

A decorative graphic on the left side of the slide features several overlapping, colorful geometric shapes. These include vertical bars and circles in shades of orange, red, green, purple, blue, and pink, arranged in a dynamic, abstract pattern.

# Project-based learning with Scratch

[JaredOLEary.com/present](https://JaredOLEary.com/present)

July 13th, 2023

# How to reach the resources

- Direct link is in the chat
- [JaredOLEary.com](https://jaredoleary.com)
  - Presentations
    - Project-based Learning with Scratch (CSTA 2023)



# Speaker



**Jared O'Leary**

[JaredOLEary.com](http://JaredOLEary.com)

# Project-based learning?





Project-based learning is built on the idea that real-life problems capture student interest and provoke critical thinking and develop skills as they engage in and complete complex tasks that typically result in a realistic product, event, or presentation to an audience. (p. 40)

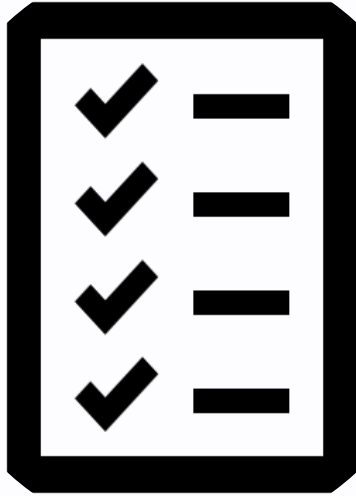
Tobias, E. S., Campbell, M. R., & Greco, P. (2015). [Bringing Curriculum to Life: Enacting Project-Based Learning in Music Programs](#). *Music Educators Journal*, 102(2), 39–47



# What is project-based learning?

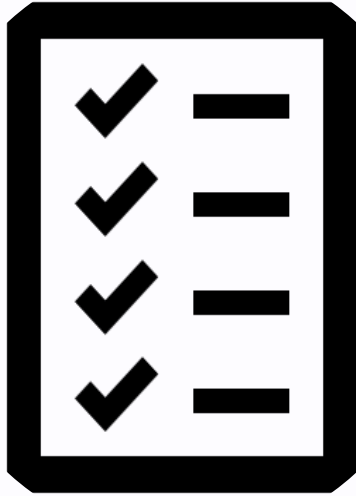
- 1 Central to the curriculum
- 2 Organized around driving questions
- 3 Focused on constructive investigation
- 4 Student-driven
- 5 Authentic

Tobias, E. S., Campbell, M. R., & Greco, P. (2015). [Bringing Curriculum to Life: Enacting Project-Based Learning in Music Programs](#). *Music Educators Journal*, 102(2), 39–47



Fixed





Fixed



Open







Fixed



Open



# Example: Fixed project criteria

- Game
- One player sprite
- Three enemy sprites
- At least two “if \_ then” blocks
- At least one variable



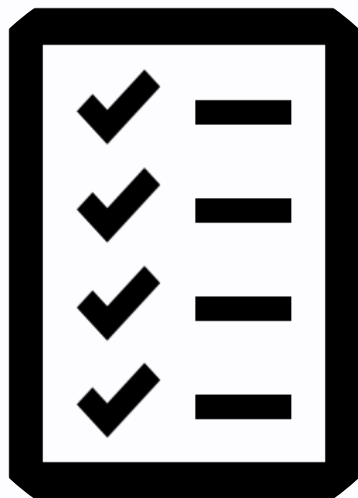
# Example: Open project criteria

- Can you create a school appropriate project that...
  - ...helps someone?
  - ... is scary, funny, exciting, boring, musical, silly, relaxing, or colorful?
  - ... solves a problem you see in the world?
  - ... reminds you of a special event, story, or place?
  - ... you can give as a gift to someone else?
  - ... you can use for another class?

# Example: Open project criteria

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Fixed



Flexible



Open



# Example: Flexible prompts with embedded criteria

- What type of project can you create that includes at least two “if \_ then” blocks and at least one variable?
- How might you create a game that keeps track of a score?
- Storyboard and create a superhero(ine) project that uses several different “Events” blocks.



