PCS edventures!™

Experts in Hands-On STEM Education

Scratch Camp

Grades 1-3

CURRICULUM SAMPLE

STEAM ENRICHMENT

edventures.com

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(208) 343-3110

STEAM ENRICHMENT

COMPLETE PROGRAM

PRINT MATERIALS

CURRICULUM SAMPLE

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Scratch Camp

GRADES: 1-3

STUDENTS	TIME
Up to 30	12, one-hour lessons

SUBJECTS
- Technology
- Robotics & Coding
- Math Connections

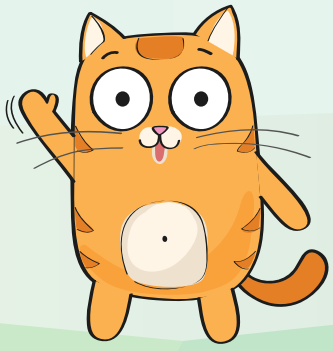
SETTINGS
- Summer camps
- Classrooms
- Before & After-school programs

Scaffolded projects introduce learners to **computer programming** with *Scratch*, a free-to-use block coding software that makes learning the fundamentals of computer science easy.

♻ 100% reusable

TECH REQUIREMENTS / PREREQUISITES
- One device per student recommended
- *Scratch* is compatible with any Internet-connected device, including desktops, laptops, iPads, Android tablets, and Chromebooks. Best when used with video projector available.

PRICING OPTIONS
- Complete Program: $495^{00}



Scan or Click QR Code for:

PRODUCT ORIENTATION | FULL MATERIALS LIST | STANDARDS & ALIGNMENT

CONTACT US:
Call: **(208) 343-3110**
Email: **sales@edventures.com**
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Rev: 12/18/25

Spirographs

STEM CONNECTIONS

Technology: Technology Operations and Concepts

Engineering: Defining Engineering Problems

Math: Numbers and Operations in Base Ten & Measurement and Data

DURATION

60 Minute Lesson

MATERIALS

- **Computers** (1 per student)
- **Projector connected to instructor computer, if available**

SCHEDULE

- Intro (5 min)
- Draw a Square (15 min)
- Square Spirograph (15 min)
- Spirograph Challenge (20 mins)
- Wrap-Up (5 min)

OBJECTIVE

Explore repeating motion and pen commands to create complex spirograph drawings.

ALIGNED STANDARDS

NGSS

K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

CCSS

CCSS.MATH.CONTENT.2.NBT.A.1: Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.

CCSS.MATH.CONTENT.4.MD.C.5: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

CCSS.MATH.CONTENT.4.MD.C.5.A: An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.

CCSS.MATH.CONTENT.4.MD.C.5.B: An angle that turns through n one-degree angles is said to have an angle measure of *n* degrees.

21ST CENTURY SKILLS

- Critical Thinking and Problem Solving
- Flexibility and Adaptability
- Information, Media, and Technology Literacy

HABITS OF MIND

- Thinking Flexibly
- Responding with Wonderment and Awe

KEY TERMS

- **Degrees of an Angle:** a degree is a measurement of an angle. A full circle is 360 degrees, so an angle of 1 degree is 1/360 of a full circle.
- **Spirograph:** a shape that is repeated a number of times to produce a new, more complex, shape.

DAILY PREP

- Read through today's activities and prep all the materials needed to complete them.
- Have the *Scratch* homepage visible or saved as a favorite in the browser.
- Work through the *Scratch Camp* activities on your own before the start of camp to ensure you're able to answer all questions.
- Make sure each camper either knows or has access to their *Scratch* login information.
- **Highly Recommended:** Use a projector to demonstrate each new skill. If this technology isn't available, the handouts are designed to serve as mini-screen shares, giving campers a visual reference to go along with your verbal directions.

STEP-BY-STEP DIRECTIONS FOR INSTRUCTORS

Whole Group

INTRO

Welcome everyone back to *Scratch Camp*, and start Day 3 by reviewing the ideas covered in the last two lessons. Be sure to follow the blue script for guidance. If you're moving on directly from Day 2, skip this intro discussion.

> Welcome back to *Scratch Camp*! Is everyone ready for their third day of characters and coding? Today, we're going to explore the power of programming! During these lessons, we'll be using one very important block: the "forever" loop. We've already used this block before — does anyone remember what it does?

