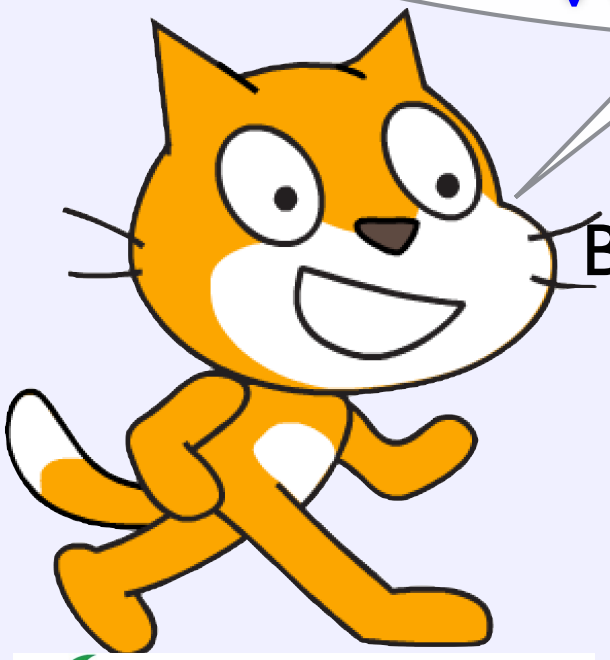
Scratch that Coding Itch with Scratch!



Barry Webster, computer science teacher
bwebster@barrywebster.com
http://barrywebster.com

MACUL SIG CS

MIchigan Computer Science Teachers Association

A Chapter of the Computer Science Teachers Association

Scratch that Coding Itch

- Install scratch offline editor
- Scratch, from Scratch
- Guide your students' interests
- Where to go after Scratch?
- How Scratch compares to other programming languages
- Hour of Code K-8 Resources and HS resources
- Resources

Introductions

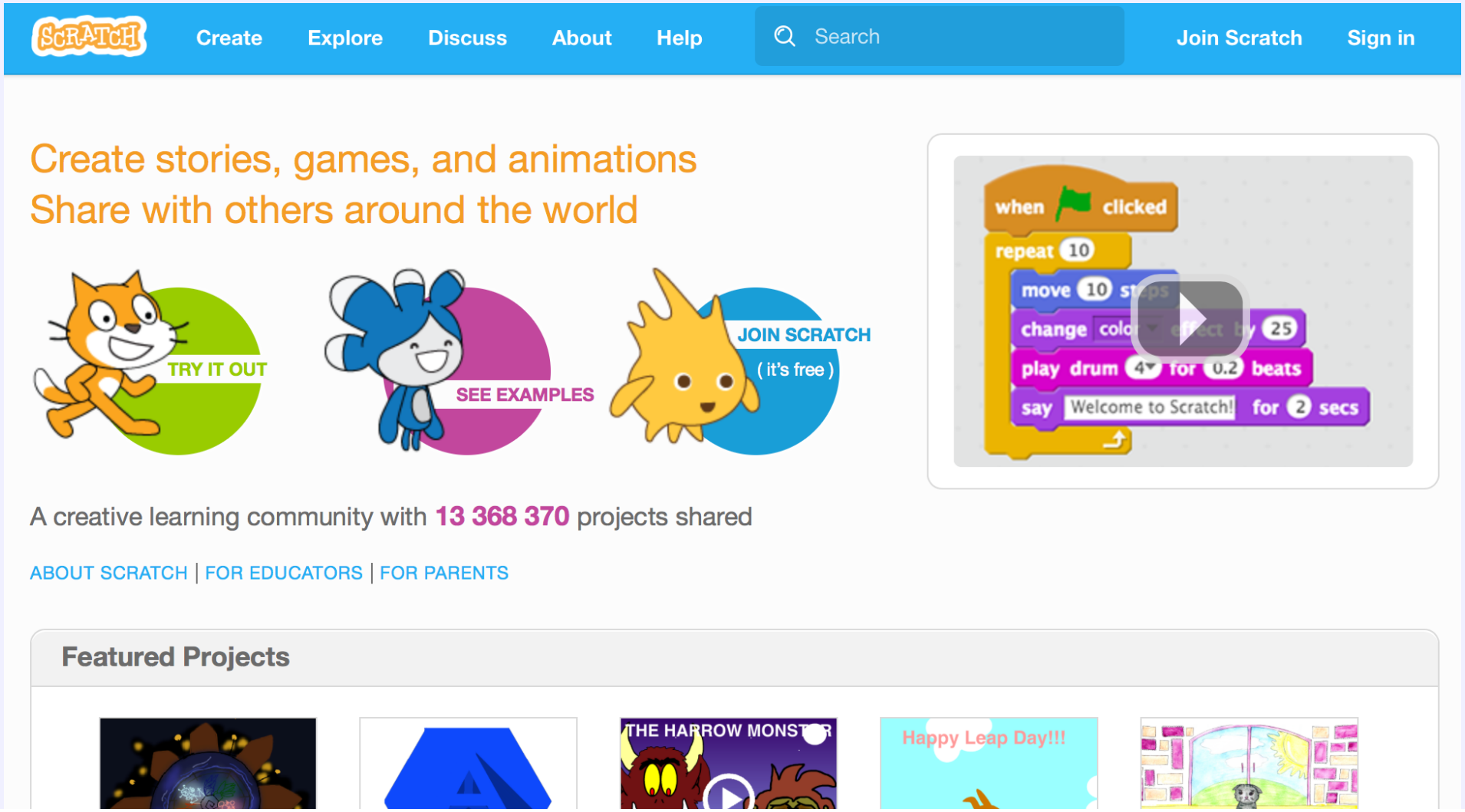
- Name
- Grades and/or subjects you teach
- Where you teach
- What would you most like to get from this workshop?

Install Offline Editor..

- If you don't want to login to the scratch website
- If your Internet access has glitches (or you want to save your files locally)
- If you want capability to work offline
- If you want to use an older version (a standard app)
- To have experience for setting up student computers

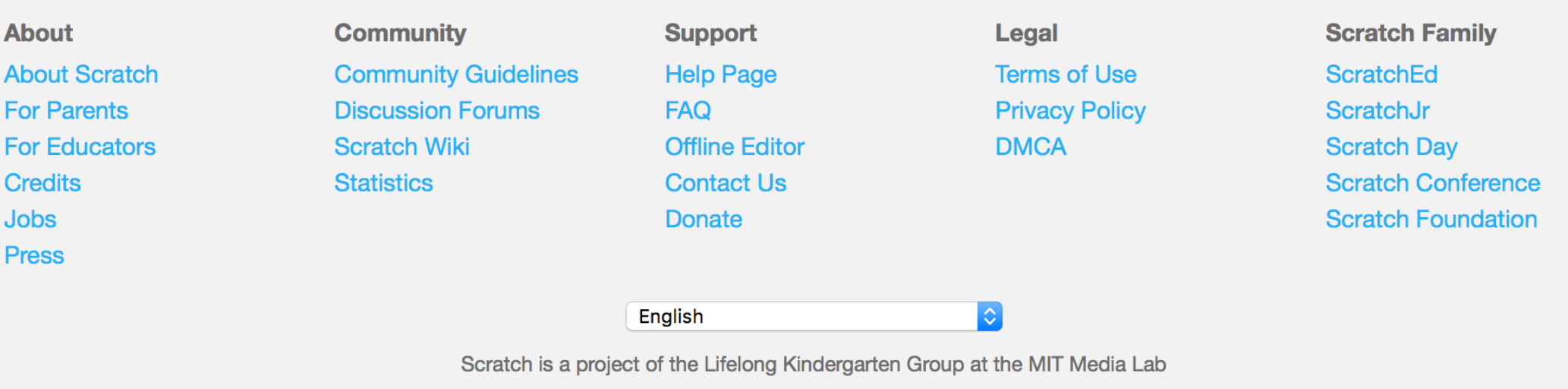
To Install Offline Editor..

- Go to the scratch website https://scratch.mit.edu/



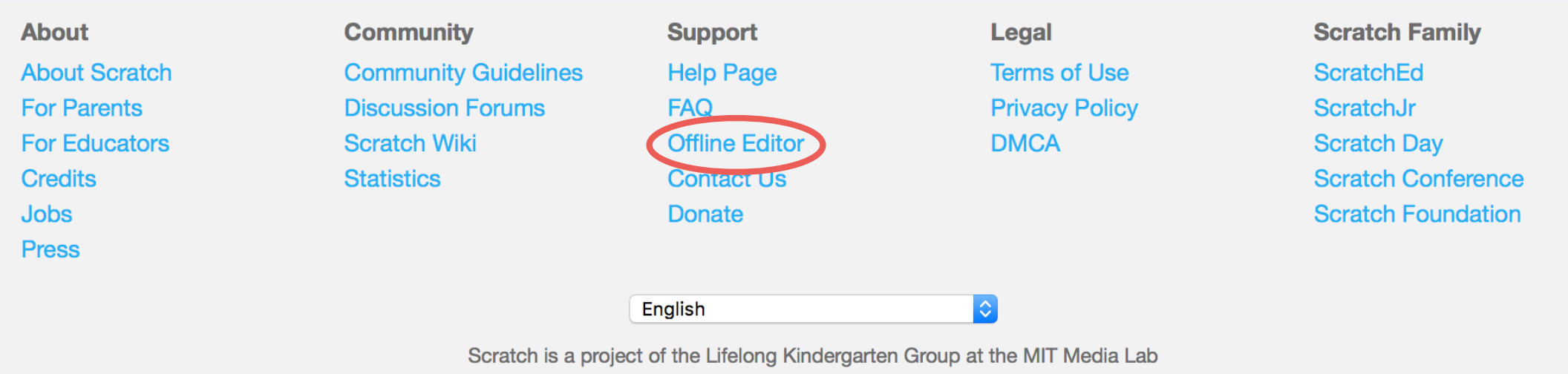
To Install Offline Editor..

- Go to the scratch website https://scratch.mit.edu/
- Scroll to the bottom of the page



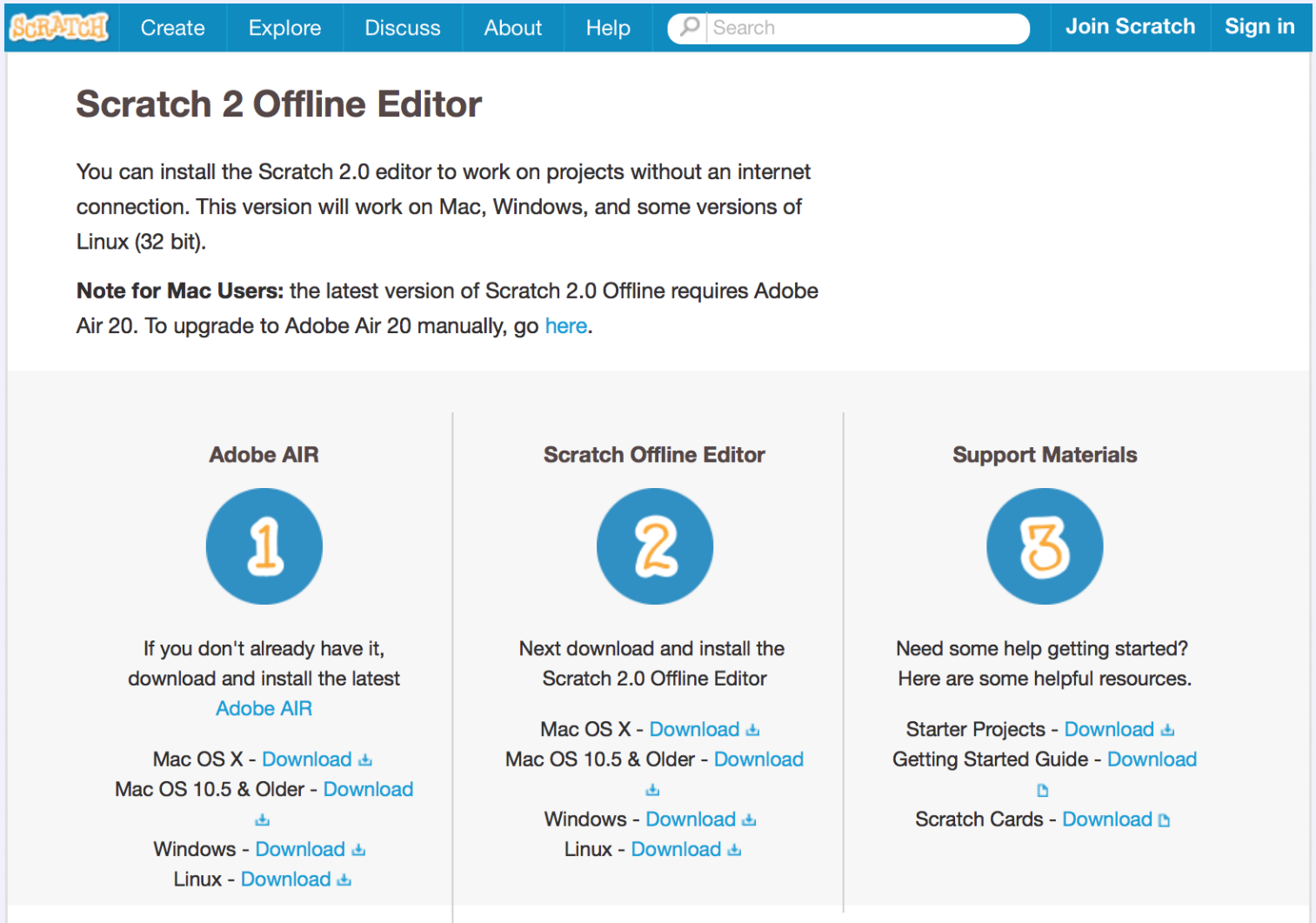
To Install Offline Editor..

