

Overview

SPRK STEM challenges are fun, interactive activities that challenge students to use creativity and teamwork to move through simple steps of the design process in order to build Sphero-based creations. In this challenge, there are optional activities that provide students time to learn about chariots as they were used throughout history. Students will brainstorm designs for their chariots both individually and in groups. The teams will then have sufficient time to build their own Sphero chariot to race. Also, as a class the students build a macro for Sphero to navigate the course.

Getting started

To run this challenge, you will need Spheros. Spheros are controlled via Bluetooth on either Apple (iPod, iPhone, or iPad) or Android devices. Ideally, you would do this lesson in groups of 3 or 4 students, each with their own Sphero and device. This lesson is designed for iPads or other tablet devices, but other devices could be used. Here is what each group would need:

- iPad or tablet with Sphero Macrolab loaded. You can get Sphero Macrolab for free from the iTunes app store or Google Play.
- Sphero that has been fully charged

Materials

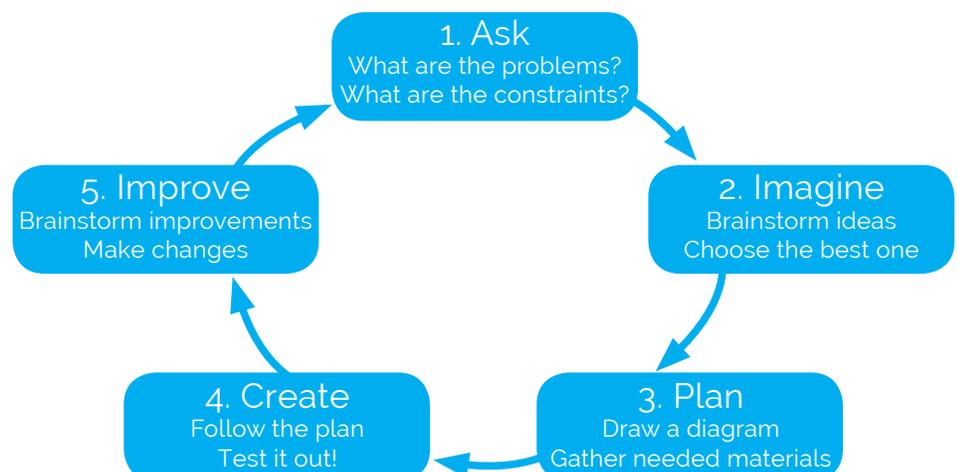
For this challenge, the following materials are recommended. Feel free to be creative and use different materials for your class.

- Materials for Chassis and Wheels (Legos, Knex, cardboard, CDs, etc.)
- Large space on the floor for building the race track
- Tape to outline the course

PART 1: Introduction – 15 minutes

For this challenge, the following materials are recommended. Feel free to be creative and use different materials for your class.

- Break students into groups
- Briefly introduce Sphero and how it works
- Describe engineering design process (right)
- Describe the Chariot Challenge and show students the different materials available to build with, as well as, any guidelines they need to follow



PART 2: Individual brainstorming – 5 minutes

This section gives students time to generate concepts on their own, it may be challenging to think of 8 unique ideas but challenge them to think of crazy and weird designs.

- Each student has a blank piece of paper and folds it into 4 quadrants. Using both sides of the page have them draw 8 different potential designs

Optional Social Studies focused activities (Steps 3 – 5)

PART 3: Historical research in groups - 60 minutes

Students will perform research on chariots throughout history; the primary focus of their research will be around the design and function of them

- Assign each group to a historical time/region
- Provide the students with some information about the chariots in that culture or they just do web searches.

PART 4: Historical presentations - 30 minutes

Have each group come up and present for 4-5 minutes. Each presentation should include the following:

- Photo of a chariot from their region
- What material were they made of?
- What were chariots used for?
- How many wheels and how big were the wheels?
- How many horses/other animals were used to pull them?
- 1 other interesting fact about chariots in that culture

While each group presents, you can fill in a table that is drawn on the whiteboard that describes the different characteristics of the different chariots.

PART 5: Individual re-brainstorm - 10 minutes

After learning about the different chariots from history, have students fold another piece of paper into quadrants and sketch 8 new ideas. Each student identifies their favorite designs to bring to the team.

