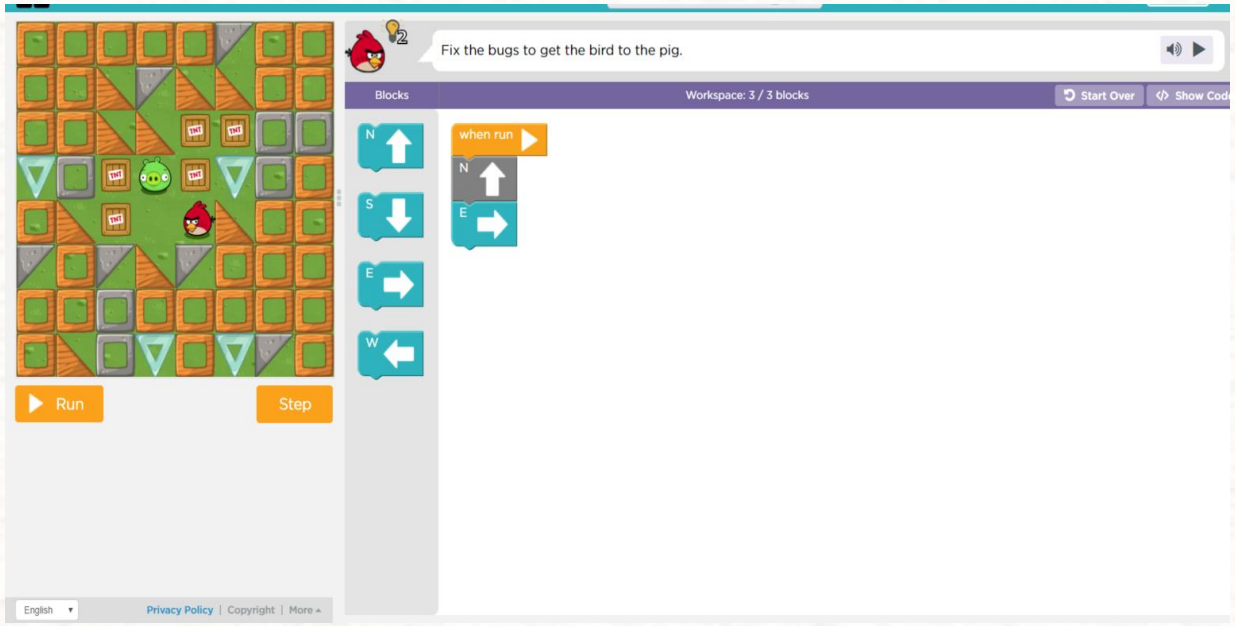


Code.org *Programming* Plugged-In: Maze

How do people solve problems?

The goal is to get the angry bird to the pig.



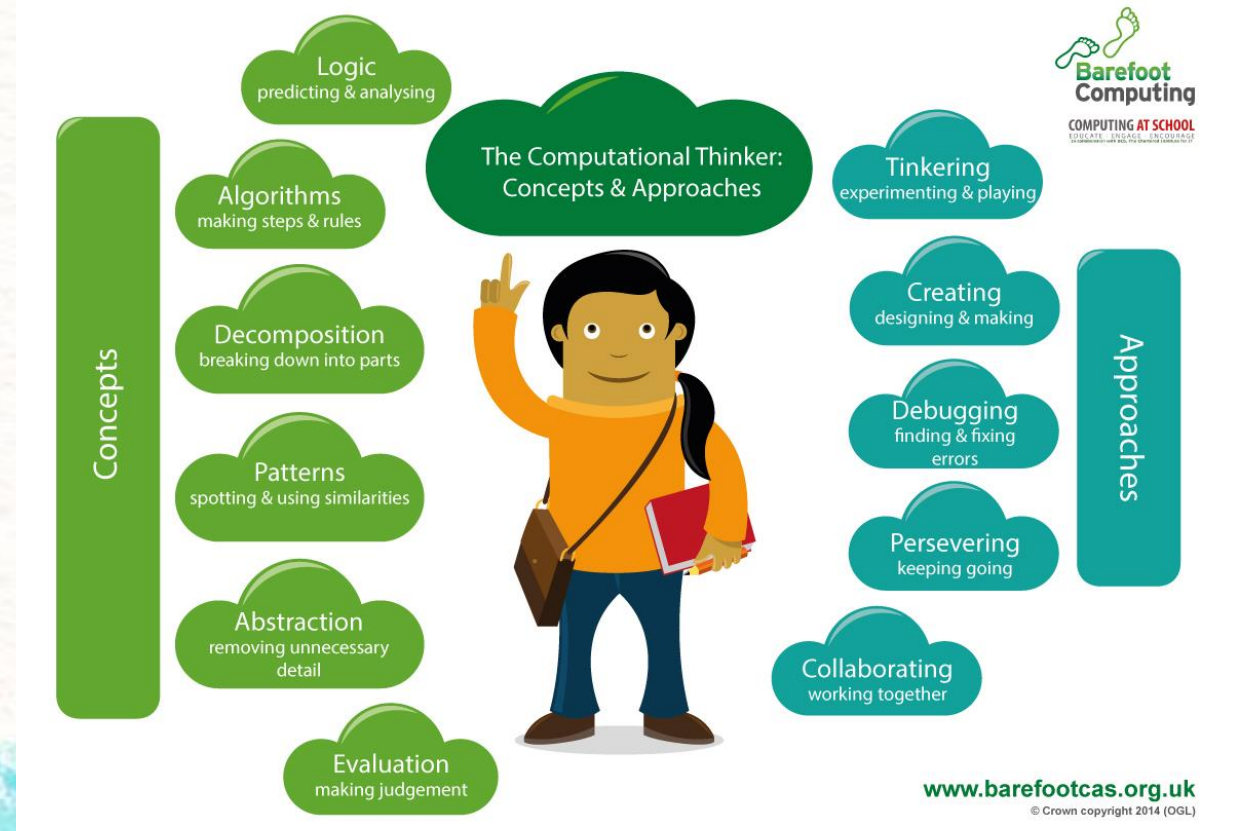


As you work, consider these questions:

- Is there more than one way to get the angry bird to the pig?
- Can you find the most efficient way to get the angry bird to the pig?
- Can you describe your ***program*** using the words north, south, east and west?
- How can you ***debug*** your ***program*** to solve problems you encounter?
- What skills are you using to find solutions to problems encountered in this activity?
- How is this activity related to mapping?
- How do you represent space on a map?
- How can students benefit from this type of learning?

Coding Vocabulary: *How do these definitions/ideas relate to other content areas?*

Algorithm - A precise sequence of instructions for processes that can be executed by a computer.
Program - An ***algorithm*** that has been coded into something that can be run by a machine.
Bug - Part of a ***program*** that does not work correctly.
Debugging - Finding and fixing problems in an ***algorithm*** or ***program***.
Repeat - Do something again.
Loop - The action of doing something over and over again.
Event - An action that causes something to happen.



[Code.org Course B – Grade 1]

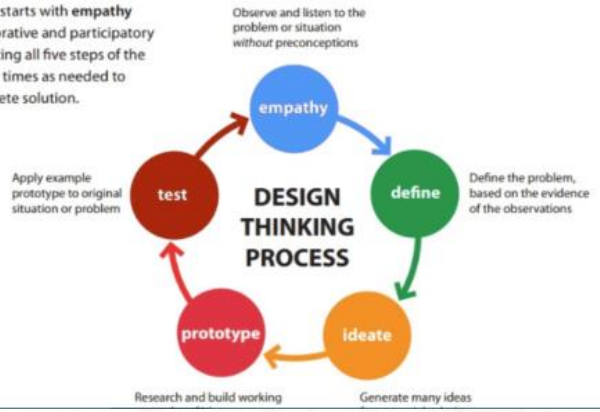
Lesson Name	Progress
1. Debugging: Unspotted Bugs	1
2. Persistence: Stevie and the Bi...	1
3. Real-life Algorithms: Plant a S...	Unplugged Activity
4. Sequencing with Drag and Dr...	1 2 3 4 5 6 7 8 9 10 11 12 13
5. Digital Citizenship: My Digital...	Unplugged Activity
6. Programming: My Robotic Fri...	Unplugged Activity
7. Programming in Maze	1 2 3 4 5 6 7 8 9 10 11 12 13 14
8. Programming with Rey and B...	1 2 3 4 5 6 7 8 9 10 11
9. Loops: My Loopy Robotic Fri...	Unplugged Activity
10. Loops in Collector	1 2 3 4 5 6 7 8 9 10 11 12 13
11. Loops in Artist	1 2 3 4 5 6 7 8 9 10 11 12
12. Events: The Big Event	Unplugged Activity
13. Events in Play Lab	1 2 3 4 5 6 7 8 9

Home Tools Challenges

JGMS Design Lab

The JGMS Design Lab strives to develop opportunities that inspire our community of learners to utilize diverse approaches in applying 21st century skills and creativity. The Design Lab is a fun, relaxed, hands-on place of learning that fosters students' creativity, courage and curiosity through open-ended academic challenges in the fields of STEAM (science, technology, engineering, art and mathematics). Our students learn patience, flexibility, persistence, respect for others and their ideas, and the collaborative problem solving process.

Design thinking starts with **empathy** and uses collaborative and participatory methods, repeating all five steps of the process as many times as needed to achieve a complete solution.



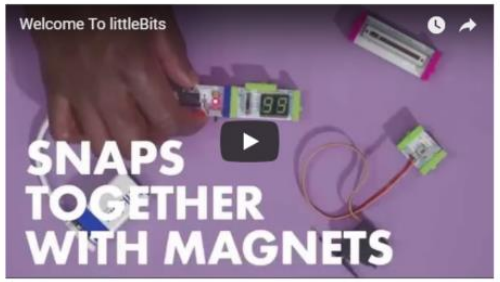
When asking humans to solve a problem, the first step is to have empathy for the person or group with the problem. Developing empathy involves, trying to see things from another person's point of view, validating other's perspectives, examining your own attitude, listening and asking questions. All of this is a key first step in the design process. Developing empathy for others is a key element of our Design Lab.

