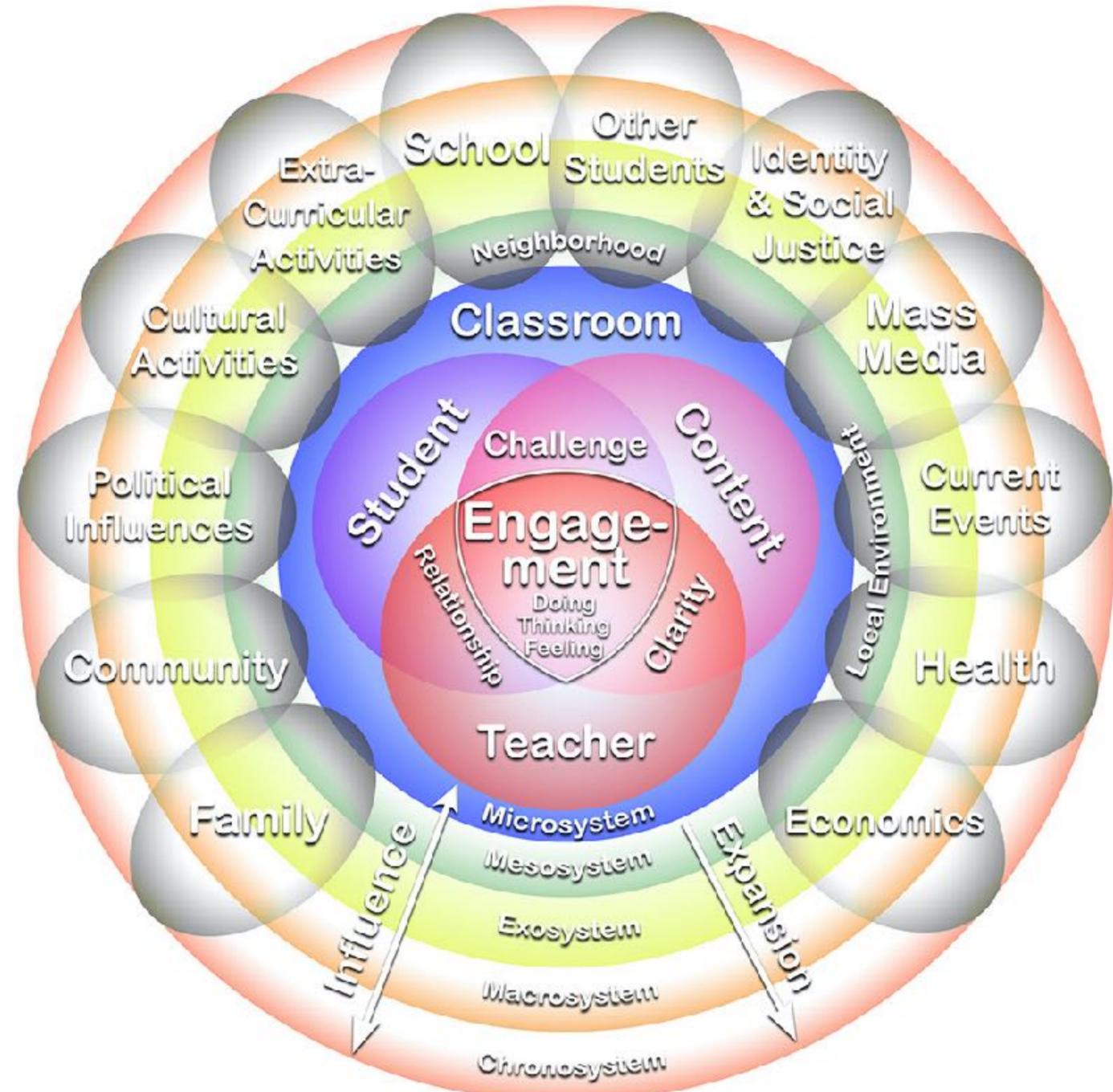


Students in Crisis: What are the Problems?

