



Creative Computing

The Kano Curriculum





Creative Computing Standard Alignment

		Build A Computer	Intro to Make Art	Intro to Scratch	Intro to Kano Code	Intro to Hack Minecraft	
US K12CS	Algorithms and Programming	Algorithms	○	○	○	●	○
	Algorithms and Programming	Control	○	○	○	●	○
	Algorithms and Programming	Program Dev	○	○	●	●	●
	Computing Systems	Devices	○	○	○	●	○
	Computing Systems	Hardware + Software	●	●	○	●	○
	Computing Systems	Troubleshooting	○	○	○	●	○
CSTA	K-2: 1A-A-3-7	○	●	●	○	●	
	K-2: 1A-A-5-2	○	●	●	○	●	
	K-2: 1A-A-6-8	○	●	●	○	●	
	K-2: 1A-C-6-11	○	○	○	○	○	
	K-2: 1A-C-7-9	○	○	○	○	○	
	K-2: 1A-C-7-10	○	○	○	○	○	
	3-5: 1B-A-2-1	○	○	○	○	○	
	3-5: 1B-A-3-7	○	○	○	○	○	
	3-5: 1B-A-5-4	○	○	○	○	○	
	3-5: 1B-A-6-8	○	○	○	○	○	
	3-5: 1B-C-6-11	●	○	○	○	○	
	3-5: 1B-C-7-9	●	○	○	○	○	
	3-5: 1B-C-7-10	●	○	○	○	○	
	6-8: 2-A-5-6	○	○	○	○	○	
	9-10: 3A-A-5-4	○	○	○	○	○	
	COMMON CORE	CCSS.MATH.PRACTICE.MP1	●	●	●	●	●
		CCSS.MATH.PRACTICE.MP2	○	●	●	●	●
CCSS.MATH.PRACTICE.MP3		○	●	●	●	●	
CCSS.MATH.PRACTICE.MP4		○	●	○	○	○	
CCSS.MATH.PRACTICE.MP5		●	●	●	●	●	
CCSS.MATH.PRACTICE.MP7		○	●	○	○	●	
CCSS.MATH.PRACTICE.MP8		○	○	○	○	○	
CCSS.MATH.CONTENT.1.G.A.2		○	○	○	○	○	
CCSS.MATH.CONTENT.2.G.A.1		○	○	○	○	○	
CCSS.MATH.CONTENT.3.OA.D.9		○	○	○	○	○	
CCSS.MATH.CONTENT.4.OA.C.5		○	○	○	○	○	
CCSS.MATH.CONTENT.5.G.B.3		○	○	○	○	○	
CCSS.MATH.CONTENT.6.G.A.3		○	○	○	○	○	
CCSS.MATH.CONTENT.HSG.MG.A.3		○	○	○	○	○	



LESSON 1

Build a computer!



Beginner



1 hr 10 min

Students will discuss ahead of time what are the components of a computer and then use that knowledge to BUILD.

OBJECTIVES



Learners can describe the components of a computer system, including hardware, operating systems, and applications.



Learners can give examples of how computers are used in the real world.



Learners build computers and write lines of code.

STANDARDS



K12 CS: Computing Systems.Devices, Computing Systems.Hardware and Software



CSTA: 3-5: 1B-C-7-9, 1B-C-7-10, 1B-C-6-11



Common Core: CCSS.MATH.PRACTICE.MP1

MATERIALS NEEDED

Print out a diagram of the Raspberry Pi and talk through each component.

Introduction

⌚ 10 mins

Linking

Today learners will build a computer! Before they do, challenge them. Ask them to write down as many parts of a computer (mouse, speaker, etc) as they can in 2 minutes. After the time is up, have them compare with their partner. As a group, share out your answers and the lead write them down so the class can see the parts. Discuss the difference between hardware and software.

Engage

We were able to name a lot of parts for a computer, and today we will focus on these hardware pieces. Some we always knew, some we just learned. Today, we are going to see how all these parts interact and make a computer. We will have our own components, and by the end of the day we will build, and have a computer that works!

Exploration Activities

Challenge 1: What Can Computers Do?

⌚ 5 mins

Ask learners what they think computers can do. As they discuss write their responses down.

- What are they used for?
- What is code?
- What is a Raspberry Pi?

Challenge 2: Build A Computer!

⌚ 30 mins

Pass out the Kano kits. Ask learners whether any of them have built their own computers before to get them excited.

