

# STEMATH

Northern Rockies AER 2022



AMERICAN  
PRINTING  
HOUSE





# Leslie Weilbacher

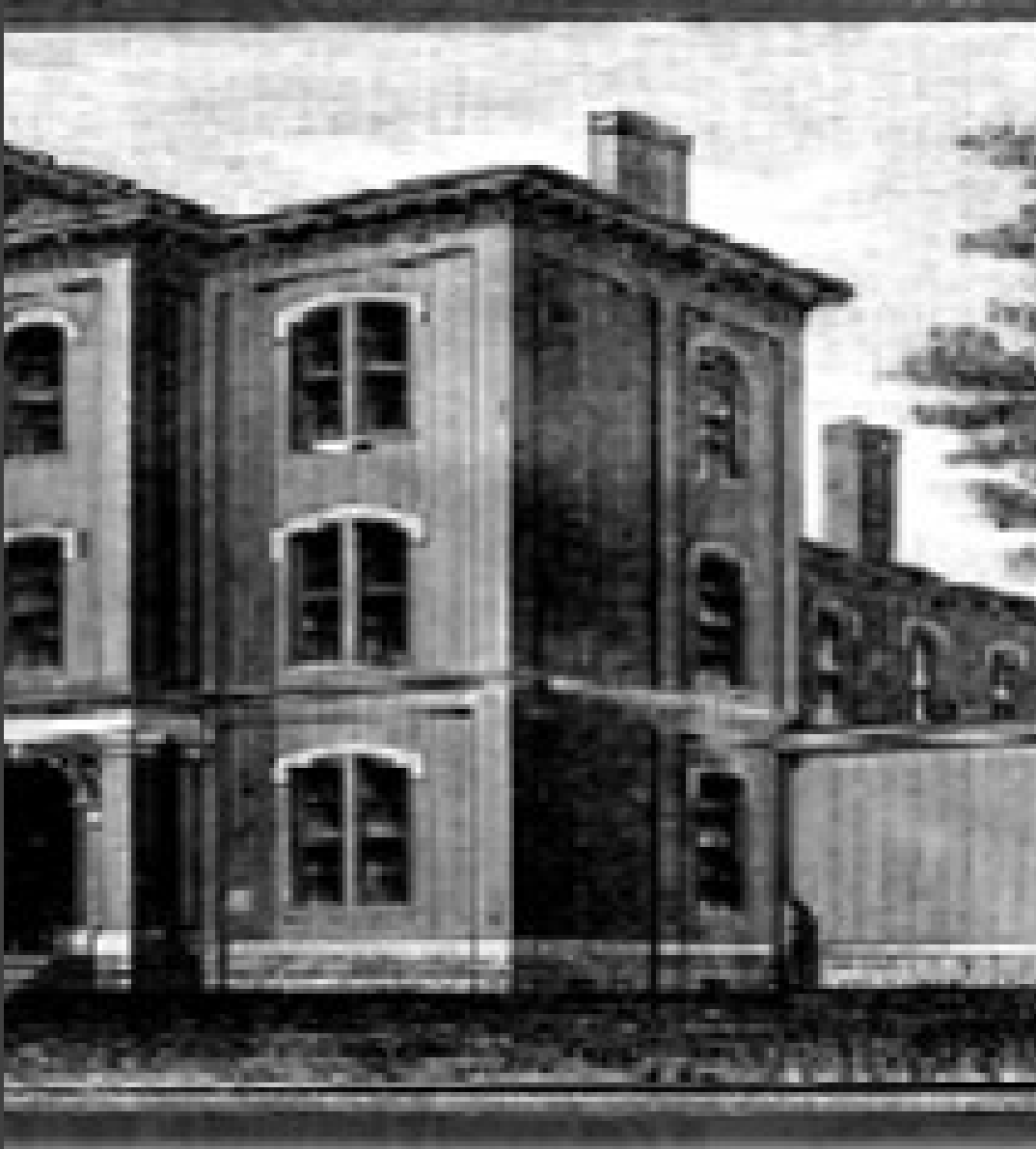
Outreach Specialist -  
Northwest

American Printing House for the Blind



# BACKGROUND





# ***The American Printing House for the Blind***

***The American Printing House for the Blind is the world's largest company devoted solely to creating products and services for people who are visually impaired. APH was founded in Louisville, Kentucky in 1858, making it the oldest institution of its kind in the United States.***

# Outreach Services Goal

The goal of the Outreach Services department is to promote the education of the blind by increasing awareness about the many products and services offered by APH. This includes but are not limited to the following: distance learning and statewide/nationwide training opportunities; exhibits and presentations at regional, statewide and national conferences; expanded core curriculum academies/professional learning communities; and parent and family training opportunities.

# **S. T. E. M. = STEM**

What do Science, Technology, and Engineering have in common?

At some point you will use MATH

# The M in STEM

“Mathematical research and education are at the heart of some careers, while other careers utilize mathematics and its applications to build and enhance important work in the sciences, business, finance, manufacturing, communications, and engineering.”