# Example: Storyboard questions

- What sprite(s) will you use as superhero(ines)?
  - What kind of superpowers or technology will they have?
  - Will they transform into their superhero(ine) costume or always be a superhero(ine)?
    - If they are transforming, what will they look like normally? What will they look like when they are a superhero(ine)?
- Who will the superhero(ines) try and save?
  - What kind of danger are they in?
  - If it's another sprite, what kind of powers or technology will they use?
- How might your superhero(ine) save the day?
  - What algorithms can you create to do that?
- Will users be able to interact with your superhero(ine) project?
  - If so, what kind of code will you use to create that interaction?

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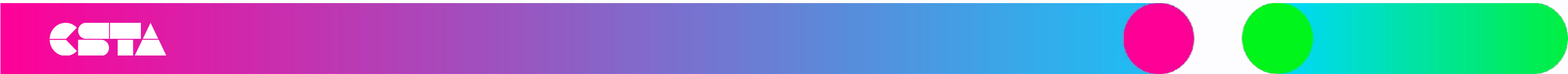
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# Steps for creating a project

- 1 Choose a worthy topic
- 2 Find a real-life context
- 3 Create generative questions
- 4 Develop critical thinking and cultivate dispositions
- 5 Decide the scope
- 6 Design the experience

Tobias, E. S., Campbell, M. R., & Greco, P. (2015). [Bringing Curriculum to Life: Enacting Project-Based Learning in Music Programs](#). *Music Educators Journal*, 102(2), 39–47



# 194: Bringing Curriculum to Life: Enacting Project-Based Learning in [Computer Science] Programs



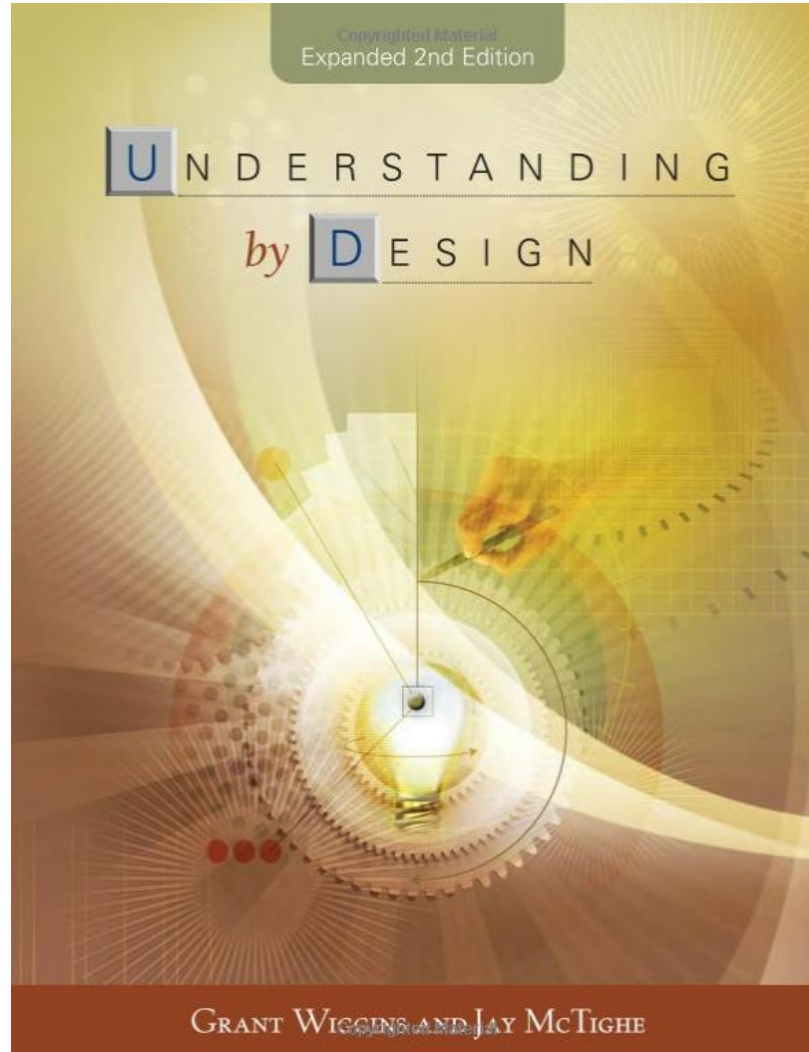
**#CSK9**  
**Podcast**  
with Jared O'Leary