- Go to the scratch website https://scratch.mit.edu/
- Scroll to the bottom of the page
- Click on Offline Editor



To Install Offline Editor..

- Follow instructions 1 and 2 on page

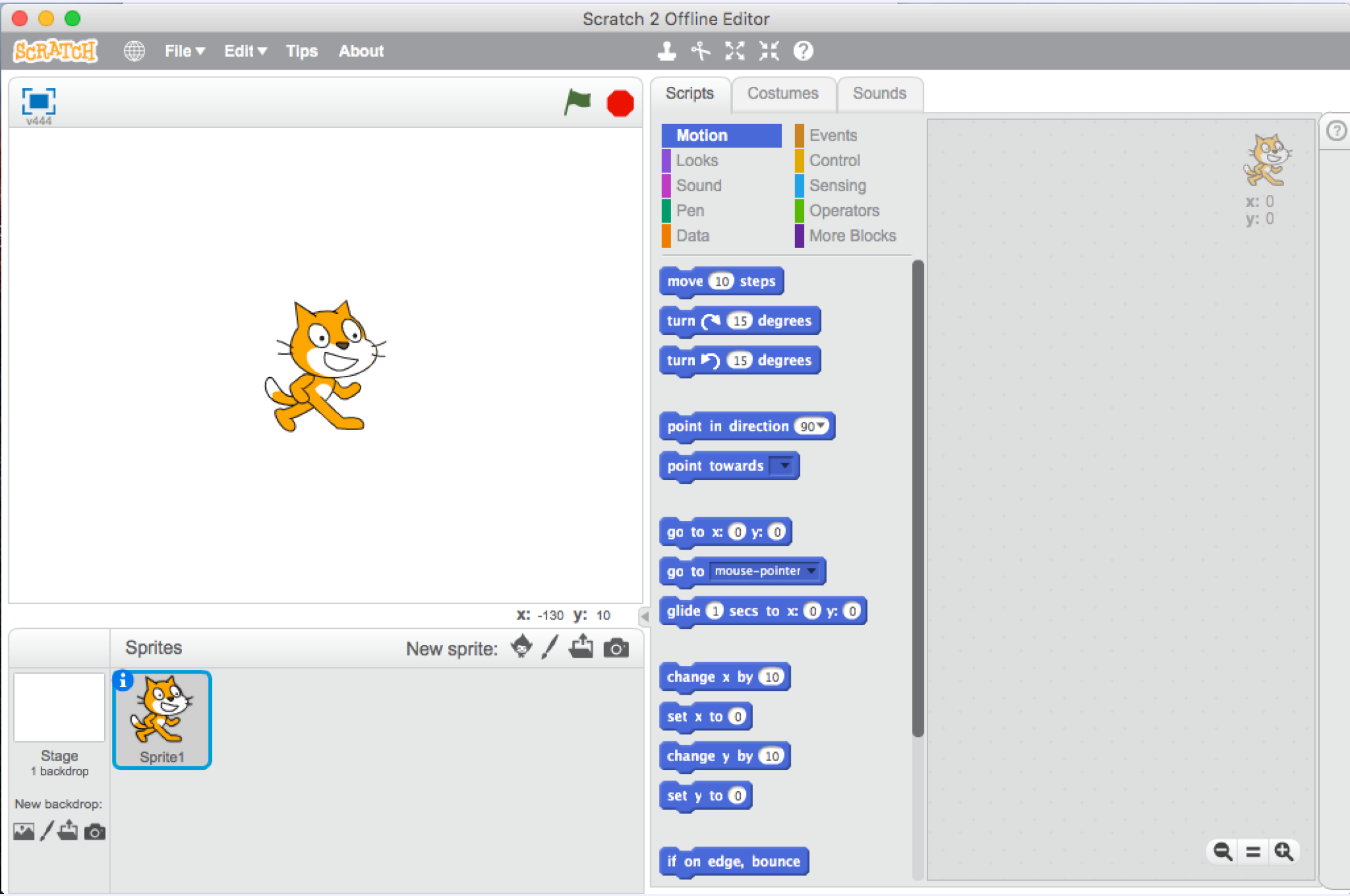


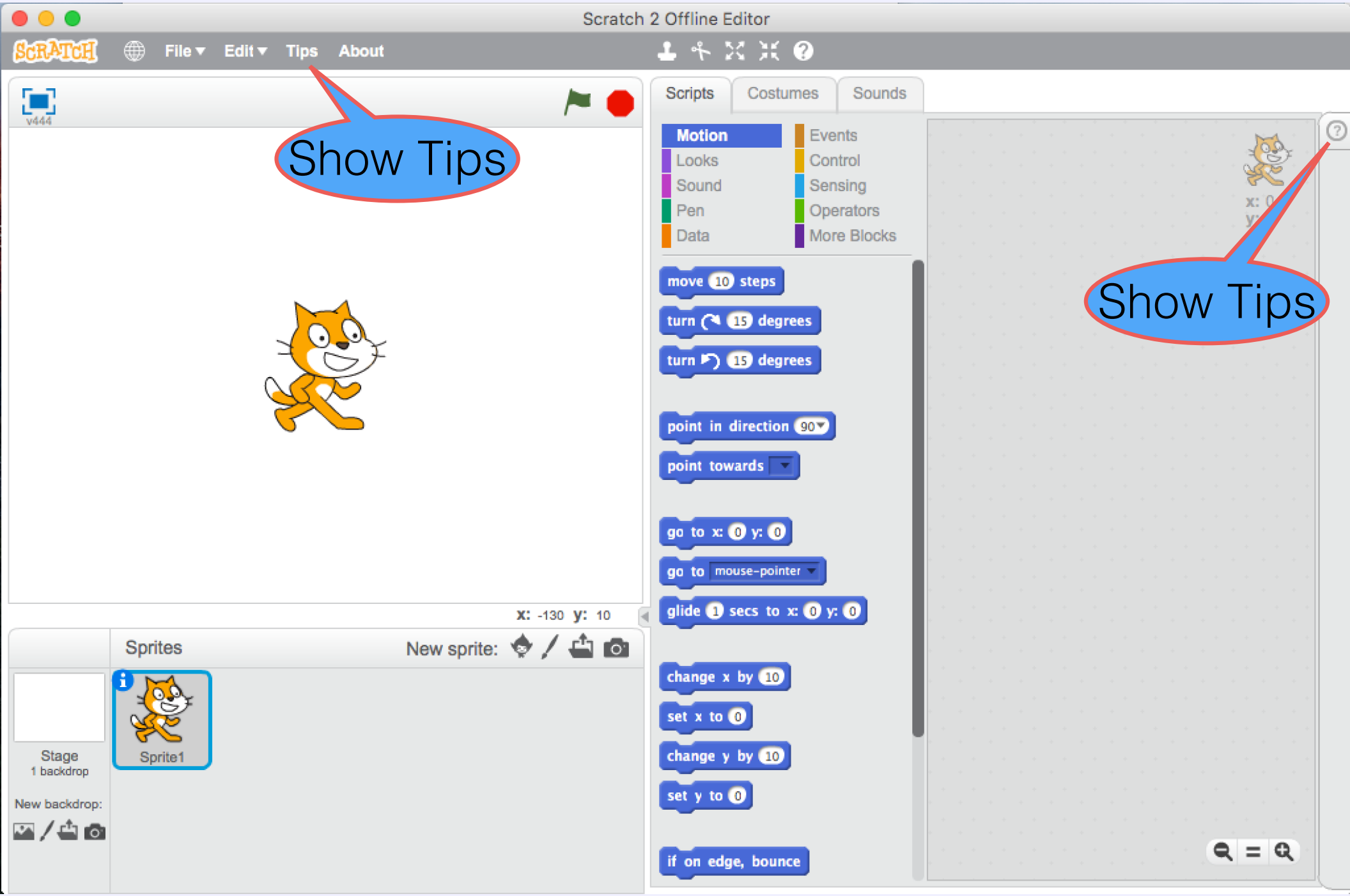
Scratch, from Scratch

- Computer Science and Scratch
- Editor tips
- Build a project, with add-ons
- (…)
- How might you guide students using Scratch?
- Learning more Scratch
- Scratch teaching resources

Now, let's explore

- Launch your offline editor OR
- Sign in (click "Sign in" at top right of scratch webpages) so you can save projects, then click "create" at top left for online editor.


Scratch 2 Offline Editor
SCRATCH
File
Edit
Tips
About
v444
Scripts
Costumes
Sounds
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: 0 y: 0
go to mouse-pointer
glide 1 secs to x: 0 y: 0
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
x: 0
y: 0
x: -130 y: 10
Sprites
New sprite:
Stage
1 backdrop
Sprite1
New backdrop:


Scratch 2 Offline Editor
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Show Tips
Scripts
Costumes
Sounds
Motion
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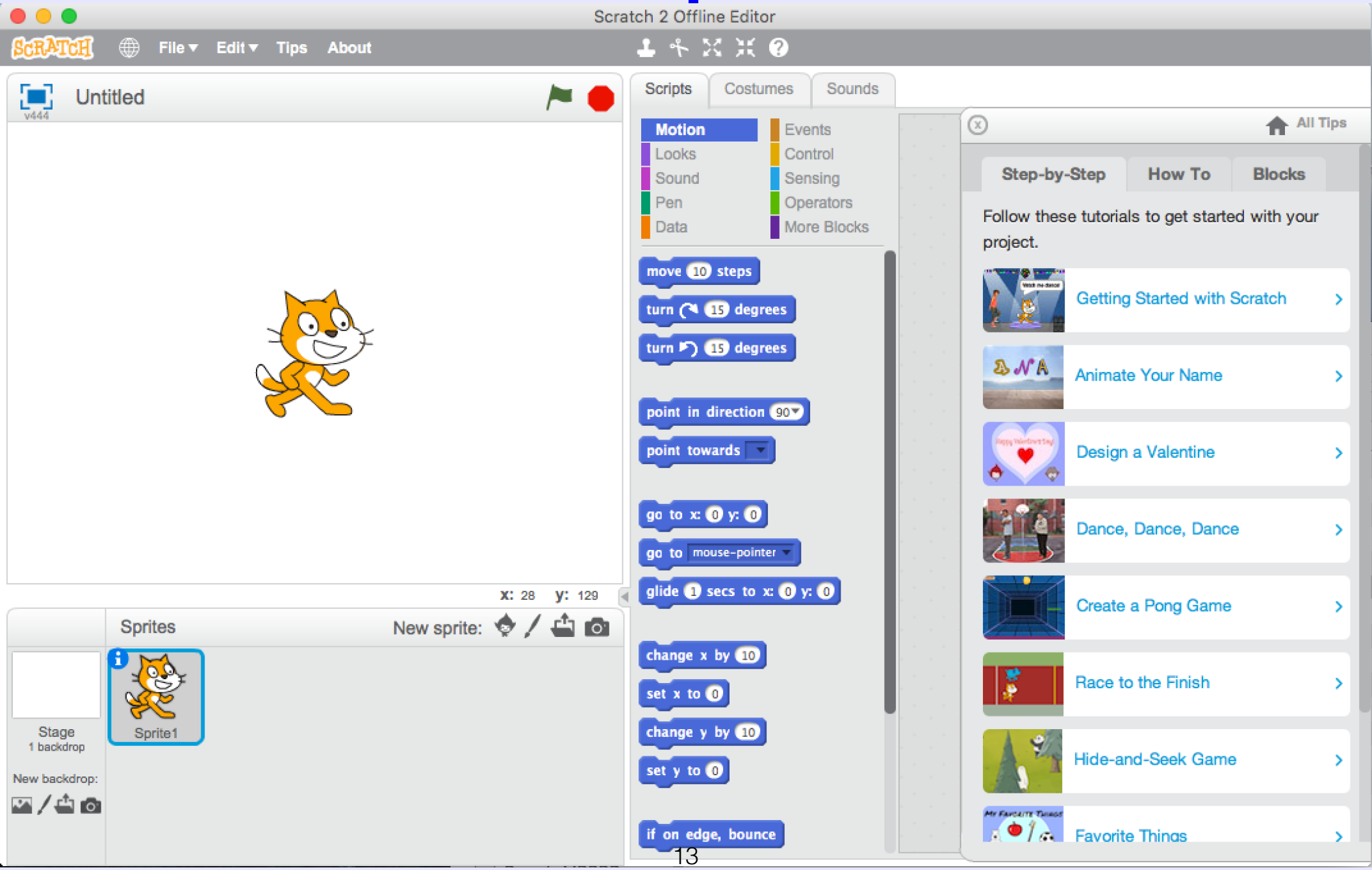
New sprite:
Stage
1 backdrop
New backdrop:
Sprite1
Show Tips

