Nevertheless, They Persevered

Red Level: Unit 1, Lesson 6

Objectives

In this activity, students will:

- Follow one or more origami algorithms with perseverance.
- Add-on to an origami algorithm to create a new shape.
- Articulate changes they made to the original algorithm.

Activity Description (30-40 minutes)

| # 10 min. | **Welcome:** Welcome back to computer science in Kindergarten! Computer science is using the power of computers to solve our problems and express ourselves. (Reference a video, photo, or other artifact.) Last week, we decomposed "The Farmer Plants the Seeds" and the Funky Robot dance into smaller pieces! At the end of the lesson, you earned a badge! What was it for? Yes, decomposition! Today, you will have a chance to earn your fourth star - for *algorithms*. Step-by-step! (To draw more attention to vocabulary, consider challenging students to wiggle their fingers silently in the air, or some other signal, each time they hear or use the vocabulary word of the day.)

Warm-up: Show me a thumb-up if you've ever seen paper folded into shapes like these (show some pre-made origami shapes). Do you know what this kind of art is called? Yes, Origami! Origami is the Japanese art of folding paper into shapes. As you can see, some of them look pretty good, but other ones, I still need more practice with. That's okay, because I'm so interested in origami, I know that I can just practice, practice, practice, and each time I will improve!

Let's read one of my favorite books, <u>More-igami</u>, so we can learn why it is so important to persevere when we're learning or doing something we care about.

(Read a physical copy or view [this ad-free one](#) on View Pure.)

Learning computer science is like learning how to fold origami. It takes what we call perseverance. Say it with me. Perseverance! That means continuing to do something even when it's hard, even when we fail, even when things and people stand in our way. |
| # 15 min. | **Main Activity:** Today we are focusing on computers' power to follow a very specific set of directions, called *algorithms*. We will follow algorithms to do origami, just like you |

	read about in <u>More-igami</u>! We will also write some algorithms of our own, for our classmates to follow. Following Algorithms with Perseverance ● **Materials**: Square-shaped paper, [print-outs of origami algorithms](#) ● **Challenge**: Just like Joey from <u>More-igami</u>, we are going to practice making origami objects by following step by step directions. You will get to choose a design to make; and I want you to try it without my help. It may feel challenging, but you can work together, try your best, and remember - it just takes practice! ● **Teacher tips**: Do let children choose which origami algorithm they wish to do and allow them to do as many as they wish; the learning is following the algorithm step-by-step, and to not give up, so the more algorithms they practice with, the better. If students want to create their own origami algorithm, please encourage them to do so. If two or more students want to fold the same origami object, encourage them sit next to one another so they can talk through their process. If a student misses a detail from the algorithm's sequence, prompt another student to check it, so the two students can have the debugging conversation. Use all of your self-control to let the children attempt these algorithms independently; it'll be worth it! We are developing a safe space to take risks, collaborate with peers, and persevere. Creating Algorithms Choose one of your origami shapes and add one or two more steps to the algorithm. What is your shape now? Did you change it into something new? Show someone else how you added to the _____ algorithm to make a different shape!
# 10 min.	**Circle share**: (Showcase two or three student's artifacts by having the student present their thinking. Ask guiding questions such as "Which algorithm did you add-on to? What did you do next? What is the shape now?" Let's look at our [special chart](#) to celebrate what we're learning in computer science. Today, we practiced following origami algorithms, and we practiced our perseverance. We used our creativity and added-on to these very specific step-by-step origami algorithms to make something new! Humans program computers with algorithms to help us solve problems. Let's say "algorithms" together! Algorithms! Congratulations, you've earned your algorithms badge today!

Reviewing Student Work

★ Consider student talk during not only the group share but the independent or partner/small group work time. Are certain students dominating? Is there a balance of female, male, gender-fluid, mono and multilingual students speaking?
★ What kind of language did students use to describe their process and negotiate with peers?
★ Consider reflections, either done orally or in journals. What concepts from the lesson resonated most with particular students?

Lesson Notes
✚ This lesson concludes Unit 1. Consider foreshadowing Unit 2's robotic focus by congratulating students on all their hard work earning their pre-computational skills badges. Next time, they will get to practice their computational thinking skills on real computers.

Extension Activities
✚ Debrief the content and the process orally and/or in journals. Feel free to select one or of these prompts, or create one specific to your class:
   ○ Who is someone you'd like to thank for working with you today?
   ○ Draw yourself as a computer scientist, persevering and creating algorithms.
   ○ What will you tell someone at home about what you learned today?

Vocabulary
● **step** - one of multiple actions in a sequence
● **sequence** - events arranged in a specific order, from beginning to end
● **algorithm** - a list of steps to finish a task
● **origami** - the Japanese art of folding paper into shapes
● **perseverance** - continued effort to do or achieve something despite difficulties, failure, or opposition

Standards
● K-2.AP.10
● K-2.AP.12
● K-2.AP.13
● K-2.AP.15
● K-2.AP.16
● K-2.AP.17