



Have you ever heard of prototyping? Or [marble runs](#)? In this lesson, you'll learn about both!

This STEAM* lesson is all about experimentation, trial and error on the pathway to making something great.

Before we start, though, take a look at this online book: [The Most Magnificent Things](#), by Ashley Spires.

Discussion topics:

- What does the girl enjoy doing?
- What is her plan in this book?
- Where does she find her supplies? – *In a store? Elsewhere?*
- The first time she makes her “thing”, it is “right”? Is it what she imagined?
- What does she do next?
- How many times did she “try again”?
- How did she feel after so many tries?
- Did getting mad help her make her magnificent thing?
- What finally helped? (*stepping away for a bit and coming back to the project; taking a walk; looking at the project with a fresh set of eyes*)

If at first you don't succeed, try, try again!

*STEAM = Science, Technology, Engineering, Art and Mathematics

Vocabulary:

Marble run: a rolling ball sculpture is a form of kinetic art – an art form of that contains moving pieces – that specifically involves one or more rolling balls.

Prototype: an early sample of a product built to test a concept or process; something to be learned from. *The girl in the book made many prototypes before finally making the thing she envisioned.*

To make a marble run

1. Gather your supplies. Look around your house and see what you can find. The girl in the book didn't go to a store for her supplies – she just used what she found. Here are some suggestions of things to look for.

Marbles	
paper plates	chopsticks
toilet paper tubes	bamboo skewers
paper towel tubes	popsicle sticks
foam insulation tubes	toothpicks
cardboard boxes to cut up	sticks from your yard or a walk
paper, construction paper	
paper or Styrofoam cups	masking tape
yogurt containers	string
milk jugs or cartons	yarn
Pop bottles	duct tape
fabric scraps	scotch tape
coffee filters	

2. Think about the marble run you'd like to make. Will it be free-standing, or will it attach to the walls, tables and chairs in your home?
3. Plan your run on paper (optional) or dive right in and start to assemble.

Marble Runs

4. Use tape and string to hold pieces together. A hot glue gun can also help, if there is one in the house, but we usually make ours with tape and string. It is easier to make changes if things are not glued together.
5. As you finish each step, try it out – does it work or does it need to be altered?
6. Will you have spirals? Drops? Jumps?
7. Will you have a landing pad with scores? Some of our student Makers have placed egg cartons at the end of the run, with numbers in each space, and keep score for every marble that finishes the run. How else could you keep score? With yogurt containers?
8. Will you decorate your marble run with colours, paper flags and other decorations?
9. The important thing to remember is to have fun. Try, experiment, re-do and, if you get frustrated, do what the girl in the book did – step away, take a walk or do something else for a bit, and come back to your project when you are less frustrated. Perhaps that break will help you to see things in a new way and you'll be able to figure out what to do next.