Tips


Scratch 2 Offline Editor
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Control
Sensing
Operators
More Blocks
move 10 steps
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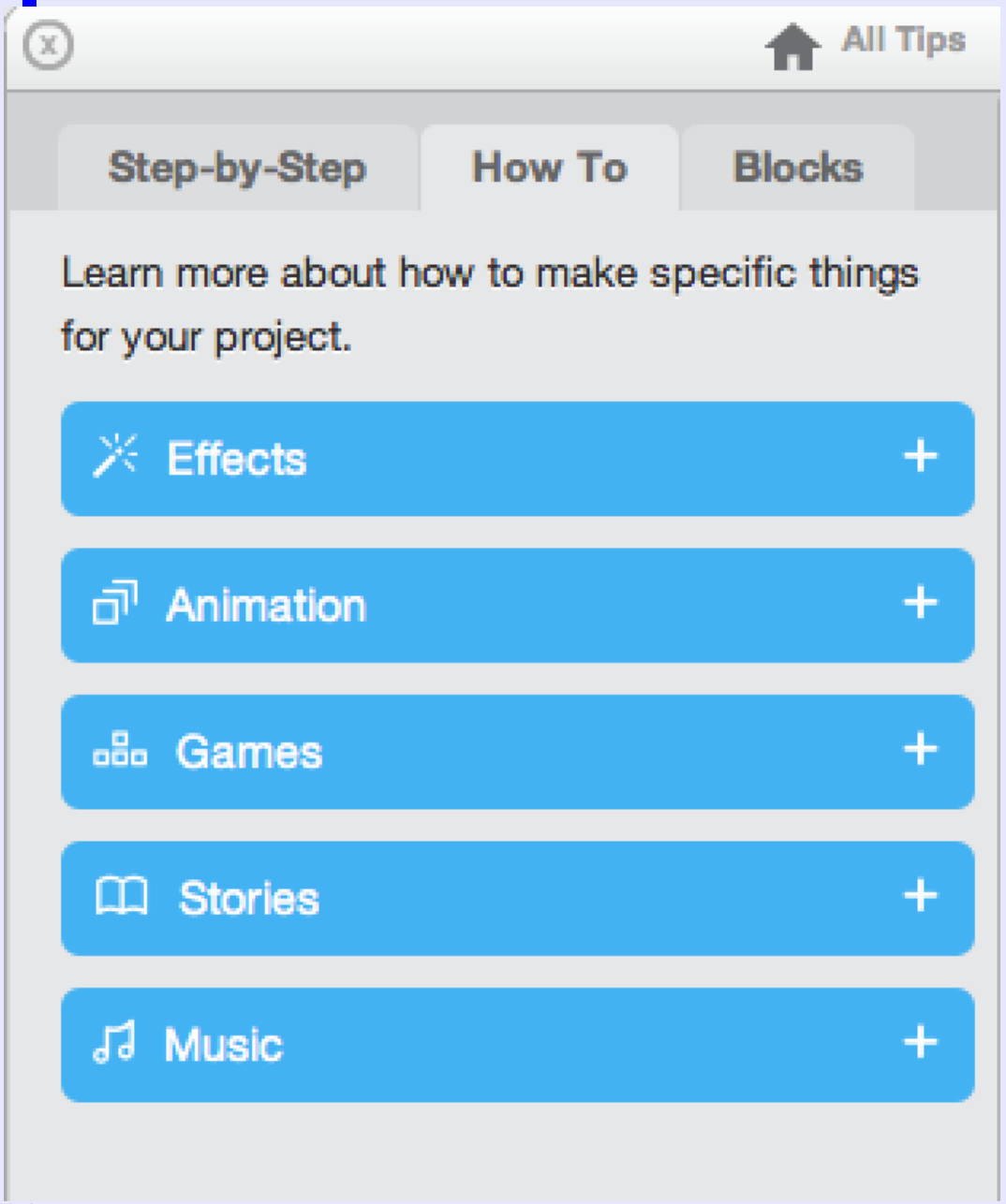
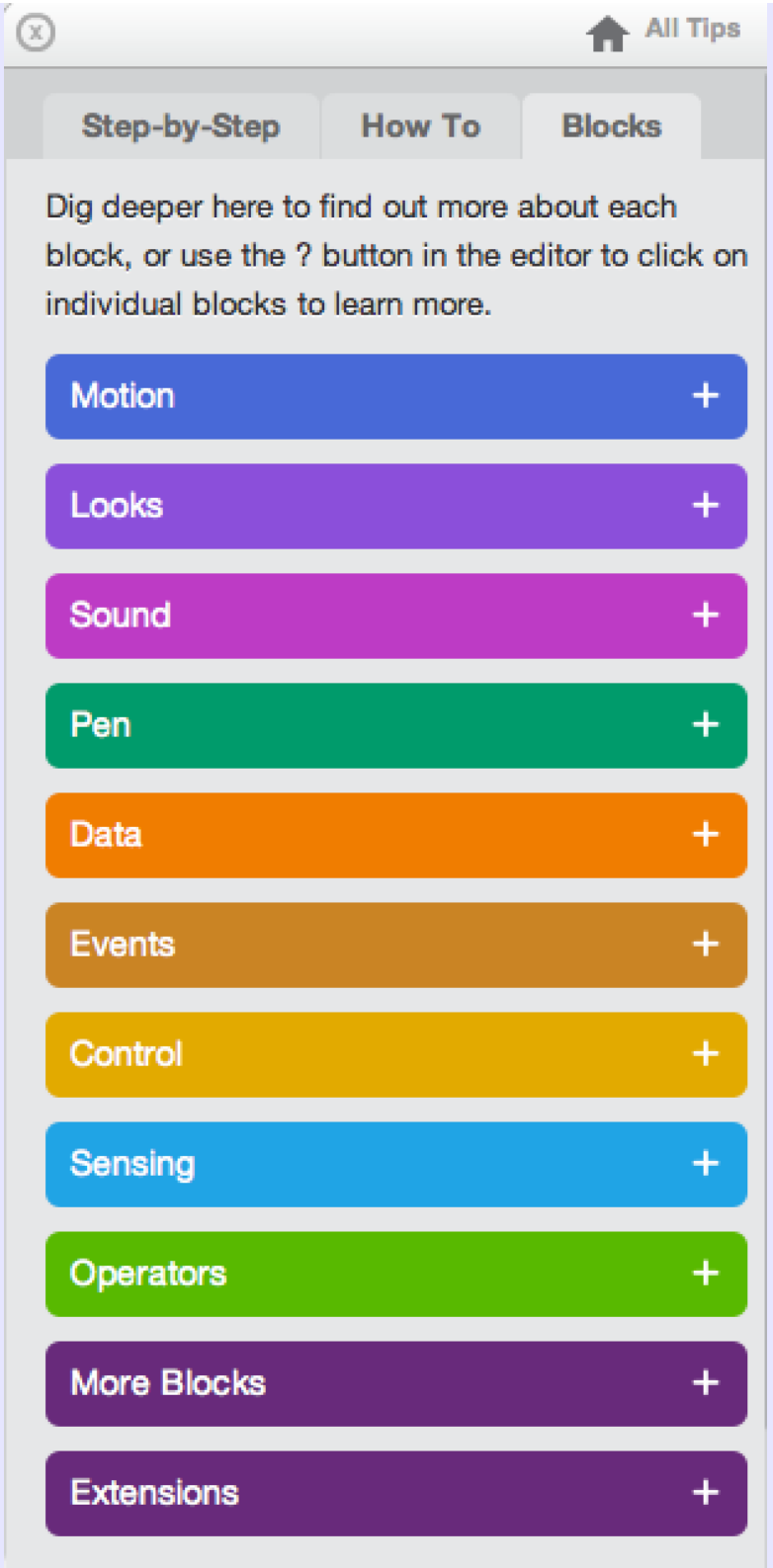
go to x: 0 y: 0
go to mouse-pointer
glide 1 secs to x: 0 y: 0
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
x: 28 y: 129
Sprites
New sprite:
Stage
1 backdrop
New backdrop:
Sprite1
All Tips
Step-by-Step
How To
Blocks
Follow these tutorials to get started with your project.
Getting Started with Scratch
Animate Your Name
Design a Valentine
Dance, Dance, Dance
Create a Pong Game
Race to the Finish
Hide-and-Seek Game
Favorite Things

Tips


All Tips
Step-by-Step
How To
Blocks
Learn more about how to make specific things for your project.
Effects
Animation
Games
Stories
Music

Tips


All Tips
Step-by-Step
How To
Blocks
Dig deeper here to find out more about each block, or use the ? button in the editor to click on individual blocks to learn more.
Motion +
Looks +
Sound +
Pen +
Data +
Events +
Control +
Sensing +
Operators +
More Blocks +
Extensions +

There are several ways to learn scratch

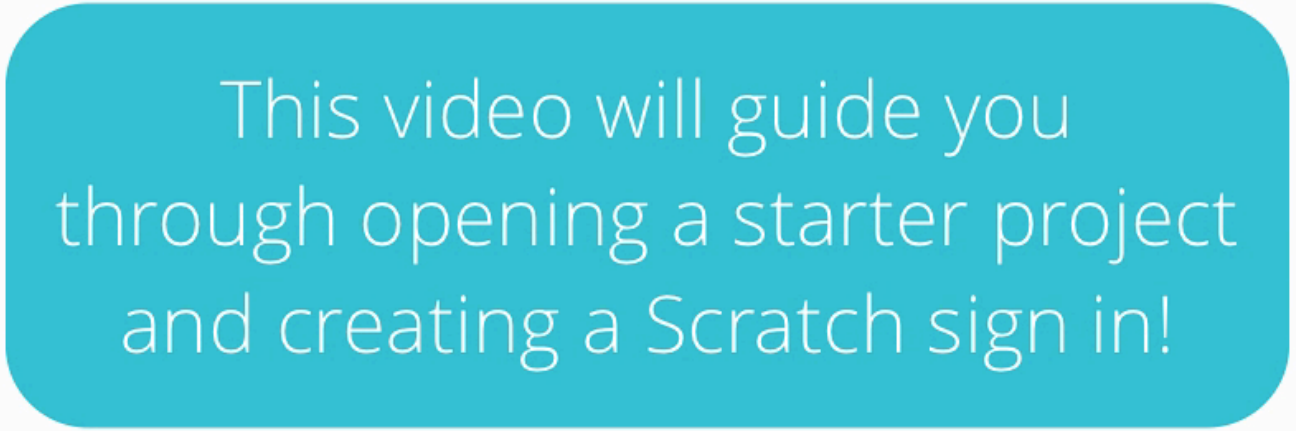
- Explore the editor and its tips
- Scratch website resources
- Other websites
- Workshops

