

Pattern Creator

60 minutes

Digital Creation Lab

WHAT THIS LESSON DOES

Get ready to create amazing patterns in Scratch! In this lesson, you'll learn to use the pen tool and variables to design unique patterns. Follow the steps to code spirals, adjust colours, and experiment with different sizes.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Master the use of Scratch for pattern creation.
- Understand and apply the use of variables in creating complex shapes and patterns.
- Manipulate the pen tool to draw and create unique patterns.
- Experiment with different degrees and pen sizes to alter pattern outcomes.
- Apply creativity in coding to produce vibrant and unique patterns.

BEFORE THE LESSON

- Open and test scratch.mit.edu/projects/editor on pupil devices; check the school filter allows it.
- One device per pupil or pair, charged, with sound optional but a shared screen useful for the first demo.
- Have pupils logged into Scratch if your school saves projects to accounts.

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HOW THE LESSON RUNS	
	Introduction to Pattern Creation
	Create a new Scratch project
	Add the Ball sprite
	Add the Pen Extension
	Draw a circle
	Create some variables
	Use the steps and degrees
	Change the degrees
	Add some colour
	Change the pen size
	Play around
	Wrap up

TEACHING MOVES

- 1. Introduction to Pattern Creation. Show a finished spiral briefly if you have one saved, then tell pupils they will build the pen, variables and sliders themselves step by step.
- 2. Create a new Scratch project. Get everyone to the editor and delete the cat together before moving on, so no one is still stuck on the default sprite.
- 3. Add the Ball sprite. Stress that any sprite works because it will be hidden; the Ball is only the drawing agent at the centre of the stage.
- 4. Add the Pen Extension. Watch for pupils who add Pen but leave the pen up or skip erase all; both cause blank or messy runs on the next green flag.
- 5. Draw a circle. Ask them to predict why move 5 and turn 5 inside repeat until touching edge makes a circle, then run it once as a class check.
- 6. Create some variables. Guide creation of steps, degrees and size; hide steps, and set degrees and size to slider display on the stage.
- 7. Use the steps and degrees. Check that steps starts at 0, move uses the steps variable, and change steps by 1 sits inside the loop, or the path will not grow.
- 8. Change the degrees. Have everyone set degrees to 20 for a spiral, then try other values. Pause to compare patterns across the room.
- 9. Add some colour. Place change pen color by 10 inside the loop only. Outside the loop the whole drawing stays one colour.
- 10. Change the pen size. Set pen size to the size variable under pen down, then let pupils drag the size slider and re-run to see thicker or thinner trails.
- 11. Play around. Give open exploration time. Challenge pairs to find one degrees value and one size value that make a pattern they want to keep.
- 12. Wrap up. Invite two or three pupils to show a pattern and name which variable they changed. Remind the class that practice and small experiments drive better results.

WHAT TO WATCH FOR

- Pupils put move (steps) in the loop but forget change steps by 1, so the sprite inches the same tiny distance each time or stays put if steps is 0. Ask them to watch the steps value on a run (temporarily show it) and point to where it should grow inside the repeat until block.
- Pupils leave the pen up or omit erase all, so nothing draws or old patterns stack on top of new ones. Run the green-flag stack slowly with them and check pen down comes before the loop and erase all sits near the start.
- Pupils expect the degrees slider to change a drawing already on the stage without clicking the green flag again. Explain the slider only sets the variable; a fresh green-flag run is needed to redraw with the new turn amount.

DIFFERENTIATION

- Emerging: Pair them with a partner and have them match each code screenshot one block at a time before freer exploration. Stay with them for variable creation and slider setup; those clicks are the usual sticking point.
- Developing: Once the spiral works, ask them to explain aloud what steps and degrees each control before they add colour. Prompt them to try two named degrees values and say how the pattern changed.
- Proficient: Challenge them to find degrees and size combinations that fill the stage with a repeating motif, then save the project. Ask them to add a second controlled change, still using only pen and the variables already in the lesson.