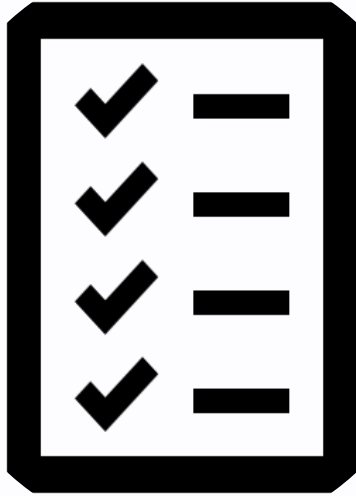
A podcast for  
computer science  
educators

Pro  
Gaymer

[All podcast episodes](#)

# Backward design projects





Fixed



Flexible



Open



# Backward design

1. Identify the desired results
  - a. Big ideas
  - b. Enduring understandings
  - c. Essential questions
2. Determine evidence
3. Plan learning experiences





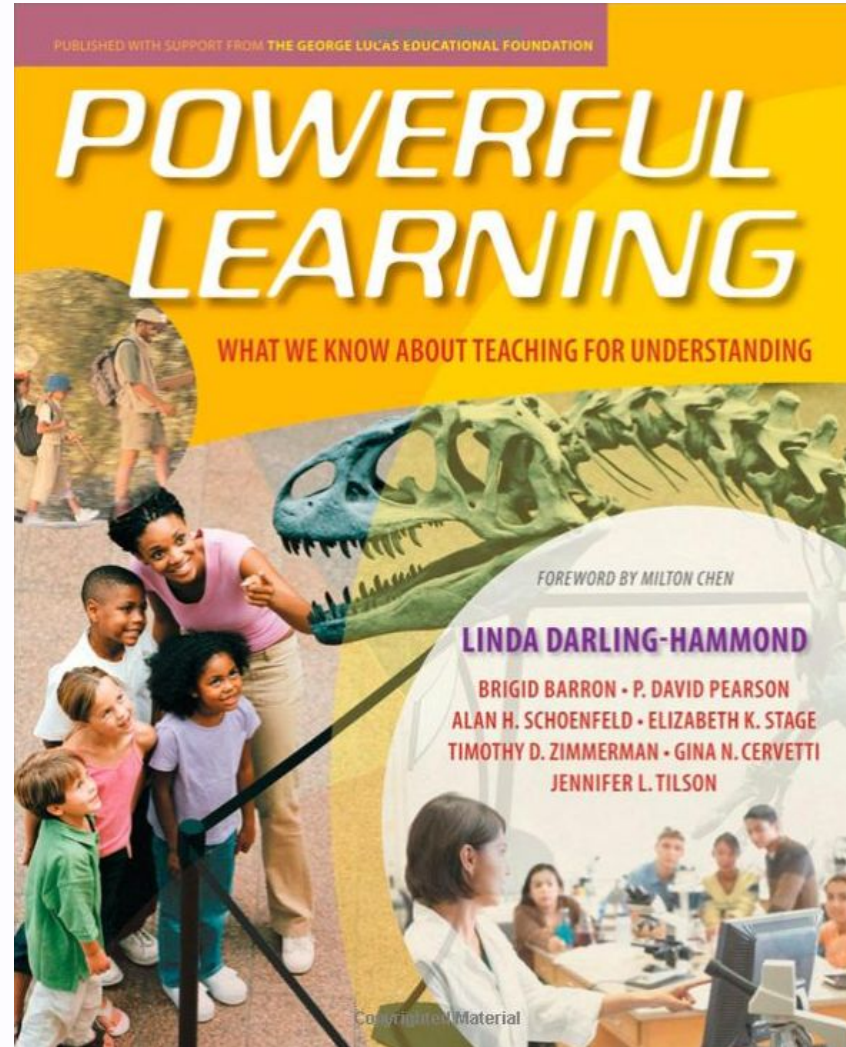
# Backward design for standards

PRODUCING													Producing
Anchor Standard 6: Convey meaning through the presentation of artistic work. Enduring Understanding: Media artists purposefully present, share, and distribute media artworks for various contexts. Essential Question(s): How does time, place, audience, and context affect presenting or performing choices for media artworks? How can presenting or sharing media artworks in a public format help a media artist learn and grow?													
	Pre K (MA:Pr6.1.PK)	Kindergarten (MA:Pr6.1.K)	1 <sup>st</sup> (MA:Pr6.1.1)	2 <sup>nd</sup> (MA:Pr6.1.2)	3 <sup>rd</sup> (MA:Pr6.1.3)	4 <sup>th</sup> (MA:Pr6.1.4)	5 <sup>th</sup> (MA:Pr6.1.5)	6 <sup>th</sup> (MA:Pr6.1.6)	7 <sup>th</sup> (MA:Pr6.1.7)	8 <sup>th</sup> (MA:Pr6.1.8)	HS Proficient (MA:Pr6.1.I)	HS Accomplished (MA:Pr6.1.II)	HS Advanced (MA:Pr6.1.III)
Present	a. With guidance, share roles and discuss the situation for presenting media artworks.	a. With guidance, identify and share roles and the situation in presenting media artworks.	a. With guidance, discuss presentation conditions and perform a task in presenting media artworks.	a. Identify and describe presentation conditions and perform task(s) in presenting media artworks.	a. Identify and describe the presentation conditions, and take on roles and processes in presenting or distributing media artworks.	a. Explain the presentation conditions, and fulfill a role and processes in presenting or distributing media artworks.	a. Compare qualities and purposes of presentation formats, and fulfill a role and associated processes in presentation and/or distribution of media artworks.	