

KIBO “Dream Car” – 1 hour Imaginative Building (Engineering connection)

Overview: Students will become engineers, learning the steps of the Engineering Design Process. Inspired by the book *If I Built a Car* by Chris Van Dusen, students will follow the engineering design process to create their own “dream cars” out of craft and recycled materials. They will scan a short programming sequence to get their cars moving!

Learning Goals: Students will:

- Define an **engineer** as someone who invents and improves things.
- Understand the steps of the **engineering design process**.
- **Build a sturdy construction** of a car with craft supplies, LEGO® bricks, or other familiar building materials.
- **Program** a robot to move.

Materials/Resources:

- One KIBO 10 kit or higher per group of 2-4 students
- A variety of craft and recycled materials for building and decorating.
- Engineering Design Process poster (included as page 3 here).



New to KIBO? Watch the Videos!

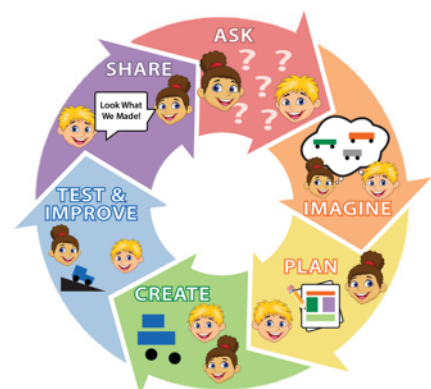
If this is your first time using KIBO, we encourage you to check out our short tutorial videos at kinderlabrobotics.com/getting-started.

Lesson Plan



Inspire: “Today we will all become **engineers**. We will build and improve our own creations. An engineer is anyone who invents or improves things.”

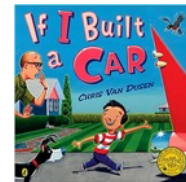
Introduce the engineering design process using the poster image on page 3. “In their projects, engineers follow a series of steps called the “**Engineering Design Process**.” It has just 6 steps: **ASK**, **IMAGINE**, **PLAN**, **CREATE**, **TEST & IMPROVE**, and **SHARE**. The Engineering Design Process is a cycle – there’s no official starting or ending point. We can keep going around and around as we imagine and invent our creations.”



Ask children to share their ideas about what each of the steps mean. Record their ideas on the board. Ask the students to share examples of times they've imagined something new and then created it.



Connect: Read *If I Built a Car*. Read *If I Built a Car* by Chris Van Dusen. This book will get kids thinking creatively about how they might design their own dream car. You can connect the book to the Imagine phase of the Engineering Design Process.



Small-Group Work: Build your dream car. Student groups will design and build their own “dream cars” with KIBO. Students will use a variety of arts and crafts materials to build directly onto KIBO. They can attach art materials to KIBO with masking tape, pipe cleaners, string, and other fasteners. Remind students to attach their materials in a sturdy way!

Allow the students to design creatively and build how they see fit to create a dream car like Jack's from *If I Built a Car*. (Some students may not connect with the notion of building a car. Allow these students to define their own creative goal for this lesson.)

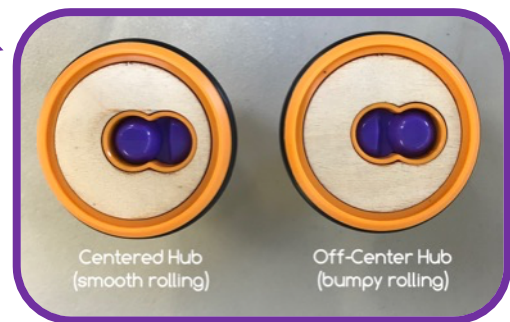
When ready, student groups can bring their cars to a testing station to scan the program “BEGIN, FORWARD, END” with the help of a teacher, then run the program. This test is to ensure that their robot follows the instruction properly and that it is sturdy. Students can continue trying different programs when this is mastered.



Invite students to play with the different ways of attaching the wheels to the motor hubs and see the difference in KIBO's motion.