Build! Kids build their Kanos. Clap and cheer as kids get powered up and type “cd rabbit hole.”

Challenge 3: Explore Kano

🕒 10 mins

If you have a little time, let the kids play around and move into different apps on Kano. Direct them to Make Art so they can start coding art! If you have a lot of time left to explore then move on to the Explore Kano lesson.

Closing

Evaluation

🕒 5 mins

Once the computers are picked up, ask students to fill out their engineering journal daily log. As well, in the in class reflection section answer these questions:

- What was your favorite part about today's session?
- What was your least favorite part about today's session?
- What are 3 things you learned today?
- Why is it important to create, not just consume, technology?

Call on 4 people to answer 1 of the 4 questions above.

Extension

🕒 5 mins

Before everyone leaves, ask the learner to go home tonight and draw or write what it was like to build a Kano Computer. Did they enjoy it? Were they excited? What was the computer like?

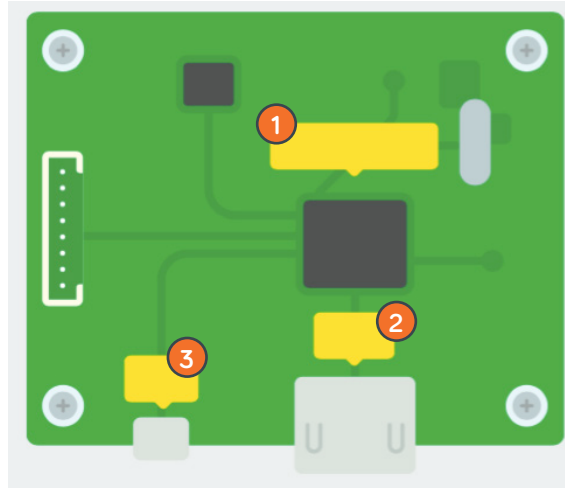
As well, pass out the "Build Worksheet" to be completed at home. You can find the worksheet in the appendix section of this packet.

Kano Cleanup

🕒 10 mins

As you start using Kano in class, how you clean up will become important. Take a substantial amount of time (10 - 15 minutes) to practice your clean up routine with your students.

Below is an image of the Raspberry Pi. Can you label each part correctly?



1

2

3

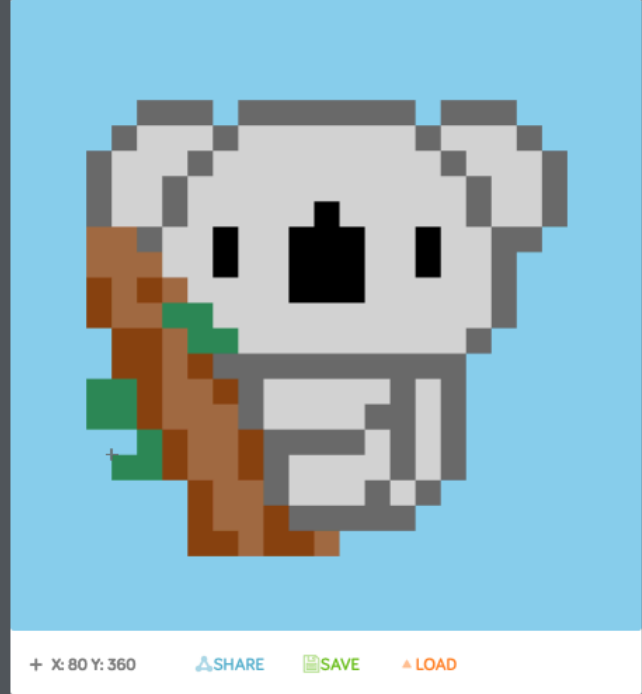
Programmer Questions

In the sections below answer the questions to the best of your ability. If needed, draw examples to support your statements!

1. Today you built and coded your Kano Computer! Can you name the components that were **hardware** of the Kano? Can you name the components that were **software** on the Kano?

Hardware	Software

```
1 stroke 0
2 background skyblue
3 color lightgray
4 moveTo 240, 240
5 square 20
6 moveTo 160, 240
7 rectangle 80, 20
8 moveTo 260, 240
9 rectangle 120, 20
10 moveTo 140, 220
11 rectangle 80, 20
12 moveTo 280, 220
13 rectangle 100, 20
14 moveTo 120, 200
15 rectangle 40, 20
16 moveTo 180, 200
17 rectangle 40, 20
18 moveTo 280, 200
19 rectangle 40, 20
20 moveTo 340, 200
```





LESSON 2

Intro to Make Art



 Beginner  2 hr 20 minutes

Have your creators gets used to Make Art and begin creating unique creations to share!