- * Lack of engagement
- * Why are students disengaged?
 - Distractions - cell phones, social media, etc.
 - Teacher-centered lessons: sage on the stage
 - Instructionism: didactic lectures
 - Other reasons?
- * Many outside influences impinge on the classroom and on students

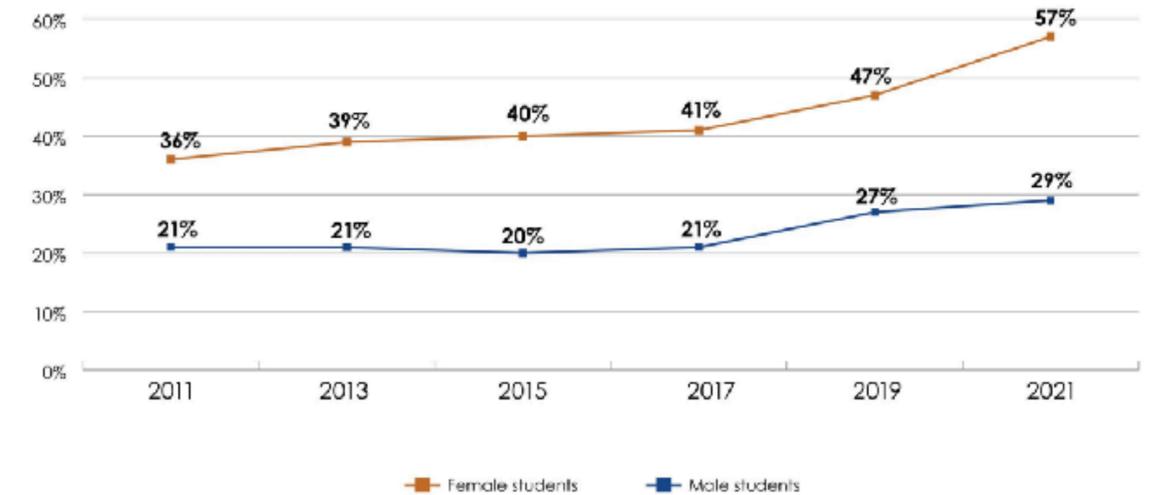
A Synthesis Model of Student Engagement



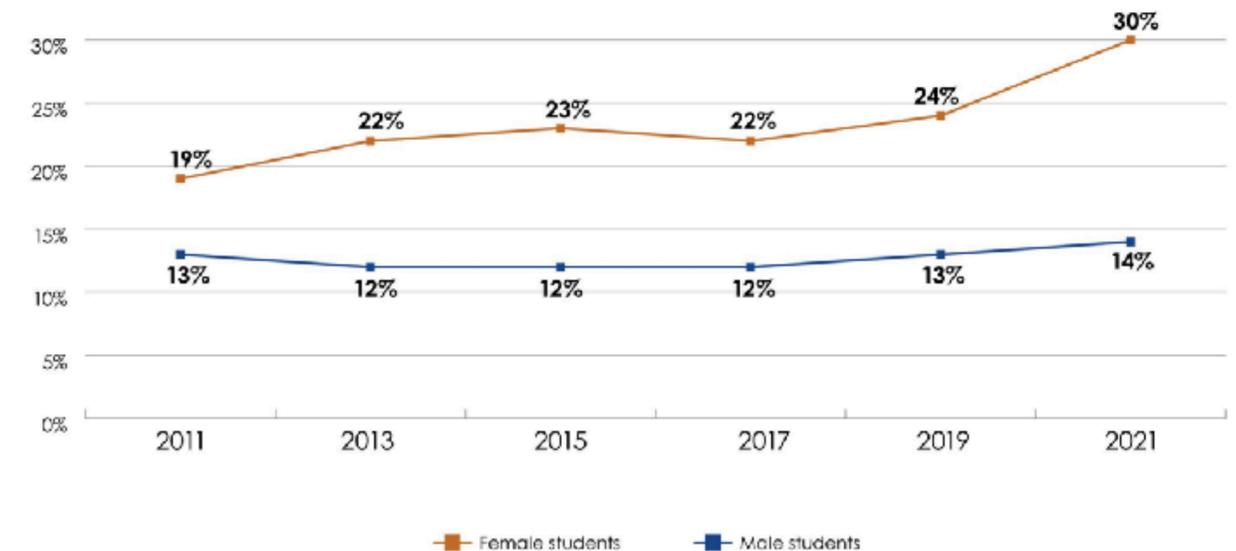
Social-Emotional Learning

- * Anxiety
 - New CDC study (Feb. 2023)
 - Record levels of teen sadness and suicidal ideation
 - Living public lives: selfie culture, Tik Tok videos
 - Living for likes, FOMO
 - Correlates well with advent of smart phones
 - Lower sleep duration, more social isolation
- * Lack of resilience or grit - black and white thinking (Duckworth)
- * Fixed mindset instead of growth mindset (Dweck)