from https://www.cs-first.com

Sample Activity

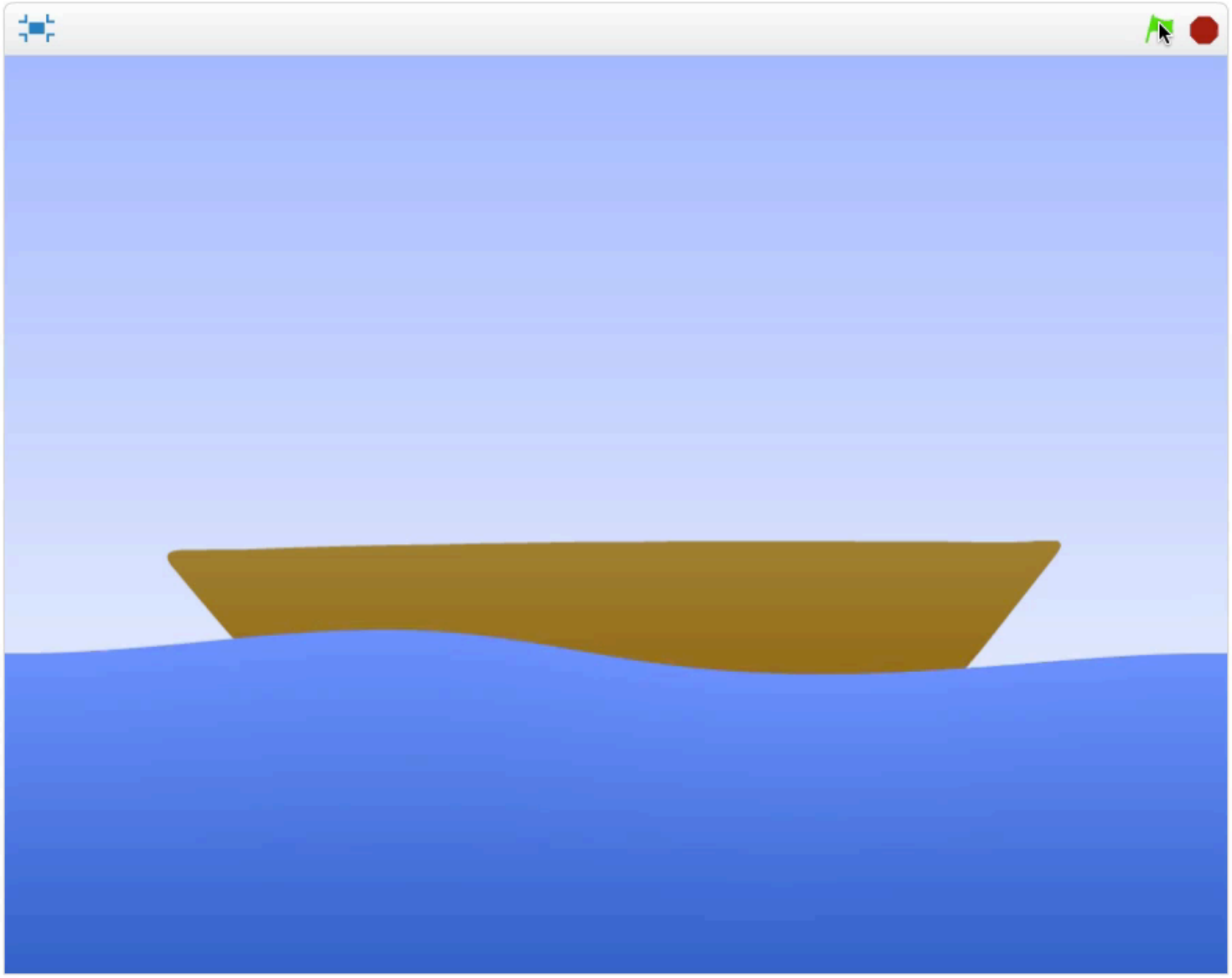
High Seas Introduction

from https://www.cs-first.com



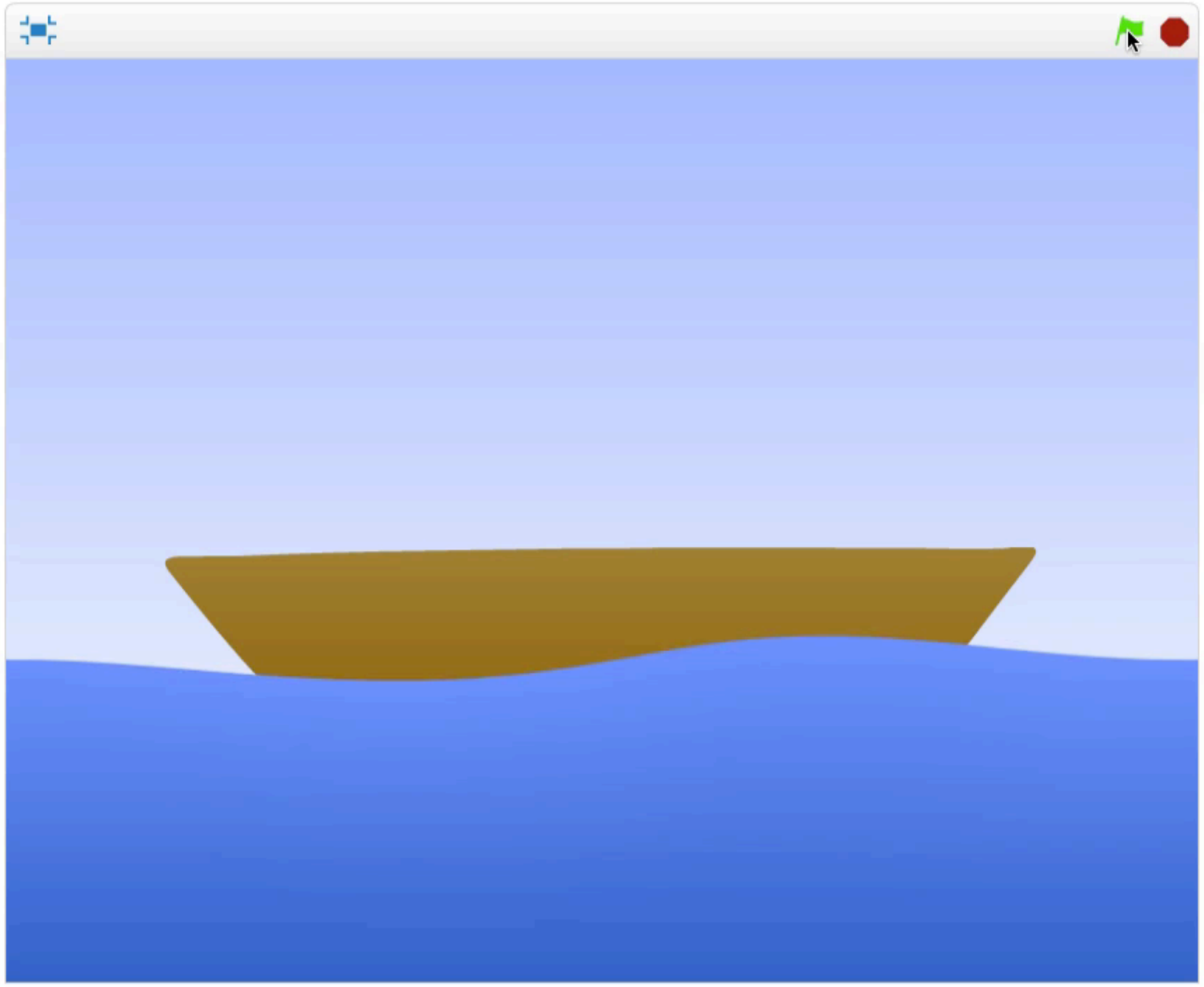
Video 2

from https://www.cs-first.com



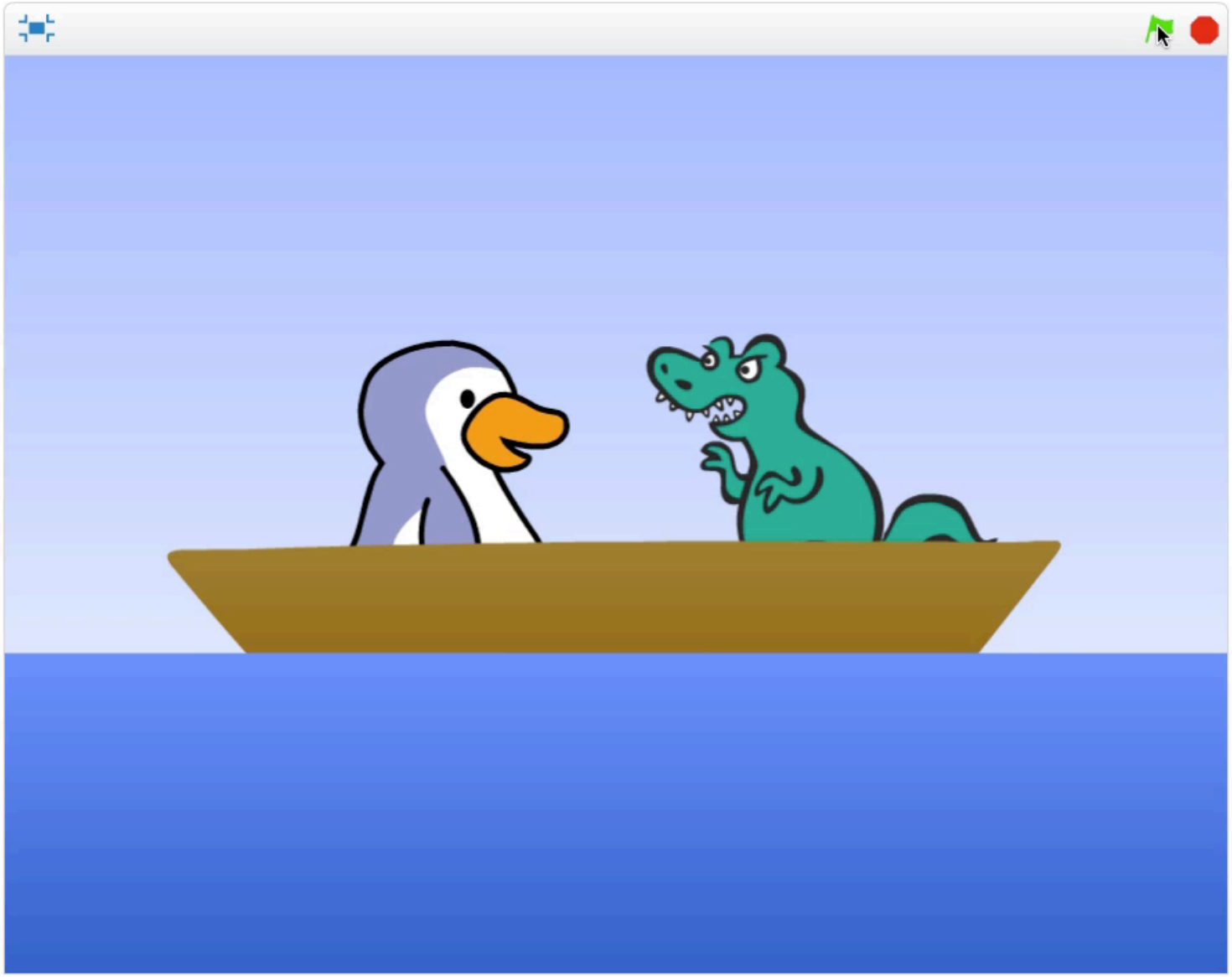
Video 3

from https://www.cs-first.com



Video 4

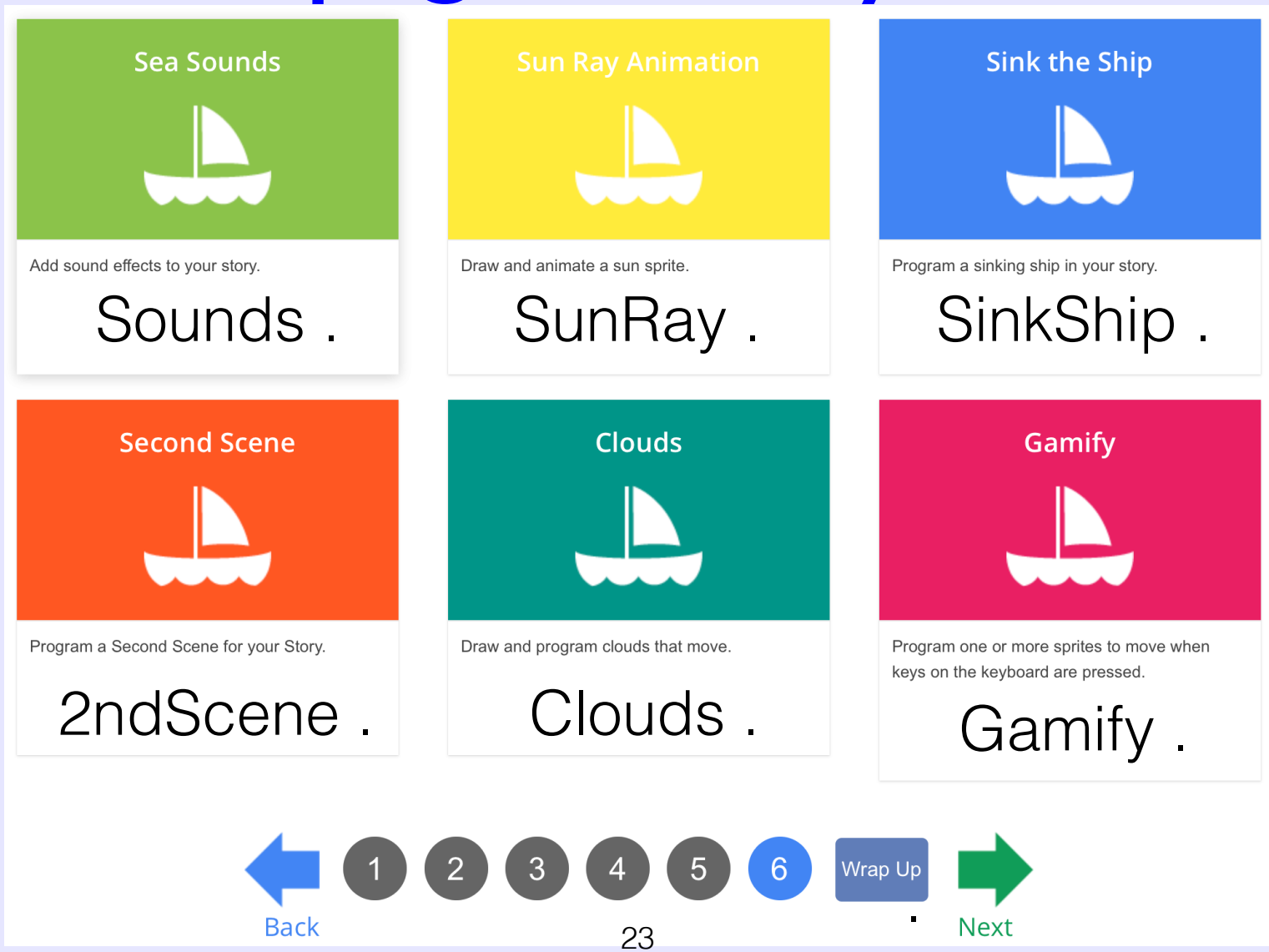