After campers discuss what the "forever" block is used for, introduce the "repeat" block as the main tool for today's project.

> As a computer program, *Scratch* can run hundreds of commands almost instantly, as we will soon see. Luckily, we don't have to program hundreds of steps! We can just tell the sprite to repeat certain steps over and over. And when the Pen is used on repeat, we can draw some really stunning pictures. With these new commands, we're going to draw some fantastic images — are you ready to draw a spirograph?

Whole Group

DRAW A SQUARE

Start today's code by adding a new sprite.

> Let's start by adding a new sprite. Open the Sprite Library and choose a sprite you haven't worked with before. Then delete the Scratch Cat from the sprite list by selecting it from the sprite area, right-clicking and deleting.

Now, discuss how to make a sprite move in a square using "  " blocks.

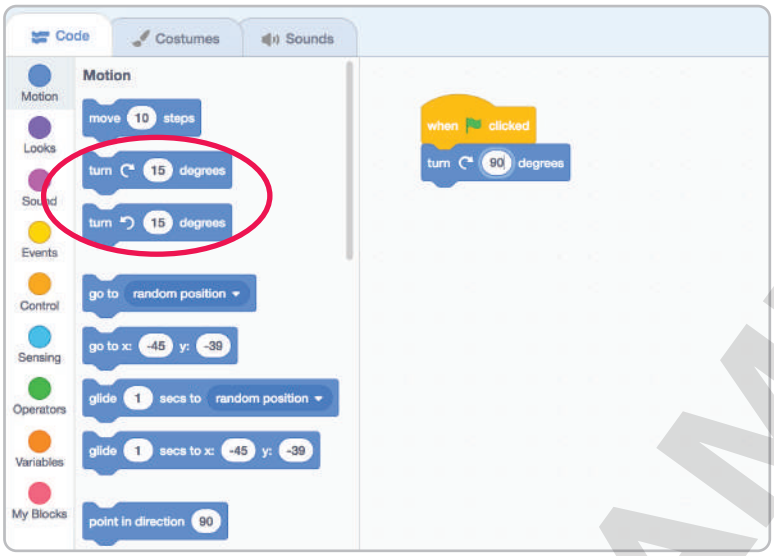
> We're going to have your new sprite make a simple shape first: a square. But this time, all we actually need to program is one straight line and one turn — a special new block will complete the square for us!
>
> - With your new sprite selected, add a "when clicked" Event block.
> - Then open the Motion section.
> - At the top of the list, there are two blocks called "turn __ degrees." Drag one to your code and try experimenting with them.

- What happens when you change the number inside the block?

After campers have had a chance to toy with the new block, explain how to make the 90-degree turns they'll need for a square.

The "turn __ degrees" block is special because it can make a sprite change direction in a very specific way. Just like how you walk around a corner in a hallway, the "turn ___ degrees" block does the same thing for the sprite. But remember, we want the sprite to make a square, not just turn in circles. To make a square, we need to remember that each square has four corners. These four corners all bend in exactly the same way, or at the same "angle." Angles can range anywhere from 1 to 360 degrees, but for the four corners of a square, the angle needs to be exactly 90 degrees.

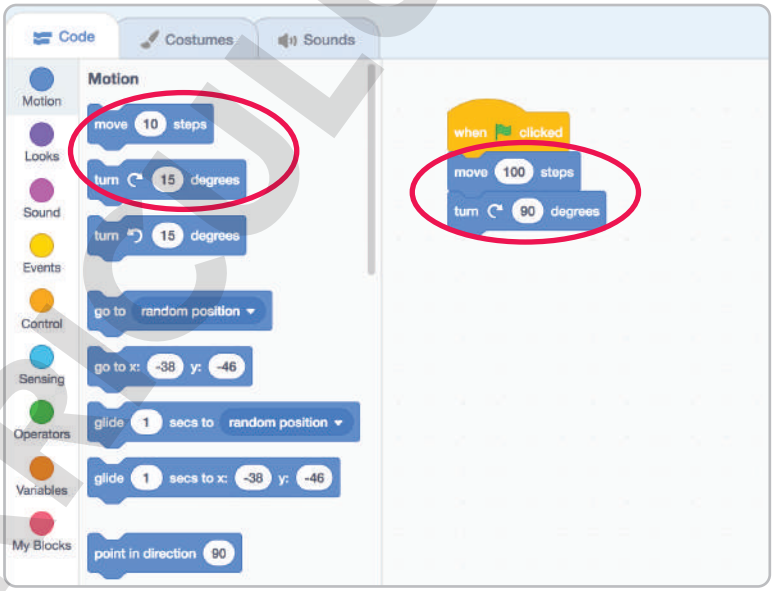
- Experiment with this very specific angle by changing the number inside of your "turn" block to 90.



