
Thinking Sideways

— Computational Thinking and —
Early Literacy

#ThinkingSidewaysPLA

Objectives

- Learn what computational thinking is, especially in early childhood.
- Be able to make connections between early literacy and computational thinking skills.
- Learn how computational thinking can be introduced in library programs for young children using unplugged and digital activities.

Libraries [Ready to Code]

An Initiative of the American Library Association

librariesreadytocode.org

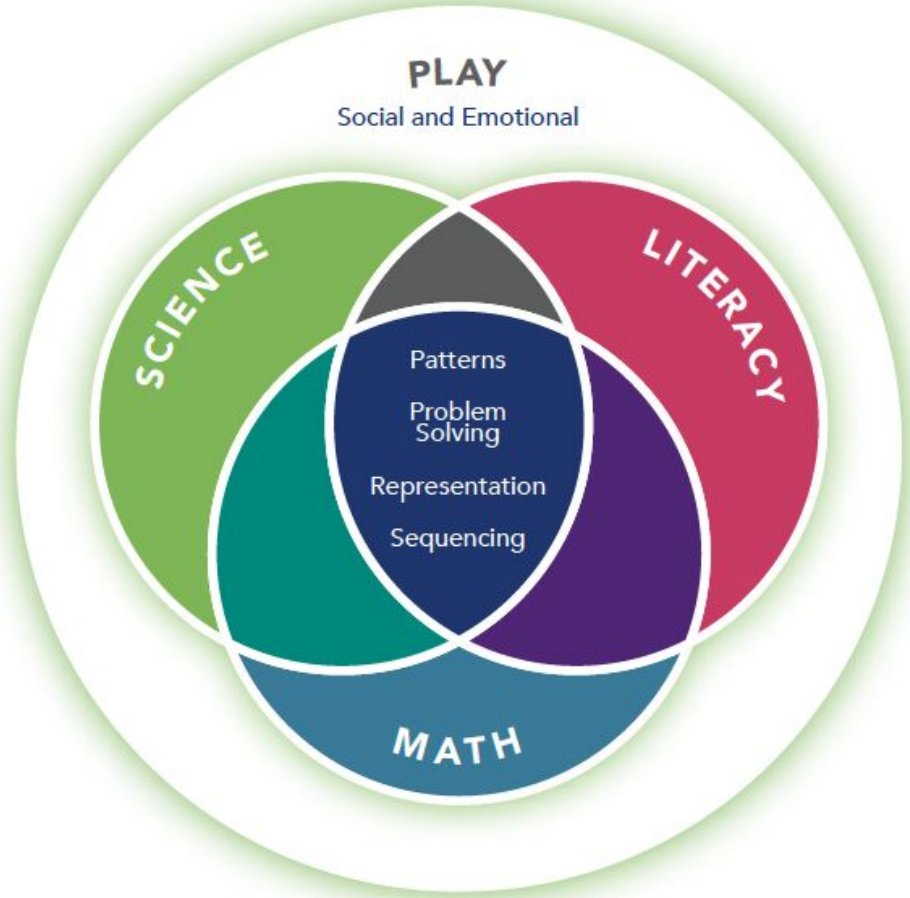
Exercise

Grab a piece of paper and writing instrument.

Draw a “house”. (60 seconds on the clock!)

What is Computational Thinking?

A process that can be used to develop and implement solutions to big, complex problems.



History of CT



1960s
Jean Piaget



1980
Seymour Papert



2006
Jeannette Wing



2016
Marina Umaschi Bers

“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.” --Jeannette Wing (2006)

Why Young Children?



Image: nleer.wordpress.com

“A computational thinker sees computation as more than something to consume; computation is something they can use for design and self expression. A computational thinker sees computation as a medium and thinks, ‘I can create and I can express my ideas through this new medium.’”