--The American Mathematical Society





# MATH LEARNING PRODUCTS

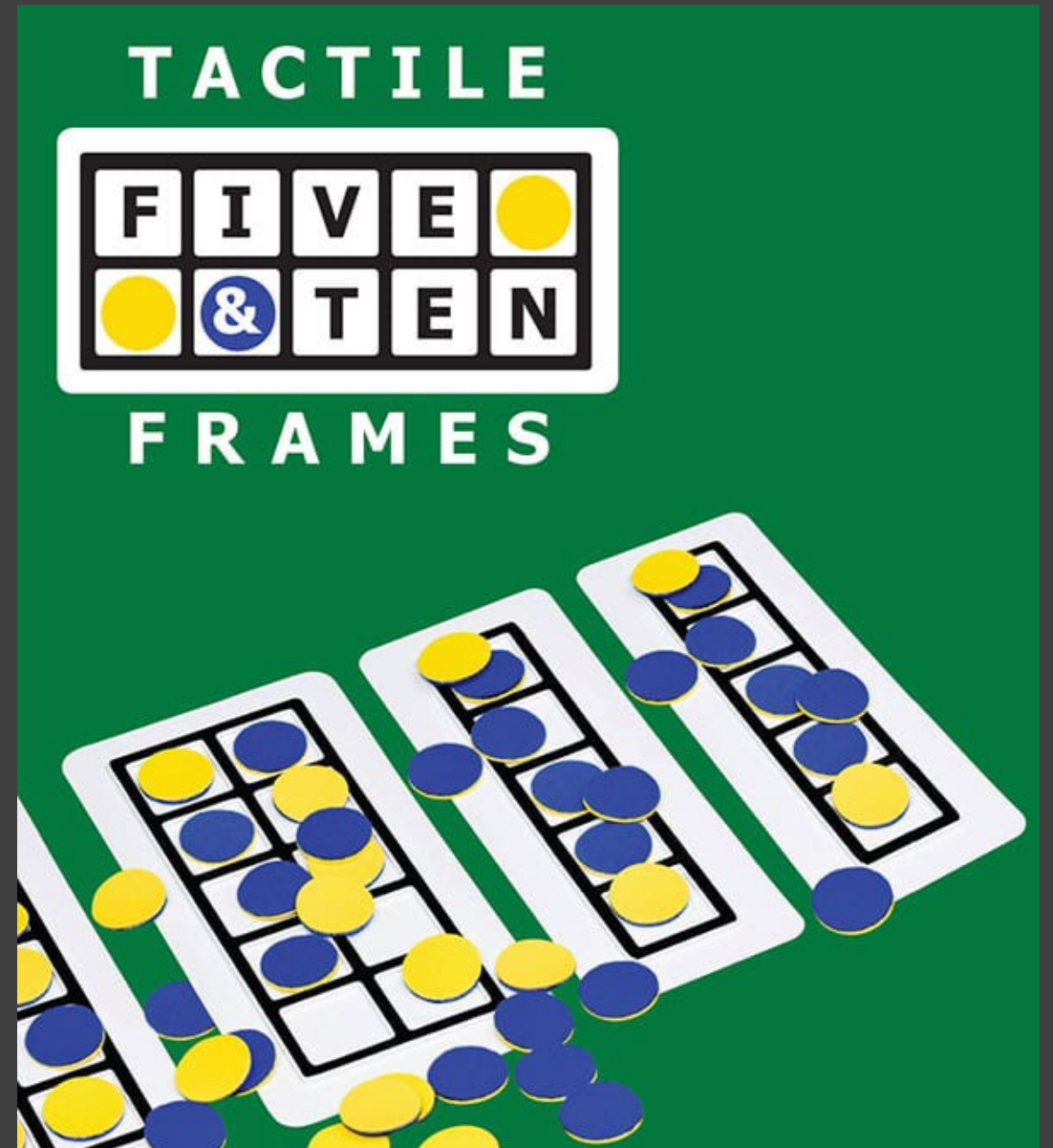
Foundation of STEM





# Tactile Five & Ten Frames

Learning and understanding that numbers are composed of tens and ones is an important foundational mathematical concept.