Now, add a "move __ steps" block to the code.

The square code is already almost finished! But we still need to tell the sprite to actually move.

- Click and drag a "move __ steps" block and drop it at the top of the code, below the Event block but above the "turn" block.
- Then change its number of steps to be 100.
- Try clicking the green flag four times. Did your sprite move in a square shape?



With the movement completed, it's time to model how to add a "repeat" code.

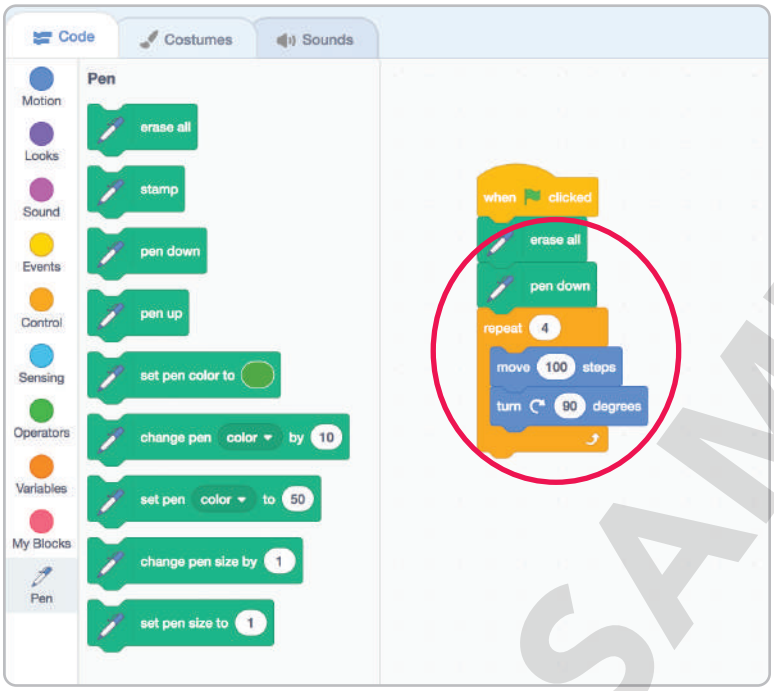
We've completed a square, but let's make things a little easier by eliminating the need to click the green flag over and over again.

- Go to the Control section.
- Look for the "repeat" block and drag and drop it onto your code.
- Just like the "forever" block, it will surround the other blocks like a sandwich.
- Then change the repeat number to 4.
- Click the green flag to see your sprite move in a square!

Now add a Pen command to the square code.

The "repeat" and "forever" blocks make coding so much easier! Now, let's try adding the pen to this project.

- Open the Pen section and drag over the "erase all" and "pen down" blocks. (You may need to reload the Pen option from the extensions tab.)
- Add them to the very top of your code, so they are not inside the "repeat."
- If you want, choose the color and pen size too by adding the correct blocks.
- With the pen blocks down, try running your program. Did you draw a square?

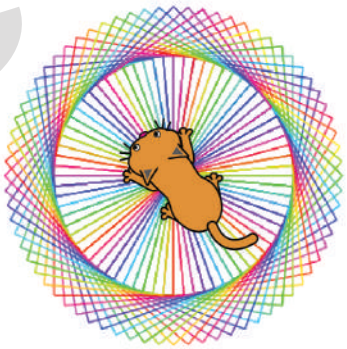


Whole Group

SQUARE SPIROGRAPH

With streamlined squares taken care of, introduce spirographs to the class.