-Karen Brennan & Mitchel Resnick

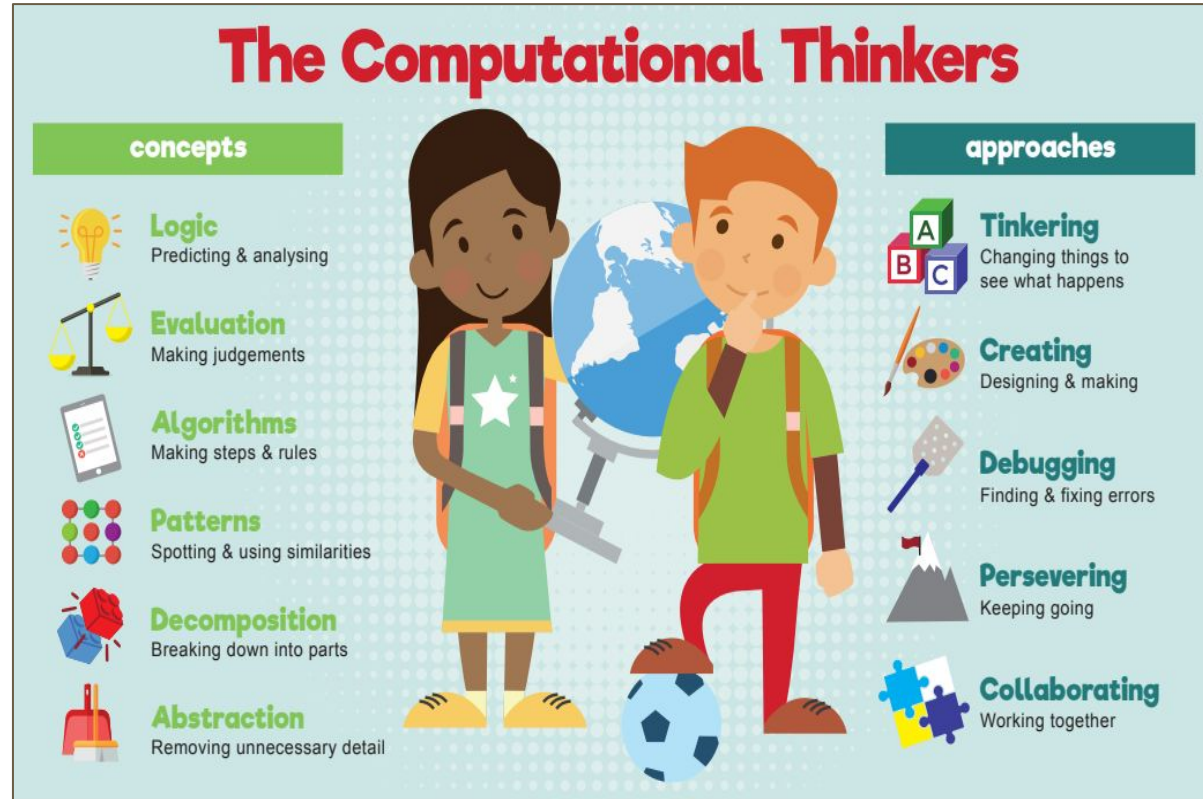


Image: <https://barefootcas.org.uk/wp-content/uploads/2017/02/ComputationalThinkingPoster-small.jpg>

The Ready Readers

Skills

Phonological Awareness

Background Knowledge

Print Awareness

Print Motivation

Vocabulary

Letter Knowledge

Practices



Playing



Singing



Reading



Talking



Writing

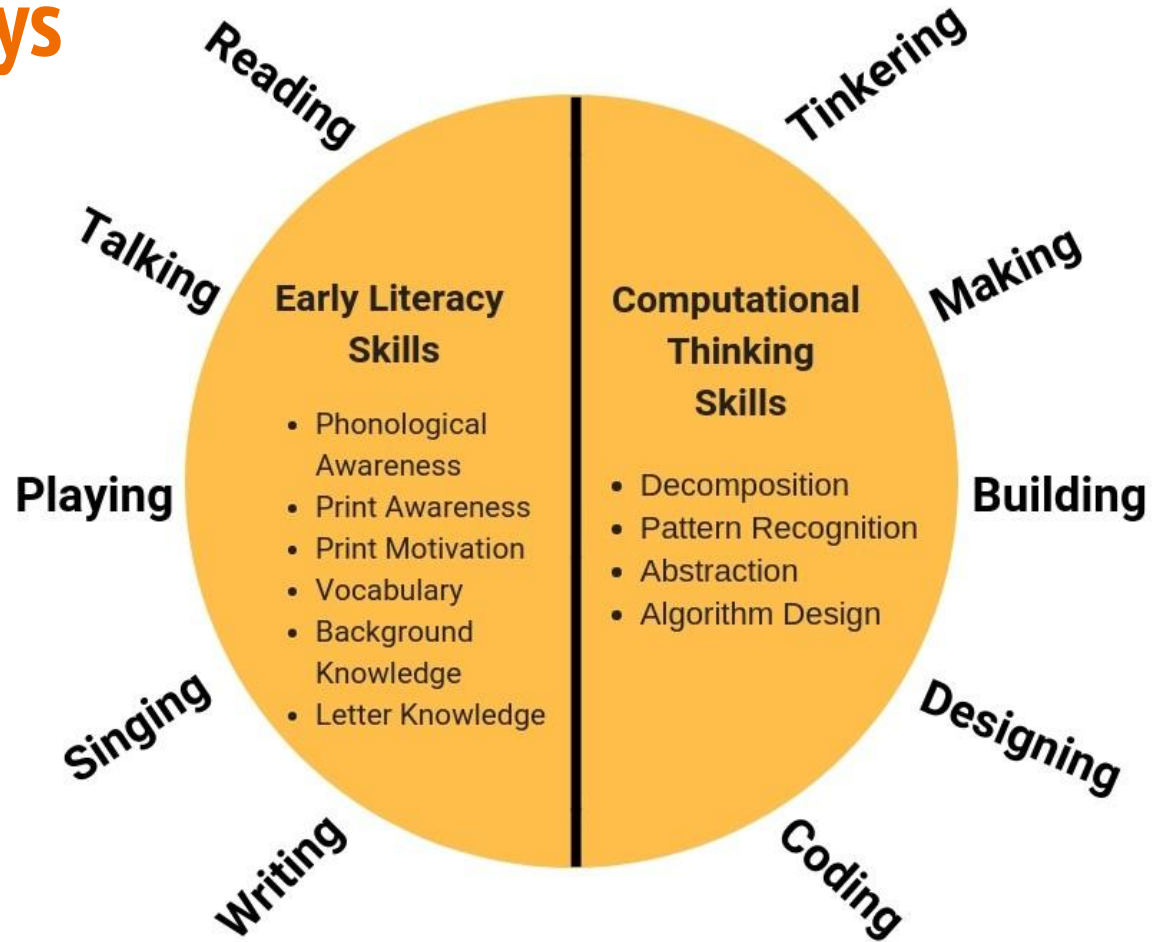
Early Literacy is...

“what children know about communication, language (verbal and nonverbal), reading and writing before they can actually read or write.”

