SCOUTreach Workshop - Elementary School Students

Part 1: Programming Robots

Purpose: When I complete this workshop, I will know about programming and be excited to do more programming on my own!

1. How do robots "think"?
2. What languages do robots use?
3. What is it like to communicate with a robot?
4. What is programming like?
5. How do we use programming for robotics?

Warm-Up Activity and Introduction	■ As students arrive, they will find a seat with a workbook and start this in their workbooks: Decode the Secret Message ● The secret message is "I will change the world with science, technology, engineering, and math!" ■ All the facilitators will briefly introduce themselves with name, grade, and role within the team.
1 - How do robots "think"?	■ The group will discuss the terms "programming" and "algorithm." ■ The group will brainstorm things that they do in a series of steps ● Examples: cooking, getting ready for school/bed, doing homework, building with LEGOs, etc.

2 - What languages do robots use?	■ Students will learn about different languages programmers can use with the Programming Language Matching Game
	    ● Each student will get a card with uses for a programming language, and they will find the facilitator with the pictures that correspond to that language
	       ■ Javascript, HTML/CSS, Python, SQL
	    ● Facilitators will briefly describe the uses for these languages

3 - What is it like to communicate with a robot	■ Students will get an idea of what is is like to communicate with a robot with the Robot Relay Cup Stacking Game. ■ The group will discuss the experience of communicating with their "robots" in the game and learn that this is very similar to the experience of actual programming!
4 - What is programming like?	■ Students will work with a partner and try programming for themselves online with a fun Dance-themed activity. ● The activity can be found on https://code.org/dance
5 - How do we use programming for robotics?	■ Facilitators will describe the two different ways robots use programming for the competitions and in the real world. ● Autonomous and Driver-Controlled Programming

Part 2: Designing Robots

Purpose: When I complete this workshop, I will know how robots are used to solve a variety of problems in the world, and I will build my own prototype to solve a problem!

1. How do robots help people?
2. What kind of problem can I solve with a robot?
3. How can I build a prototype to solve a problem?
4. How should I present my robot to the group?
5. How does an actual robot work?

1 - How do robots help people?	■ The group will play the <u>Types of Robots Guessing Game</u>
	   ● The focus questions are: What does this robot do? How does it help people?
	■ Facilitators will talk about the variety of ways robots help people in different fields:
	   ● Healthcare, Entertainment, Space, Safety, Agriculture, Manufacturing, Household, Mining, Construction, etc.

2 - What kind of problem can I solve with a robot?	■ Facilitators will introduce the Design Process and how it is used: brainstorm, design, prototype, test, REPEAT! ■ Students will work with a partner to brainstorm a design for a LEGO prototype to solve a problem ○ Students will sketch a design in their workbooks and think about what parts they will need

3 - How can I build a prototype to solve a problem?	■ Facilitators will share the <u>Prototyping Awards</u> teams can win.
	   ● "Inspire" - for the biggest impact on the world
	   ● "Innovate" - for the most creative design
	■ Students will design and build their prototypes out of LEGOs

4 - How should I present my robot to the group?	■ Teams will give brief presentations of their prototypes. They will share what their robot does, how it works, and how it helps people. ■ Facilitators will listen and take notes, then decide who to present the awards to. ■ Meanwhile, students will fill out "I'm Inspired To…" Cards. They can then share what they are inspired to do. ■ Facilitators will present the "Inspire" and "Innovate" award certificates to the winning teams.
5 - How does an actual robot work?	■ Each student will get a chance to drive a robot! ■ Students will get resource cards for information about more STEM opportunities they can pursue, as well as team merchandise like stickers or buttons!