> The square is a pretty easy shape to draw, but it loses its excitement factor pretty quickly. Let's see if we can slightly adjust the code to make it more interesting. We can make an astounding new shape by only adding a few new blocks! This perplexing shape is known as a spirograph!



Start by adding a "loop" and "turn __ degrees" block to the repeat code to make a spirograph.

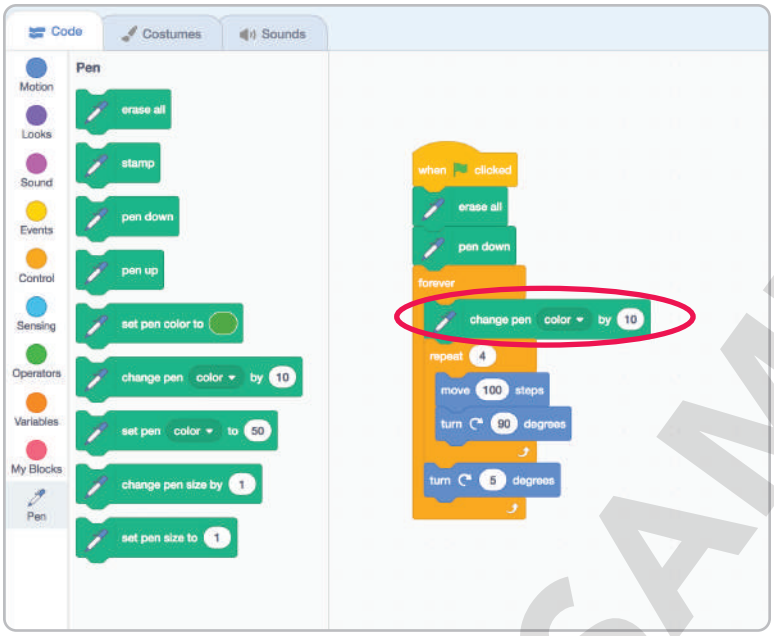
To make a spirograph, open the Motion section.

- Drag over a new "turn __ degrees" block and drop it at the bottom of the code, beneath the repeat block.
- Then click on the number in the turn block and change it to 5.
- Next, open the Control section and drag over a "forever" block.
- Surround both the "repeat" and "turn" blocks with the "forever" block.
- When you are ready, hit the green flag!

Isn't that spirograph cool? Ramp-up the coolness factor even more by modeling how to create a rainbow-colored spirograph.

Did you think that the spirograph is a cool shape? Watching that sprite whip around is super exciting! But, what if told you there was a way to make it even more exciting? What if we made the spirograph rainbow-colored? Let's do it!

- Open the Pen section and look for the "change pen color by __" block.
- When you have found it, drag it over and drop it above the "repeat" block. It should be the first block in the "forever" code.
- Now the color should change every time it starts a new square. Test it out!



Individual

SPIROGRAPH CHALLENGE

Challenge campers to add new sprites and create a different spirograph with each one.

> Congratulations! You've made a sophisticated drawing by creating a complex and multi-step program! Let's see if we can go one step further by adding a new sprite to create a totally new spirograph. Instead of a square, you could try a triangle spirograph or even a pentagon spirograph. What happens when you change the numbers in the "turn __ degrees" blocks? You can also experiment with some of the new blocks, like the "change color" or "repeat" blocks. Have fun and see where the mysteries of investigation take you!

Group Discussion

WRAP-UP

At the end of the day, have everyone log out of *Scratch* and turn off their computers and screens. Then lead the class in a wrap-up discussion.

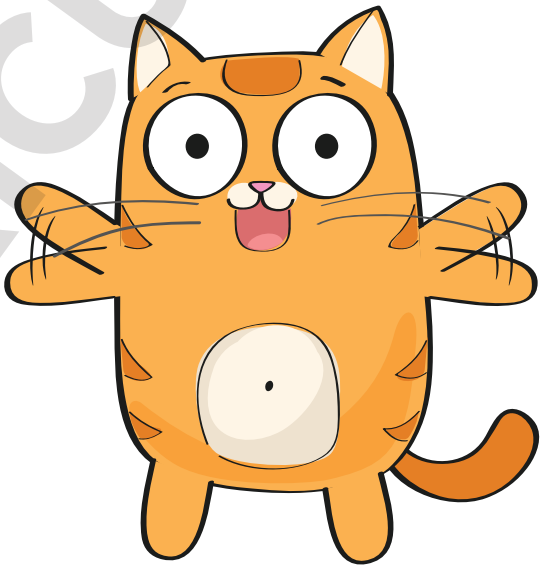
> It's been a big day, guys! You experimented with "turning" blocks and made some amazing shapes!
>
> - What was your favorite shape to draw?
> - Did the "repeat" or "forever" block make drawing spirographs easier? How so?