a. Analyze various presentation formats and fulfill various tasks and defined processes in the presentation and/or distribution of media artworks.	a. Evaluate various presentation formats in order to fulfill various tasks and defined processes in the presentation and/or distribution of media artworks.	a. Design the presentation and distribution of media artworks through multiple formats and/or contexts.	a. Design the presentation and distribution of collections of media artworks, considering combinations of artworks, formats, and audiences.	a. Curate and design the presentation and distribution of collections of media artworks through a variety of contexts, such as mass audiences, and physical and <b>virtual channels</b> .	a. Curate, design, and promote the presentation and distribution of media artworks for intentional impacts, through a variety of contexts, such as markets and venues.
	b. With guidance, share reactions to the presentation of media artworks.	b. With guidance, identify and share reactions to the presentation of media artworks.	b. With guidance, discuss the experience of the presentation of media artworks.	b. Identify and describe the experience and share results of presenting media artworks.	b. Identify and describe the experience, and share results of and improvements for presenting media artworks.	b. Explain results of and improvements for presenting media artworks.	b. Compare results of and improvements for presenting media artworks.	b. Analyze results of and improvements for presenting media artworks.	b. Evaluate the results of and improvements for presenting media artworks, considering impacts on personal growth.	b. Evaluate the results of and implement improvements for presenting media artworks, considering personal and local impacts, such as the benefits for self and others.	b. Evaluate and implement improvements in presenting media artworks, considering personal and local impacts such as changes that occurred for people, or to a situation.	b. Independently evaluate, compare, and integrate improvements in presenting media artworks, considering personal to global impacts, such as new understandings that were gained by artist and audience.	