**PERSISTENT FEELINGS OF SADNESS OR HOPELESSNESS
AMONG U.S. HIGH SCHOOL STUDENTS, BY SEX, 2011-2021**



**SERIOUSLY CONSIDERED ATTEMPTING SUICIDE
AMONG U.S. HIGH SCHOOL STUDENTS, BY SEX, 2011-2021**



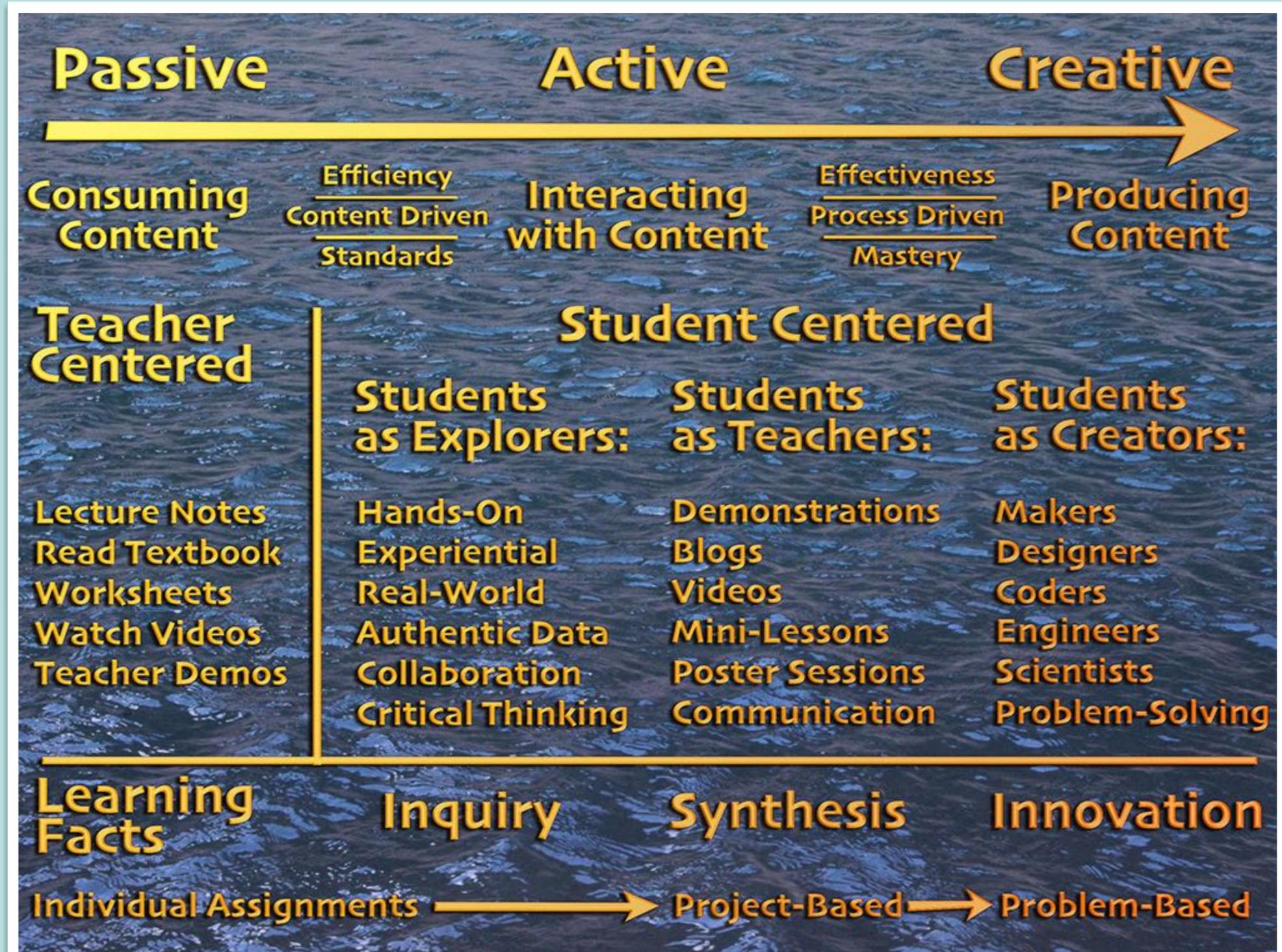
Lack of Teaching Creativity or Innovation