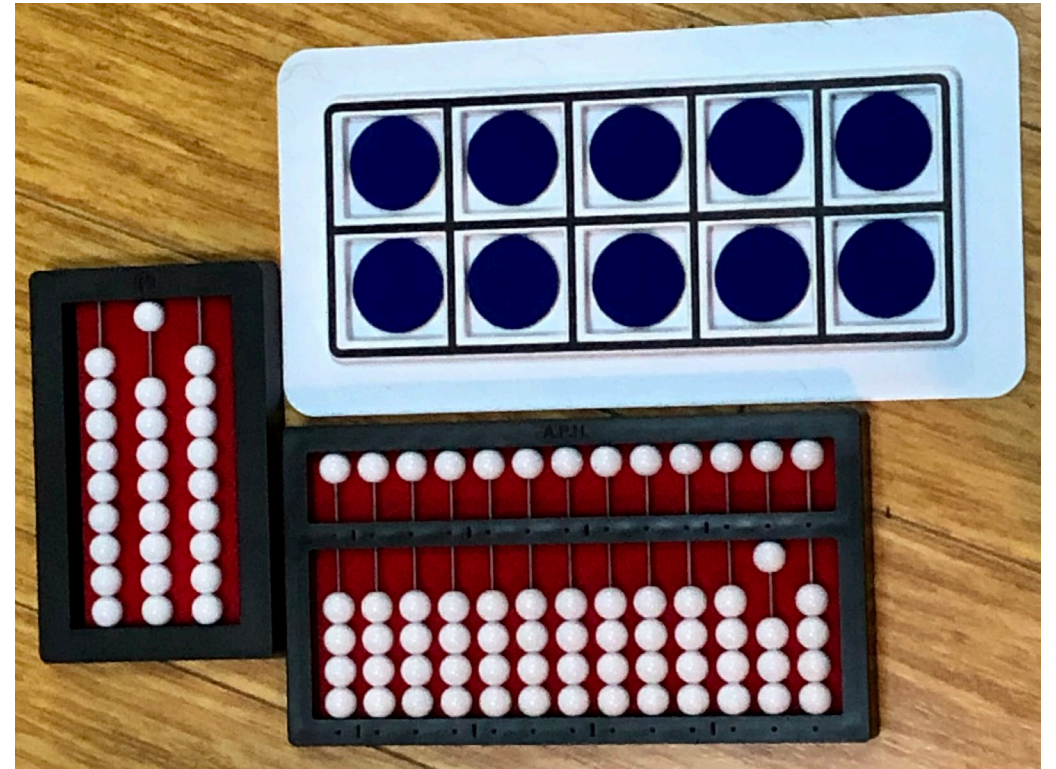
# A Sense of 10

- Numbers are composed of tens and ones
- Number sense,
- Composing and decomposing numbers,
- Place value understanding, and
- Mental calculations

# Other Concepts

- Top to bottom, Left to right
- 1 to 1
- Sets of five and ten
- Develop subitizing skills
  - Instantly see how many
- Lead into abacus
- Foundational for Coding and more...

# The 5 Bead and Place Value



# Tactile Algebra Tiles



Tactile Algebra Tiles are colorful, magnetic tiles that can be manipulated on a steel board to assist students in solving math problems.

# Introduce the Concepts

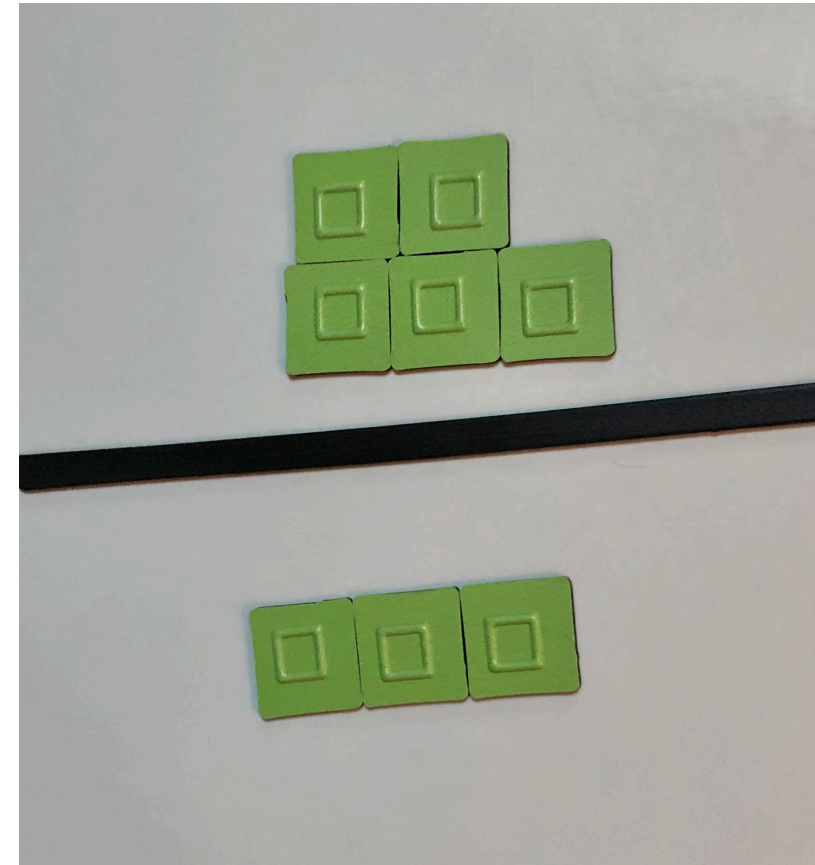
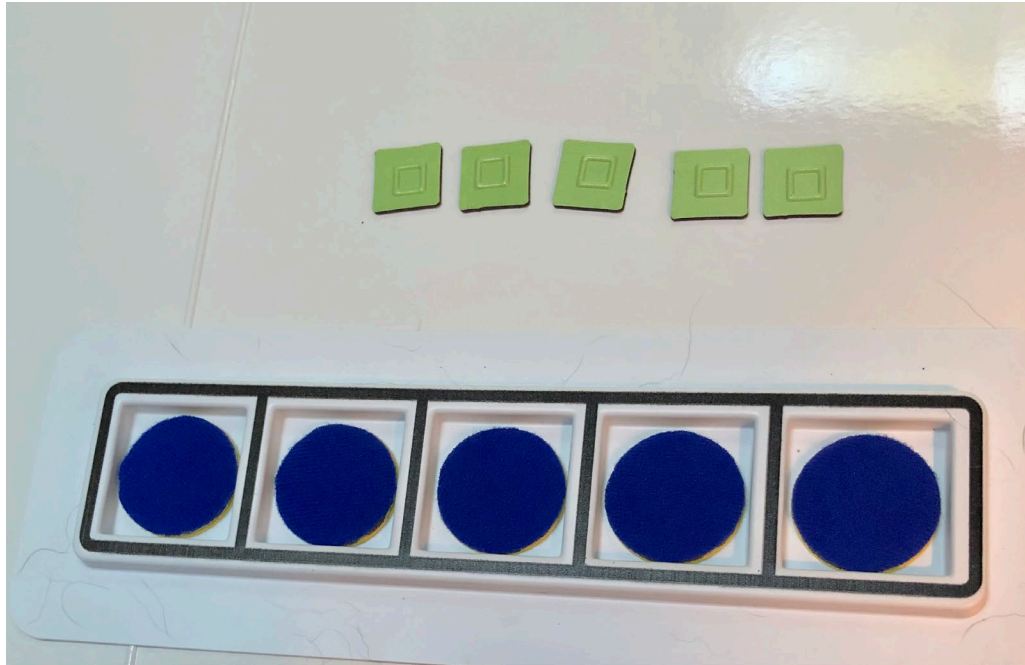
- Adding, subtracting, and multiplying integers
- Simplifying expressions
- Solving linear and quadratic equations, and
- Adding, subtracting, multiplying, and factoring polynomials

