Educator Resource Guide
COMPUTATIONAL THINKING

Science Museum of Minnesota

SUMMARY

This guide offers a curated selection of computational thinking curricula, technical resources, and pedagogical supports for educators of diverse computer science experience levels, developed by Science Museum of Minnesota instructors.

Want to create your own copy of this unit overview to use or share? Click here.

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Lesson Plans and Activities

Introduction to Computational Thinking Unit

A four-lesson unit for grades 3-5 during which students learn that understanding how to effectively combine what humans do well and what computers do well is Computational Thinking (CT). Students explore algorithm design and share their projects using Scratch.

Length: Four 60-minute lessons

Mystery Objects Mini Lesson

Explore the unique strengths of humans and computers in this object-based investigation. This activity is excellent for examining computers' prevalence in our lives, understanding how important human qualities are in

computing, and preparing for further explorations of computational thinking and coding.

Length: Approximately 30 minutes

My Robotic Friend Mini Lesson

In this 'unplugged' mini lesson from Thinkersmith, students explore the connection between symbols and actions, as well as the valuable skill of debugging, by figuring out how to guide one another to accomplish specific tasks without discussing them first. See a demonstration of this activity on YouTube!

Length: Approximately 60 minutes

CS Toolkit: Ara the Star Engineer (1st Grade)

Students listen to a read aloud of Ara the Star Engineer, begin to understand some characteristics of computer scientists, and start to envision themselves in the field of computer science.

Length: Approximately 40 minutes

CS Toolkit: Gabi's If/Then Garden (2nd Grade)

With the help of Gabi's If/Then Garden, second graders will read a book introducing the concept of if/then statements, then play a game with a partner to practice giving if/then instructions. Students will connect if/then to ideas of cause and effect.

Length: Approximately 45 minutes

CS Toolkit: Sporty Algorithms & Sporty Bugs and Errors (3rd Grade)

With the help of the Sporty series, students do sports-related activities in stations to practice writing algorithms, identifying bugs, and correcting code.

Length: Approximately 45 minutes

CS Toolkit: Train Your Brain with Activities Using Loops (4th Grade)

The Train Your Brain series helps students learn to think like computer programmers. This book includes 12 different activities centered all around loops (repeating patterns used in computer code) that you can incorporate into your class as you see appropriate.

Length: Approximately 60+ minutes

CS Toolkit: Train Your Brain with Data Activities (5th Grade)

The Train Your Brain series helps students learn to think like computer programmers. This book includes 12 different activities centered all around data collection, organization, and visualization that you can incorporate into your class as you see fit.

Length: Approximately 50 minutes

Number Sorting Activity Station

Have you ever wondered how computers make decisions? See an algorithm in action when you choose six random numbers and use a logic tree to sort them like a computer does! This activity is part of our Celebrate Computational Thinking! family event and works well as a standalone activity or as part of a rotation of CT activities.

Binary Beading Activity Station

Binary is a language we use to talk to computers, and we can use it to talk to each other too! Build each letter of your name in binary code using the pattern in the code key, or write a message for someone else to decode! This activity is part of our Celebrate Computational Thinking! family event and works well as a standalone activity or as part of a rotation of CT activities.

Cup Stacking Activity Station

What do you think you could build with only five cups? How would you stack them? How would they balance? Build a cup tower that is tall, strong, balanced — or set your own goal! This activity is part of our Celebrate Computational Thinking! family event and works well as a standalone activity or as part of a rotation of CT activities.

Pipe Shape Building Activity Station

Free build with PVC pipes, using two different fittings to connect your shapes together. Look for patterns in the shapes you build, and think about new ways to connect your shapes together! This activity is part of our Celebrate Computational Thinking! family event and works well as a standalone activity or as part of a rotation of CT activities.

Movement Patterns Activity Station

Get moving with patterns! Use light-up Simon games and dance mats to see and feel patterns. How long of a pattern can you memorize? This activity is part of our Celebrate Computational Thinking! family event and works well as a standalone activity or as part of a rotation of CT activities.

Scratch and Technical Resources

Signing Up for a Scratch Teacher Account

A video walk-through of how to sign up for a Scratch teacher account, with one of our own CT instructors.

Introduction to Scratch — Professional Learning Session

A visually rich workshop offered by museum instructors about getting started as an educator in Scratch, great for beginners individually or in a group!

Strategies for Supporting Multi-Language Learners in CS Education

Strategies and resources for supporting multi-language learners in CS education, including several downloadable resources for making Scratch accessible to a wide variety of language learners.

Scratch Surprise

This video will lead you through a project called “Scratch Surprise,” a great activity for people who are just getting started with Scratch. The goal of this activity is to explore what’s going on in Scratch and make the Scratch Cat do something surprising. This activity is part of a guide called “The Creative Computing Guide to Scratch.”

Interactive Collage Introduction

This video will help you get started with your interactive collage project in Scratch. The interactive collage activity is part of our 7-lesson unit “Observing Nature,” in which students use the computational thinking practice of abstraction to observe the natural world, determine the main idea of an informational text, and plan and code an interactive digital collage to illustrate their thinking.

Interactive Collage Loops

This video will walk you through creating loops in Scratch. Loops can be part of an algorithm in Scratch that repeats, or makes your Sprite do something over and over again. Using loops can help you save time and use fewer blocks. Loops are explored in both our "Observing Nature” and “Lines, Polygons, and Play” integration units.

Scratch Debugging Guide

An extensive guide with tips and tricks for getting started in Scratch, working through problems with your Scratch code, ideas and support for using Scratch in the classroom, and debugging strategies to share with your students.

Teacher Accounts Guide from Scratch

A guide to creating teacher accounts, making classes, and adding students created by the Scratch Team.

Teacher Professional Development

Computational Thinking Practices

A breakdown of the four computational thinking practices with essential questions and guidelines. Use these examples of CT integration to help picture what CT might look like in your own classroom practice.

- Printable Posters (8.5 x 11 in)
- Printable Posters (18 x 24 in)

Teaching CT: Equity Scenarios

A discussion activity for educators to proactively prepare for equity concerns that could arise while teaching Computational Thinking to children. Recommended as a small group activity, but can also be done individually.

Intro to Creative Computing with Programmed to Dance and Performing Scripts Activities

This guide contains a brief introduction to creative computing and two activities – Programmed to Dance and Performing Scripts (length: 30-60 minutes) – which were pulled from a longer document created by the Harvard Graduate School of Education and the ScratchEd team which can be found here: C3 Creative Computing Curriculum.

ATTRIBUTIONS

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