Drawing on Kinship

Rurally Sustaining Computational Thinking Pathways

https://bit.ly/kyste23ctkinship

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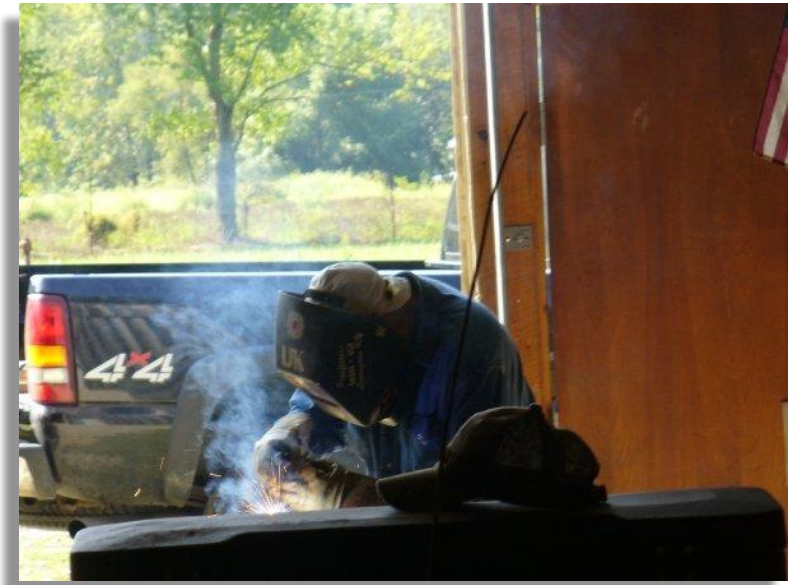
Our “Why” - Connecting CT with Appalachian Ingenuity

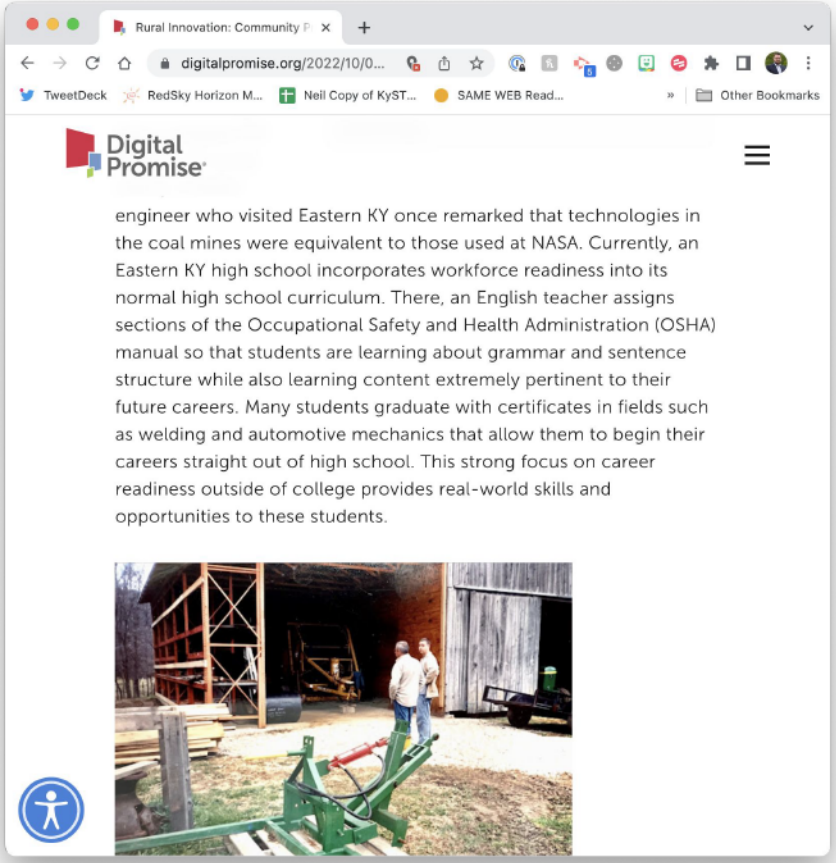
“Who are the community makers? Who are the creators? Even the historians? … [T]hat conversation about imparting that Appalachian Ingenuity and how we capture and perpetuate that, for me that’s the biggest driver that has come out of what we’ve done in the past 3 years. It takes [computer science] from novelty to actual change, and it ties it directly to the people on the ground.”