from https://www.cs-first.com



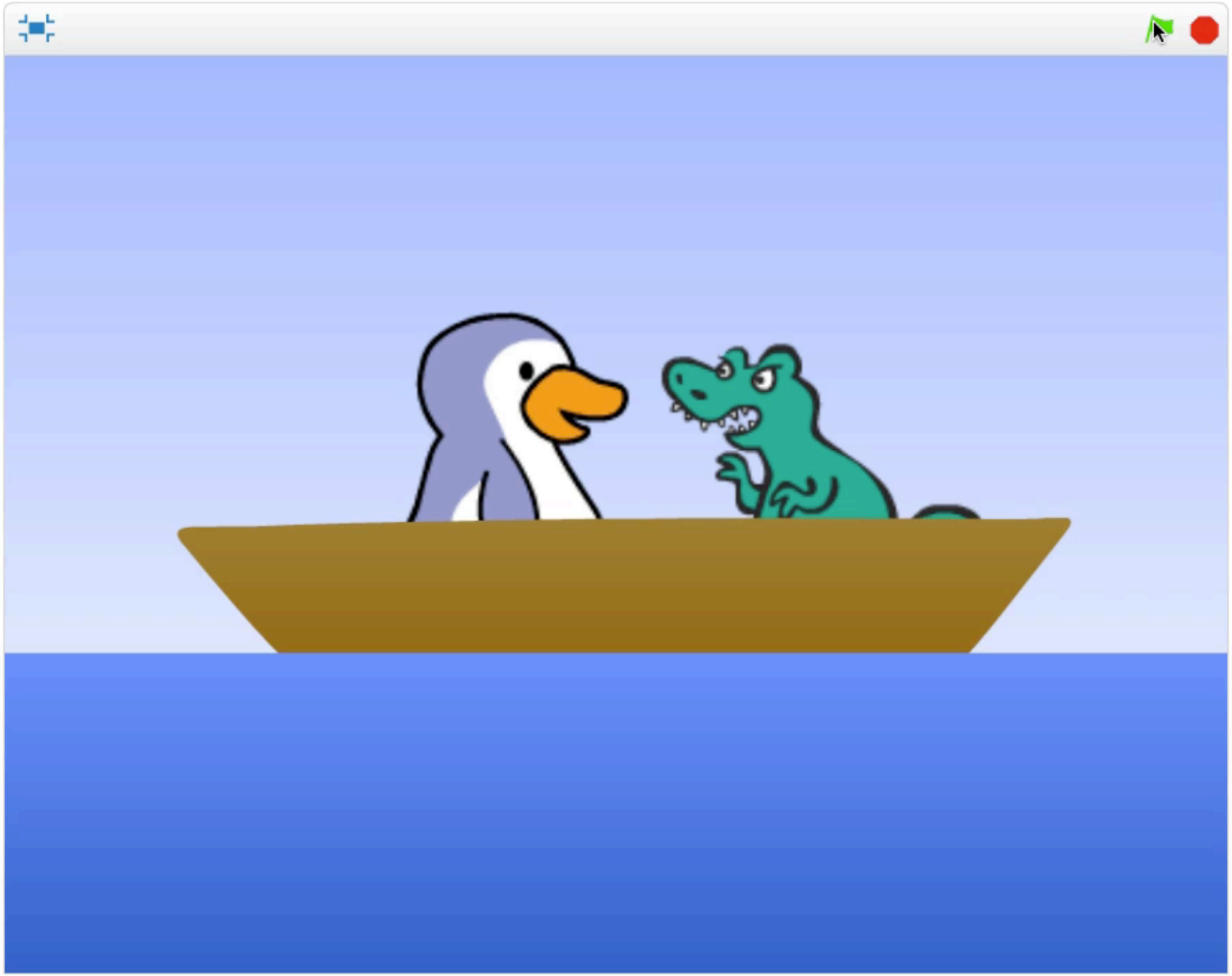
Video 5

from https://www.cs-first.com

https://www.cs-first.com/studentpage/activity-add-ons



Sea Sounds



Sea Sounds

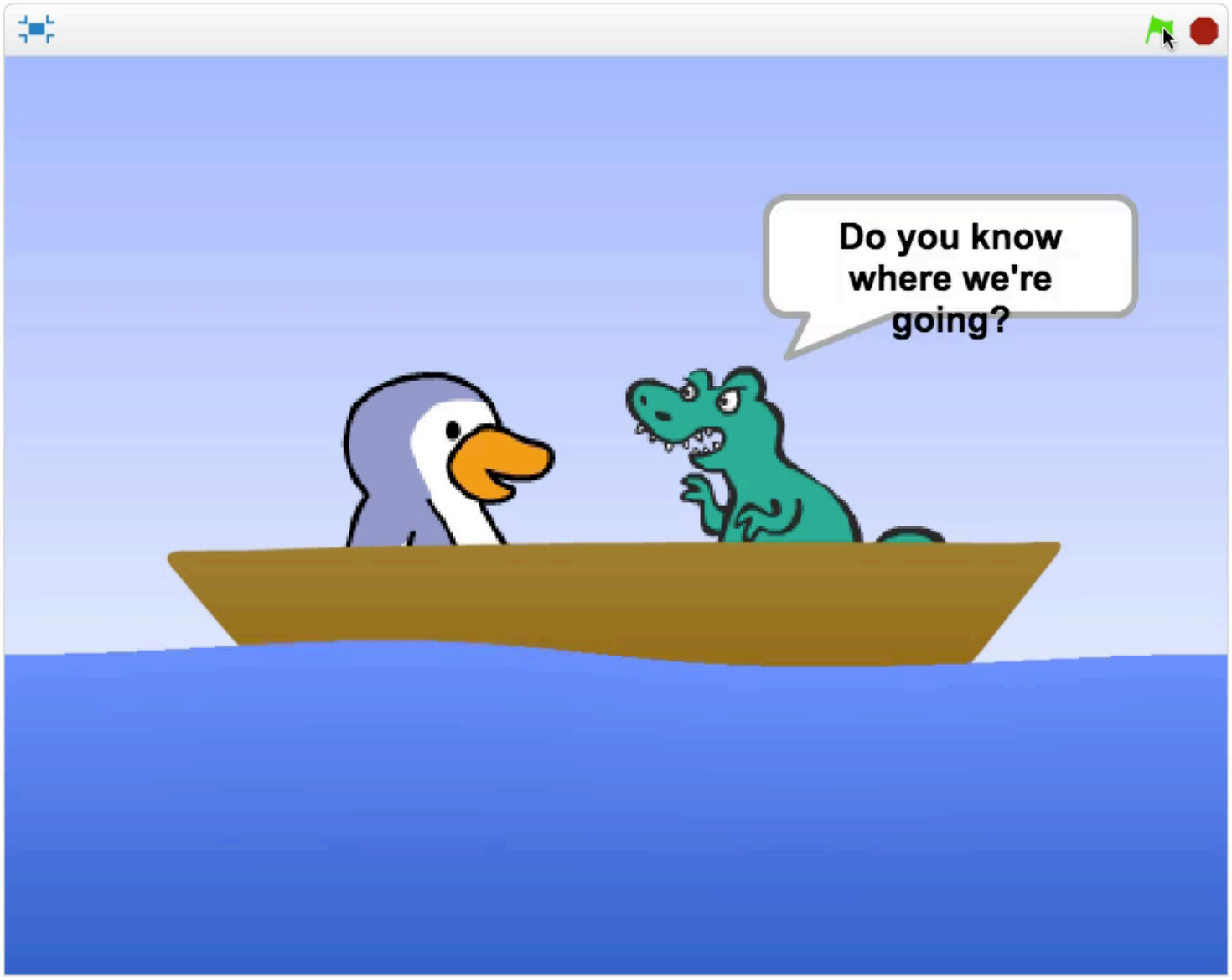
Sun Ray Animation

Sun Ray Animation

Sink the Ship

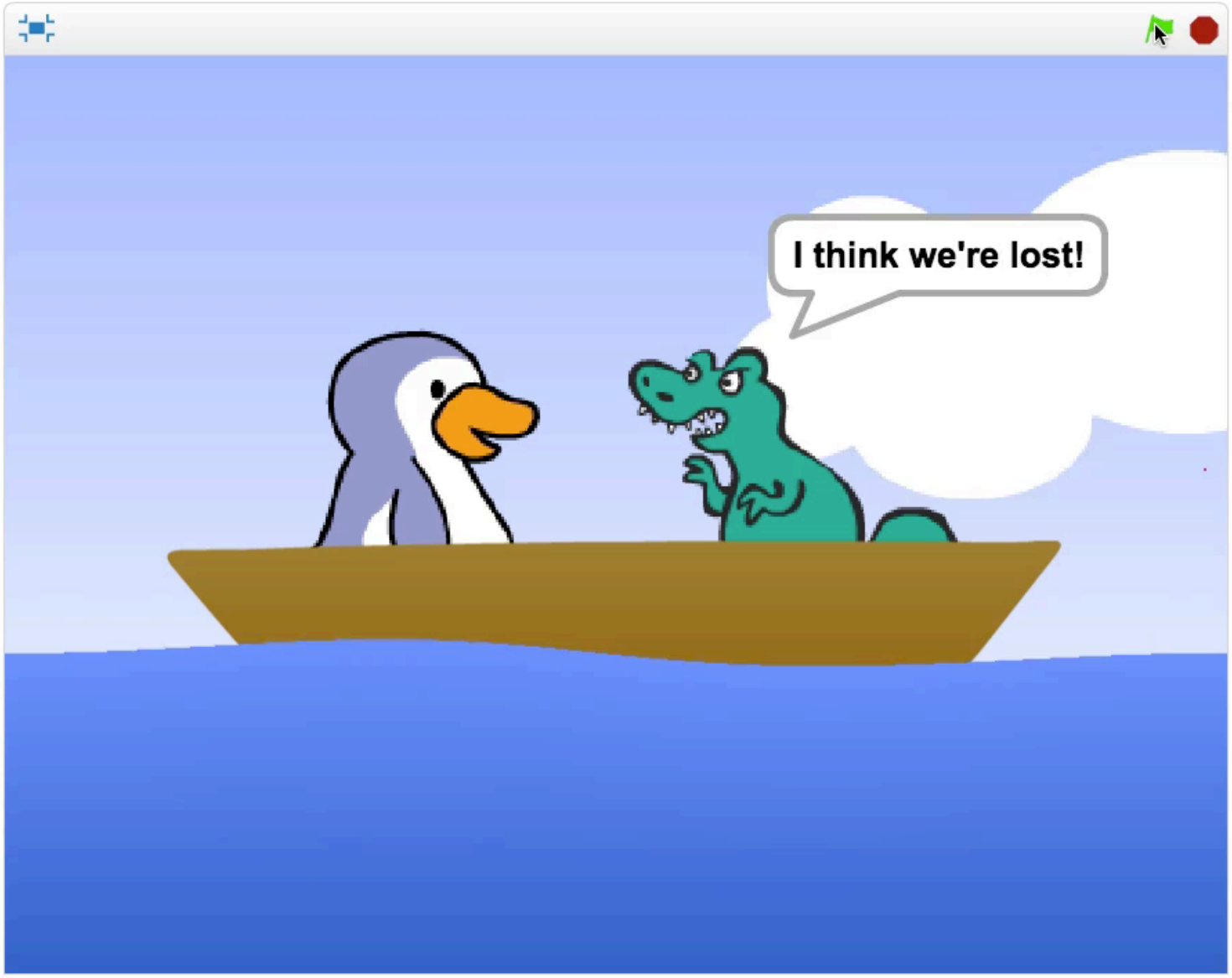
Sink the Ship!