Meet during Directed Study – 55 minute block. 3 different activities each week – science, technology and art. Students can sign up for activities on a weekly basis. Sign up sheet posted outside of cafeteria. Mixture of boys and girls. Mostly 6th graders.

Tools Available in the Design Lab

Keva Planks are 1/4" x 3/4" x 4 1/2" planks of wood. Their imagination is the only thing that limits what they can create with these.

Legos are one tool used by engineers when they are designing new ideas.



K'Nex are various size and shape pieces that fit together. They are used to create design models.

Without BEF Grants we wouldn't have as much as we do. Thank you !

Paper circuitry is an option we are adding to the the space this year. We will also have a soldering station.

This kit is just the starting point for kids. The kits offer ideas which is good for some kids, but we hope that's not where they will stop. The projects are designed to kickstart their ideas and then the kids take it from there.

While coding and 21st century skills are necessary, Spheros go beyond code by incorporating robotics and technology with collaborative STEAM activities, nurturing students' imaginations.

Solidworks is a 3D design program that is used in the Tech Ed program at JGMS. Thanks to the Science department, we have this program in the Design Lab/Library so students can continue what they have learned in Tech Ed in the Design Lab space.

Challenges

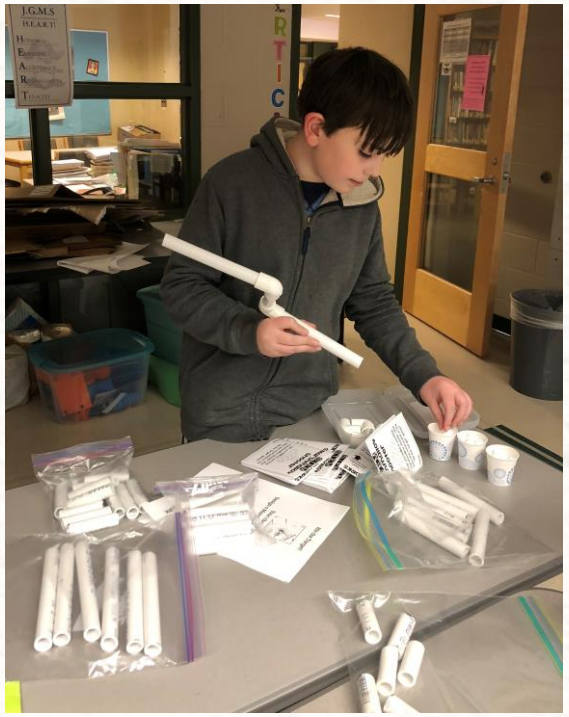
The Design Lab is open 6th period every Day 6 in the cycle. Teachers are also welcome to bring their classes to the lab throughout the rest of the week.

This week student's were learning to block code with the Spheros. This activity was designed by Mr. Mehler.

Another option this week was to design a Halloween-themed maze. The overarching goal for this activity was for kids to be collaborating with one another and creating a design they both agreed upon.

Students were given apples, paint and tracing paper. They are creating wind-chime like sculptures.

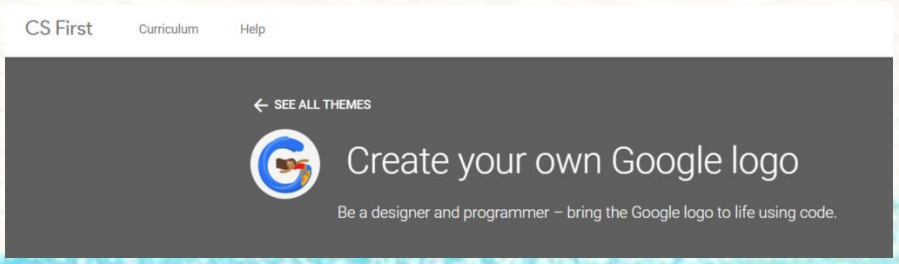
Students were given Makey Makey kits, along with conductive materials to see what they could design. This is a banana piano.



Design Lab – Sample Challenges

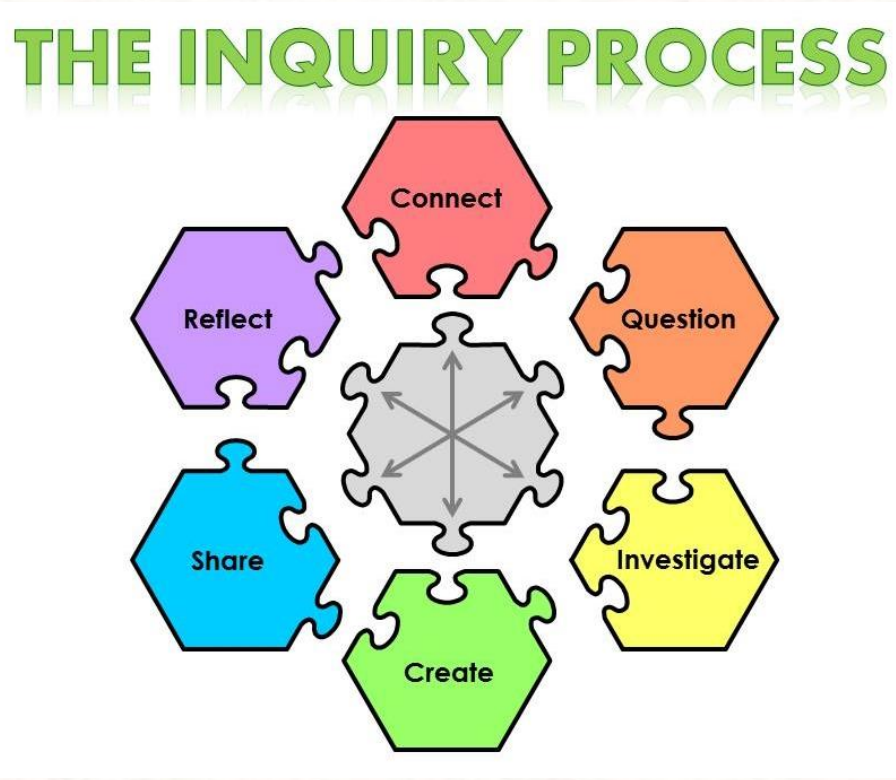
Week	Science	Technology	Art
09/12	Pencil bridges	Littlebits	Stained glass windows with tissue paper
09/20	Pencil Towers	Makey Makey *needs flash http://makeymakey.com/apps/#goapps	Stained glass Apple Printing
9/28	Pumpkin Elevators	Google CS First - Build a video game	Hedgehog Corner bookmark
10/6			
10/17	Haunted House Maze	Spheros with Mr. Mehler	Stained glass Apple Printing
10/25	Pumpkin Launchers	Cubelets Keva Planks	Day of the Dead Felt Pillow or Felt Sugarskull Template
11/2			
11/14	K'Nex design challenge	Spheros	Hedgehog Corner bookmark

Wind Powered Boat Challenge



Library Programs to Better Support Classroom Curricula

- **Digital Literacy: Research Skills**
  - –DESE's Digital Literacy and ELA Frameworks – combined standards - more condensed and cohesive
  - – Turn K-8 standards into student friendly "I can" statements
    - Lane Example - Grade 5

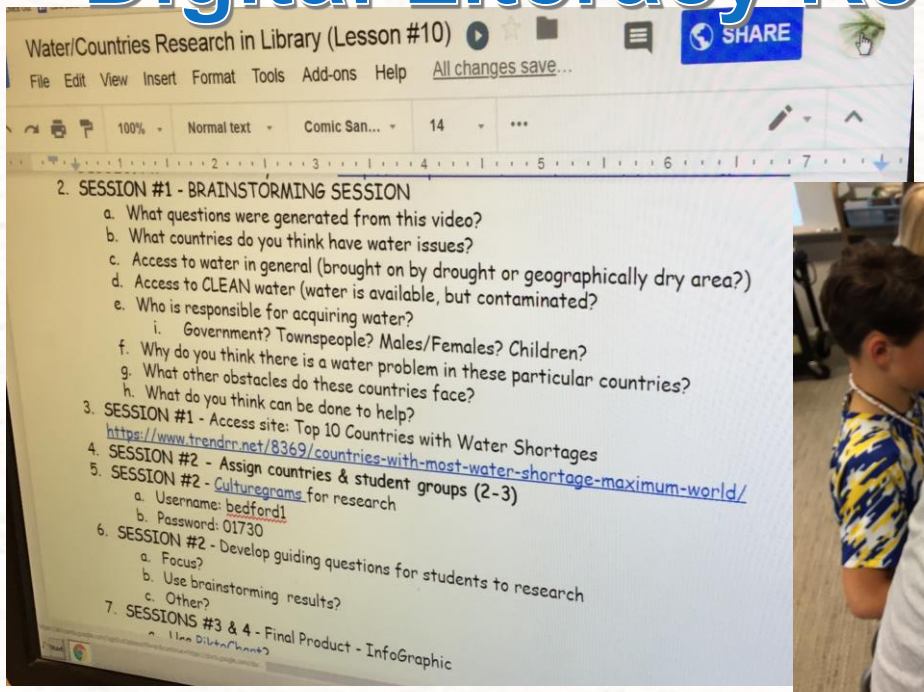


Use several sources to conduct short research inquiries using 2 or more keywords or advanced search techniques to refine digital searches to investigate different aspects of a topic and create an artifact that shows understanding.	Recall or gather relevant information from experiences or from print and digital sources; evaluate the accuracy and appropriateness of sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.	Draw evidence from literary or informational texts to support written analysis, reflection, & research; cite text-based sources using a school adopted format and basic source information for non-text-based sources.	· I can research different parts of a topic to answer a question. · I can use more than one relevant and accurate resource to answer my question. · I can use several keywords and other search techniques to find information to answer my question. · I can choose the best information to answer my question and support my thinking. · I can explain how the information I found answers my question. · I can take notes on and write sentences and paragraphs about the information I found. · I can put the information I found into my own words. · I can create a visual, write an explanation or present the answer to my question. · I can give credit to the authors and creators of the resources I used to answer my question.