Reflect: What Does Your Car Do? After finishing their cars, groups share their creations. Encourage them to explain the features of their dream car and what materials they used to construct it. Ask students to compare the different dream cars and see which features are similar and different. Do they think their cars could be built?

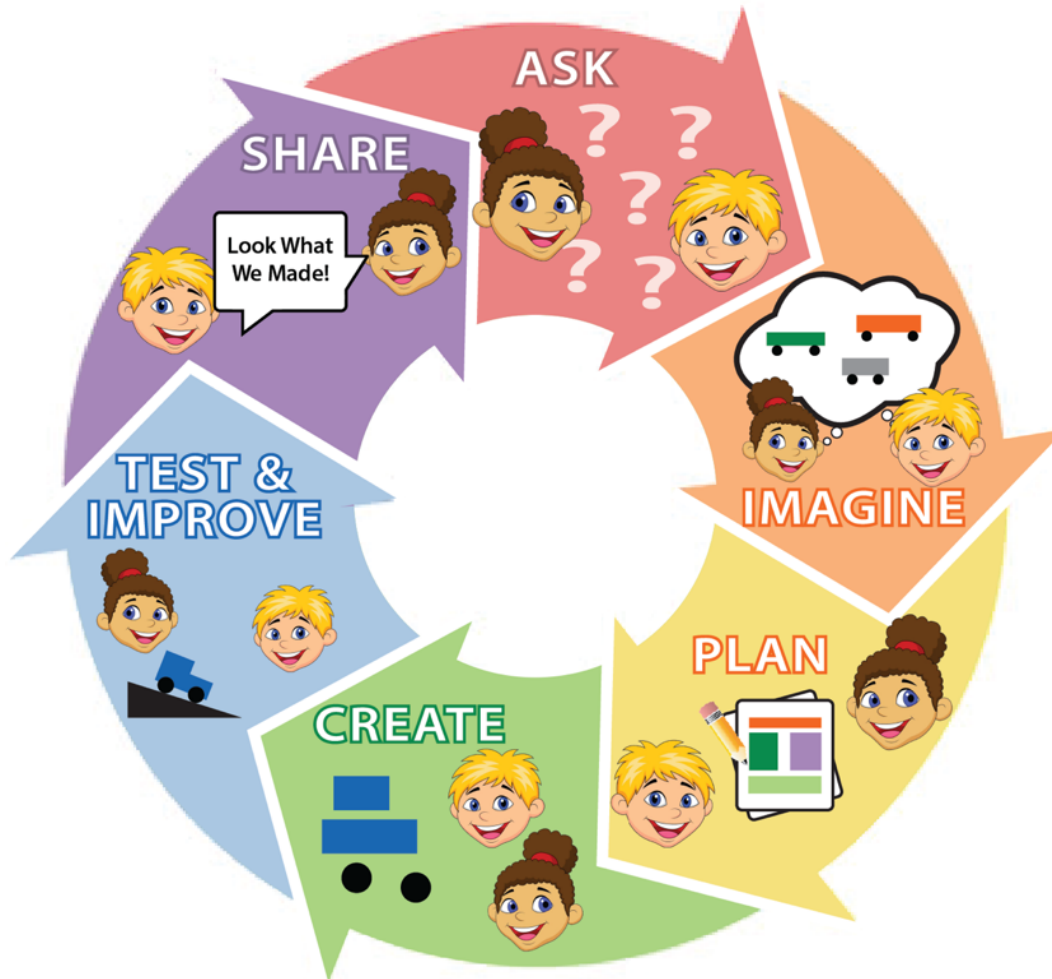


Standards Addressed

CSTA K-12 Computer Science Standards: 1A-AP-10, 1A-AP-11, 1A-AP-15

NGSS Science Standards: K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3

The Engineering Design Process



When making projects, engineers follow a series of steps called the Engineering Design Process. It has just 6 steps: ASK, IMAGINE, PLAN, CREATE, TEST & IMPROVE, and SHARE. The Engineering Design Process is a cycle – there’s no official starting or ending point. You can begin at any step, move back and forth between steps, or repeat the cycle over and over!