-Katie Campana, Liz Mills & Saroj Ghoting



Thinking Sideways



Breakdown of CT for Young Children

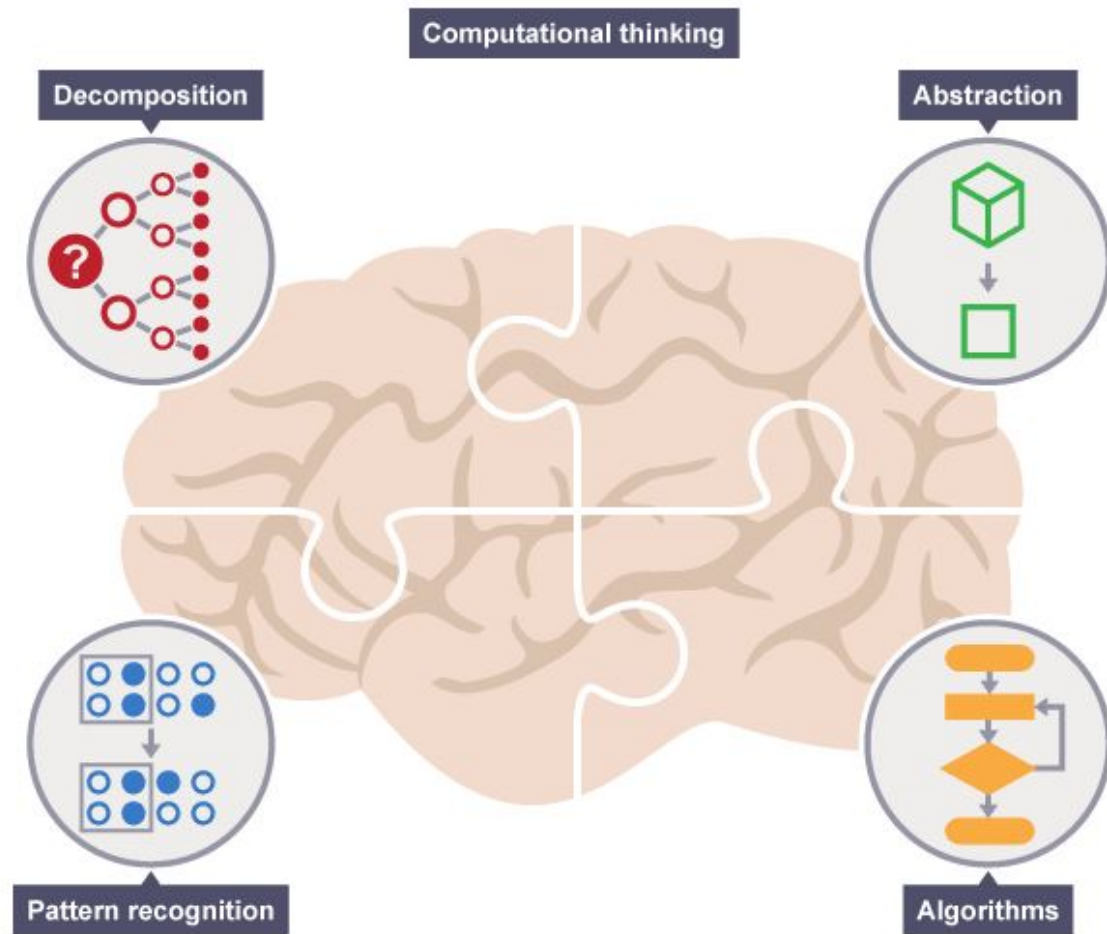


Image: <https://www.bbc.com/education/guides/zxxbgk7/revision/1>

CT: Pattern Recognition



Image: Buzzle.com

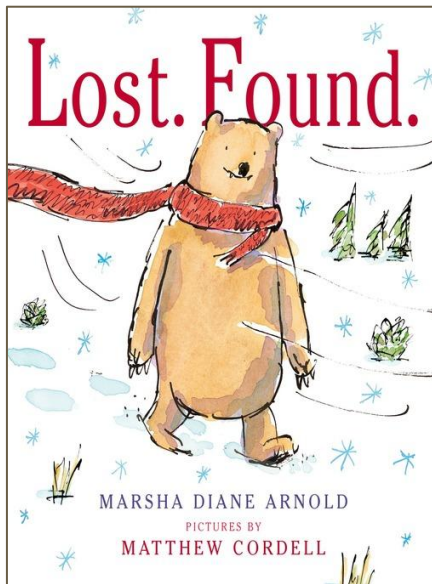
Skill: Identifying and classifying similarities.

Practice: "Simon Says."

PR... *in the library*

Share: *Lost. Found.* by Marsha Diane Arnold and Matthew Cordell

Design: Quiet Blocks Building Challenge



Quiet Block Building Challenge

Can you build a tower like this?

Hints:

- How many layers does it have?
- How many blocks are in each layer?
- Do you see a pattern?
- Which shape of blocks are used in each layer?



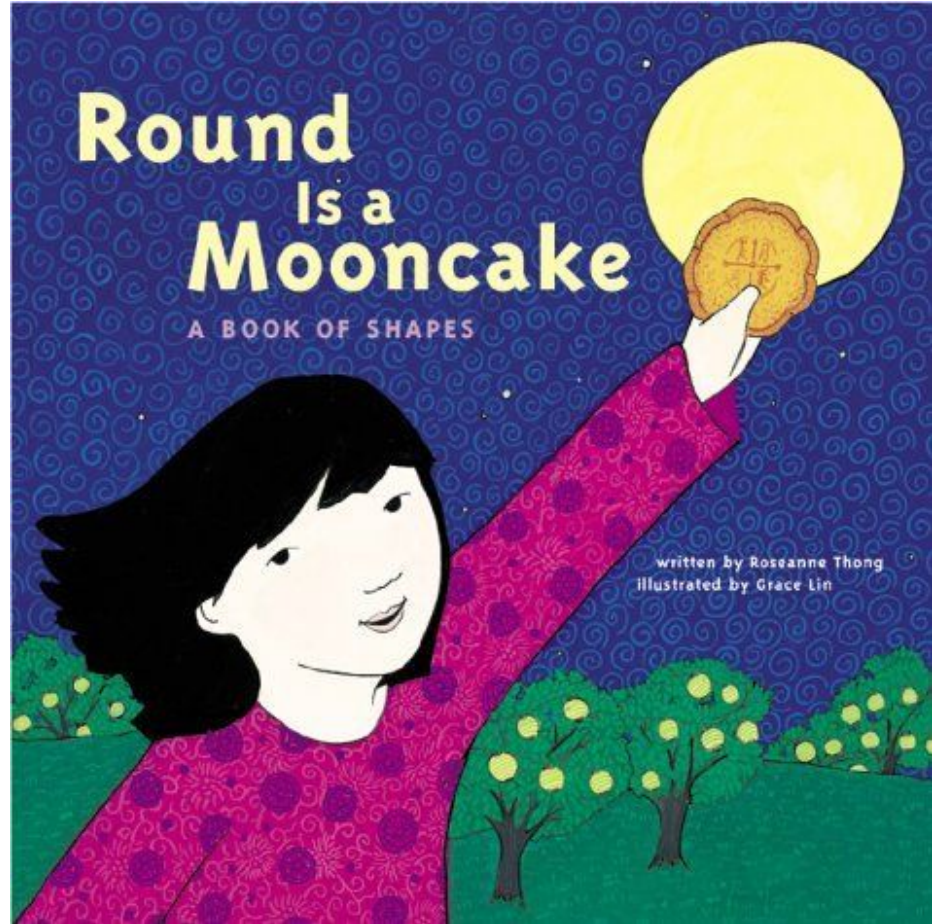
Grown-ups:

Help your child grow their computational thinking skills by asking them problem solving questions as they try to build a similar tower.

PR... *at home*

Share: *Round is a Mooncake* by Roseanne Thong and Grace Lin

Explore: Go on a color or shape scavenger hunt! Look for a specific color or shape, red or triangles for example, in different places you visit around town.



CT: Decomposition

Skill: Breaking larger actions into smaller, easily completed steps.

Practice: Singing and clapping words to break them down into syllables.

Twinkle, Twinkle, Little Star

Twinkle, twinkle, little star
How I wonder what you are
Up above the world so high
Like a diamond in the sky
Twinkle, twinkle, little star
How I wonder what you are



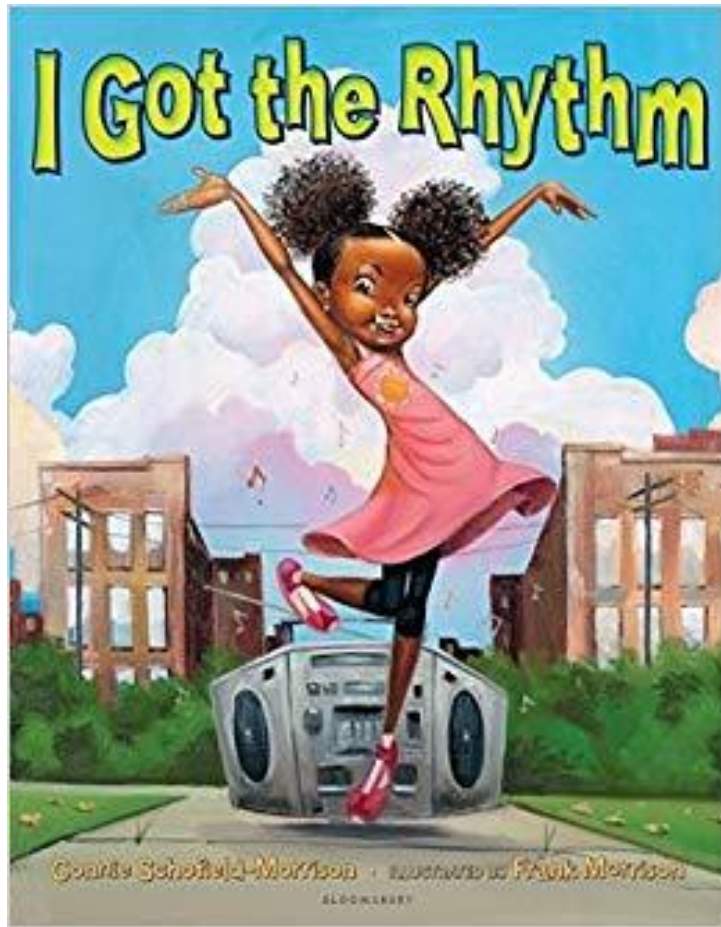
Decomposition... *in the library*

Share: *I Got the Rhythm* by Connie Schofield-Morrison and Frank Morrison

Tinker: Make music with playdough and a Makey Makey



Image: Homer Public Library



Decomposition... *at home!*

Share: *The Red Hen* by Rebecca Emberley and Ed Emberley

Make: Put a lunch together! Talk about the different parts of the meal you want to share. For example, will you include a sandwich, soup, fruit or a specific drink?