CHECK FOR UNDERSTANDING

- Can you "repeat" a "forever" block? Why or why not? *(Yes, both Control codes can nestle inside of each other, but they have the same effect — it doesn't create a unique outcome.)*
- What did the degree number in a turn block change? *(The angle at which the sprite turned.)*

EXTENSIONS

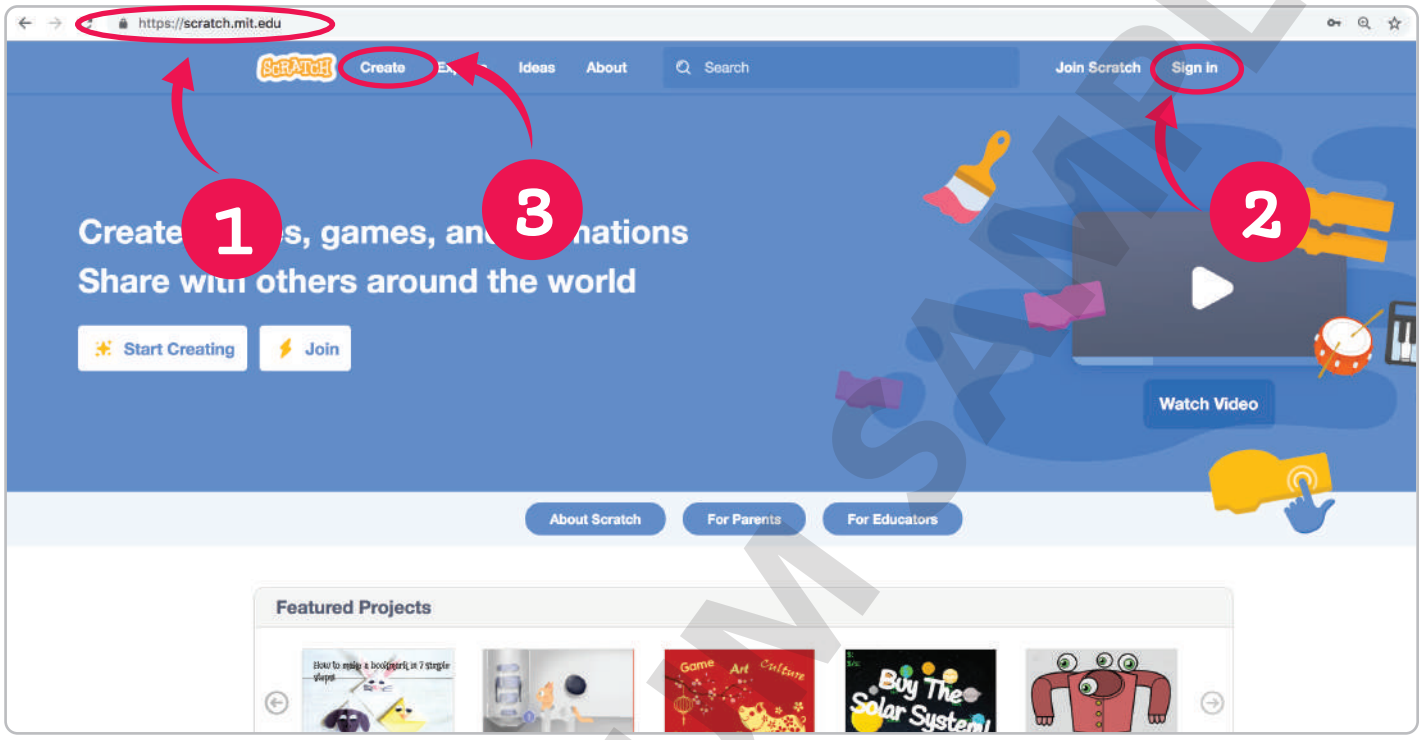
- Discuss how to determine the needed angle of a shape by dividing 360 by the number of sides in the shape (i.e., 360/4 for a square).
- Challenge campers to make a circle spirograph.