Second Scene

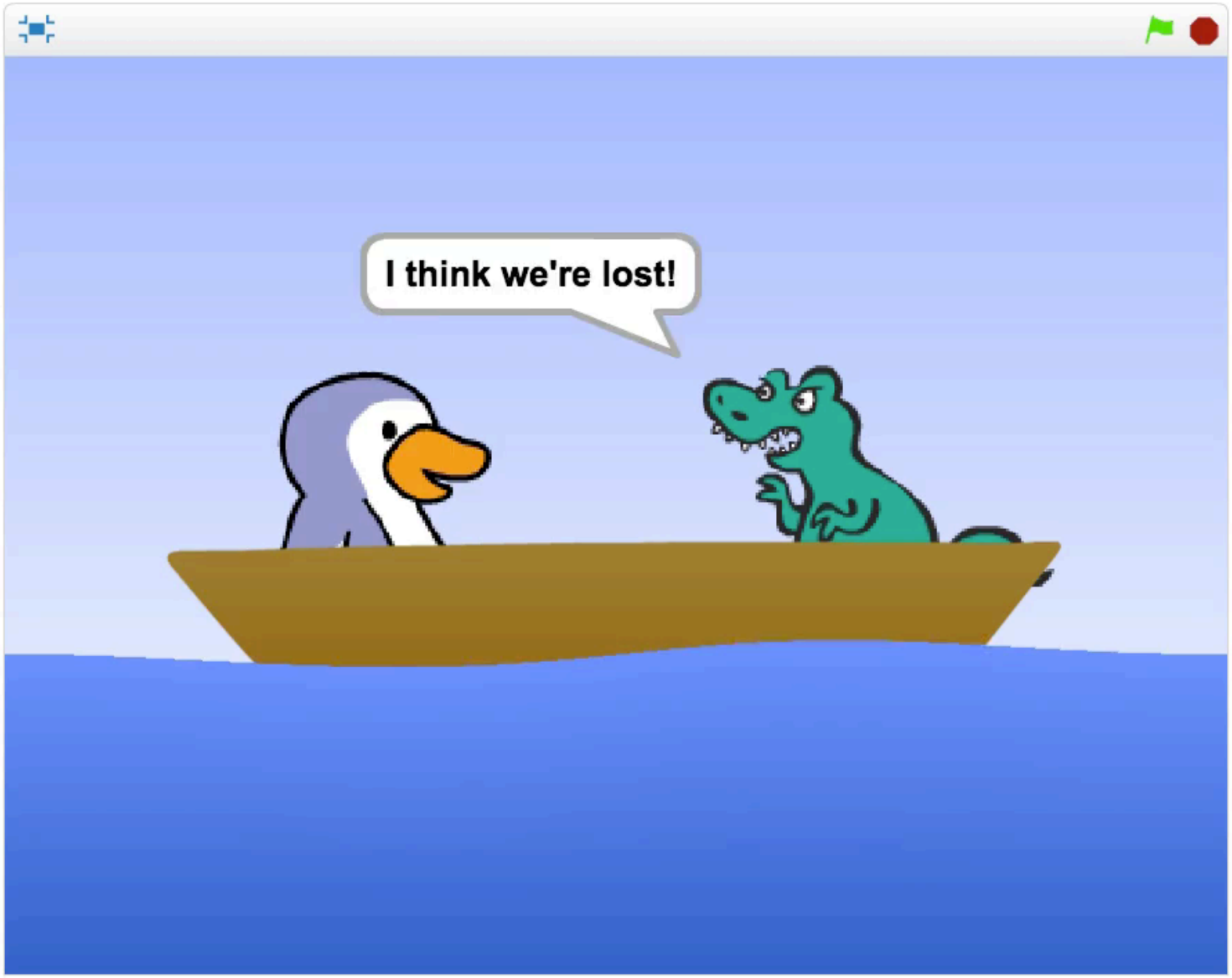


Second Scene

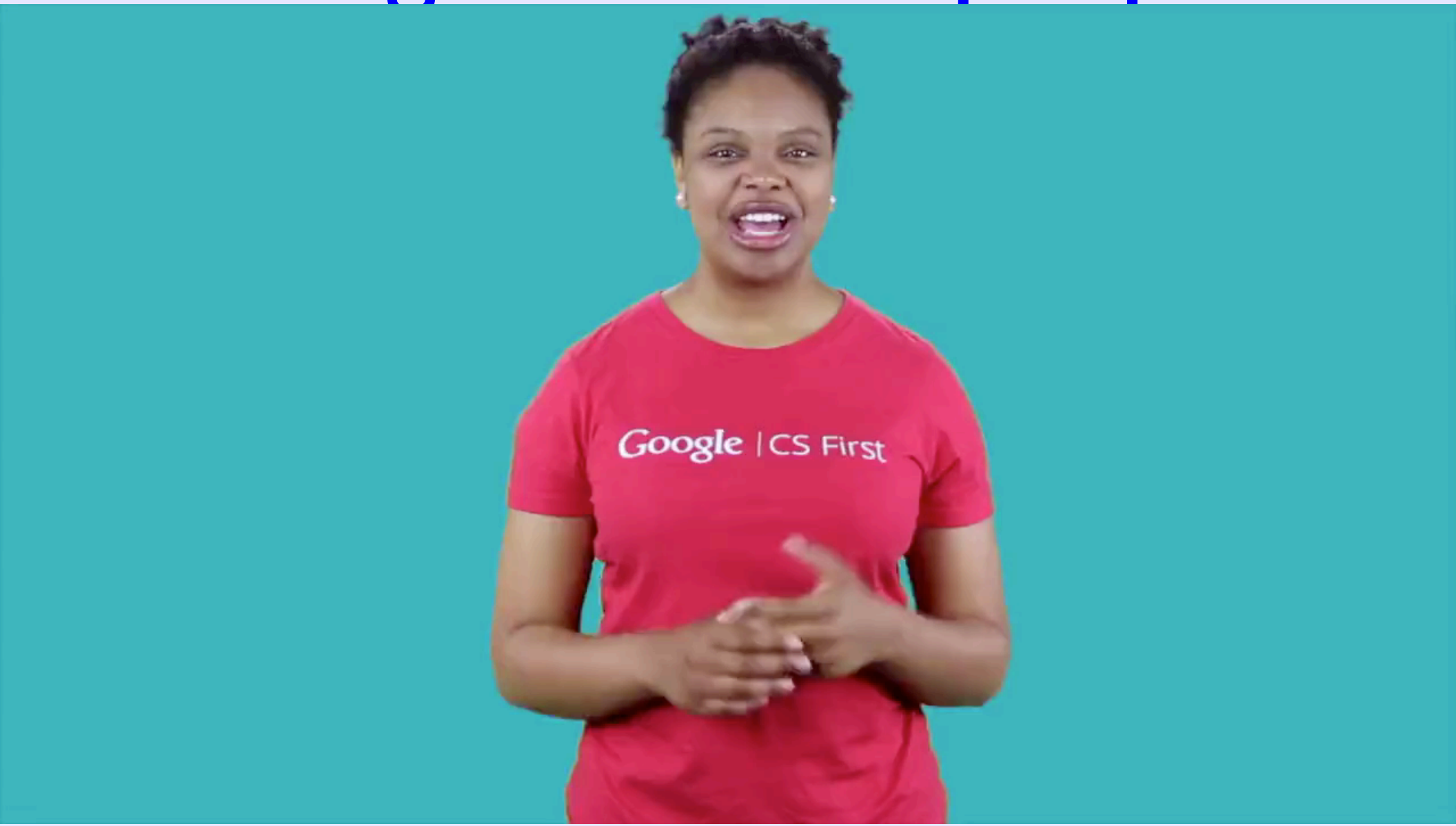
Clouds



Gamify



High Seas Wrap Up



Guide your students' interests

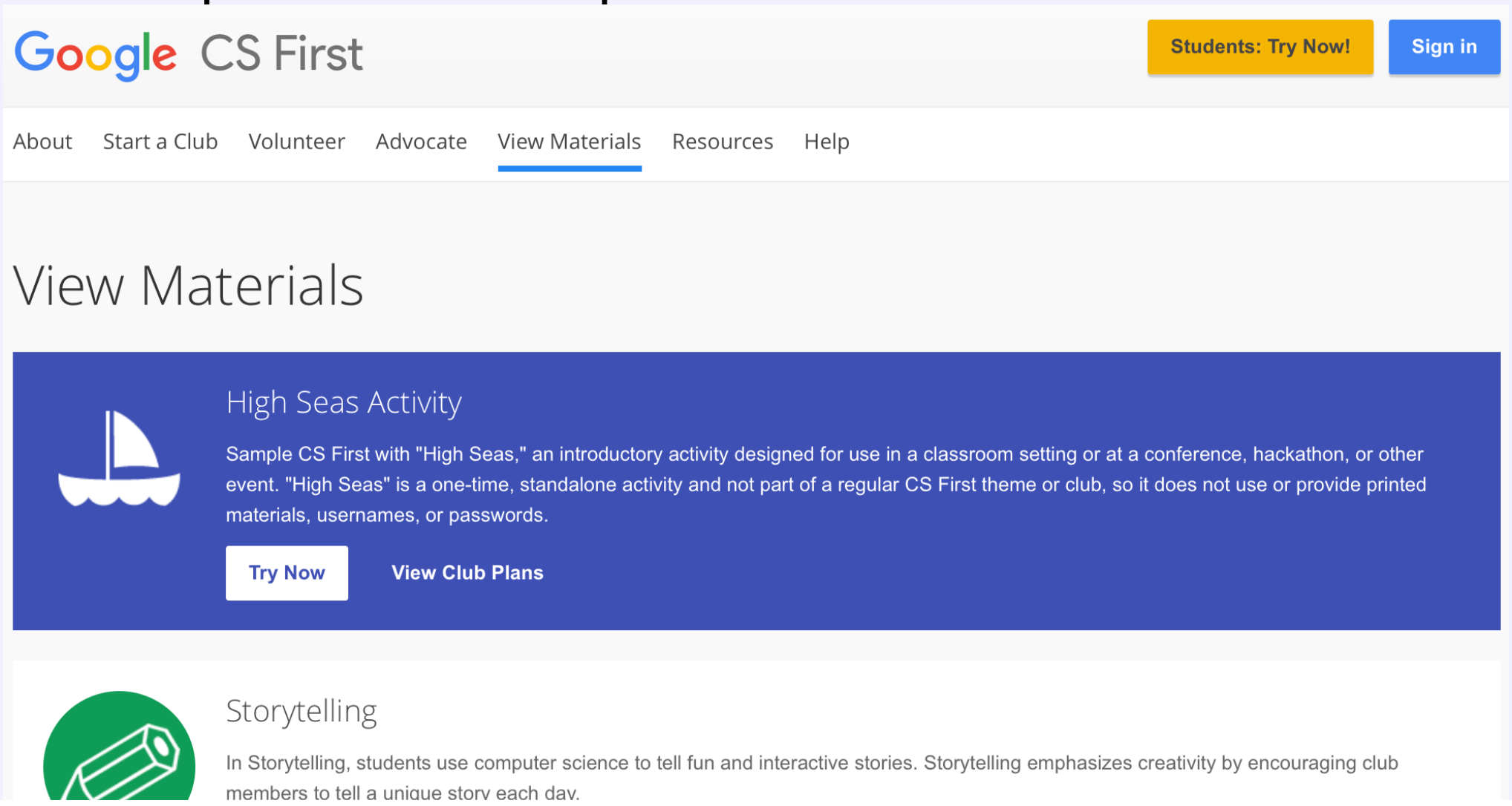
- Learn more about Scratch so you can
- Explore Scratch teaching materials so you can