Neil Arnett (Pikeville Independent School District) reflecting on possible research questions for “TAN2”



Drawing on Kinship Project Questions

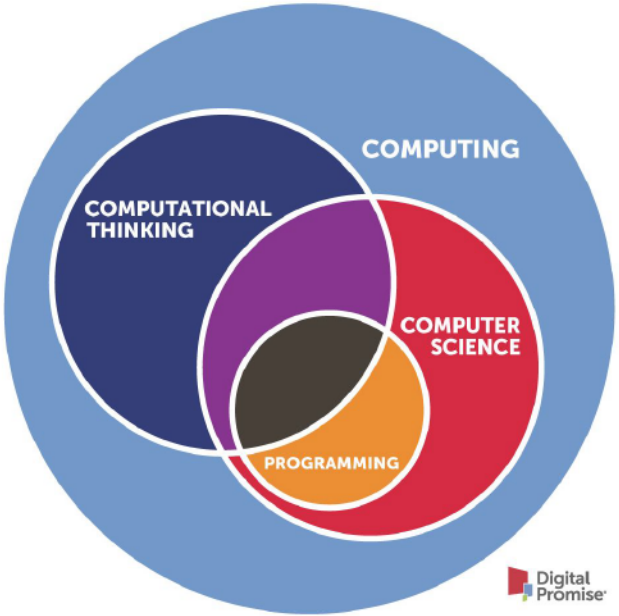
- How can we create a rurally sustaining K-8 CT pathway in Eastern KY, leveraging the tradition of Appalachian Ingenuity?
- Does a rurally sustaining CT pathway substantially benefit CT teaching and learning? If so, how and why?



What is “Computational Thinking”?

- Coding: a technical skill
- CS: an academic discipline
- CT: a problem-solving process that is central to CS, and also applies to learning in many disciplines