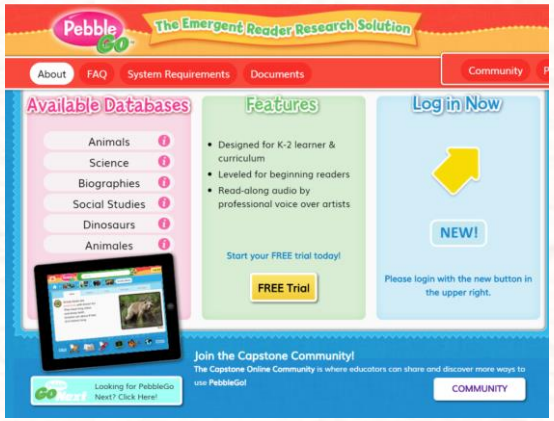
  - – Present work to Lane Leadership Teams and then grade level teams
  - – Grade level integration of skills
  - – Provided professional development

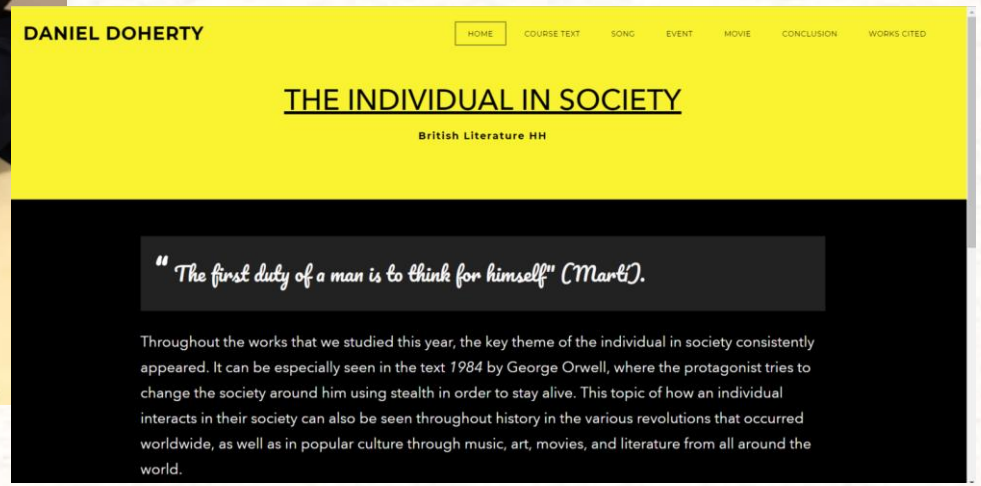
Library Programs to Better Support Classroom Curricula

Digital Literacy Research Skills



Resources





Professional Development

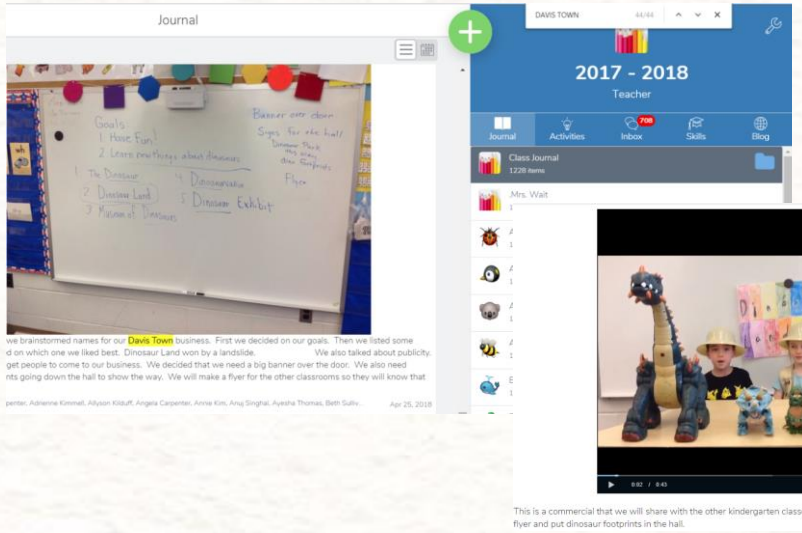
Team Teaching

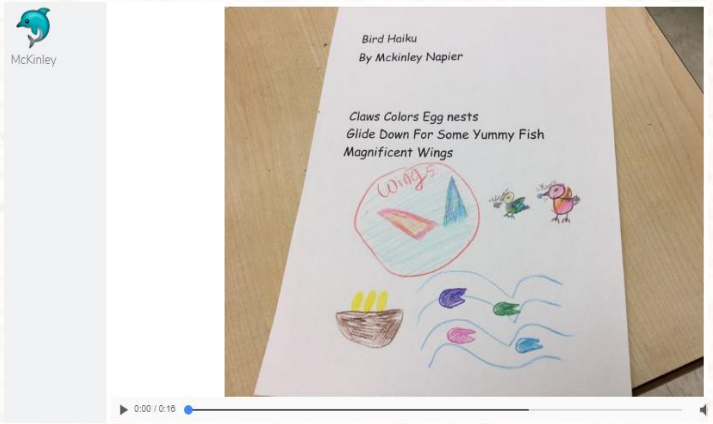
Student Portfolios: Self-Reflective Learners

- Piloting the use of digital portfolios for students to reflect on their learning.
- Visited Weston Public Schools and the Francis Parker Charter School in Devens.
- Use SeeSaw at Davis
  - kindergarten cohort
  - some interest from grade one and grade two

- Use Google Sites at Lane, JGMS and High School
  - grade 5 cohort
  - all students grades 3-5 that are not part of the cohort created/will be creating a Google site in library
  - all 6th graders created a Google site in Tech Ed
  - some 8th grade digital art classes
  - some English and world language classes at the High School
- Need for professional development – possible summer course