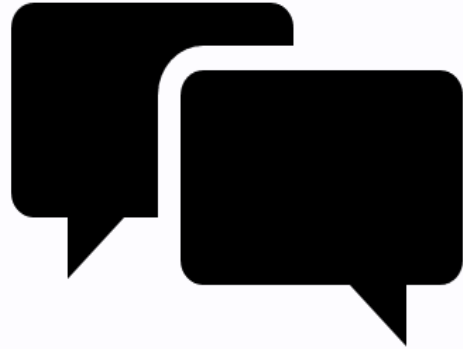


# Inquiry-based projects





Fixed



Flexible



Open

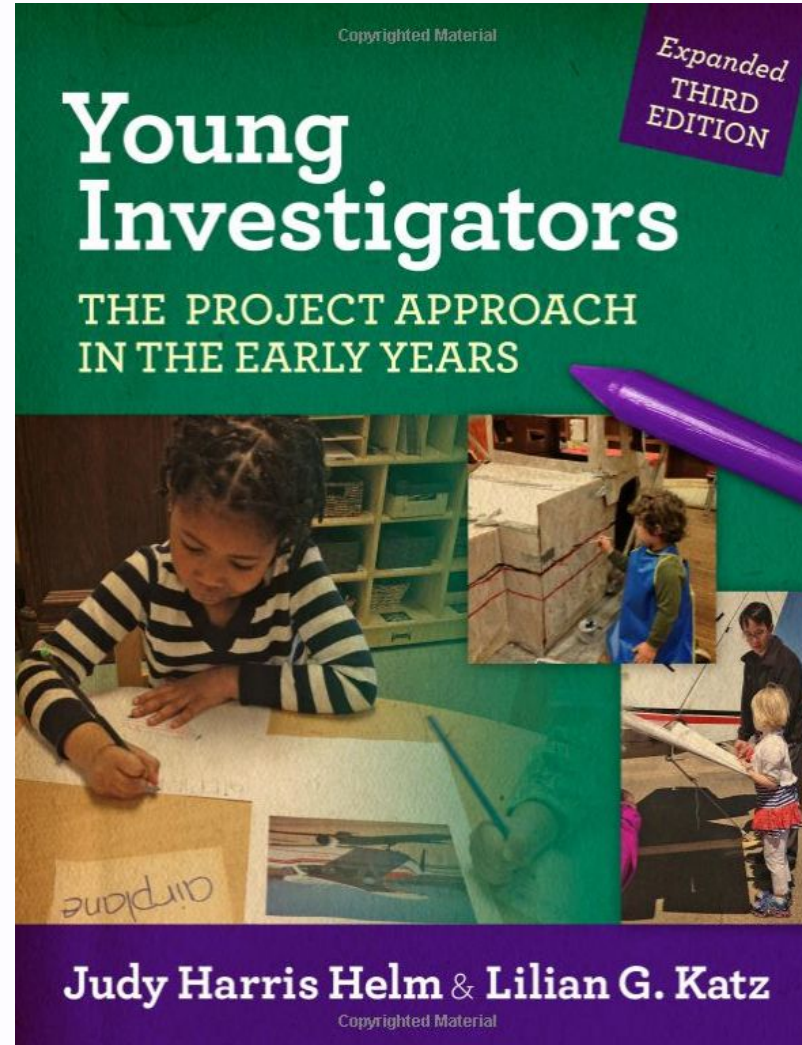


# Inquiry-based projects

1. Vision
2. Inquiry
3. Build
4. Showtime
5. Transition



# Emergent projects





Fixed



Flexible



Open



# The project approach phases

1. Determine a topic
2. Plan and investigate the topic
3. Culminating event/activities and assessment



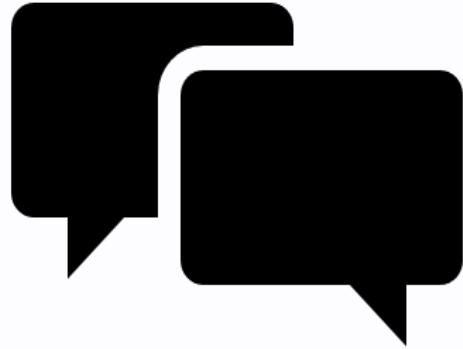
# If using a sequential curriculum...

1. Create a base project idea or theme
2. Layer in new concepts and understandings
3. Revisit throughout the year





Fixed



Flexible



Open





# Scratch resources to explore



# Scratch tutorials in Scratch



Getting Started



Getting Started - ASL



Animate a Name



Imagine a World



Make Music



Create A Story



Make a Chase Game



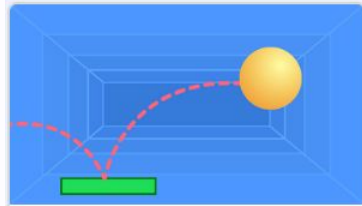
Animate A Character



Make a Clicker Game



Make it Fly



Pong Game



Code a Cartoon



Animate an Adventure Game



Video Sensing



Create Animations That Talk



Talking Tales



Add a Sprite



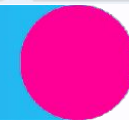
Add a Backdrop



Change Size



Glide Around



# Scratch tips + projects I've created



All Scratch tips in one playlist



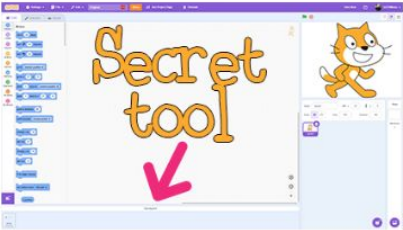
How to add (and animate) a GIF in Scratch