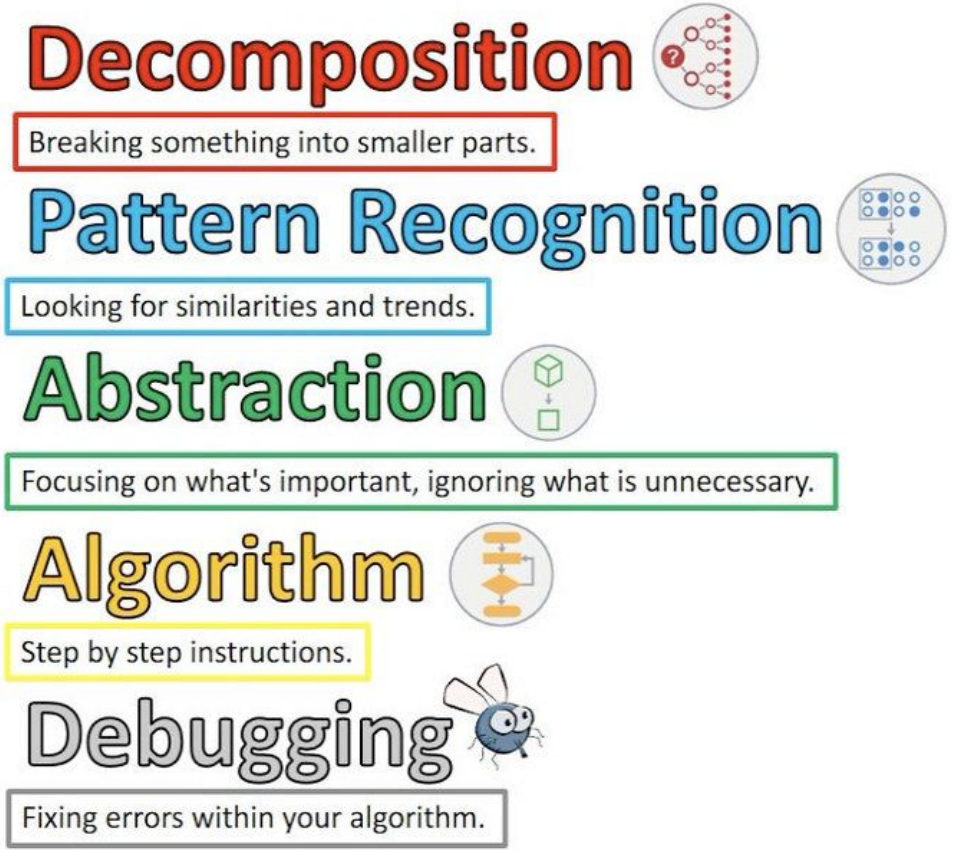
  https://bit.ly/AboutCT



What is “Computational Thinking” (CT)?

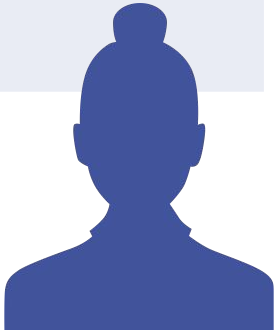
Computational thinking allows us to take a complex problem, understand what the problem is and develop possible solutions. We can then present these solutions in a way that a computer, a human or both, can understand.

There are five key techniques to computational thinking:



What is computational thinking? - Teachers explain

"Computational thinking is not a new theory—this is just a new name of a ***problem solving approach that involves using innovative technology to assist*** *in the process."*



"Computational thinking is ***being able to analyze, build and create steps in a process in order to generate new understandings****. This can entail collecting data, problem solving while building our understanding of various competencies."*

"Computational thinking is ***problem solving steps that teach students perseverance through exploring and analyzing algorithms*** *to find solutions"*

Source: E KY Summer Institute 2022 Teacher Survey

Key project activities

1. **Community, CT & Heritage-focused PBL**
   - ☐ Middle school
   - ☐ About data science or automation
   - ☐ Solve a local problem
   - ☐ Connect to local heritage

← **This is very difficult!**

- ☐ *Heritage?*
- ☐ *CT?*
- ☐ *Community needs?*
- ☐ *PBL?*

What is our Cultural Capital?

Our cultural wealth is rich in:

- Familial Capital (kinship)
- Social Capital

We aim to improve our student's

- Aspirational Capital
- Linguistic Capital
- Navigational Capital
- Resistant Capital