OBJECTIVES

-  Makers will understand how to access Make Art
-  Makers will be able to identify the features of Mark Art and use them to create their own pieces of art

STANDARDS

-  **K12 CS:**
 - Computing Systems.Troubleshooting; Algorithms and Programming.Algorithms
 - Algorithms and Programming.Control; Algorithms and Programming.Program Development
-  **CSTA:**
 - K-2: 1A-A-5-2, 1A-A-3-7, 1A-A-6-8
 - 3-5: 1B-A-2-1, 1B-A-5-4, 1B-A-3-7, 1B-A-6-8
 - 6-8: 2-A-5-6
 - 9-10: 3A-A-5-4

MATERIALS NEEDED

Visit <http://art.kano.me/challenges> to find all our Make Art challenges

Introduction

Linking

⌚ 5 mins

Ask your students to draw anything, using a pen and paper. It can be as simple or as complex as they want but they only have 5 minutes. Put a countdown up to get them energized to go!

Engage

⌚ 5 mins

Tell your students to turn and talk to each other for 1 minute each. What is your favorite program you have used to edit images (Paint, Photoshop, Code)? Do they think they can transfer their drawings to the computer with one of those softwares? If you can how? After they are finished with the 2 minute turn and talk discuss how computers are becoming used more often in artwork, from [Disney films](#), to [3D printed jewelry](#), to [laser cut wood prints](#), to [art made from code!](#) Art is changing and using technology to create this change. Today they will learn one platform to use code to create art and share it with the world!

Collect Kanos

⌚ 5 mins

Retrieve Computers, Turn On, Log In..

Exploration Activities

Challenge 0: Get to know Make Art!

⌚ 10 mins

Briefly go over the features of Make Art and how you access the app.

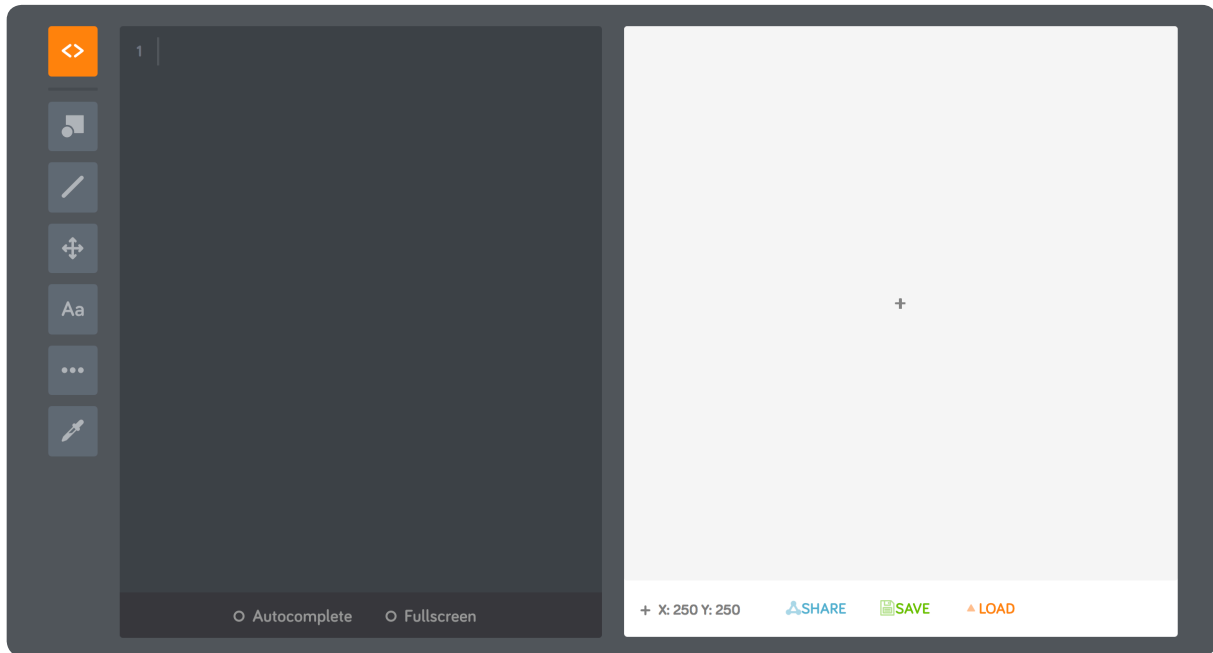


Click this icon to launch Make Art!