Explore Scratch

- Explore the Scratch editor
- Explore https://scratch.mit.edu/

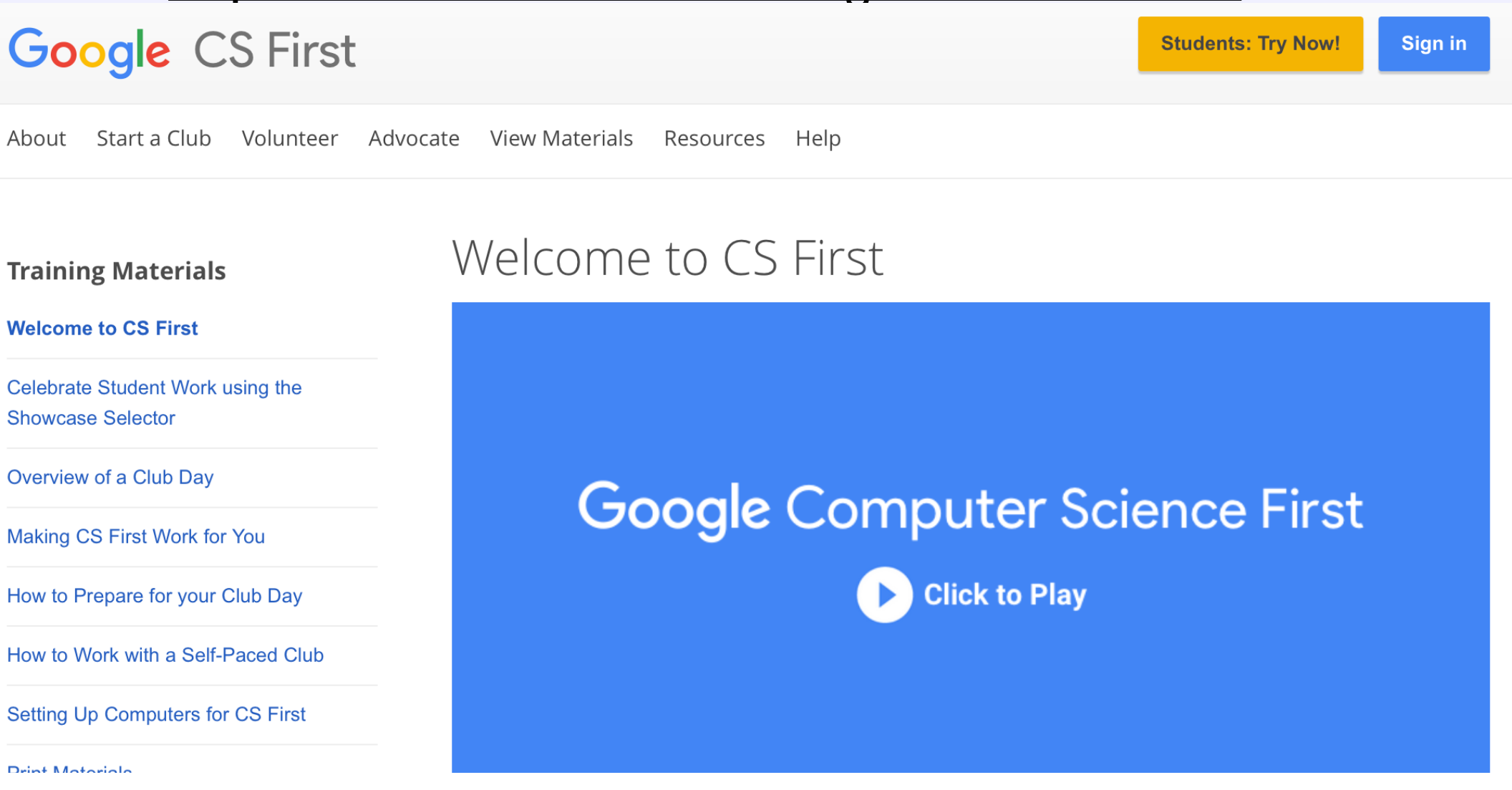
Explore Scratch Teaching

- Explore CS First: https://www.cs-first.com/materials



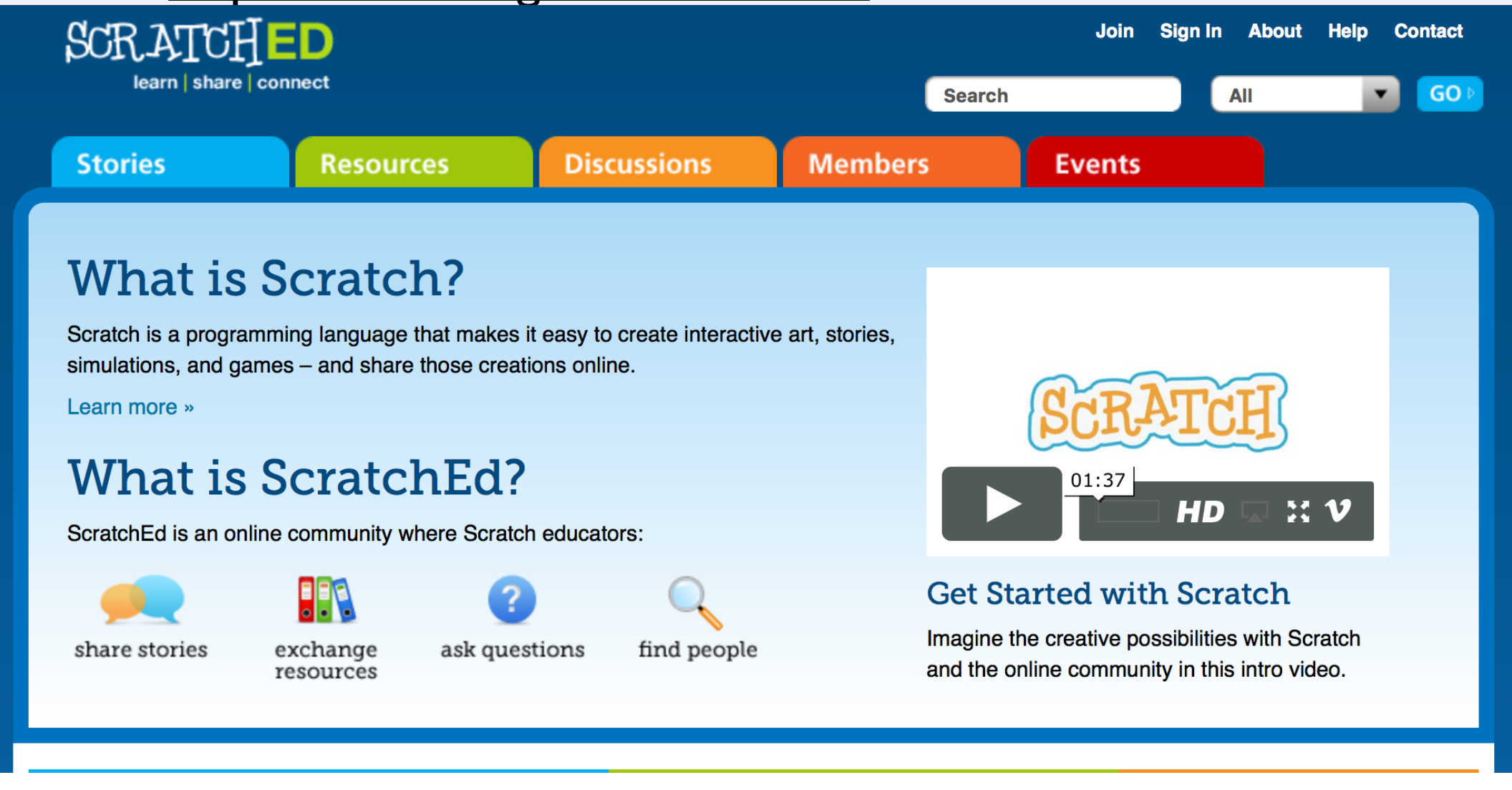
Explore Scratch Teaching

- https://www.cs-first.com/training/welcome-cs-first



Explore ScratchEd

- http://scratched.gse.harvard.edu/



Explore ScratchEd Resources

- http://scratched.gse.harvard.edu/resources

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Featured Resources

Scratch Educator Meetup Guide

Contributed by ScratchEd Team, January 29, 2015

A guide to organizing local Scratch educator meetups

Content Types: Advocacy Material, Handout, Reference Guide
Education Level: Professional Development
Curricular Areas: Teacher Education

4 Comments 20 Bookmarks

More Featured Resources

Scratch Curriculum Guide
Contributed by: ScratchEd Team

Best of both worlds: Issues of structure and agency in computational creation, in and out of school
Contributed by: Karen Brennan

Hour of Code Activity & Handout: Interactive Holiday Card
Contributed by: ScratchEd Team

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Explore ScratchEd Resources

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- Elementary School (517)
- Middle School (478)
- High School (370)
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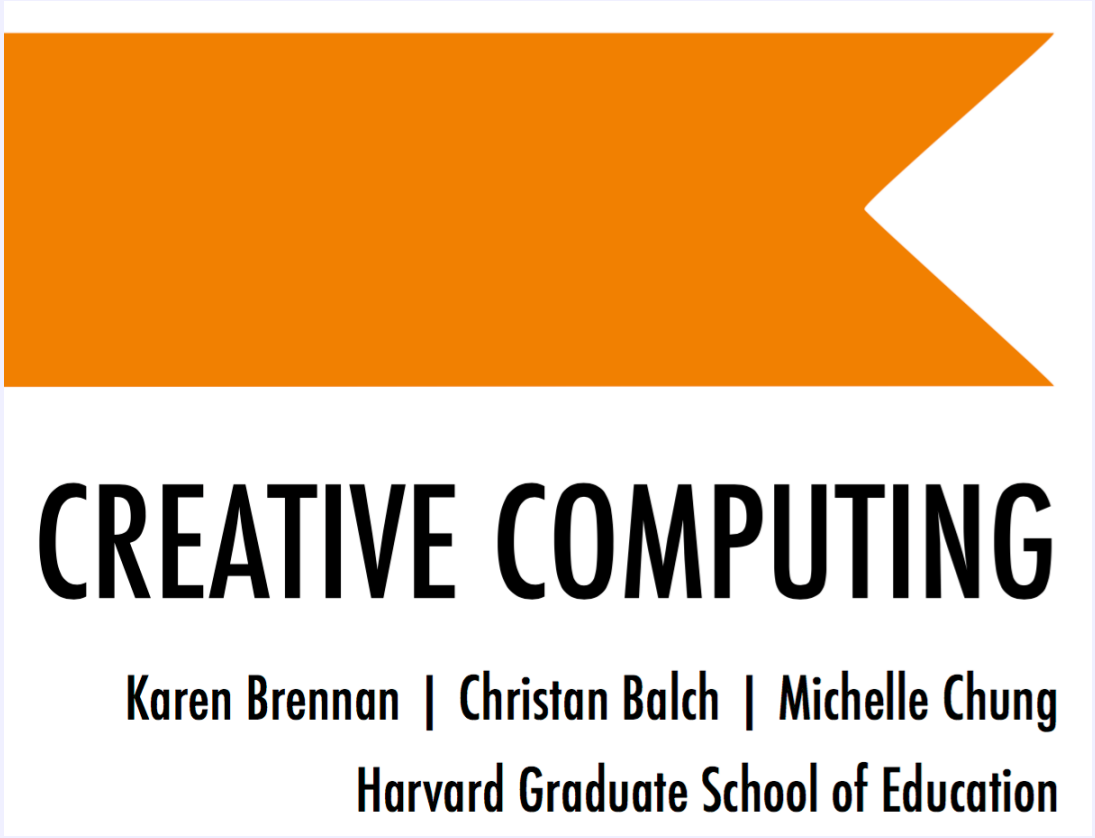
- Deutsch (9)
- Português (12)
- Ελληνικά (3)
- Nederlands (Dutch) (7)
- 日本語 (1)
- 正體中文 (3)
- Other (35)

Explore ScratchEd Resources

- http://scratched.gse.harvard.edu/guide/files/CreativeComputing20141015.pdf



Guide your students' interests

- You may want to use other tools; where to go from Scratch
- What to consider when choosing

Where to go from Scratch

How Scratch compares to other programming languages

- Scratch is a graphical block language
- Several languages for beginning students use graphical blocks
- Several are more specialized (less general)

How Scratch compares to other programming languages

- Traditional computer languages are text based
  - Require precision
  - Can require patience for beginners
  - Are used by professionals
  - Are used in high school and college computer science

How Scratch compares to other programming languages

- **Lowers the bar to start programming**
  - Drag and drop (instead of pesky semicolons;)
  - Quick feedback and development
  - Visuals are easier
  - Sound is easier
- Find the right examples to engage students

Which programming environment(s)?

- Is it suitable for your students (interests, age, and stage of development)
- Will it work well on computing equipment (at school, home, personal)
- How easy is it to learn compared to how much learning is possible (or likely)
- How much does it and teaching materials cost

Which programming environment(s)?

- Is it under active development
- Who is the developer
- How widely is it being used
- How "professional" is it

Hour of Code tutorials https://code.org/educate/allhourofcode

- Student-Led Hour of Code Tutorials
  - Tutorials that teach JavaScript
  - Tutorials for Grades K-8
  - Tutorial apps for phones and tablets
  - Tutorials in other programming languages
  - Make games or apps
- Teacher Led Hour of Code Lesson Plans
  - Elementary School
  - Middle School
  - High School
- Other activities

Hour of Code K-8 tutorials
https://code.org/educate/allhourofcode

Tutorials for Grades K-8

Tynker

Ages 5-13. Modern web browsers, iPad, Android. Learn to code by solving fun puzzles and build your own games.