# More Than Algebra

- 1 to 1
- Sorting
- Addition and Subtraction
- Subitizing
- Lead in from 5 and 10 Frames

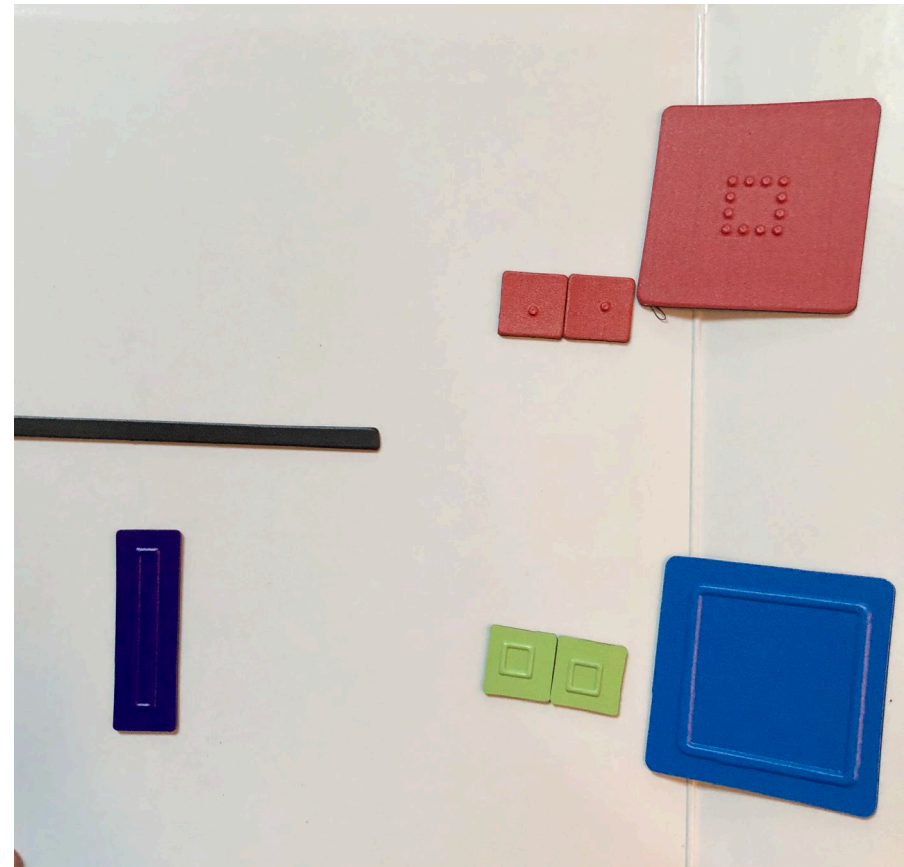
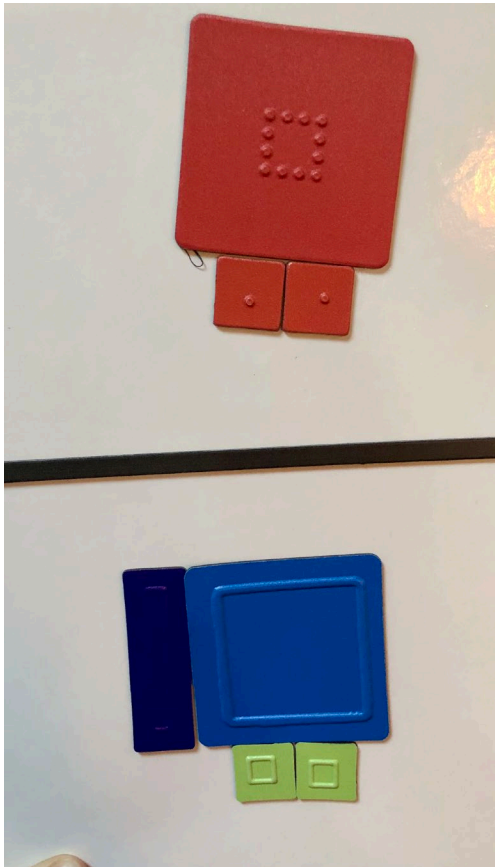