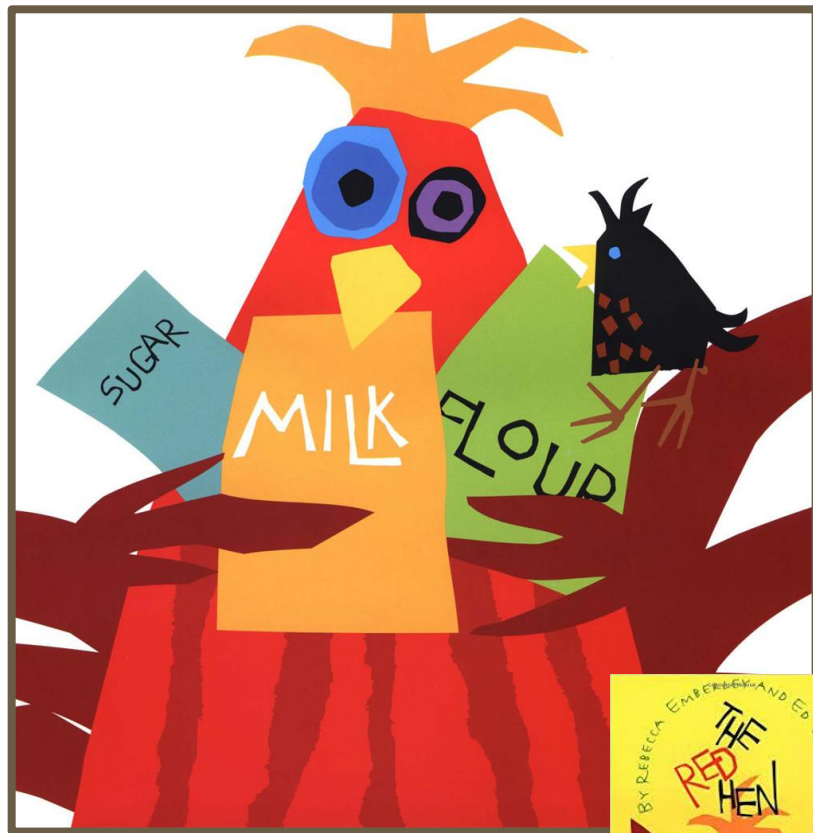


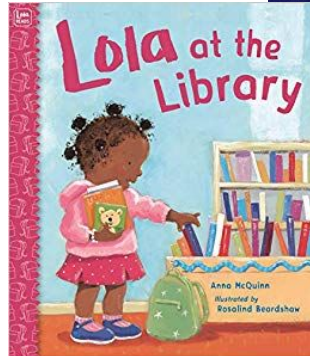
Image: Macmillan



CT: Algorithm Design

Skill: Following a specific order of actions to complete a task.

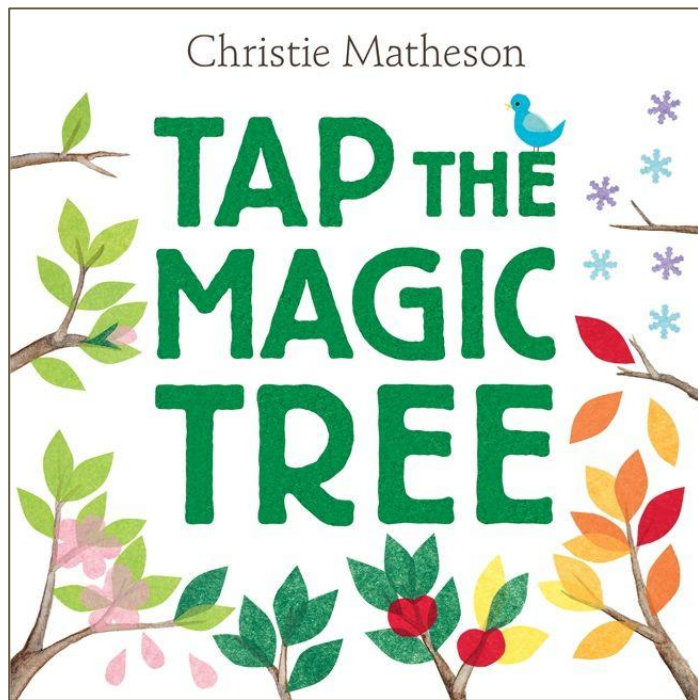
Practice: Share sequential stories like *Go Away Big Green Monster*, *Tickle Monster*, *Dog's Colorful Day*, or *Lola at the Library* with props.



AD... *in the library*

Share: *Tap the Magic Tree* by Christie Matheson

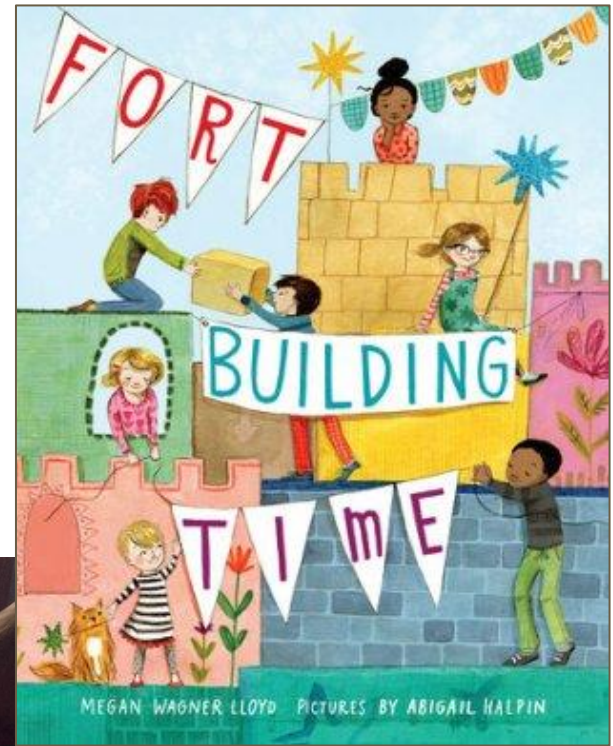
Design: Pick your favorite song and create a dance to match the rhythm. Teach the order of the steps to others. Think about when you want to start moving and if you want to repeat steps.



AD... at home!

Share: *Fort-Building Time* by Megan Wagner Lloyd and Abigail Halpin

Build: Build a fort at home, inside or outside, and talk about what steps need to happen in what order. Is some part of the design not working? Debug and fix it! Or explore seasons with Scratch Jr.