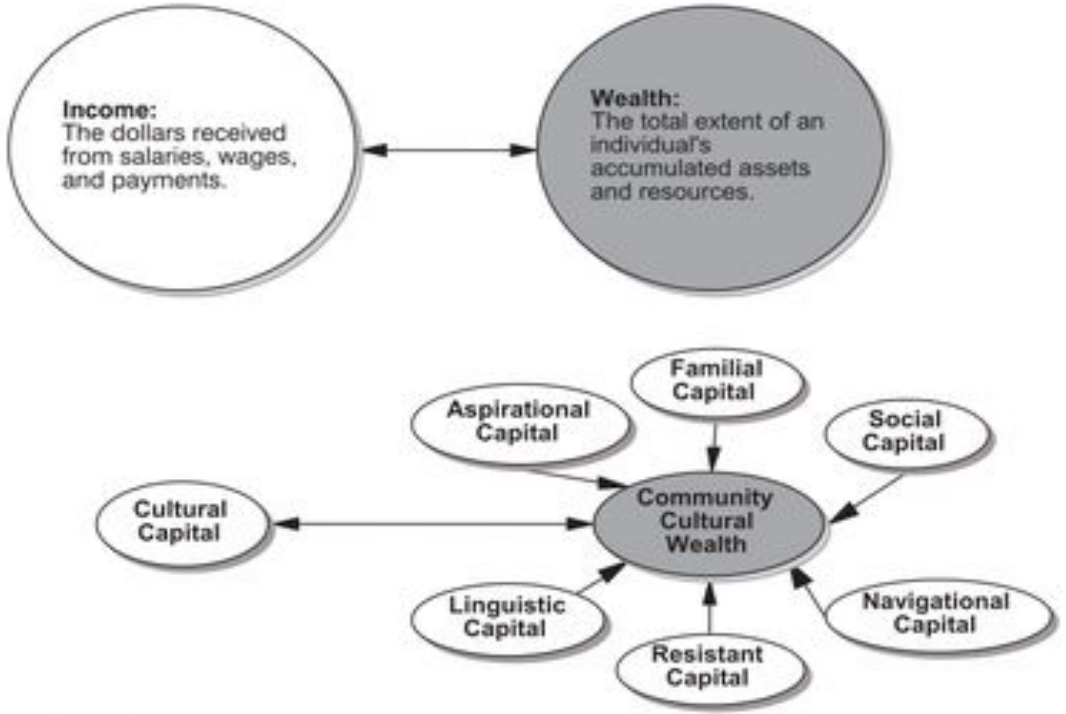


Figure 2. A model of community cultural wealth. Adapted from: Oliver & Shapiro, 1995

Building background information is very important!

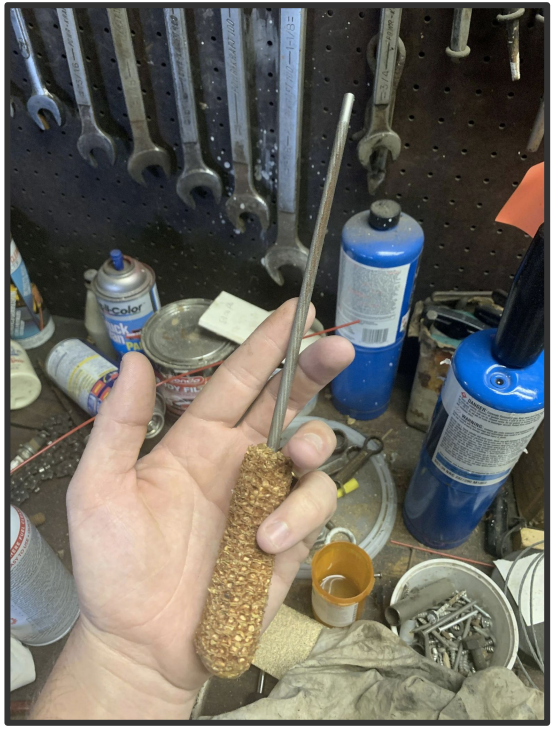
Background knowledge helps students make connections with new information and helps them understand concepts. When teachers make connections between the lesson and their ELL students' backgrounds, they validate their culture and experiences and may facilitate greater interest in the lesson.

- IRIS Center Vanderbilt University

So, how can we leverage student's background knowledge through stories of Appalachian Ingenuity?

Students bring an object that represents a story of Appalachian Ingenuity from their family. We then discuss the competencies, mindsets and dispositions that are found in the story.