- The Tynker Visual Programming Language is based on Open Web standards (HTML5, JavaScript, CSS) and works seamlessly across Web browsers and natively on mobile platforms (Android, iOS).

Scratch

Ages 8+. Desktop-only web browsers. Create your own interactive games, stories, and animations with Scratch!

- Offline editor runs on desktops and requires Adobe AIR. (Older version runs on older computers. ScratchJr runs on iPads.)

Lightbot

Ages 5-13. ALL browsers and iOS, Android, or Game Console. Program Lightbot to solve puzzles using procedures and loops!

- Solve Puzzles using Programming Logic

The Foos

Elementary (Pre-readers welcome). Modern web-browsers, iOS, Android. A fun game to learn about programming.

- Concepts: Problem Recognition, Conditionals, Critical Thinking, Perseverance, Sequencing, Algorithms, Loops, Commands/Parameters

Hour of Code K-8 tutorials
https://code.org/educate/allhourofcode

Tutorials for Grades K-8

Kodable

Elementary (Pre-readers welcome). Modern web-browsers, iPad. A fun iPad game to teach computer programming concepts.

- Grab and Go K-5 Solution. No programming experience needed

Monster Coding

Ages 5-13. Modern web browsers, iOS, Android. A colorful self-guided programming adventure for children.

- We think coding is a great way to learn many things, not just programming. So we've incorporated a lot of cool math learning blocks, as well as shapes and patterns.

AllCanCode

Ages 5-10. Modern web browsers, iOS. An immersive game to guide Marco with a visual programming language.

- Run Marco! A coding adventure around the world.

CS First

Ages 9-14. Modern web-browsers. Animate a story about two characters on the ocean. Add your own style!

- Theme-Based Clubs
- Each CS First club is based on a real-world theme and offers about 10 hours worth of lessons and activities. The different club themes aim to attract and engage students of varying backgrounds and interests. All materials are targeted at students in 4th - 8th grades (or between the ages of 9 - 14) and are free and easy to use.
- CS First is a free program that increases student access and exposure to computer science (CS) education through after-school, in-school, and summer programs. All clubs are run by teachers and/or community volunteers.
- Our materials: Are completely free and available online, are targeted at students in grades 4th-8th (ages 9-14), can be tailored to fit your schedule and needs, involve block-based coding using Scratch and are themed to attract students with varied interests

Hour of Code K-8 tutorials
https://code.org/educate/allhourofcode

Tutorials for Grades K-8

Inside Out - Made With Code

Ages 9-14. Modern web-browsers. Help Riley from the Pixar animated movie Inside Out, write code to help her make it past some of the life challenges she experiences during the movie.

- Less than 1% of girls study Computer Science. Let's change that.

NCLab: Karel the Robot

Elementary. Web-based. Learn basic concepts of Computer Science by typing programs for a robot.

- NCLab's mission to bring access and equity in STEM education to all learners, especially the under served, by providing them with technological opportunities that engage them, ignite their curiosity, and personalize & tailor their learning. NCLab makes sure that its users achieve their STEM education goals through the use of innovative self-paced online courses in computer programming, 3D modeling, and other essential STEM subjects. NCLab is passionate about training and supporting teachers who are and will remain an indivisible part of the educational process.

Alice Project

Elementary. Desktop or Game Console. Create an Alice animation with Garfield the Cat using two tutorials: Tutorial 1 sets up the scene. Tutorial 2 writes the program code.

- Alice is an innovative 3D programming environment that makes it easy to create an animation for telling a story, playing an interactive game, or a video to share on the web. Alice is a freely available teaching tool designed to be a student's first exposure to object-oriented programming. It allows students to learn fundamental programming concepts in the context of creating animated movies and simple video games. In Alice, 3-D objects (e.g., people, animals, and vehicles) populate a virtual world and students create a program to animate the objects.

Hour of Code K-8 tutorials
https://code.org/educate/allhourofcode

Tutorials for Grades K-8

Coding Pirates
Elementary. Web-based, Android, iOS. Learn to code with Captain Hack by visually programming with blocks.

- Requires app or unity webplayer-mini plugin.

- **Thimble** is an online code editor that makes it easy to create and publish your own web pages while learning HTML, CSS & JavaScript.

Hour of Code HS tutorials
https://code.org/educate/allhourofcode

High School

STEM Projects

Ages 5-18. Programming, Science (Ecology), Science (Space), Web-based. Code and animate a Solar System simulation, an interactive ecological pyramid, a working analog clock, and more.

- uses Tynker, at https://www.tynker.com/hour-of-code/tynker-stem-teacher-guide.pdf

CodeHS Pixel Art

Ages 14-18. Art, Math (Coordinates), Unplugged. Students learn about coordinates, what pixels are, and how to create drawings by setting pixels to be different colors.

- pdf pixel art resources with blanks, by CodeHS, https://codehs.com

10 Minutes of Code using a T.I. Calculator

Ages 13-18. Math (Algebra), Math (Functions), Programming, Unplugged, TI-84™ Plus graphing calculator required.

- it is https://education.ti.com/en/us/solutions/ti-codes

Scratch Animate Your Name

Ages 8 to 16. Programming, Creativity, Web-based. Students will animate the letters of their name, initials, or favorite word using Scratch!

- it is https://scratch.mit.edu/scratchr2/static/pdfs/help/AnimateYourNameGuide.pdf

Scratch Hide and Seek Game

Ages 8 to 16. Programming, Creativity, Web-based. Students will gain experience with coding as they make a hide-and-seek game.

- it is https://scratch.mit.edu/scratchr2/static/pdfs/help/Hide-and-Seek-Guide.pdf

Scratch Dance, Dance, Dance

Ages 8 to 16. Programming, Creativity, Web-based. Participants will create and code an animated dance scene.

- it is https://scratch.mit.edu/scratchr2/static/pdfs/help/DanceGuide.pdf

Hour of Code HS tutorials
https://code.org/educate/allhourofcode

High School

Looking at Data with Splunk

Ages 14-18. Math (data analysis), Web-based. Students will analyze the data from a theoretical game to find levels which are too easy of difficult.

- it is https://www.dropbox.com/s/46ed5ilhvsam8ci/SplunkLessonPlan.pdf?dl=1. Requires connection to https://splunk.codeday.org: blocked. Check out https://codeday.org.

Input and Output, Math Activity

Ages 12-16. Math (Algebra), Math (Functions), Unplugged. Connect JavaScript functions to both math and real world problems.

- It is https://app.vidcode.io/doc/unplugged-activity-math.pdf. Looks a bit sketchy.

Vizwik Voter App

Ages 13-18. Programming, App building. Learn how to build your own mobile app (iOS and Android) to share with friends to vote on a question that is important to you.

- It is www.vizwik.com/hoc. Requires sign in.

Climate Science

Ages 12-16. Science (Climate), Science (Environment), Unplugged. Students draw a picture, and take turns giving the class steps to recreate their drawing.

- It is https://app.vidcode.io/hourofcode/science-teacher-guide.

Mozilla Homework Excuse Generator

Ages 13-18. Programming, Language Arts, Web-based. Use Mozilla's code editor, Thimble, to edit strings inside JavaScript arrays and customize the homework excuse generators.

- It is https://d157rqmxrxj6ey.cloudfront.net/mozillalearning/11701/. Thimble at https://thimble.mozilla.org/en-US.

Hour of Code HS tutorials
https://code.org/educate/allhourofcode

High School

Fact or Fiction?

Ages 16-18. Programming, Build an App, Web-based. Students create an app to survey whether their classmates think a statement is find a fact or fiction.

- It is www.vizwik.com/hoc

Oral History Project

Ages 14-18. Programming, Storytelling, Unplugged CEOHP has worked with a variety of educators to develop ideas for classroom activities, homework, and exam problems based on the interview materials.

- It is www.cs.southwestern.edu/OHProject/materials-overview.html (Computing Educators Oral History Project)

Best Technology Activity

Ages 14-18. History, Storytelling, Unplugged Wired.com ran a series of articles in 2013 on each decade of the past 100 years and the significant inventions of those decades. Most interesting to students are the past 2030 years, with the explosion of technology and the gadgets that ensued.

- It is https://csedweek.org/csteacher/besttechnology.pdf

Arduino Activity

Ages 12-15. Programming, Arduino Ever wonder how toys make noises and blink lights when you push buttons? Microcontrollers and circuits are used in all sorts of everyday objects. From remote controlled cars to robots and drones.

- It is https://csedweek.org/csteacher/arduino.pdf

Secret Codes Activity

Ages 12-15. Ciphers, Math (Cryptography), Scratch, Web-based. Turing has done many things for computer science (often called the father of computer science) but today we will focus on one very important one that helped with the invention of computers.

- it is https://csedweek.org/csteacher/secretcodes.pdf. Includes remixing and extending a simple Scratch project to create your own secret code at http://scratch.mit.edu/projects/30127212

Hour of Code HS tutorials
https://code.org/educate/allhourofcode

High School

Computer History Activity

Ages 12-15. History, Storytelling, Scratch, Google Docs, Unplugged Your class will be be creating a 'history of computers' web page/Scratch project/video that we can share with the world. To make this web page, you and your partner will do research and write about one important event or person in computer history

- It is https://csedweek.org/csteacher/computerhistory.pdf. Has link to Computer History Museum (www.computerhistory.org): interesting.

Grace Hopper Debugging Activity

Ages 12-18. History, Language Arts, Storytelling, Unplugged Students will research Grace Hopper and learn the story of the first “bug".

- The link is https://csedweek.org/csteacher/gracehopperdebugging.pdf. Follow several links about Grace Hopper and computer history.

Globaloria MakeQuest

Ages 10-18. Programming, Game Design, English, Math, Creativity, Web-based. Learn to edit and write JavaScript code to defeat the 'Evil 404,' as you explore computer science concepts like variables and functions. Lesson Plan includes subject-matter extension activities for English, Mathematics, Science, History and Arts classes.

- The link is globaloria.com/courses-services/teacher-guides/. Game using code is at http://code.globaloria.com. Main http://globaloria.com.

Codesters Dream Sequence

Ages 11-16. Programming, Story Telling, Language Arts, Web-Based. Students write a story using transition words while learning computer science in this Common Core aligned English language Arts project.

- It is https://www.codesters.com/hoc-classroom/. See also the next item.

Codesters Transformation Puzzles

Ages 11-16. Programming, Math (Coordinates, Geometry), Web-Based. Students explore, identify, and perform transformations on the coordinate plane in this Common Core aligned Math project.

- https://www.codesters.com/hoc-classroom/ TechJam is next step https://www.codesters.com/TechJam/. It uses Python. “Codesters offers a full 40-lesson Intro to Python curriculum as well as several standards-aligned Math modules. Visit our **marketplace** to see the modules we have available.”

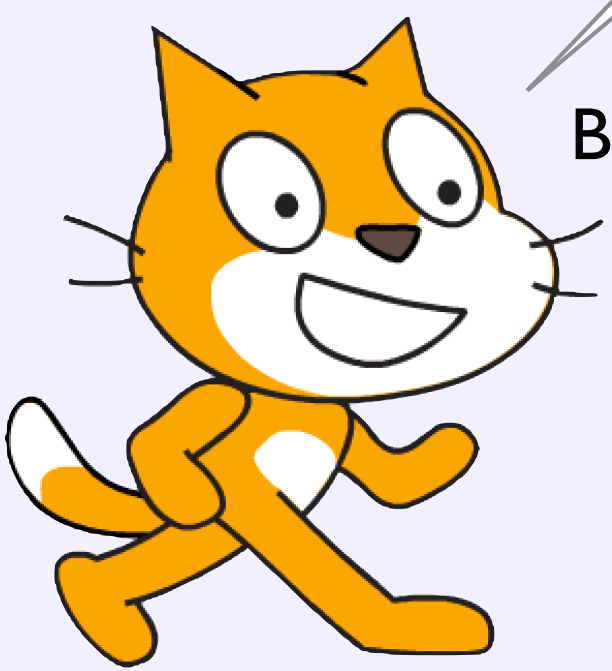
Acknowledgments

- Scratch: https://scratch.mit.edu/
- ScratchEd: http://scratched.gse.harvard.edu/
- CS First: https://www.cs-first.com/
- Code . org: https://code.org/
- Hour of code tutorials: https://code.org/educate/allhourofcode

Links

- MACUL SIGCS (Special Interest Group for Computer Science): http://www.macul.org/sigs/sigcs/
- MiCSTA (Michigan Computer Science Teachers Association): http://barrywebster.com/micsta.html
- CSTA: (Computer Science Teachers Association): https://csta.acm.org/
- My website: http://barrywebster.com/

Thank you for participating!



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