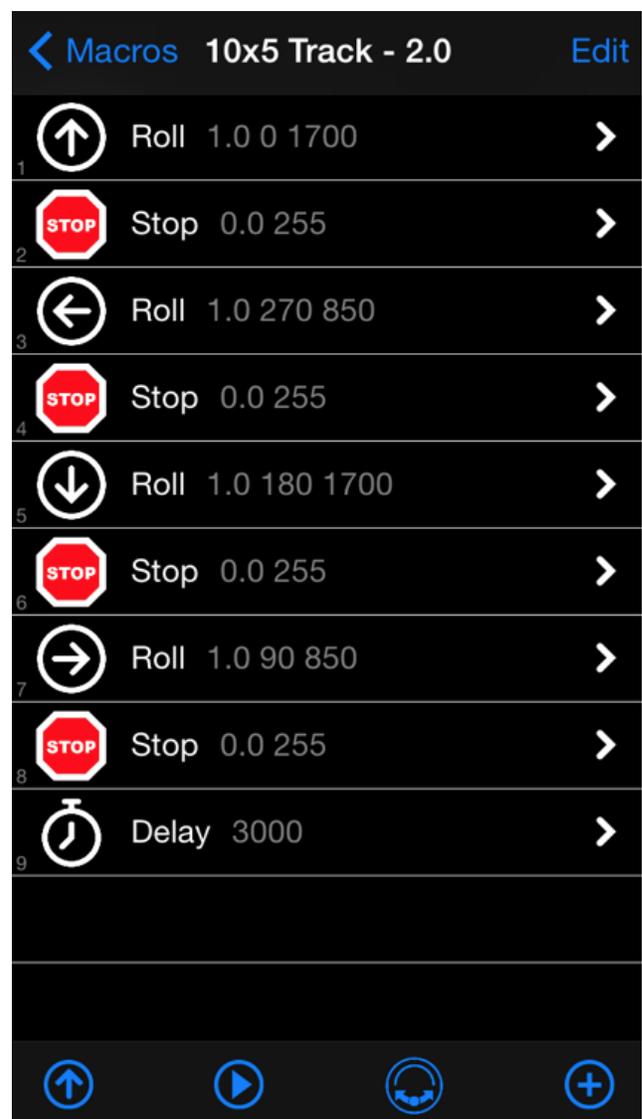
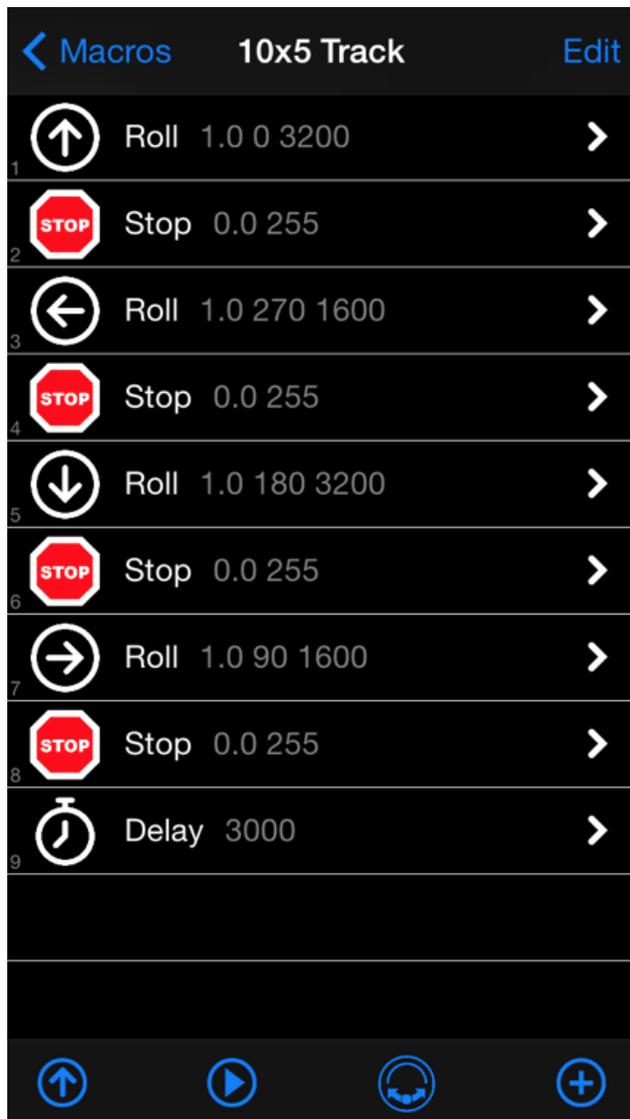
PART 6: Build the track as a class – 30 minutes

Build simple track on the floor with masking tape.

PART 7: Create the chariot Macro

The screenshots on the following page display the macros for a track 10 X 5. With a little guess and check, you can easily modify the Macro to fit dimensions of the course your class has built.

PART 7: Create the chariot Macro (continued)



PART 8: Groups pick design they will build – 20 minutes

As a group, students will choose a design to build and what materials they plan to use.

PART 9: Build and test chariot – 90 - 120 minutes

Groups have time to build and test their chariots

PART 10: Present Chariot and why you think it will work - 20 minutes

Each group will present for 3-4 minutes about the following:

- Why they chose the design they did
- What the hardest part of building was
- How they expect it to perform, do they anticipate any problems?

PART 11: Race chariots against autopilot - 60 minutes

Teams race chariots against the autopilot Sphero in tournament or other format.

PART 12: Reflection and discussion – 40 minutes

Each individual should write up their reflections on the activity and discuss their findings as a class. Some potential prompts and questions that you may want to ask are:

- What worked and what didn't?
- How would each student do things differently in the future?
- Why do the students think that the culture they studied used the chariot that they did?
- What materials worked best?
- What was the most challenging part of the activity?
- How did the size of the wheels or other design characteristics impact the results?
- What materials worked best?
- What was challenging and what worked well within your team?

PART 13: Share your experience on @SpheroEdu

We love seeing SPRK in action! Tweet us a few photos and we'll share them with the world!

PLAY IS A
POWERFUL
TEACHER