CT: Abstraction

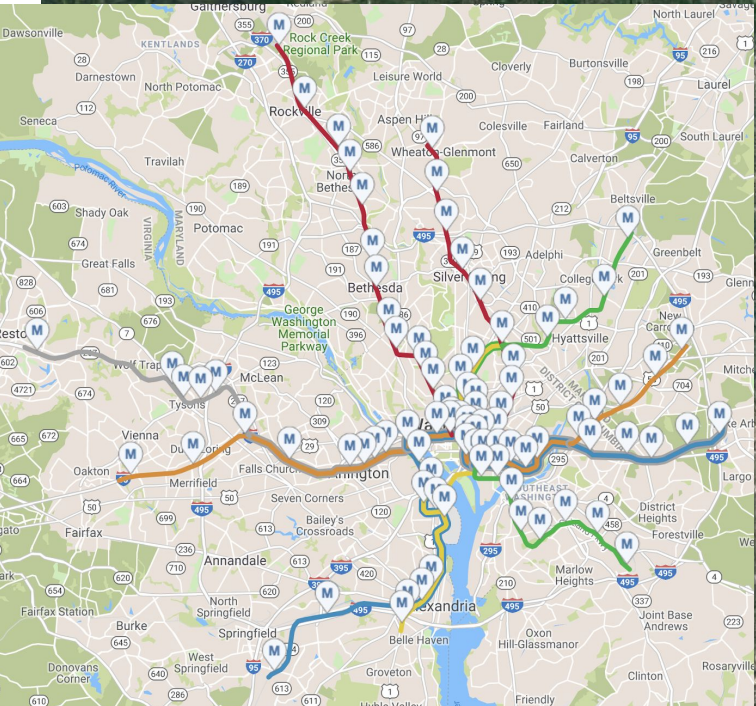
Skill: Simplifying ideas to what is essential or important.

Practice: Retell stories like *The Three Little Pigs*, *Lion Lessons*, *Little Red and the Very Hungry Lion* with movement and props.



Image: Homer Public Library

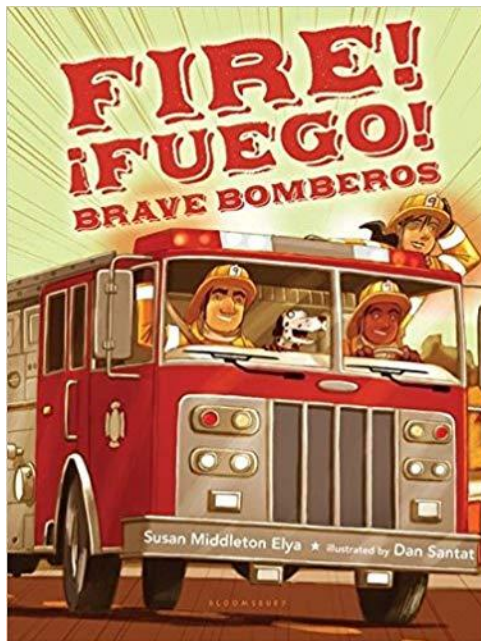
Maps



Abstraction... *in the library*

Share: *Dreaming Up: a celebration of building* by Christie Hale or *Fire! Fuego! Brave Bomberos* by Susan Middleton Elya and Dan Santat

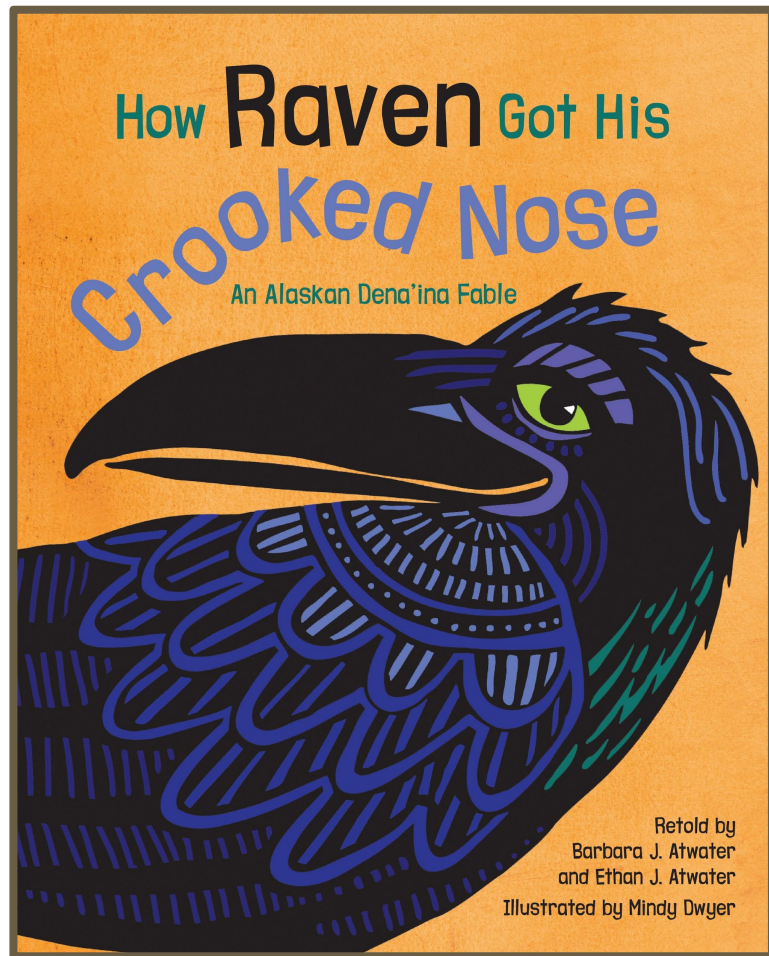
Designing: Choose a favorite story and share it through different medium: act it out with movement; write reader's theatre scripts, retell it with your own words and pictures.



Abstraction... *at home!*

Share: *How Raven Got His Crooked Nose: An Alaskan Dena'ina Tale* by Barbara Atwater, Ethan Atwater and Mindy Dwyer

Create: Re-purpose household or found materials to make a raven mask. Talk about what a beak does, what characteristics it needs and what it should look like.