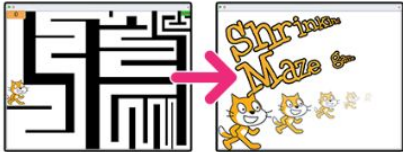
How to add comments in Scratch



How to change the block language in Scratch



How to copy and paste from one Scratch project to another



How to create a custom thumbnail in Scratch



How to create a high score in Scratch using cloud variables



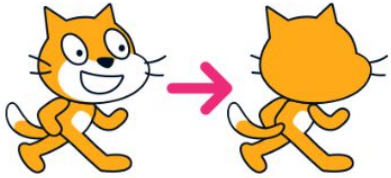
How to create a start button in Scratch



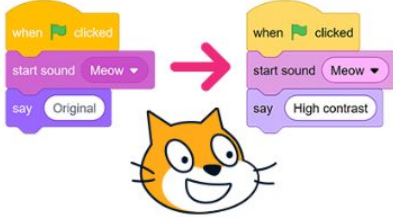
How to create a timer in Scratch using variables



How to drag sprites in Scratch



How to turn a sprite around in Scratch

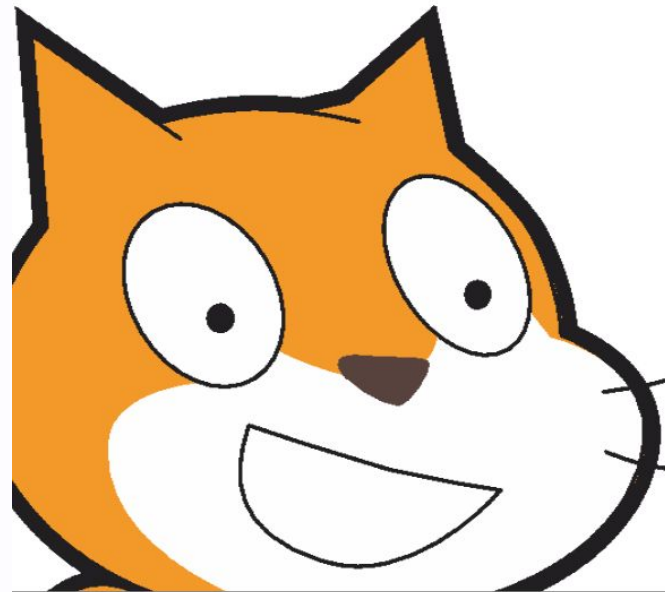


How to turn on/off high contrast blocks in Scratch



# Creative Computing Curriculum

## UNIT 0 GETTING STARTED



YOU ARE HERE

WHAT'S INCLUDED

0 1 2 3 4 5 6

INTRODUCING SCRATCH  
SCRATCH ACCOUNT  
DESIGN JOURNAL  
SCRATCH SURPRISE  
SCRATCH STUDIO  
CRITIQUE GROUP





# Get started with CS First

Coding instructions like hints, highlights, and text-to-speech  
live inside *Scratch for CS First*



## Welcome to CS First

 Text-based  Introductory  4 lessons

 4-6 hours

Students go on a first journey through Scratch for CS First with four fun projects that introduce the core elements of Scratch and foundational coding skills.

[View](#)



# Podcasts to learn more



# 192: How to Get Started with CS Education



[All podcast episodes](#)



# Podcast episodes on Scratch

## [Lifelong Kindergarten with Mitch Resnick](#)

- In this interview with Mitch Resnick, we discuss misconceptions people have around the four P's (Projects, Passion, Peers, and Play) in Mitch's book, encouraging depth of understanding while playing, what has surprised Mitch during his career, encouraging online communication and collaboration without creating artificial engagement, what Mitch wishes we'd see more of and discuss in CS education, our pet peeves with unplugged activities and computational thinking, accounting for survivorship bias with Scratch, expanding our focus on equity and inclusion to include both the "who" and the "how," the importance of experimenting and learning through play, and much more.