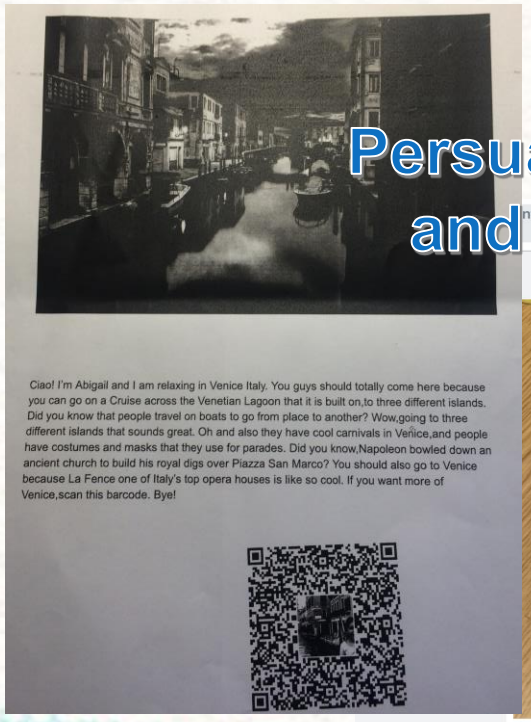
Curation of Work

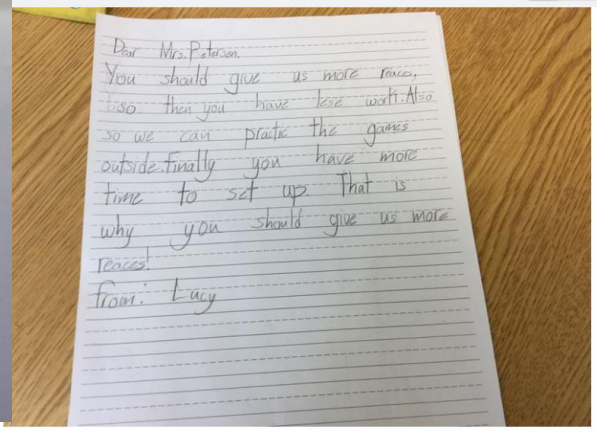




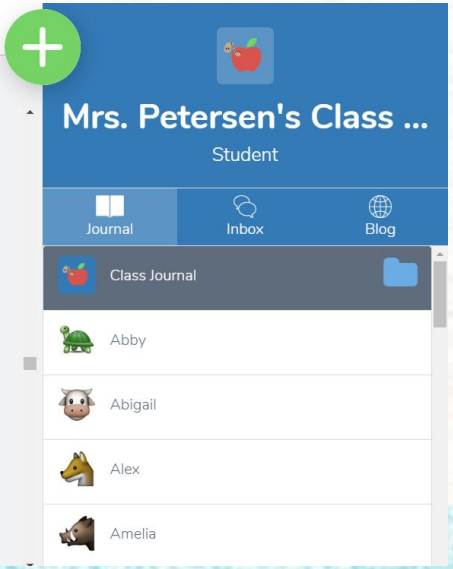
Demonstrate Knowledge

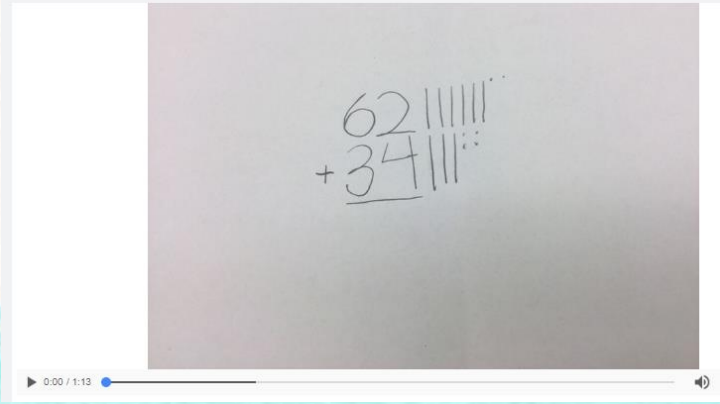
Persuasive Writing and Arguments



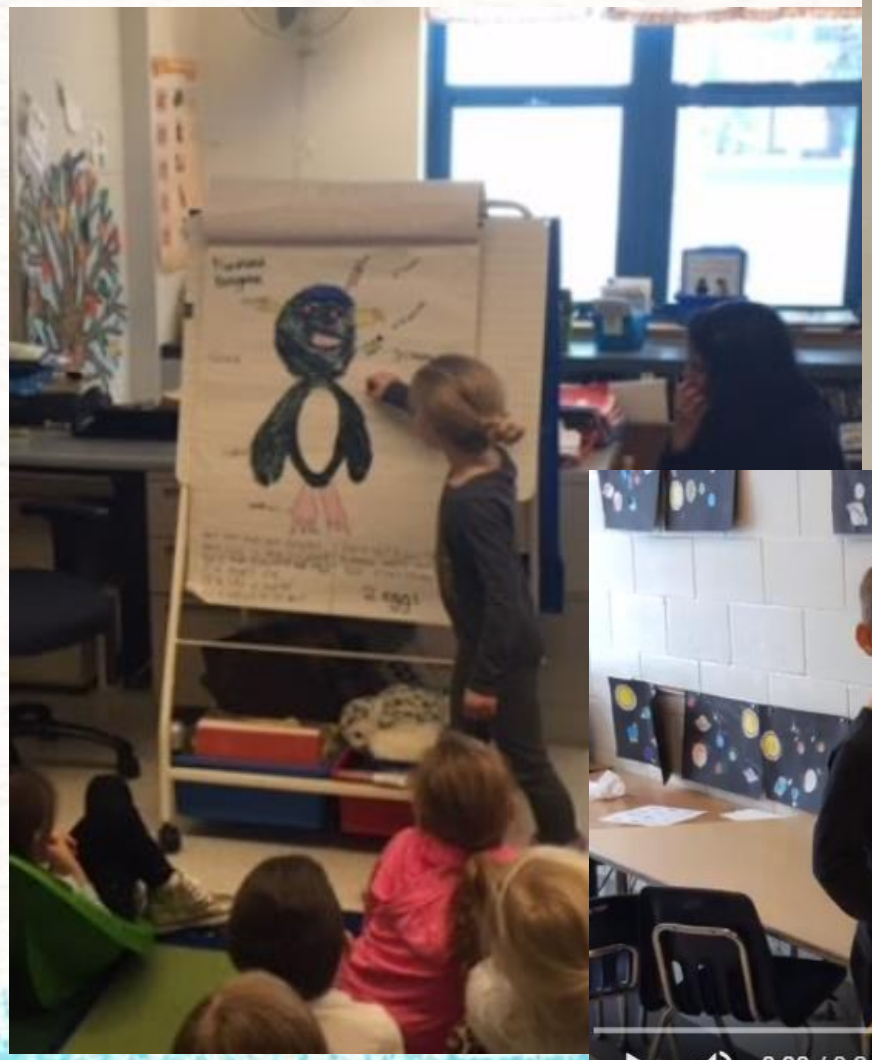


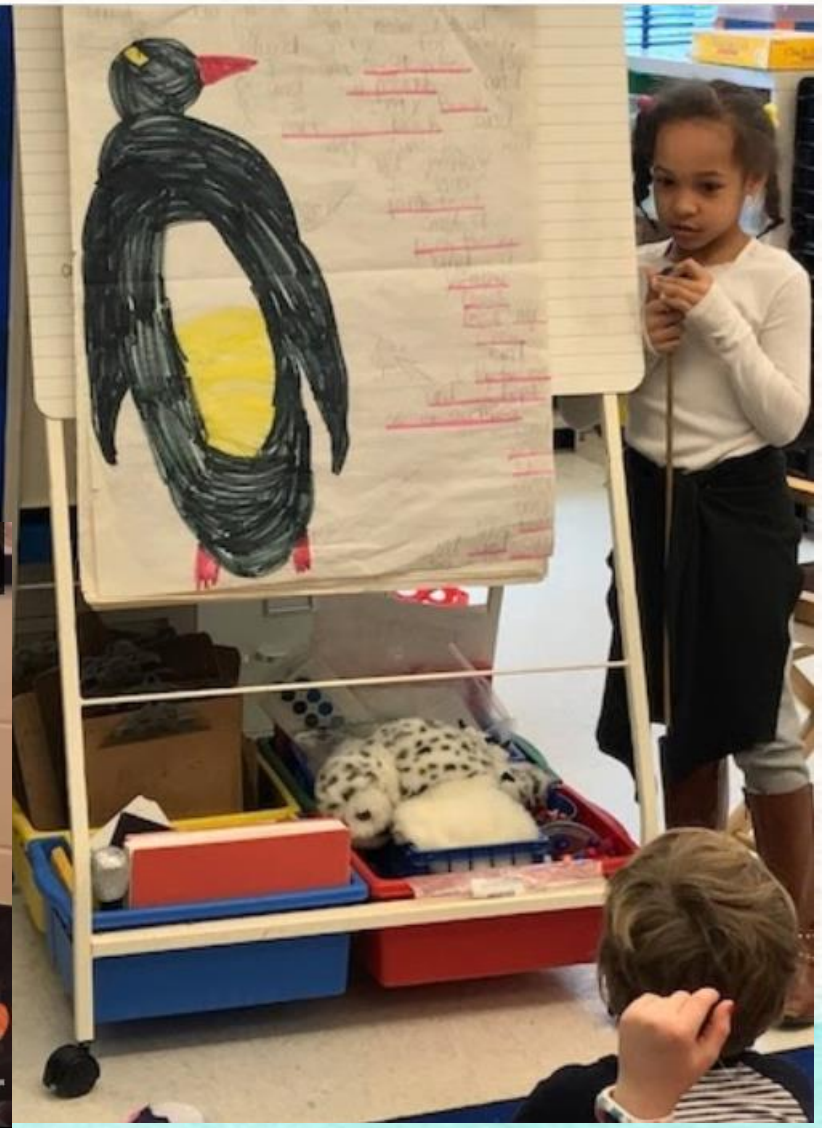
Apr 30, 2018

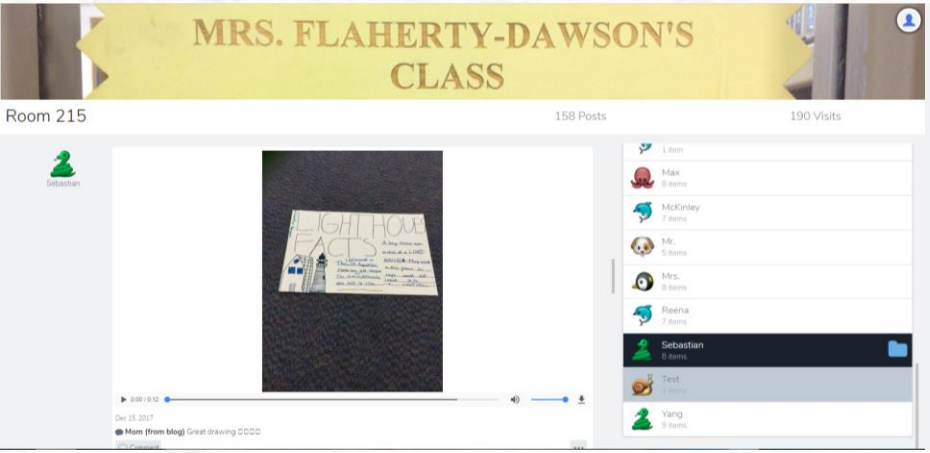




Grade 1: Finally, our class finished their research projects on the remaining 11 penguin species that we did not learn about as part of our math unit. Their task was to choose a penguin, gather information on that penguin, and then figure out how they were going to share what they learned with the rest of the class. We had some poems, a play, and many video presentations. Below you will find some examples of what the kids put together. They really worked hard and collaborated with each other nicely!