- * Land study: 95% of kindergartners show high levels of creativity and think of themselves as creative
 - By 12th grade, this is down to less than 20%.
- * Why? Creativity is educated out of them:
 - Schools kill creativity (Robinson)
- * Why? Focus on efficiency, not effectiveness:
 - One-size-fits-all curricula and practices: standardization
 - Factory model of education: assembly line
 - Overcrowded classrooms: burnt out teachers
 - Divergent thinking is punished
 - Overemphasis on “valued” subjects versus the arts, humanities, or media literacy
 - Getting the right answer instead of divergent thinking
- * Yet creativity and innovation are essential skills for our economy and in all fields. Without them, we stagnate.



Doing Instead of Learning About

- * Moving students from passive learning to active to creative
- * Students as innovators:
 - Makers, coders, designers, builders, inventors, teachers, scientists, & engineers
 - Creating educational content instead of consuming content
 - 21st century skills: creativity, critical thinking, collaboration, problem-solving, and communication
- * Mastery above standards, effectiveness above efficiency



Project-Based Learning (PjBL)

* Seven characteristics:

- Challenging problem or question
- Sustained inquiry
- Authentic research & data
- Student voice & choice
- Critique & revision (formative)
- Public product & presentation
- Opportunity for reflection

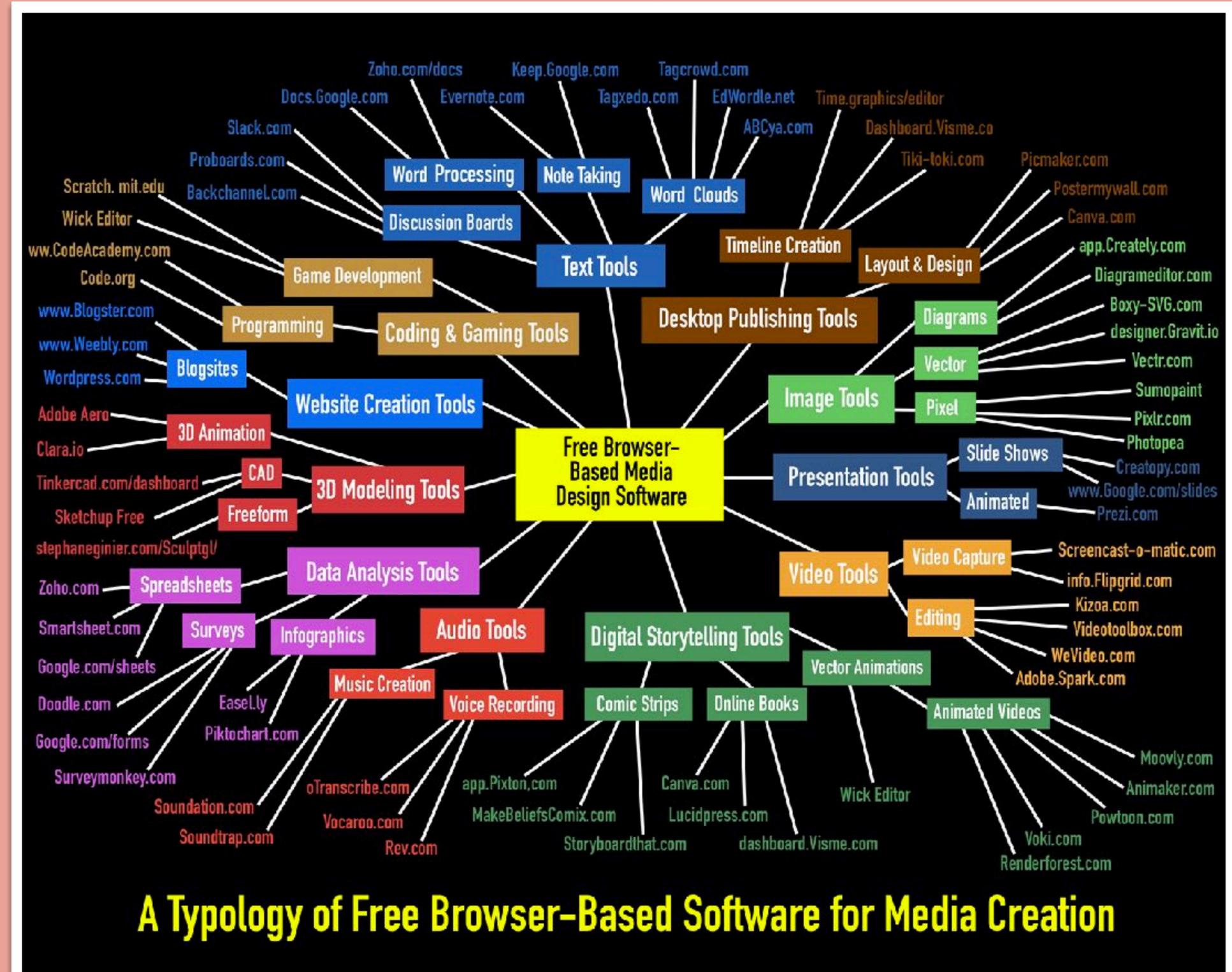
* Skills / Learning goals:

- Key knowledge & understandings
- Success skills: time management, executive functioning, creativity, critical thinking, communication, collaboration, and media design



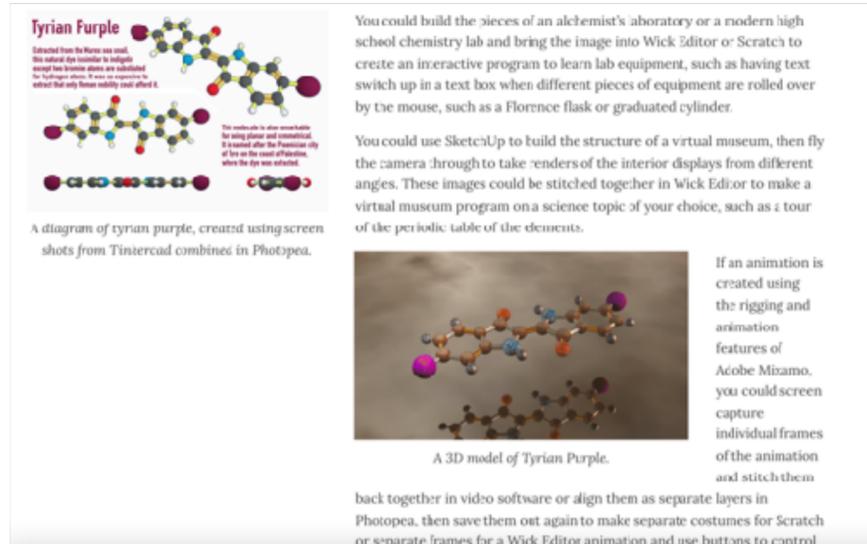
PjBL Through Student-Created Digital Media

- * Many categories of digital media software
- * Available online as browser-based software:
 - Can be played on Chromebooks, iPads, some on smart phones
 - Most have free or trial options
 - Powerful enough for professional quality products
- * Increases equity by allowing all students to access powerful creativity tools



Flipped Software Training Videos

- * Can't assume that digital natives automatically know how to use digital media software
- * Most teachers don't have time to learn digital media software in addition to everything else they must do
- * Move the software training offsite - flipped video training
- * I have created a website that includes links to these videos and descriptions of different types of projects, with examples.



Tyrian Purple
Extracted from the Murex sea snail, this natural dye was used to highlight royal law books in the Middle Ages. It is named after the Phoenician city of Tyre on the coast of Lebanon, where the dye was extracted.

The molecule is also remarkable for being almost entirely insoluble. It is named after the Phoenician city of Tyre on the coast of Lebanon, where the dye was extracted.

A diagram of tyrian purple, created using screen shots from Tintercad combined in Photopea.

You could build the pieces of an alchemist's laboratory or a modern high school chemistry lab and bring the image into Wick Editor or Scratch to create an interactive program to learn lab equipment, such as having text switch up in a text box when different pieces of equipment are rolled over by the mouse, such as a Florence flask or graduated cylinder.