## [Music Making in Scratch: High Floors, Low Ceilings, and Narrow Walls?](#)

- In this episode I unpack Payne and Ruthmann's (2019) publication titled "Music making in Scratch: High floors, low ceilings, and narrow walls," which problematizes the limitations of making music with Scratch.

## [The Effects of Providing Starter Projects in Open-ended Scratch Activities](#)

- In this episode I unpack Coenraad et al.'s (2021) publication titled "The effects of providing starter projects in open-ended Scratch activities," which compares two groups of students to determine the impact of Scratch starter projects on student creativity.

## [More Scratch episodes](#)



# Podcast episodes on PBL

## [Decolonizing Education through SEL and PBL with Matinga Ragatz](#)

- In this interview with Matinga Ragatz, we discuss Matinga's journey into education, creating environments where kids can learn through struggle, the importance of social and emotional learning (SEL), how schools promote individualism and exceptionalism, the intersections of project-based learning and SEL, decolonizing education, the importance of shared values in education, and so much more.

## [The Pulse of PBL with Mike Kaechele](#)

- In this interview with Mike Kaechele, we discuss dismantling prejudices through projects, how to situate project-based learning within the community and for local impact, what can be learned when a project fails, the difference between projects and recipes, why social and emotional learning (SEL) is important, lessons learned teaching a variety of subject areas, differences between equity and equality in education, and so much more.

## [The Place for Joy in Teaching and Learning with Sara Lev](#)

- In this interview with Sara Lev, we discuss the place for joy in teaching and learning, the impact of remote learning on PBL in early childhood, misconceptions around PBL in early childhood, encouraging curiosity by responding to questions with questions, social and emotional learning, the impact of yoga and meditation on teaching, and so much more.

## [More project-based learning episodes](#)



# More podcast episodes on PBL

## [James Fester on What Works with PBL](#)

- In this interview with James Fester, we discuss using informal learning approaches within formal learning spaces, what makes a learning experience engaging, how James' experience in the National Parks Service's Teacher Ranger Teacher program informed how he taught in the classroom, unpacking nuances of project-based learning, debunking common misconceptions of PBL, and so much more.

## [Unpacking Various Entry Points into Innovative Teaching with Jorge Valenzuela](#)

- In this interview with Jorge Valenzuela, we discuss the importance of engineering in STEM, situating computational thinking within a problem, getting started with computational thinking and computer science, project-based learning, incorporating social and emotional learning (SEL) in the classroom, Jorge's approach to professional development, and much more.

## [Project-based Learning in Computer Science with Justin Cannady](#)

- In this interview with Justin Cannady, we discuss project-based learning in CS, encouraging debugging and working through failure as students and teachers, considerations for integrating CS, lessons learned working on NMSI's CS AlignEd, and much more.

## [Bringing Curriculum to Life: Enacting Project-Based Learning in \[Computer Science\] Programs](#)

- In this episode I unpack Tobias, Campbell, and Greco's (2015) publication titled "Bringing curriculum to life: Enacting project-based learning in music programs" to explore how computer science educators could incorporate project-based learning in their classroom.

## [More project-based learning episodes](#)









# Podcast episodes on rhizomatic learning

## [Rhizomatic Learning with Catherine Bornhorst, Jon Stapleton, and Katie Henry](#)

- In this panel discussion with Catherine Bornhorst, Jon Stapleton, and Katie Henry, we discuss what rhizomatic learning is and looks like in formalized educational spaces, affordances and constraints of rhizomatic learning, how to support individual students within a group setting, standards and rhizomatic learning, why few people know and use rhizomatic learning approaches, how to advocate for and learn more about rhizomatic learning, and much more.

## [Fostering Intersectional Identities through Rhizomatic Learning](#)

- In this episode, Jon Stapleton and I read our (2022) publication titled “Fostering intersectional identities through rhizomatic learning,” which uses mapping as a metaphor for individualized learning.

## [Applications of Affinity Space Characteristics in \[Computer Science\] Education](#)

- In this episode I unpack my (2020) publication titled “Applications of affinity space characteristics in music education,” which has twelve characteristics of informal learning spaces that I will discuss in relation to computer science education.

## [More rhizomatic learning episodes](#)

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# Exploration + Q&A

[JaredOLEary.com](http://JaredOLEary.com)