Reflective Learners

REFLECTION

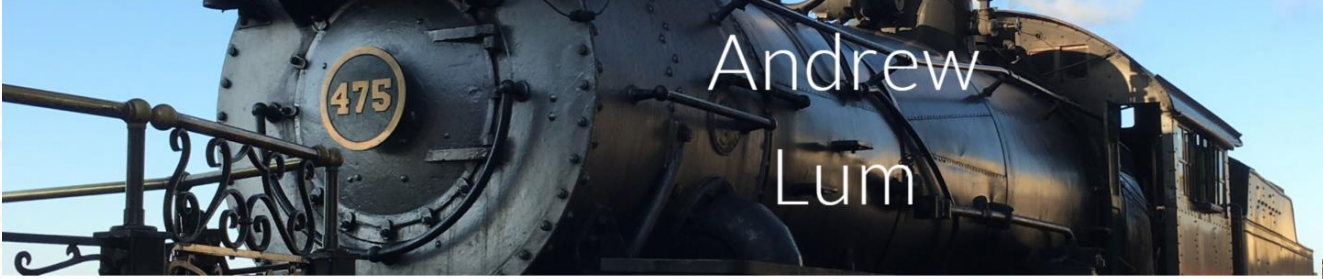
I like when I had to do Molly's Pilgrim writing because I would like to be better at typing and I have to type a lot so it improves my typing. Another reason is it was my first time writing a essay so know I know how to write I essay. Plus it helped me have more growth then I had when I stared writing & reading. What i think about the book is it was a perfect book for me to write a essay about and it was a great book to read. I wrote about this document because first I had to do it second because it helped me learn more stuff in the meaning of writing and I thought about it long and hard it grab my attention. Also in the process of writing the book I had to write about it for example Molly felt sad . Molly felt sad because . . . Then I had to underline words in these certain color depending what the word/sentence was about. Oh and I forgot to mention but before we starting writing on paper we had to plan. That was not all I did to write Molly's Pilgrim there is more it was a long process.But I think it is worth the wait it was like a dream from doing the essay. I check with the teacher again than again than again. It was very interesting it was a good amount of easy and hard so it felt relaxing. I think every ones essay on Molly Pilgrim would be interesting and awesome I really want to read it but I was afraid that I'll get in trouble from not doing my work. I think of writing one of my favorite subject from that essay it change my thinking about reading it made me smarter and reading & writing my third or second favorite subject. That book also gave me good or bad feelings. It gave me a feeling of books it made me like books more. Since I liked books more I read long, short, and two big books I read a lot about books hoping it will gave me a feeling of Molly's Pilgrim to and it did. Also we read the book Molly's Pilgrim more than once that's what good readers do right? So reading that book also helped me with that. It helped me learn so much on that one book it helped me experince that books are more and have more meaning it helped me like I said have more growth of writing & reading. I also when I was still doing the essay at night I thought and dreamed what Molly was feeling a reasons why. I loved every part of the essay on Molly's Pilgrim. After I was done with the essay I had a feeling did I learn anything from it? What do you know the next day I thought that night " I DID LEARN SOMETHING" I said in my head. That's why Molly's Pilgrim helped me experince so much that is my reasons I liked doing the essay on Molly's Pilgrim! That's why I liked doing the essay on Molly's Pilgrim.

Molly's Pilgrim

January 8, 2018

In the book Molly's Pilgrim Molly changes from the beginning to the end of the book. First Molly feels worried. First she feels worried because near the end Elizabeth said Miss.Stickley doesn't like people who don't do their work. Another reason she's worried is because her mom said I'll go talk to your teacher. Molly said no because she knew people will laugh at her mom if she came there. Molly also feels embarrassed. She feels embarrassed when she couldn't say the title Thanksgiving. Another feeling is that Molly feels excluded. She feels excluded because she feels uncomfortable that her classmates parents get to talk to the teacher except her mother. Another reason is that Elizabeth gave all the girls in her class peppermint sticks except her. In the beginning Molly's life is miserable.

Molly felt differently at the end of the story. Molly feels relieved. She feels relieved because when she brought the wrong doll she didn't get in trouble like Elizabeth said! Also she feels relieved when Miss. Stickley put Elizabeth in here place thank god for that. Another reason is she finally got respect probably because she was a pilgrim or that Miss.Stickley put her doll on here desk. Molly feels proud. My first reason is when her classmates laughed at her for bringing the wrong doll Miss.Stickley stood up for Molly. Also because her mother is a Modern Pilgrim. Molly feels included. Molly feels included when she didn't get laughed at. Also when her mom got invited to school cuz the teacher wanted to meet her. Last but not least she felt included when Emma the girl sitting right next to her said your doll is the most beautifulest doll of the ALL! It takes all kinds of pilgrims to make a Thanksgiving! It is true I think they said` in the Bible about the Jewish harvest holiday of Tabernacles and in the book Molly said I knew that holiday they call it Sukkoth! Finally at the end her life changes from VERY bad to VERY AMAZING!!!!!!!!!!!!



Hi, My name is Andrew Lum. Welcome to my student website.

This is a website about my experience in John Glenn Middle School. I hope you enjoy this website and find it helpful.

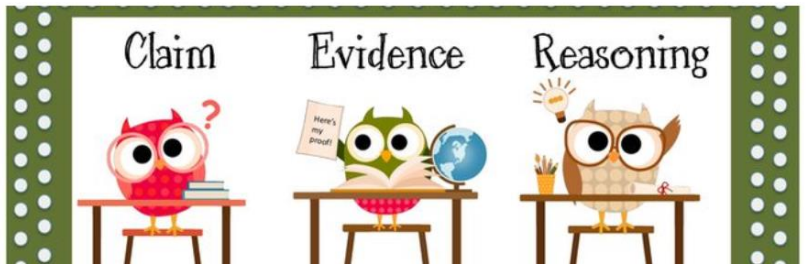
To find information on my Sixth Grade experience, click on the "6th Grade" page. From there, you can access all the 6th grade subpages, which covers all you need to know about the core subjects. *Note: Some pages may not be finished.*

There are no Seventh or Eighth Grade pages at the moment.

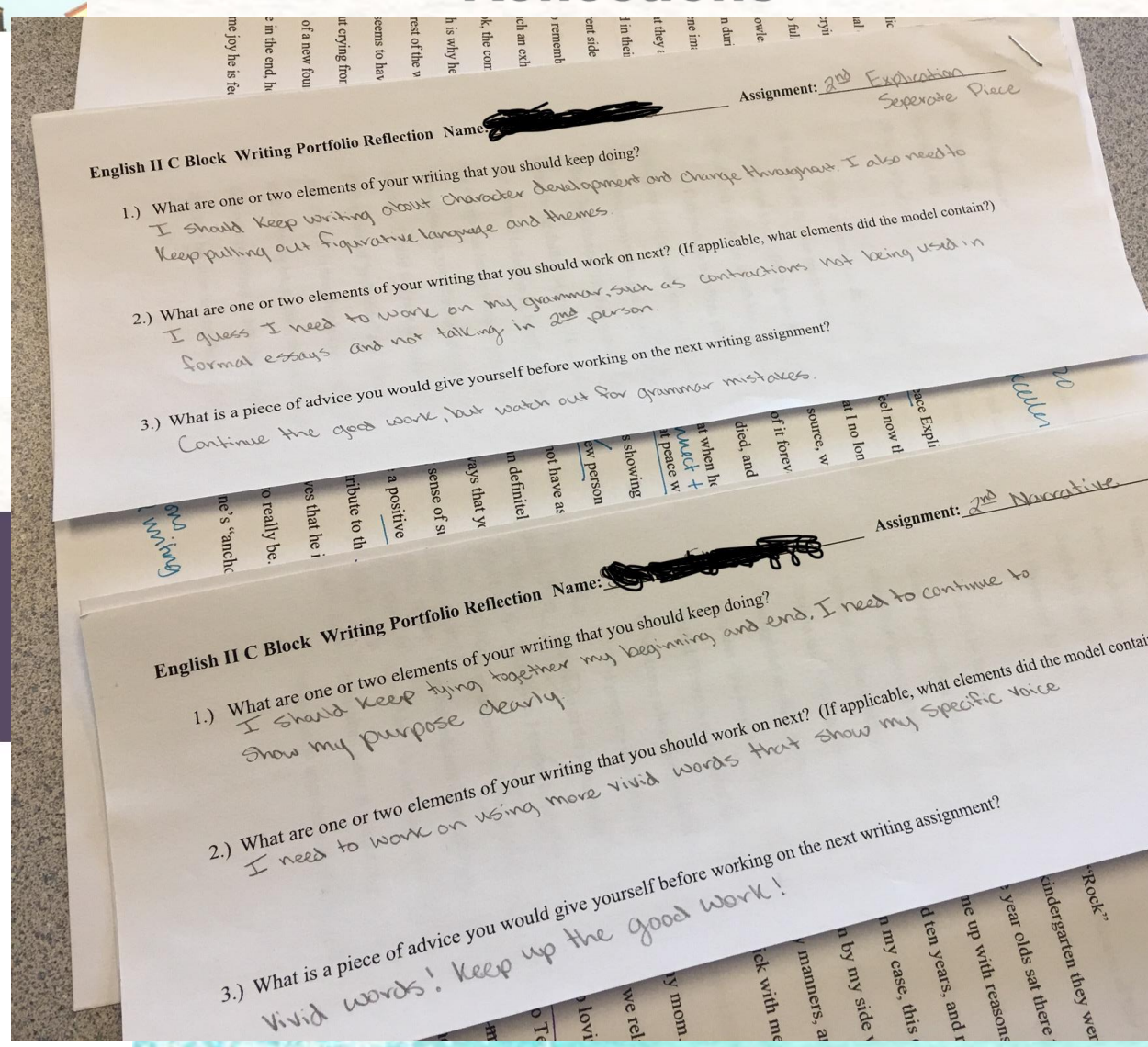
Grade 6 - Tech Ed Digital Portfolios

My name is Andrew Lum. I am 11 years old and on Yellow Team in Sixth Grade. My favorite subject is Math, but I also really like Social Studies. I love music ; I play the piano and play the viola in the [illegible] orchestra. I like the New England Patriots football team and like to watch the games when I can. As shown in the picture above, I have a passion for

This year so far we have worked on independent and dependent variables, and Claim, Evidence, Reasoning. At the beginning of the year, we worked a bit on observations and inferences. We have also done some fun experiments with Mrs. Coletta's class, like a calcium chloride experiment and a "dancing" raisins experiment.



High School – English Writing Portfolio Reflections



English II C Block Writing Portfolio Reflection Name: [redacted] Assignment: 2nd Expository Seperate Piece

1.) What are one or two elements of your writing that you should keep doing?
I should keep writing about character development and change throughout. I also need to keep pulling out figurative language and themes.