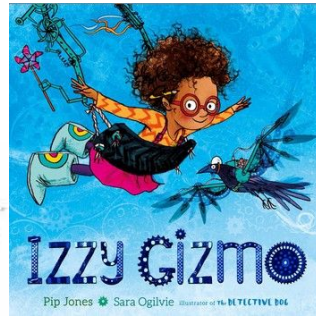


CT Mindset

"Yes!" Izzy said. "The right shape, perfect weight . . ."



"I'VE HAD IT!" yelled Izzy, heading straight for a bin.
But the crow blocked her path. He just wouldn't give in.



Art

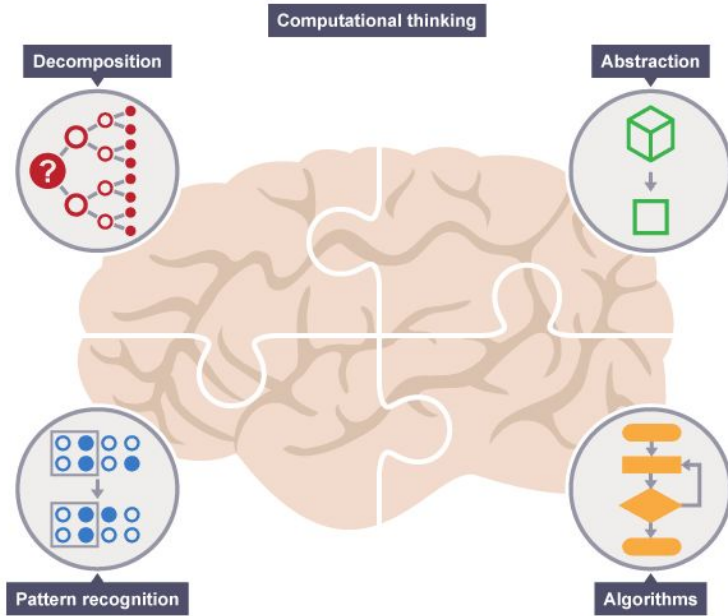
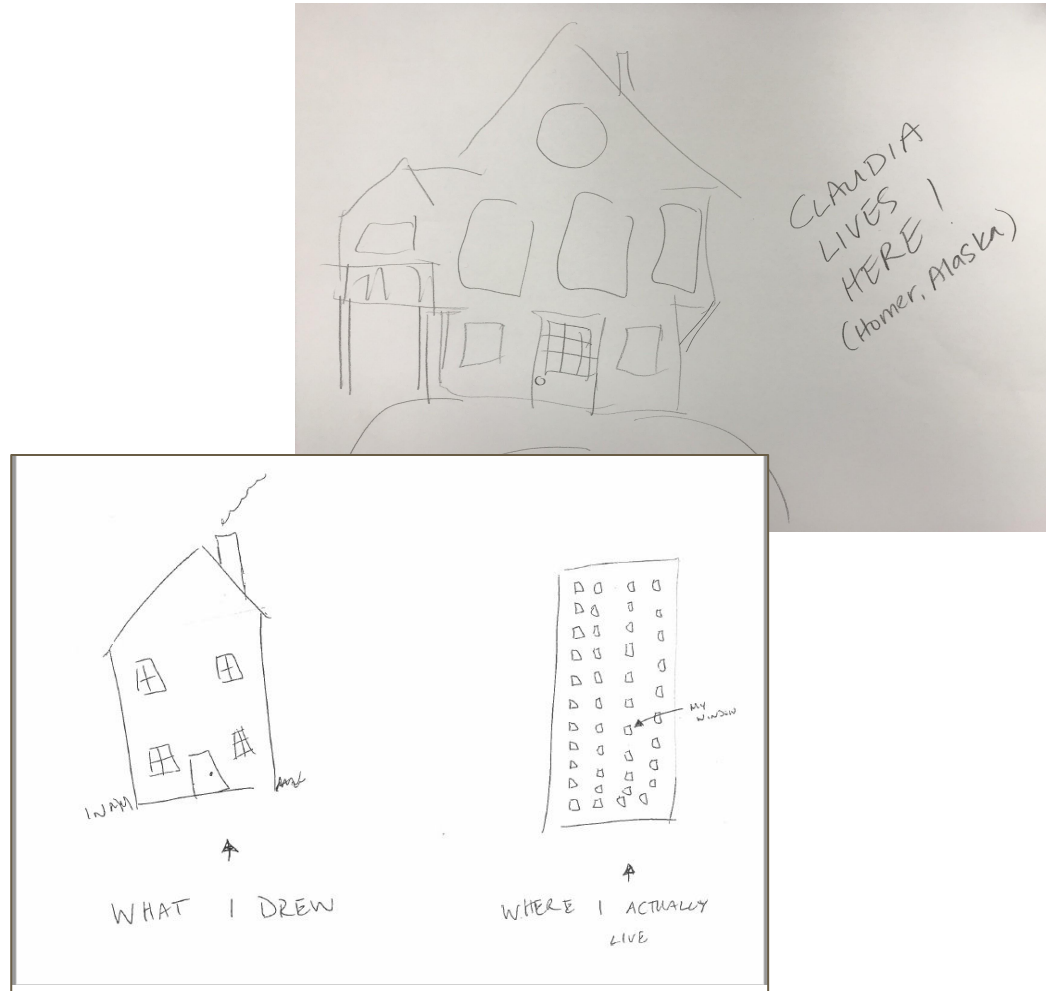


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CT with families in Washington D.C.