Examples of objects:



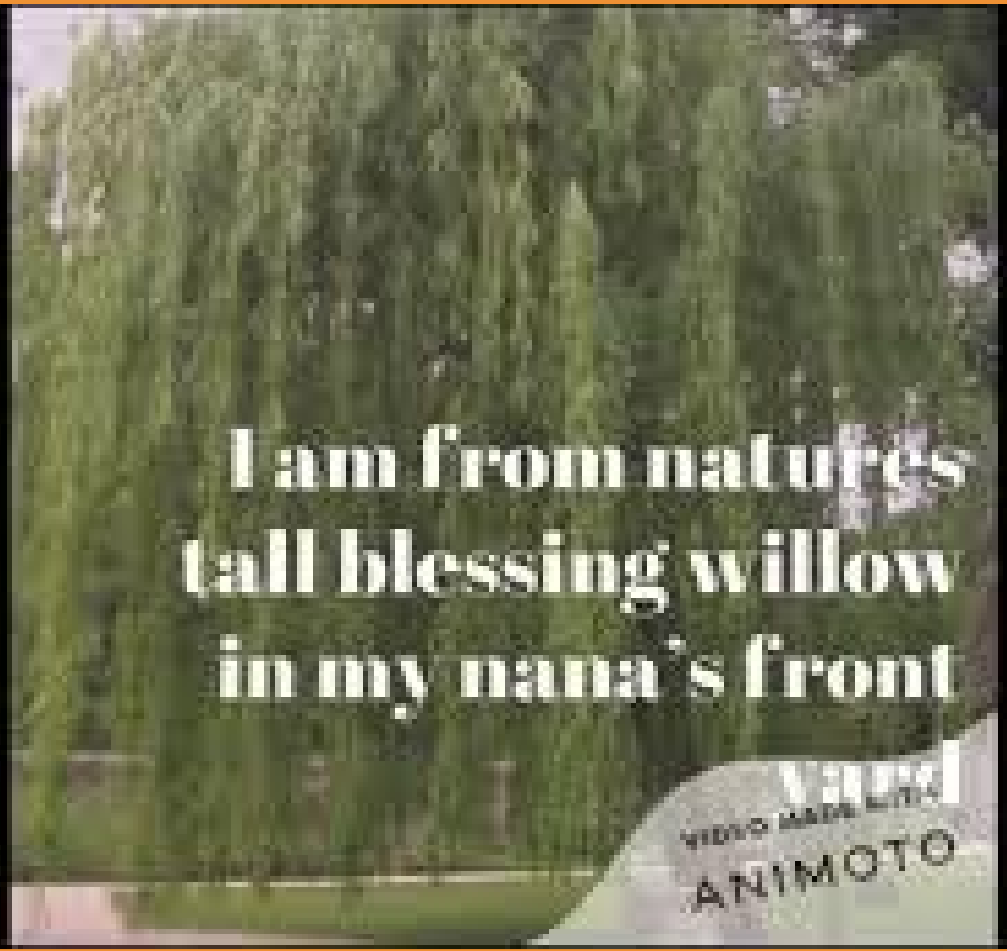
Where I'm From
by George Ella Lyon

I am from clothespins,
from Clorox and carbon-tetrachloride.
I am from the dirt under the back porch.
(Black, glistening,
it tasted like beets.)
I am from the forsythia bush
the Dutch elm
whose long-gone limbs I remember
as if they were my own.

I'm from fudge and eyeglasses,
        from Imogene and Alafair.
I'm from the know-it-alls
        and the pass-it-ons,
from Perk up! and Pipe down!
I'm from He restoreth my soul
        with a cottonball lamb
        and ten verses I can say myself.

I'm from Artemus and Billie's Branch,
fried corn and strong coffee.
From the finger my grandfather lost
        to the auger,
the eye my father shut to keep his sight.

Under my bed was a dress box
spilling old pictures,
a sift of lost faces
to drift beneath my dreams.
I am from those moments--
snapped before I budded --
leaf-fall from the family tree.