2.) What are one or two elements of your writing that you should work on next? (If applicable, what elements did the model contain?)
I guess I need to work on my grammar, such as contractions not being used in formal essays and not talking in 2nd person.

3.) What is a piece of advice you would give yourself before working on the next writing assignment?
Continue the good work, but watch out for grammar mistakes.

English II C Block Writing Portfolio Reflection Name: [redacted] Assignment: 2nd Narrative

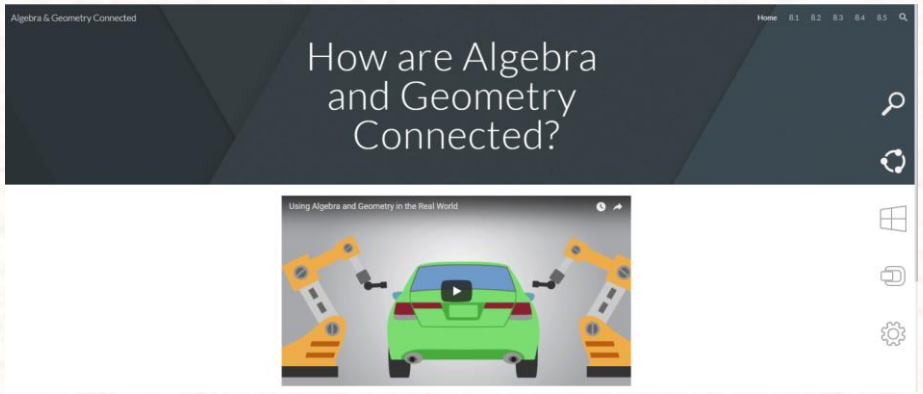
1.) What are one or two elements of your writing that you should keep doing?
I should keep tying together my beginning and end. I need to continue to show my purpose clearly.

2.) What are one or two elements of your writing that you should work on next? (If applicable, what elements did the model contain?)
I need to work on using more vivid words that show my specific voice

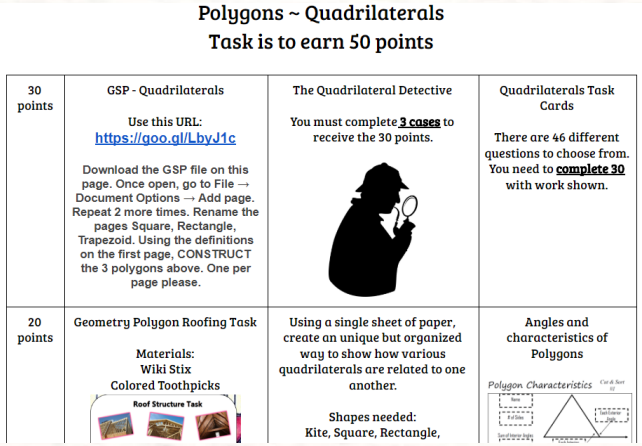
3.) What is a piece of advice you would give yourself before working on the next writing assignment?
Vivid words! Keep up the good work!

Technology Integration to Enhance Student Learning

- Focus on student-centered learning:
  - support classroom curricula
  - enhance teaching and learning
  - self-paced learning
    - basic skill building
  - inquiry-based learning
    - research
  - meta cognition
    - student portfolios
  - multi-modal learning
    - access information and demonstrate understanding



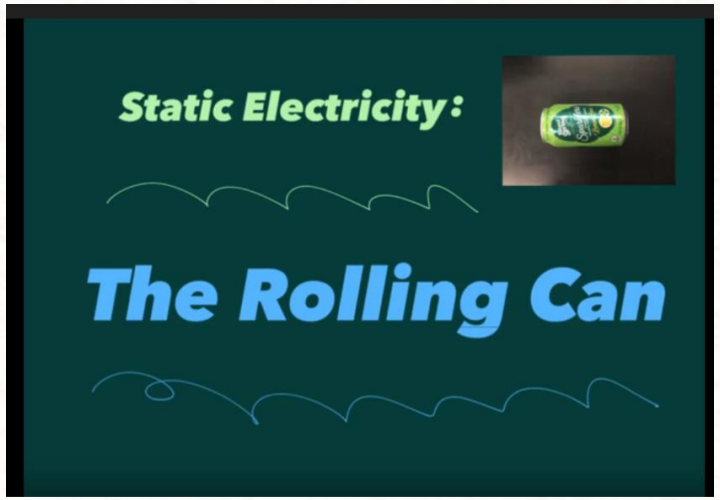
Self-Paced Learning

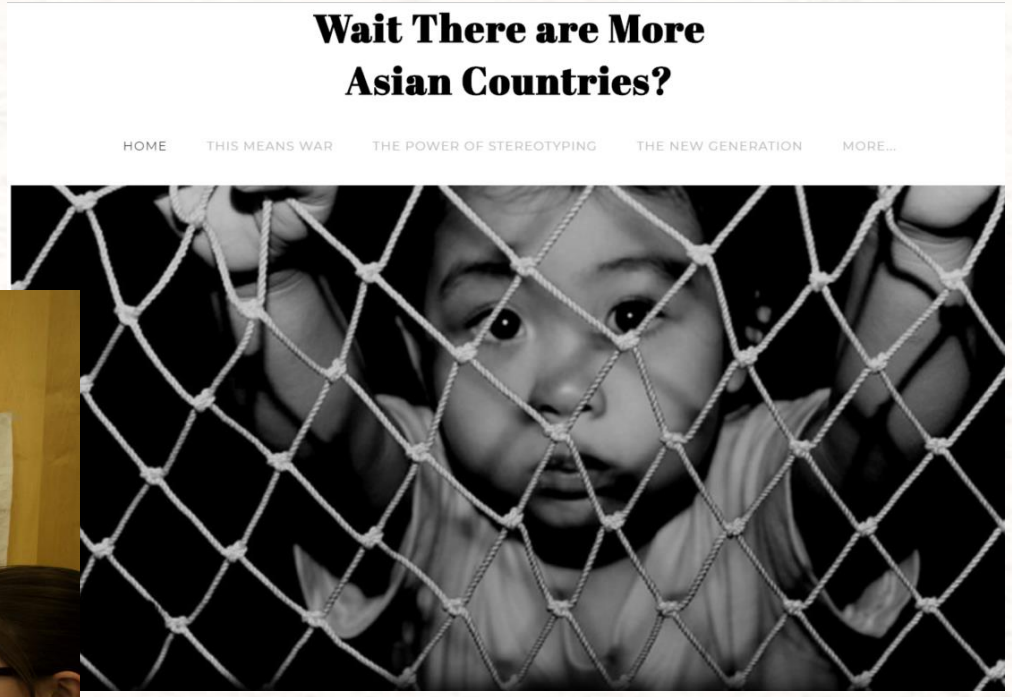


- Working towards this:
  - engineering design, coding, computational thinking
  - elementary science course – CER – Claim, Evidence, Reasoning
  - integrated units of study
    - Davis K-2
  - Interdisciplinary learning
    - grade 4 pilot
    - grade 5 DESE work

Code.org

Multi-Modal Learning






The War of 1812 Native Nations Perspective
During the early eighteen hundreds, everything would change for the Native Nations
US Expansion threatened their lands, the war was just beginning
In hopes of stopping the expansion, Tecumseh created a confederation
The Native Americans fought alongside Britain against the US in hopes this would be enough protection against intrusion.
1811 The battle of Tippecanoe was the first loss of many for the Natives, though it was a draw William Henry Harrison declared it a U.S victory and burned prophets town.
The second was the betrayal of the British during the battle of Thames... After being abandoned Tecumseh did not surrender
1813
Many lives were lost for the Natives, among them, Tecumseh
After the death of Tecumseh, the Native people had no one to lead them, this was the end of
The movement for the Native Nations


US (early) Expand
WHAT?!?!
Let us stop the intruders, before it's too late!!
BOOM!!
We will now work together
Yes, We will
His death...
Honoring Tecumseh...
This Native American must sign a contract to give away his land
Contract
They lost all their hope with Tecumseh.... They had no will left...
Nina Suhiasyan

Grade 5 DESE Integrated STEM Units

Solar System

Spheros demonstrate an understanding of rotation and revolution of the Earth.

MASSACHUSETTS DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION

RACE TO THE TOP

Table of Contents

Stage 1 Desired Results

ESTABLISHED GOALS G

PS2-1 Support an argument with evidence that the gravitational force exerted by Earth on objects is directed towards the Earth's center.

ESS1 Use observations, firsthand and from various media to argue that the sun appears larger and brighter than other stars because it is closer to the Earth

ESS1-2 Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over day, and c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.

3-5.CT.e.1 Individually and collaboratively create a simple model of a system (e.g., water cycle, solar system) and explain what the model shows and does not show.

3-5.CT.a.2 Organize information in different ways to make it more useful/relevant (e.g., sorting, tables).

Transfer

Students will be able to independently explain how a system is a set of complex interactions working together to create a complex whole.

Meaning

UNDERSTANDINGS U

Students will understand that…

- Relationship between the earth, moon and sun is central to how we make sense of day, night, and shadows. **(3-5.CT.e.1, PS2-1, ESS1, 3-5.CT.b. 3)**
- Modeling is helpful for learning science phenomenon **(3-5.CT.e.1, ESS1-2, 3-5.CT.b. 3)**
- Organizing information in a table makes it more useful to notice patterns, make predictions, and draw conclusions about shadows and sunlight **(3-5.CT.a.2, 5.MD.1, 5.G.1 , 5.G.2, 3-5.CT.b. 3)**

ESSENTIAL QUESTIONS Q

- How does Earth's place in the universe affect our daily lives?
- How does creating models help us to better understand our world?