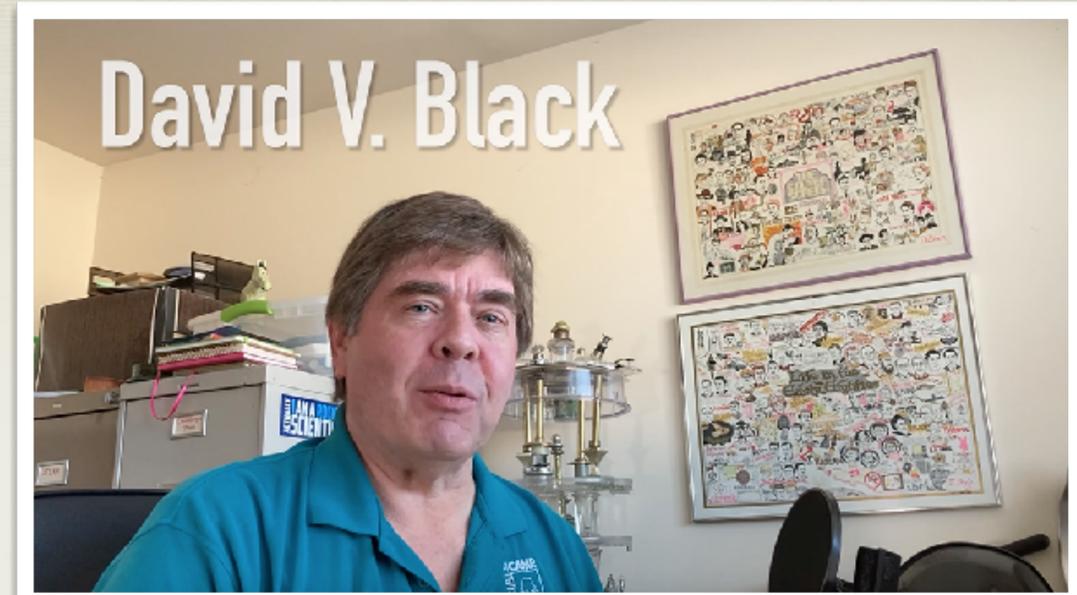
You could use SketchUp to build the structure of a virtual museum, then fly the camera through to take renders of the interior displays from different angles. These images could be stitched together in Wick Editor to make a virtual museum program on a science topic of your choice, such as a tour of the periodic table of the elements.

If an animation is created using the rigging and animation features of Adobe Mixamo, you could screen capture individual frames of the animation and stitch them back together in video software or align them as separate layers in Photopea, then save them out again to make separate costumes for Scratch or separate frames for a Wick Editor animation and use buttons to control

A 3D model of Tyrian Purple.

<http://science-creativity.com>

<https://www.youtube.com/@elementsunearthed>



My gray alien sneaking around as sequential images of a Mixamo animation.

Although full control of bones and rigging is the ultimate way to make custom animations, you can still create some useful effects with a sequence of still images.

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3D Models - Rigging and Animation:

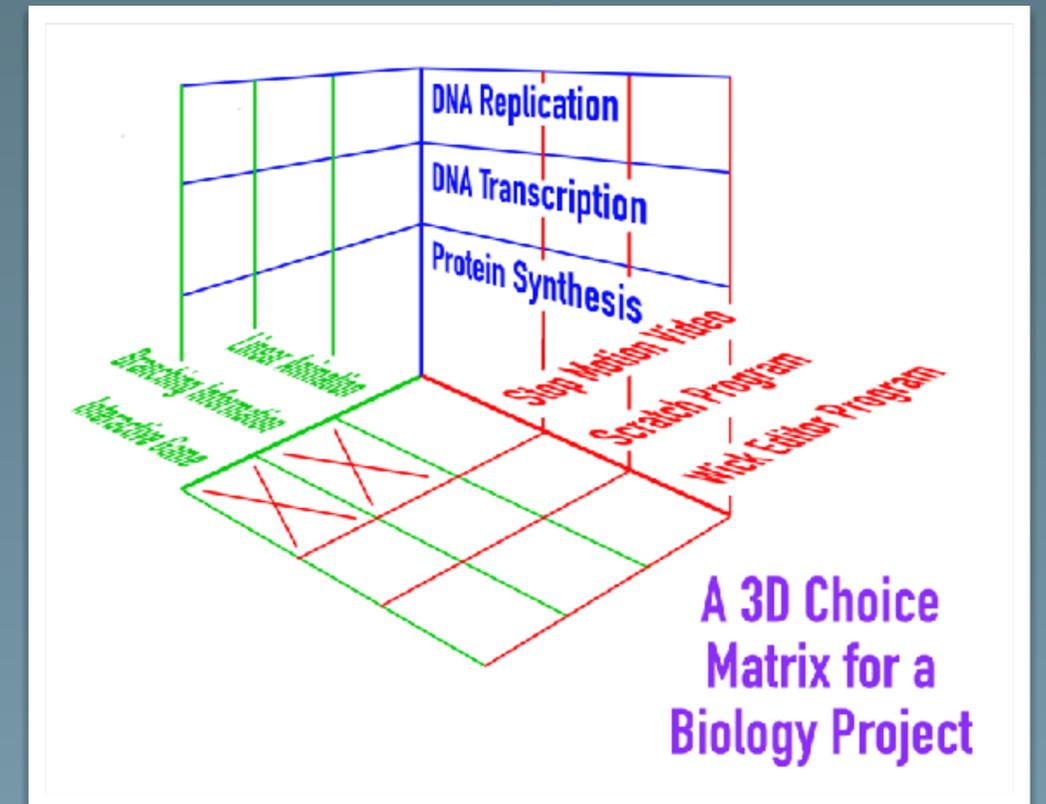
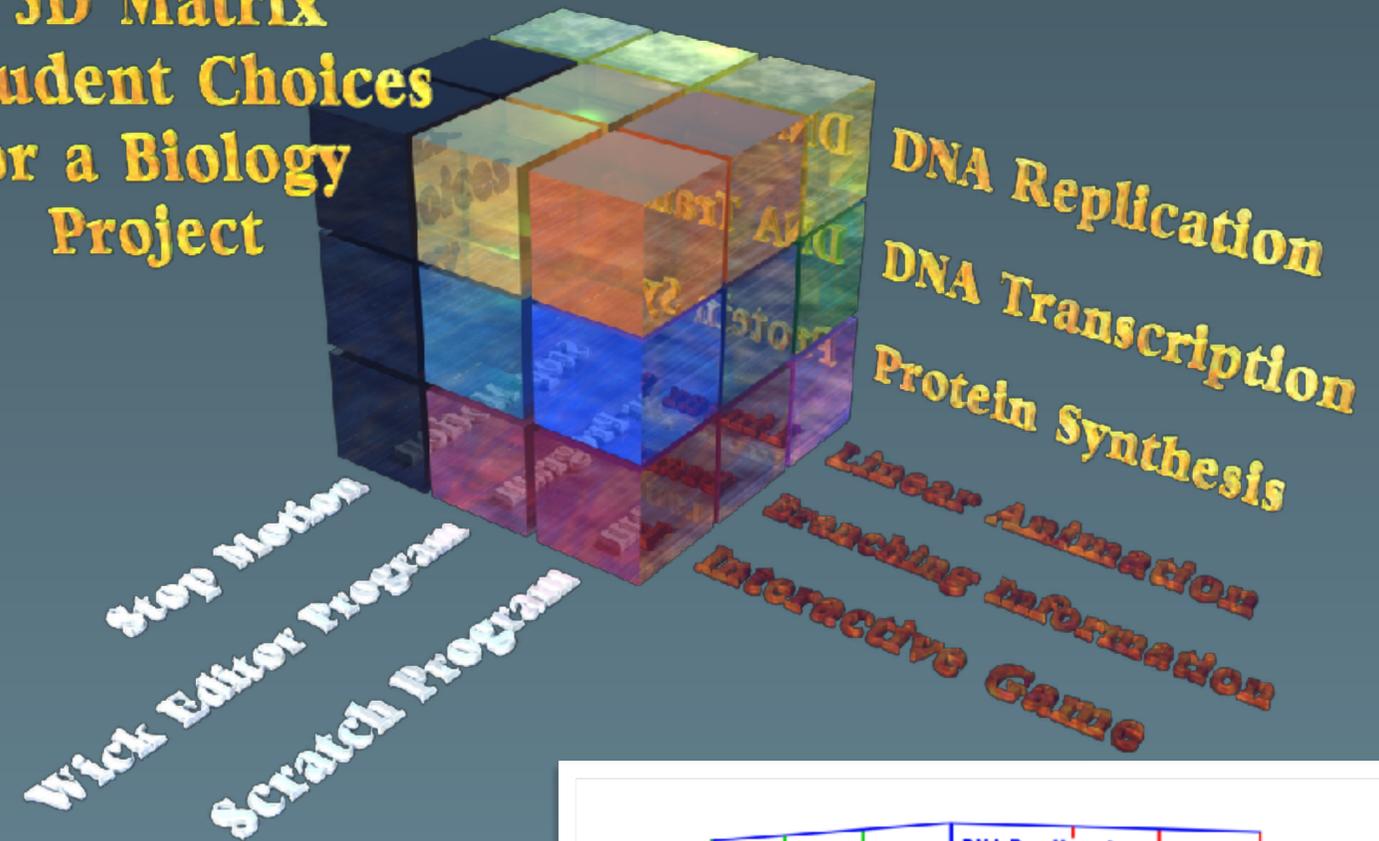
A 3D model is essentially a shell of polygons that have been subdivided and rotated to approximate the appearance of a real or imagined object. The more polygons a model has, the more detail it can show. To get a model to move around and change its form requires it to have a structure of bones attached, with each bone able to rotate at the joints between them just like our own skeletons are able to move around our bodies.