I am from natures
tall blessing willow
in my nana's front
Vayd
ANIMOTO

Where I'm From by George Ella Lyon Template

Where I'm From

I am from

_____

(a specific item from your childhood home)
from

_____

(two products or objects from your past)
I am from

_____

(a phrase describing your childhood home)
and

_____

(more description of your childhood home)
I am from

_____

(a plant, tree or natural item from your past)
whose

_____

(personify that natural item)
I am from

_____

(two objects from your past)
from _____**and** _____
(a family name) *(another family name)*
I am from _____**and** _____
(a family trait or tendency) *(another family trait or tendency)*
and from

_____

(another family trait, habit or tendency)
from

_____

(another family trait, habit or tendency)
I am from

_____

(a religious phrase or memory)

I am from _____**and** _____
(an ancestor) *(another ancestor)*
from

_____

(two foods from your family history)
from

_____

(a specific event in the life of an ancestor)
and from

_____

(another detail from the life of an ancestor)

_____

(a memory or object you had as a child)
I am from those moments

_____

_____

(conclude by finishing this thought or by repeating a line or idea from earlier in the poem)

Key project activities

1 Community, CT & Heritage-focused PBL

- ☐ Middle school
- ☐ About data science or automation
- ☐ Solve a local problem
- ☐ Connect to local heritage

In PBL, we want students to…

1. **Select** the problem they would like to work on (rather than working on a pre-defined problem), and **deeply understand** a local issue(s)
2. **Design** a solution to a locally and personally relevant issue, with a process aligned with human-centered design.
3. **Create their own algorithm or collect and analyze their own [numeric] data** as part of the design process
4. **Make explicit connections** between Appalachian Ingenuity and CT (data and algorithms)

Getting heritages into PBL

What we want

- Understand and Connect with the student's heritage
- Solve real-world problems with ingenuity and the resources they have available
- Understand how their general problem-solving skills involve CT concepts

How we'll do it

- ✓ Showcase and provide examples of ancestral / local inventor problem-solvers who came before for inspiration.
- ✓ Make connections from ancestral problem-solving to human-centered innovative design.
- ✓ 1-day **Civic Imagination Workshop**

Getting students to address community needs

What we want

- Student designed projects that demonstrates creativity and functionality for those other than themselves using the innovative design method.
- Most importantly use CT concepts to develop and improve their human-centered design product.

How we'll do it

- Students will provide innovative ideas of how to improve someone's quality of life.
- Students will use the innovative design method to produce their human-centered design product.
- Use Automation, computational modeling, and Data practice to determine the feasibility and quality of the product.