# 1 To 1 and Addition





# Compare and Balance





**LET'S TRY IT!**

You try



# CodeQuest



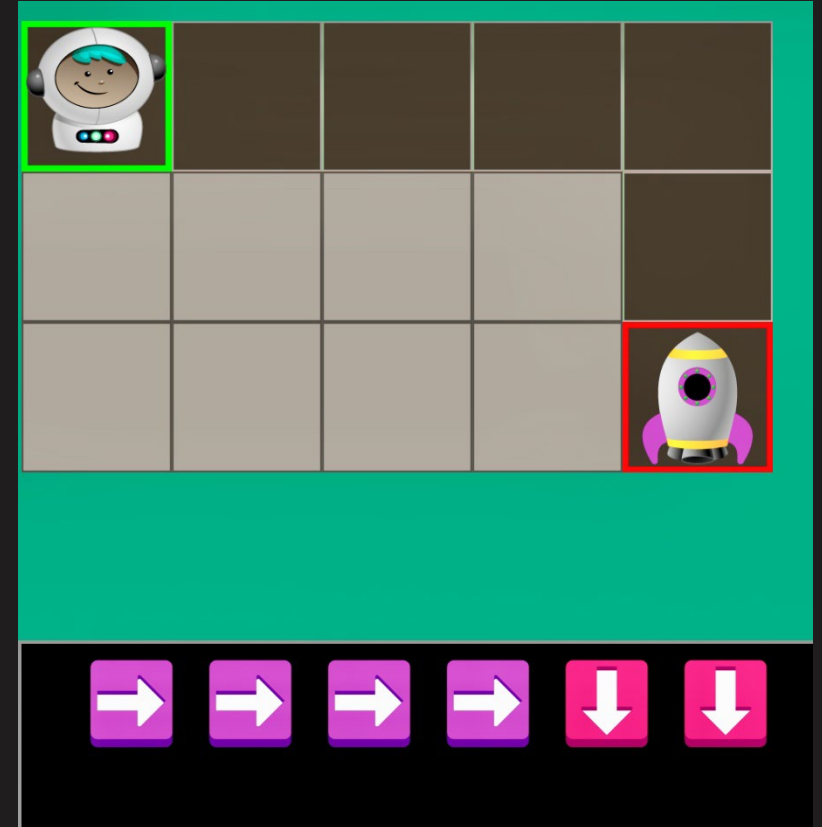
We are the programmers of the spaceship's computer ZX-5  
We program the directions the astronaut needs to get back to the ship

Sometimes the path the astronaut takes is simple and sometimes there are walls to blast through and aliens to pick up

There are 5 planets to explore and 6 levels per planet

# Math Concepts-What is a Grid?

- Rows from left to right
- Columns from top to bottom
- Find the coordinates



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# **LET'S CHECK IT OUT!**

Demonstration





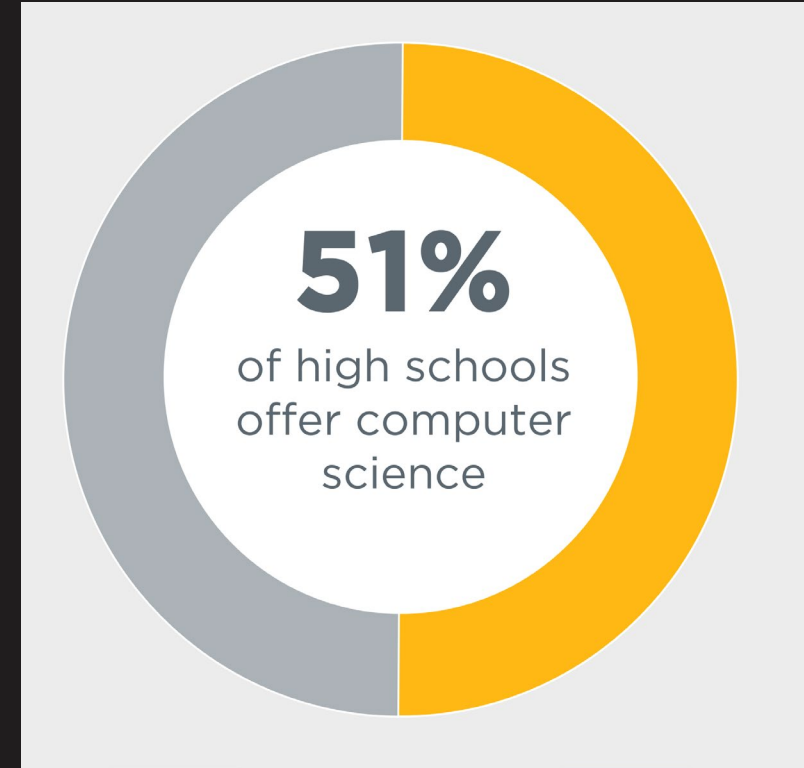
# THE ROAD TO CODE

Computer Science concepts



# Why STEM/Computer Science?

- Major part of our lives
  - A need for diversifying the field
  - Job opportunities
  - It's fun
- Code.org



# Why Coding Foundational Skills

- 29.5% of adults with a visual impairment are employed in the US
- 2X faster growth of jobs in the CS field
- 2.5% of all undergraduate degrees awarded in computer science.
- 50% of top paying jobs in the US require some coding skills
  - (Burning Glass Technologies (2016) *Beyond point and click: the expanding demand for coding skills*, Retrieved from [www.burning-glass.com](http://www.burning-glass.com)).