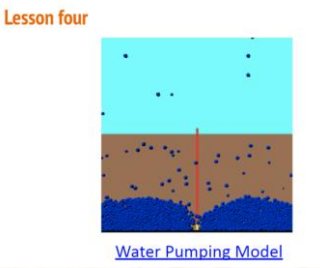
Stage 2 - Evidence

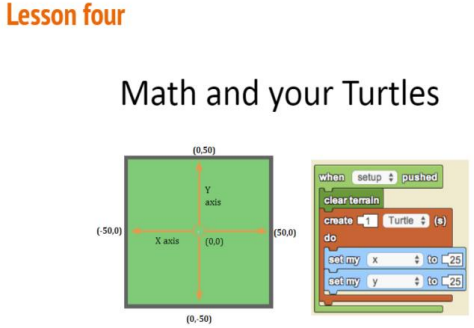
Evaluative Criteria	Assessment Evidence
Shadows and Sunlight lab report:	**CURRICULUM EMBEDDED PERFORMANCE ASSESSMENT (PERFORMANCE TASKS)** PT Performance Task: Students will observe and record the patterns in daily changes in length and direction of shadows over a day by tracing a shadow hourly in the form of a lab report. Students will be asked to make predictions for subsequent readings and draw conclusions based on their observations. This task, in the form of a lab report, assesses students' understanding of the relationship between the Earth and the Sun and how organizing information in a table makes it more useful to notice patterns, make predictions, and draw conclusions about shadows and sunlight. Final Assessment: Students will program two Spheros to represent the Earth and the Moon or the Sun and provide an oral explanation for their audience. This performance task assesses students' understanding of the rotation and revolution of the Earth, as well as create a 3D model to demonstrate students' abilities to code and solve real world problems.
Sphero: - Accurately program Sphero to demonstrate rotation and revolution - Clearly explain rotation and revolution in oral presentation	**OTHER EVIDENCE:** OE -Written self reflection on essential questions (pre and post responses) - Maintain a science journal

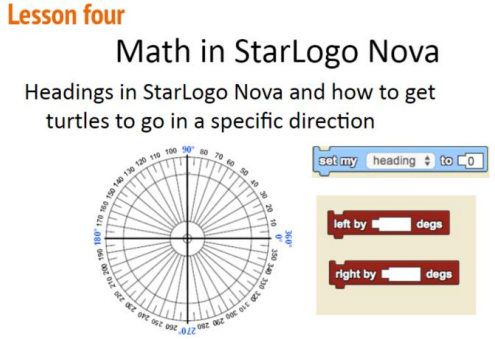
Grade 5 DESE Integrated STEM Units – Water Cycle

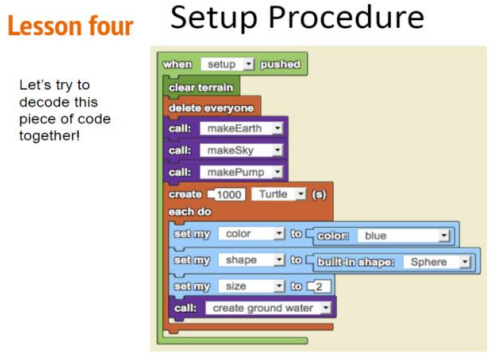
Lesson 1: How does water move throughout the earth?
Lesson 2: Of the water on Earth, how much can we drink?
Lesson 3: What is a shared natural resource? How could it be threatened?
Lesson 4: How can computer modeling and simulation help us understand the world around us?
Lesson 5: How does changing the number of water pumps in your code change your model?
Lesson 6: How can we as a community help to protect our Earth?

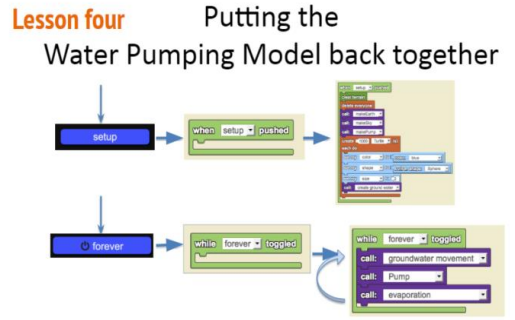
STARLOGO NOVA: Water Pumping Base Model



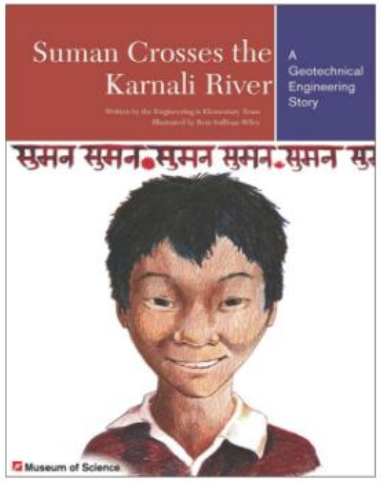






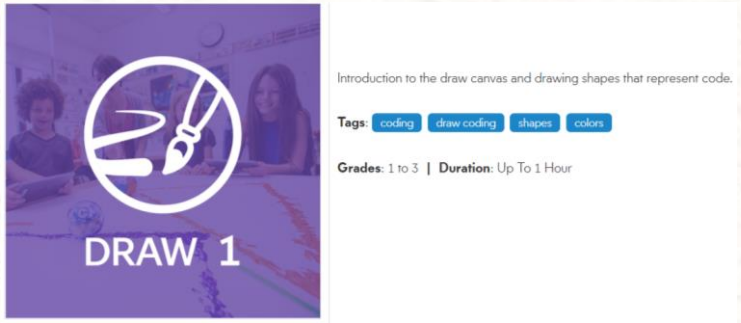


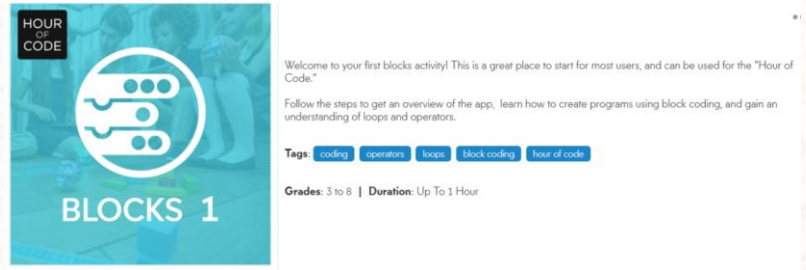
Grade 4 Integrated Unit: EiE Science Unit - A Stick in the Mud: Evaluating a Landscape



Unit Overview

The storybook that anchors this unit, *Suman Crosses the Karnali River*, takes students to Nepal, where people rely on innovative cable bridges called TarPuls to cross flooded rivers during monsoon season. Digging into the role of geotechnical engineers, students must select a safe, flood-proof, and erosion-proof location for a new TarPul. Working with a model riverbank, they study soil properties, examine maps to assess the potential for erosion at different sites along the river, and factor in the villagers' preferences for a TarPul location.





Envisions Math Unit on pattern recognition and continuation. On top of that, we integrated two technology-based experiences to offer students multiple ways to access knowledge about patterns, weather, soil, and more - and multiple ways to express mastery, too. We used Sphero Draw and Blocks lessons in one session, to talk about setting up patterns for programs using Loops.

Later, we used the PBS-created Don't Flood the Fidgits game to experience a different simulation of land and building development in flood-prone areas. The game establishes a number of variables that students can control before running a flood scenario and checking the success of their building and land plans.

Part of the EiE unit is persuasive writing and presentation. Students must act as developers and convince the area council to place a tarpul at a specific place along a flood-prone river, to maximize travel and durability of the solution.

Grade 4 Integrated Unit: Agricultural Robots

Sphero Ag-Robot Challenge

Attention Learner: You are part of the Sphero Ag-Robot team. Your team must sell Sphero Ag-Robots to local strawberry farmers. Read more about the Ag-Robots below. Your task is to create a presentation to share with farmers who are interested in purchasing the Sphero Ag-Robots.

The Sphero Seed-bot

The Seed-bot rolls over the ground planting strawberries in rectangular patches with an area of 36 square units.

The Sphero Pick-bot

The Pick-bot travels around the fields picking the berries in rectangular patches with perimeters of 30 units.

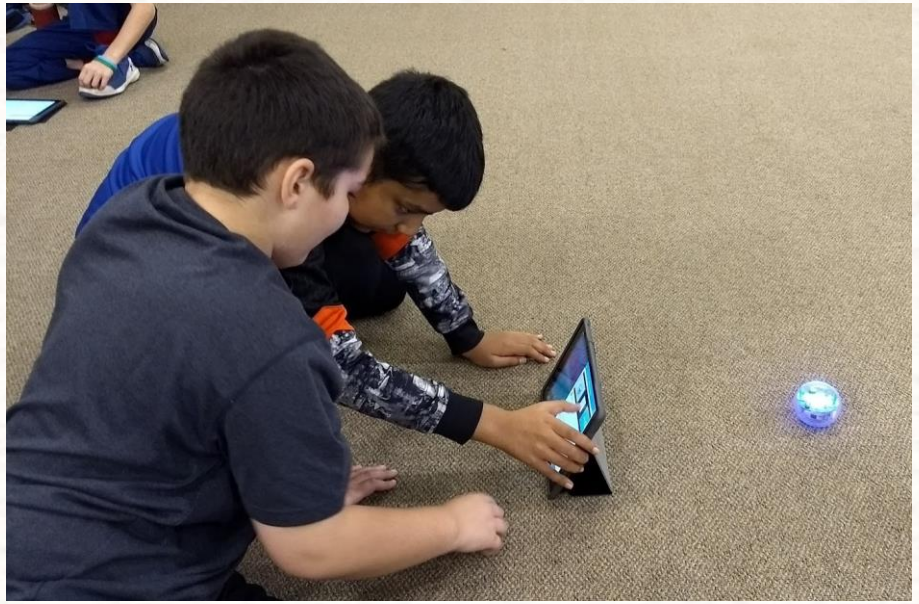
Criteria: Your team's presentation must include

- A diagram of the patch dimensions that work best for Sphero Seed-bot.
- A diagram of the patch dimensions that work best for the Sphero Pick-bot.
- A recommendation for the best way to set up a farm to use the Seed-bot and Pick-bot together.
- A paragraph to persuade the farmer that Ag-Robots will make his or her life easier
- A demonstration of working block-coded program for the Sphero Ag-Robots.