DAY 3

SCRATCH CAMP

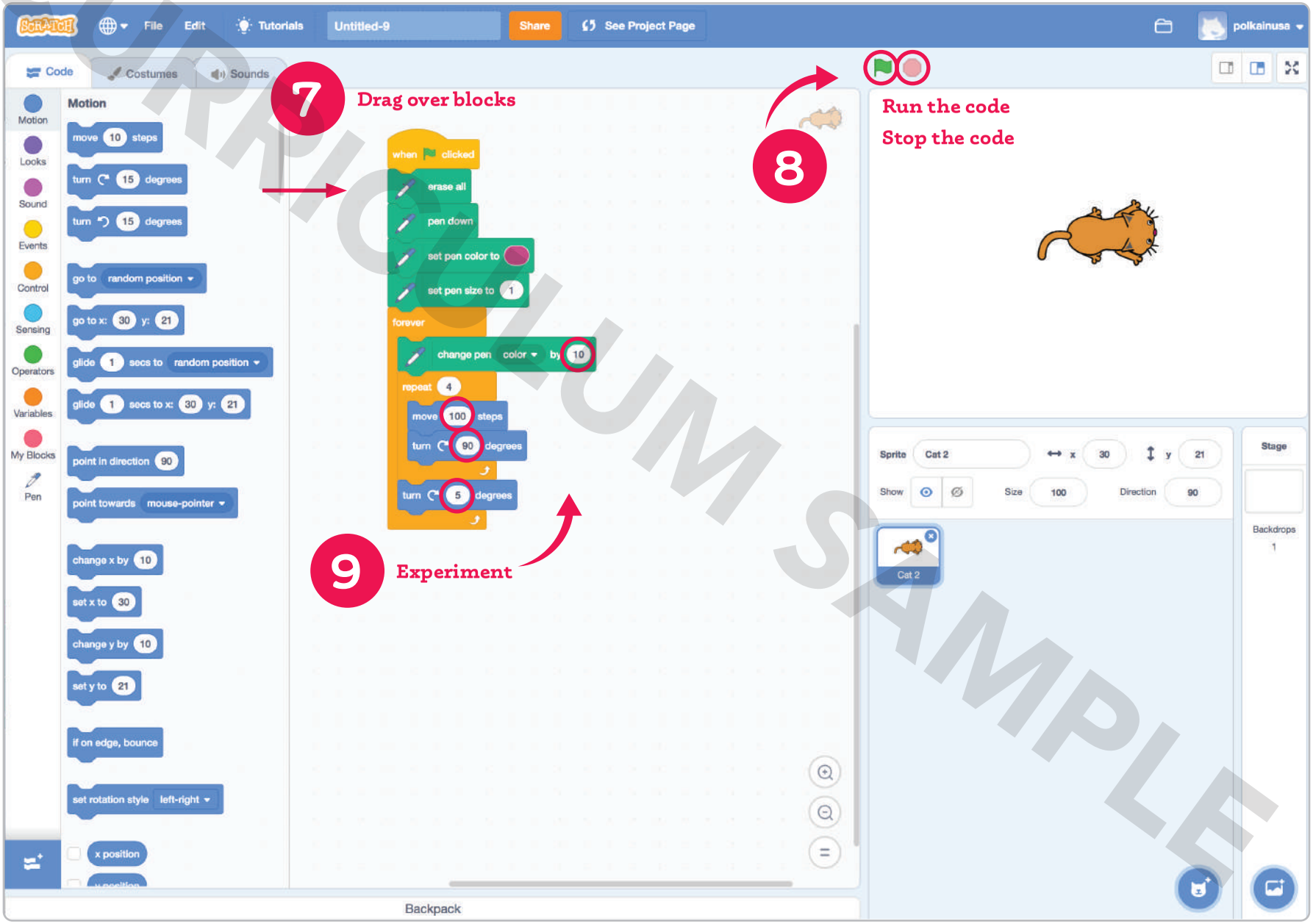
Spirographs



DAY 3

SCRATCH CAMP

Spirographs



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