# Code and Go Mouse

- Build different mazes on a grid-style board by replicating the tactile graphics
- Tactile/braille coding cards to map out a step-by-step path
- Enter that sequence into the mouse by pressing the forward, reverse, right, and left buttons on the mouse's back.
- Hit the Go button and watch the mouse race to the cheese!
- Learn problem-solving, critical thinking, if-then logic, O&M skills, route planning, and much more.



# Code Jumper

- Block coding on the table in front of you
- Build the code by connecting pods
- Physically create computer code
- Plays stories and music
- Learn more advanced coding concepts



# Math Apps

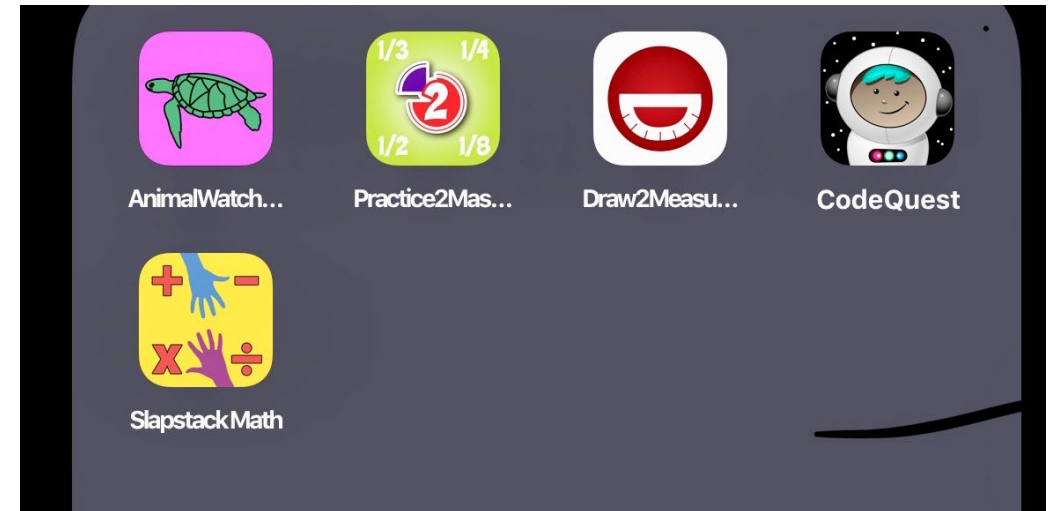
Math Robot

Slap Stack Math

Animal Watch

Practice2Master Fractions

Draw2Measure Protractor





# **BUILD IT**

Robotics and Circuits



# Electronics and Robotics

## Snap Circuits Jr Access Kit

Build real circuits to power a fan, light, and play a song

## RC Snap Rover Access Kit

Build your own remote control car with the concepts of electronics you learned from Snap Circuits

# Snap Circuits



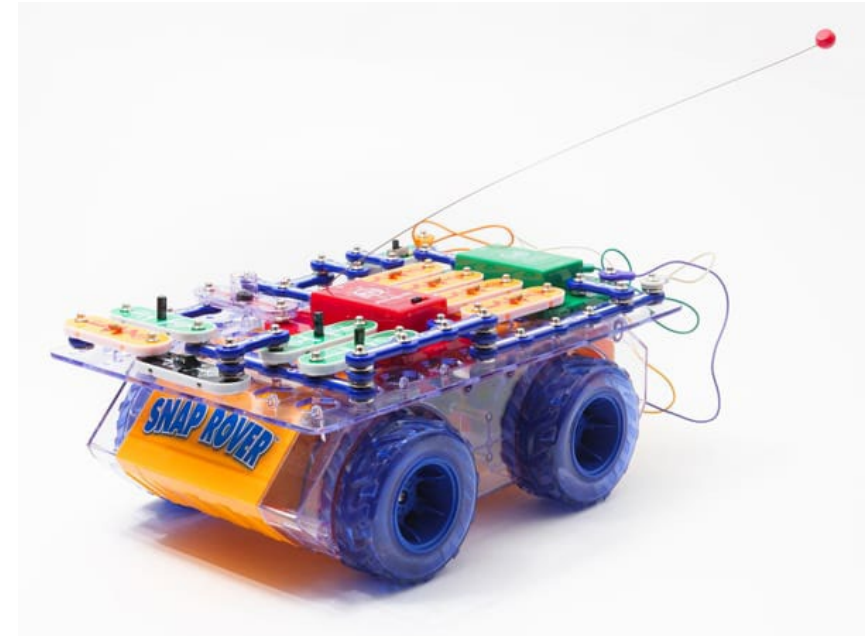
Learn about:

- Circuits,
- Current,
- Resistance,
- Switches,
- Motors, and
- Other basic electronics concepts

# RC Snap Rover

Build:

- Remote controlled rover
- Light following rover
- Water detector
- Salt water detector
- Generator using motor
- Capacitor battery
- and other amazing projects



# More Circuits

## BRIC Structures Access Kit

Build real world structures that run on electricity

## Snapino Access Kit

Snapino is an introduction to the open-source  
Arduino® hardware-software coding environment