Constraints:

- The seed-bot can only spread seeds in rectangular fields with an area of 36.
- The pick-bot can only harvest strawberries from rectangular fields with a perimeter of 30.
- The block code program must use the loop control.

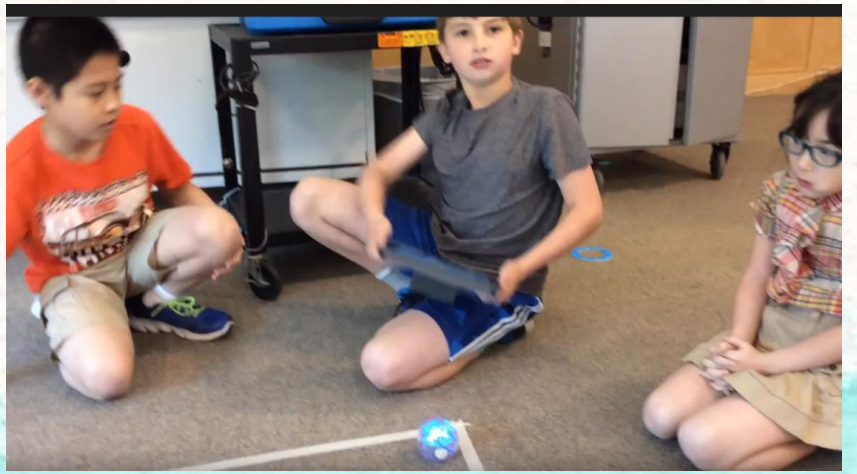
Attachments: Sphero Ag-Robots Student Page.pdf



Day 1: Students grappled with finding a rectangular plot with an area of 36 and a perimeter of 30. They practiced group resilience and lots of trial and error.

Day 2: Students began writing a program for the Sphero to traverse a 3 X 12 strawberry plot. More trial and error, i.e. different roll speeds, durations, and headings were attempted. They also had to find and use the "Stop" and "Spin" blocks to “turn on a dime.”

Day 2: The same group, after about an hour of troubleshooting and coding. They've found a block algorithm to traverse the plot in an efficient path. They're on their way to looping this chunk of code and planting strawberries in multiple plots. (That’s the next lesson.)



Success! They have a working project and even some bonus features, i.e. hoop jump and "victory dance" from the robot.

Sphero Ag-Robots

Directions to Learners: You are part of a team working to sell Sphero Ag-Robots to local strawberry farmers.

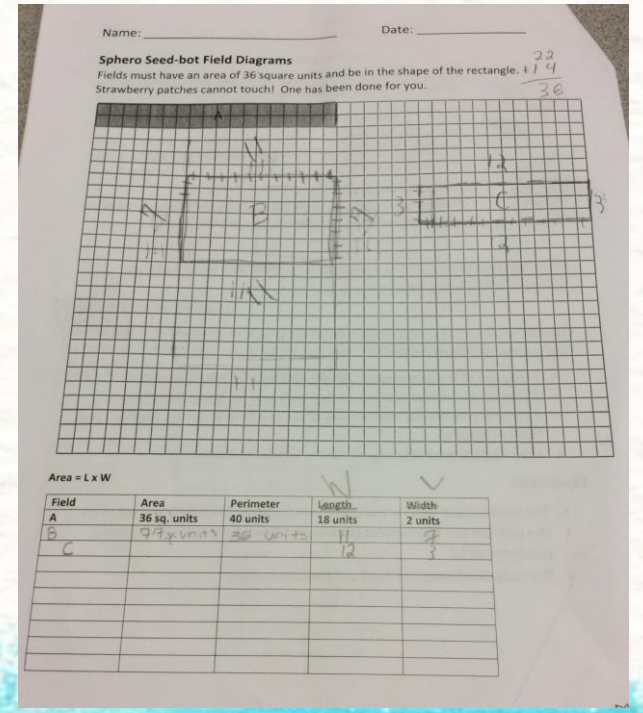
Your products include:

The Sphero Seed-bot

The Seed-bot rolls over the ground planting strawberries in rectangular patches.

The Sphero Pick-bot

The Pick-bot travels around the fields picking the berries by travelling around the perimeter of the strawberry patches.



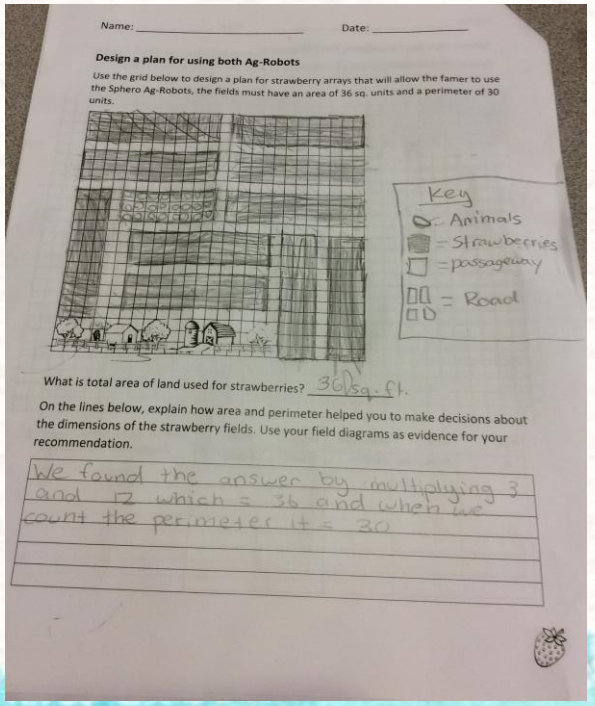
Name: _____ Date: _____

Sphero Seed-bot Field Diagrams

Fields must have an area of 36 square units and be in the shape of the rectangle. Strawberry patches cannot touch! One has been done for you.

Area = L x W

Field	Area	Perimeter	Length	Width
A	36 sq. units	40 units	18 units	2 units
B	36 sq. units	40 units	11	7
C			12	3



Name: _____ Date: _____

Design a plan for using both Ag-Robots

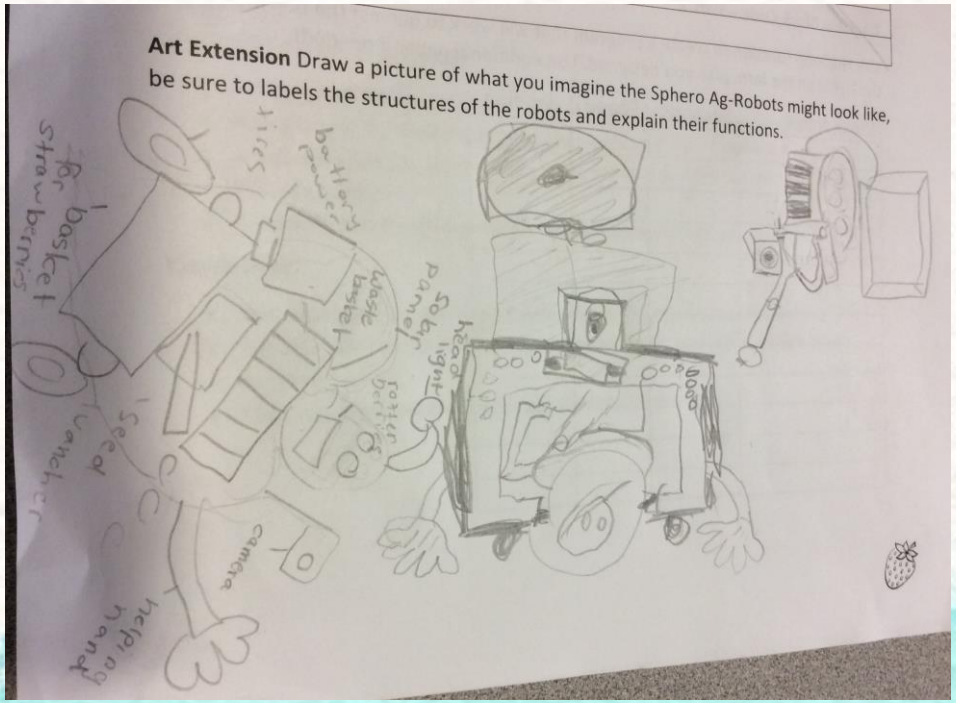
Use the grid below to design a plan for strawberry arrays that will allow the famer to use the Sphero Ag-Robots, the fields must have an area of 36 sq. units and a perimeter of 30 units.

Key
- = Animals
- = Strawberries
- = passageway
- = Road

What is total area of land used for strawberries? 36 sq. ft.

On the lines below, explain how area and perimeter helped you to make decisions about the dimensions of the strawberry fields. Use your field diagrams as evidence for your recommendation.

We found the answer by multiplying 3 and 12 which = 36 and when we count the perimeter it = 30



Art Extension Draw a picture of what you imagine the Sphero Ag-Robots might look like, be sure to labels the structures of the robots and explain their functions.

How can we bring about change?

- Instructional Coaches and Technology Integration Specialists
  - ongoing professional development for teachers
  - individual, small and large group work
- Librarians as instructional partners
  - research
  - makerspace philosophy
- Ongoing professional development
- Share best practices and exemplars
- Wednesday meetings
- Develop teacher leaders
- Teachers teaching teachers, i.e. EdCamp