Choices: DNA Animation for Biology

- * Three dimensions of choice:
 - Choice of topic (from list)
 - Choice of digital media software
 - Choice of project type
- * Example: Create a linear animation of DNA replication using stop-motion images placed onto a timeline in video software with caption text and narration added.
- * Example: Interactive branching program on DNA transcription using Wick Editor and a main menu with buttons for each step of the process.
- * Example: Game program or quiz in Scratch to test students' knowledge of the steps of protein synthesis.

A 3D Matrix of Student Choices for a Biology Project



Upcoming Projects: STEAM Showcase

- * STEAM Showcase presentations
 - Groups of 2-3 students choose a topic
 - Create mini-lesson with script and presentation (no Google Slides or Powerpoint)
 - Activity or demonstration
 - Handout in Canva with summary, diagram, URLs
- * Present to each other in mid-March
- * Present to K-8 classes on March 29-30
- * Present to parents, siblings, and public on April 27
- * Peer and teacher critique feedback with revisions in-between
- * Final reflection May 1



WALDEN SCHOOL OF LIBERAL ARTS
PRESENTS
THE FIRST ANNUAL
SCIENCE SHOWCASE
MAY 11, 2011: 7:00 PM.

Schedule of Events:

7:00: Welcome and Science Magic Show by Dave Black

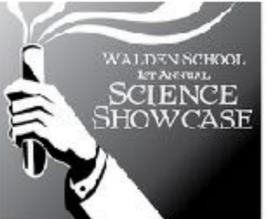
7:15 *First Session:*
Dave's Room: Copper Chemicals
Carl's Room: Cabbage pH
Joshua's Room: The Rock Cycle
Outside: Pate: Toasting the Rune and Gunpowder
Commons: Science Displays and Slideshow

7:45 *Second Session:*
Dave's Room: Making Ice Cream
Carl's Room: Dry Ice and Root Bee: Making
Joshua's Room: Minerals of Utah
Outside: Pate: Craters of the Moon and the
Dangers of Space Travel
Commons: Science Displays and Slideshow

8:15 *Third Session:*
Dave's Room: Gold
Carl's Room: Salt of the Earth
Joshua's Room: The Inertial Scale: Weighting
Objects in Space
Outside: Pate: Magnets and Gravity Assist
Maneuvers
Commons: Science Displays and Slideshow

8:45 *Fourth Session:*
Dave's Room: Untarnishing Silver
Carl's Room: Award Winning Science Fair Project
Joshua's Room: Generating Electricity
Outside: Pate: Firework!
Commons: Science Displays and Slideshow

Refreshments served in the Commons Area throughout the evening. Homemade ice cream and root beer will be served after 8:15. Displays of student projects, posters, and a slideshow of science labs and demonstrations will be shown in the Commons Area as well.



Please Help!

- * For the final phase of this project, I need you to try out the website and videos in your own classes through your own projects:
 - Have students use the choice board PDF or website to choose a project based on the topics you give them.
 - They will create a project using browser-based software and the flipped videos for training.
 - You will fill out a survey describing their efforts and final products.
- * I will be gathering data in April and May, so any project you do before the end of the school year will work.
- * If you don't have any projects planned, then I also need teachers to evaluate the website and videos and make suggestions.
- * Will analyze the data in June and write up results and conclusions in July-August
- * Final dissertation defense in October



David V. Black

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<https://science-creativity.com>

YouTube Channel:

<https://www.youtube.com/@elementsunearthed>

Please fill out the sign-up sheet!