All 4 kits can build off each other



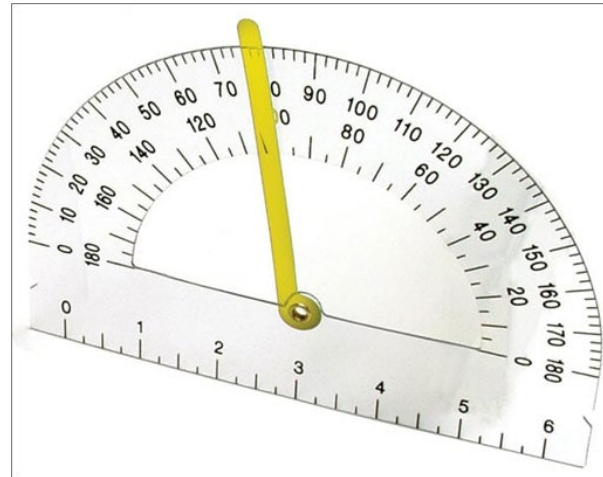
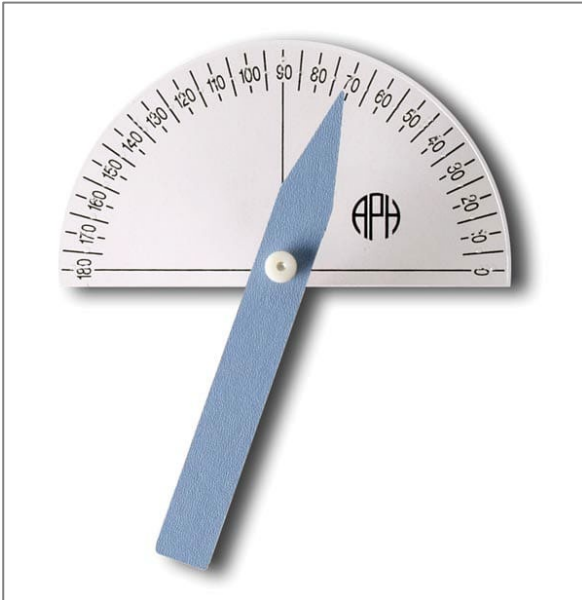


# **MATH & SCIENCE PRODUCTS**

There's more...



# Braille-Large Print Protractors



- This is a braille-large print protractor with pivoting wand that allows for tactile exploration of angles.
- Large Print only

# Quick Picks

Independent practice or challenge a friend

Multi choice questions

Make a choice with the wooden tool

If correct cards comes out of case

No battery or screens needed

Braille contractions, Addition, Subtraction,  
Multiplication, and Division



# Geometro Sets



Geometro materials provide hands-on experiences with manipulatives that aid in teaching 3-D geometry.

Large: 1-03024-00

Medium: 1-03023-00

Mini: 1-03022-00

Cylinder and Cone: 1-03030-00

# Adapted Science Materials Kit



- Enables students with visual impairments to participate in science lessons and experiments alongside their sighted peers.

# Azer's Interactive Periodic Table Study Set (NEMETH)



- Designed to make the Periodic Table of the Elements accessible to students with visual impairments and blindness.

# Submersible Audio Light Sensor (SALS)

- Waterproof light detecting probe
- Converts changes in light to sound
- In the air or a liquid
- Free iOS or Android app
- Makes many science activities accessible to students



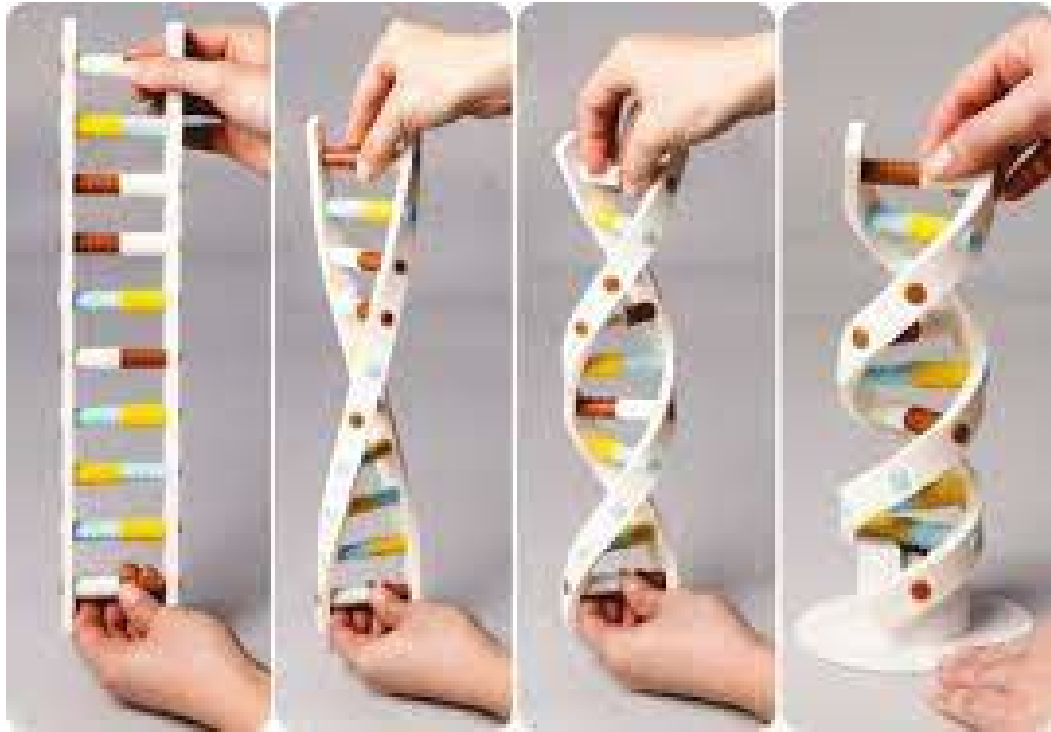
# Build-A-Cell



- Build and discover the different characteristics of bacterial, animal, and plant cells with Build-A-Cell.