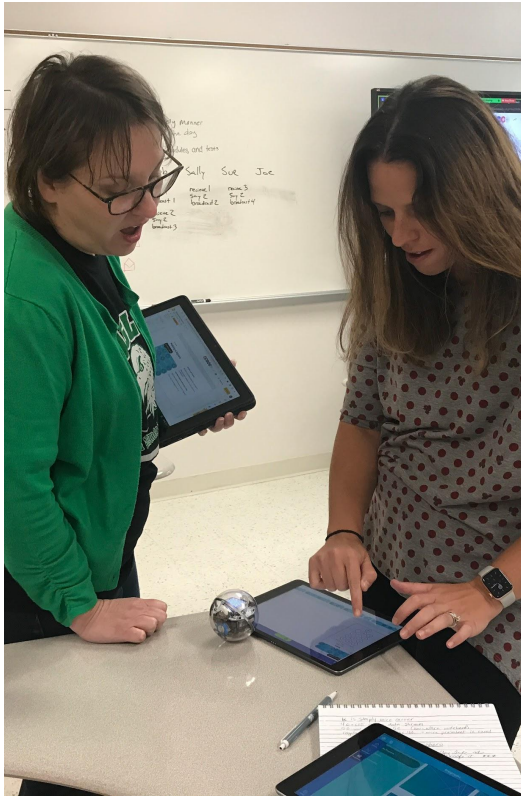
Incorporating CT into PBL

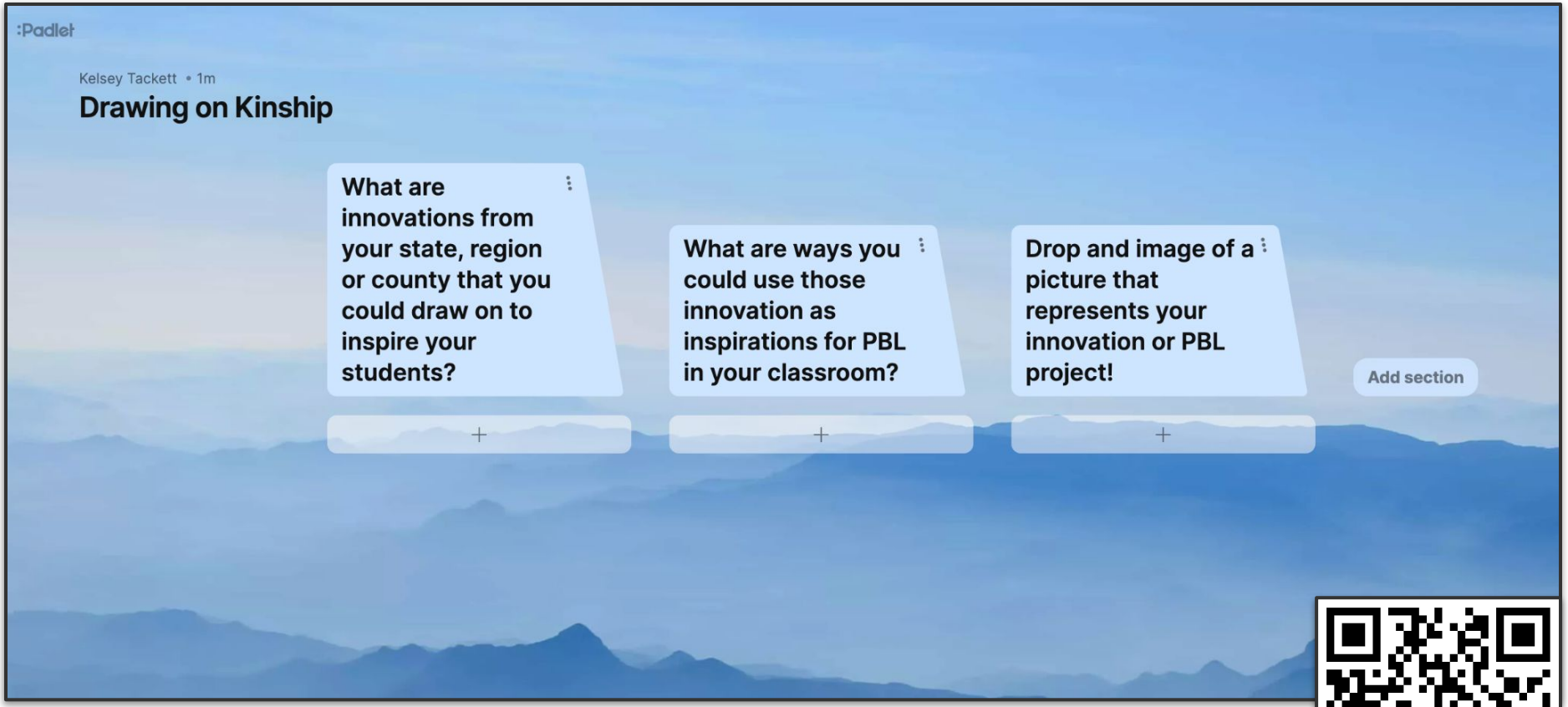
What we want

- Students engaging in a CT practice
  - Automation
  - Data practices
  - Computational modeling

How we'll do it

- Train teachers in data practices, and automation in summer institute and throughout the year as needed
- CT competency consultations with Digital Promise





Join our Padlet to brainstorm various innovations from your area and how it can be used to develop PBL learning opportunities for your students!

Where I’m From Poem Template Activity

Practice using this template as a way to engage students in evaluating their cultural capital as a way to identify ingenuity within their communities!

Presentation Resources