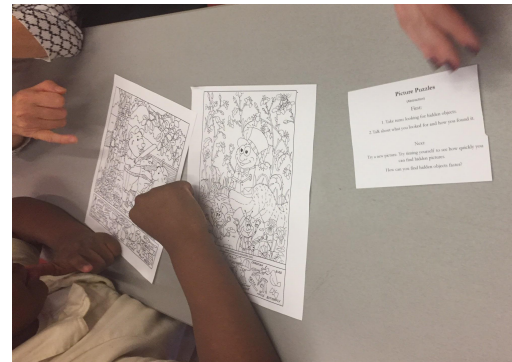
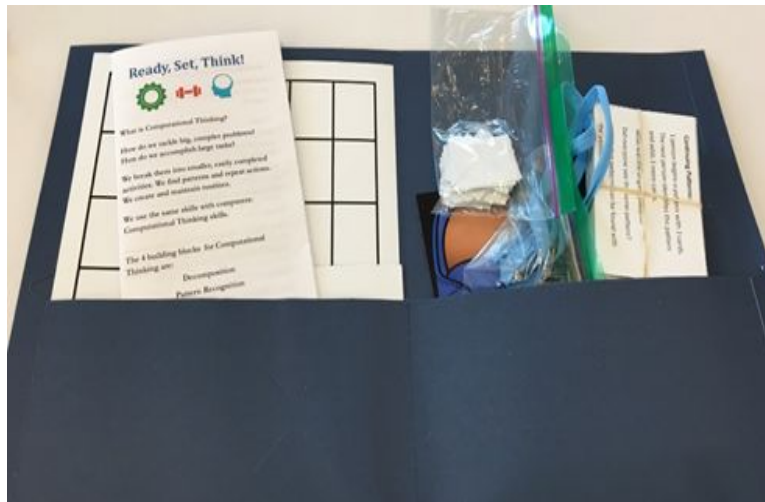


Decomposition

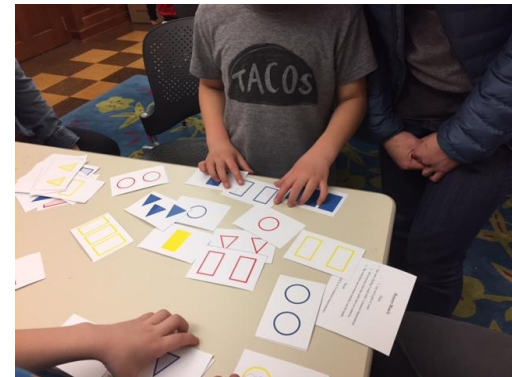


Algorithm Design

Take Home Packet
Everyday materials ready for family
engagement

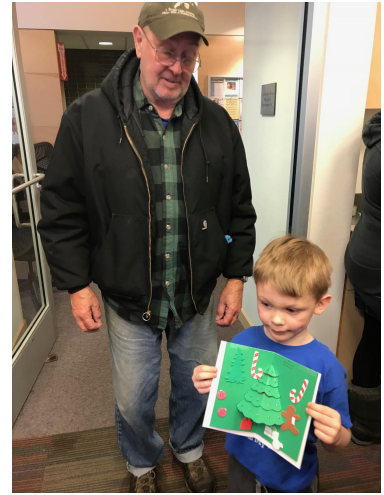
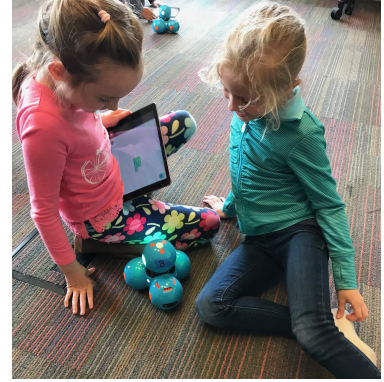


Abstraction



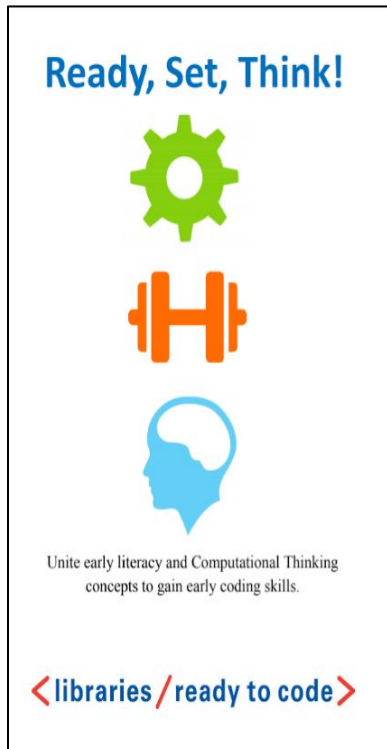
Pattern Recognition

CT with families in Homer, Alaska

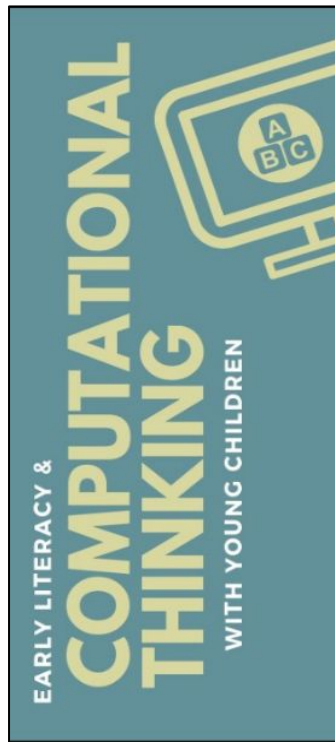


Images: Homer Public Library

Talking with Families about CT



Pamphlet link:
https://drive.google.com/file/d/19usKLQo_puizAcwMOG1Y_PQRbJx6X0ii/vi?usp=sharing



Pamphlet link:
<https://drive.google.com/file/d/0B7T8RDGgL8e8YndhVlhEbKJRZmJyU2RBX3RmcVdyLWJwb09J/view?usp=sharing>

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