# DNA Twist



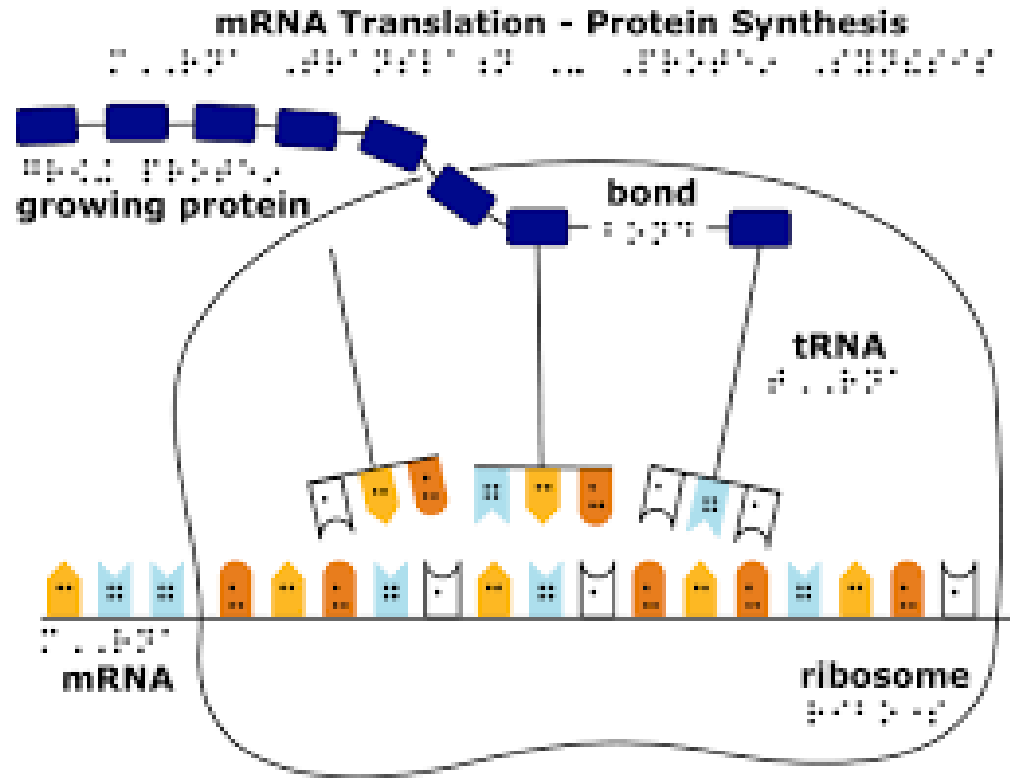
- Learn about the structure of the DNA molecule with this accessible DNA model.

# DNA-RNA Kit



- Learn about the formation of single and double strands of DNA, DNA replication, and transcription of DNA to messenger RNA with this accessible kit.

# Protein Synthesis Kit



- Decode messenger RNA with the genetic code and create transfer RNA molecules that bring amino acids in the correct order to form a protein.



# RESOURCES

Services and programs





# Access Academy

## For the Professionals

- Your one-stop resource for the meaningful education and training webinars you need to get the most out of APH products and services
- Live and recorded



Access  
Academy

## Information for Classroom, Home and Workplace

- Tutorials on new products
- Hacks on how to get the most from your beloved technology
- Information on resources, services, and programs
- ACVREP credit for live events



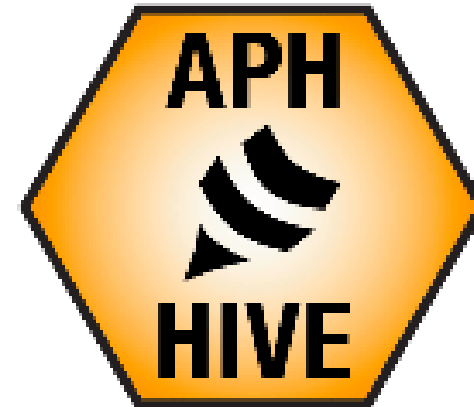
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# Learning Management System



# The Benefits

- One-stop shop for professional development
- FREE
- ACVREP credit
- Resources
- Self-paced learning





# One of a Kind

- ❖ Offers both FREE access and ACVREP credit
  - ❖ Bite-size instructional video modules
- ❖ Activities that bridge learning with professional application
  - ❖ Peer reviewed content



# APH Resources

- [National Prison Braille Network](#)
- [Museum](#)
  - [Migel Library](#)
  - [Hall of Fame](#)
- [InSights Art Contest](#)
- [Accessibility Hub](#)
- [NIMAC](#)
- [Louis Database](#)
- [Tactile Graphics Image Library](#)



# THANK YOU

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# Wrap Up