Once the app is open they will have the option to work on :”challenges” or hang out in the “playground.” Challenges are exactly that, challenges, that the Kano team creates to help creators get used to the environment and start learning code. They are walk throughs that provide specific instructions to move forward and you can customize your creations afterwards!

The playground is a little different. There are no walkthroughs, it is a playground for your imagination! Take the skills you learned in the walk throughs or tinker around to see what you can create!

When you open up Make Art in “challenges” or “playground” you will see a screen like the one below. The left side is where you will code, and the right side is where you will see your creations start to grow and be built!



Try hitting enter a few times in the dark left side. You will notice numbers appear. This is a number system to help you create individual lines of code.

Now on the right side move your cursor around. You should notice that in the bottom left corner of the white screen you will see the “x” and the “y” move positions. In Make Art you are creating masterpieces on a grid that corresponds to a coordinate plane. You can use your cursor to help you identify where on the grid you need to draw!

On the left side you will notice 7 gray boxes. These are buttons to different windows that give you information on Make Art!



Code: This will be where you will usually have your left screen working on. Here you type in the code that will help build your creations on the right side.



Shapes: Do you want to create objects? You can create shapes: circle, ellipse, square, rectangle, and polygon in this section with the example code shown.



Lines: With this button you can draw lines! These include drawing a line of a certain size, and drawing a line to a certain point.



Position: We want to create in different spaces on our digital canvas. To do this we need to learn how to move in Make Art. You can see example to move the cursor a certain distance away and move the cursor to a particular position.



Text: Maybe you want to say something in words. Use the text box to learn examples to: write a message, set size and/or font, sets bold text on (true) or off (false), sets italic text on (true) or off (false).



General: This button explains a few things that don't fit in the other categories. Such as: repeat code or get a random number in a range.



Colors: What is a piece of art without color? In the color button you will see examples to: set the background color, change the color in use, change the width and color of the stroke (border, set a color's brightness, set a color's saturation, rotate a color's hue angle by a given amount, set how see through a color is.

Challenge 1: Explore MakeArt!

🕒 15 mins

Have your kids click on MakeArt and explore the beginner challenges. Don't forget them to share their art pieces on Kano World!

Challenge 2: Are your kids ready for a challenge?

🕒 20 mins

Are your kids ready for a challenge? Have them open up the playground and attempt the following scenarios:

Scenario 1: You coded a Swiss flag, but can you code another flag? See if your kids can create a flag themselves! Suggested flags: Japan, Bangladesh, Nigeria, and France.

Scenario 2: In the code your face we created a smiling face! Can you figure out how to make the face frown?

Challenge 3 : Challenge a classmate!

⌚ 20 mins

Challenge a classmate! Pair up your kids. Have each student write a challenge on a piece of paper. Tell them to make it reasonable and something that can be created in Make Art only. Make sure their partner doesn't see! Once they have their challenge thought out they will exchange with their partner. Can each person finish the challenge before they run out of time?

Closing

Sharing and Evaluation

⌚ 15 mins

Your students should have finished Challenge 3. Ask the challenger to critique the challenge -y's artwork. Did it make the grade? Ask the challenger to grade them! If they did, give them a 3, if it was okay a 2, if not that much a 1. Ask the challenger to give 2 lines of feedback, one helpful comment to make it better and one positive comment!

Educator Note: It is recommended you model this to the kids to make sure they fully understand the task.

Tell the students you hope they enjoyed this introduction lesson and that they will be doing more exciting work with Make Art. While students leave, tell them to turn in their post it notes with their grade for their challenge partner's work. Also, have students complete their daily log in their engineering journal!

Kano Cleanup

⌚ 5 mins

Power down and put away Kanos

Programmer Questions

What does Syntax error mean? How do you fix it?

In the challenge “Sunny Day” you have the completed code below. In the below code, explain which words can be changed to modify the outcome and which things have to stay the same.

```
1 background blue
2 color yellow
3 circle 150
```

Creator Question

You created on Make Art today, but challenge yourself now! Draw a simple drawing only using 3 shapes (rectangles, circles, and/or triangles). Try to code this drawing tonight or in class later!