



Volunteer Guide

OVERVIEW

This volunteer guide will provide an overview of the Toyota and Discovery Education partner program Keys to Connect. The goal of the guide is to support Toyota employees and other volunteers with information on how to bring program materials into classrooms, both for in-person and virtual volunteer opportunities. These include facilitating activities and discussions that help students explore the concept of mobility and careers in a variety of STEM fields.

ABOUT KEYS TO CONNECT

Keys to Connect is dedicated to engaging students in transportation challenges at a local level to help address some of the most pressing issues of our time. Through an interactive collection of standards-aligned curriculum resources and hands-on learning opportunities, students can apply critical thinking skills and STEM problem-solving to important issues of equity and access, infrastructure, and sustainable innovation.

PREPARING FOR YOUR VISIT

- Coordinating the visit: Contact school administrators and afterschool program leads to connect with educators or program leaders that may want to get involved in the Keys to Connect Program. Communicate that the program is free and allows STEM professionals to facilitate engaging STEM activities that are standards-aligned and empowers students to solve local transportation challenges. Once an educator has been identified who would like to collaborate, set up a meeting to share and identify the items below:
 - Decide whether facilitation will be virtual, in-person, or a special event.
 - Schedule a pre-visit meeting to prepare for the event.
 - Give an overview of the program and various activity ideas.
 - Discuss how much time is available for your visit.
- Pre-visit checklist: Once you have connected with an educator or afterschool program leader, you will want to work together to ensure a seamless visit. Before your visit, set up some time together to discuss key details that will make your visit both smooth and successful. The items below are important to include in your pre-visit meeting:
 - Ask if there are any advance requirements or paperwork needed by the school office or afterschool program for you to visit.

- Learn about the setting of your visit, how many students you will be working with, and if there are any other details that are helpful for you to know in advance.
- Decide which one of the activities will be used.
- Determine what the educator would like your role to be throughout the facilitation of the activity.
- Ask the educator to print and copy the student worksheets or other printable materials needed.
- Learn what technology will be available and use that to determine how the activity should be facilitated.
- Ask for any tips! Educators have honed expertise in connecting with students. Consider your educator a valuable resource.

THE DAY OF YOUR VISIT

Ensure that you have all items, technology, and supplies that you will need to successfully facilitate your activity with students. Be sure to arrive early enough to find the office. Many community centers and schools will require visitors to sign in and out at the main office and wear a visitor pass. To ensure an efficient sign-in, have your ID ready, and have a printout of the activity you will be facilitating on hand for reference when you need it.

If you are assisting in facilitating a virtual event, log into the chosen platform 10–15 minutes early to check your connection, sound, and lighting. Make any adjustments before participants begin to arrive.

IN-PERSON EVENT

The Discovery Education resources have been designed to follow the agenda below. However, every group is unique, and different factors, such as available timeframe, will affect the exact nature of how *Toyota Keys to Connect* resources are used.

Step 1: Volunteer Introduction (2–3 minutes)

Step 2: Activity (35–40 minutes)

Step 3: Wrap-up (2–3 minutes)

VIRTUAL EVENT

When a visit is requested by a group in an area not easily accessible to an employee or due to other restrictions, there may be an opportunity to participate virtually instead of going to the site. There are several free platforms, such as Google Hangout or Skype, that would allow you to share materials and visuals, and chat with students as they are working. However, the educator you are working with may have a platform that they are most comfortable with. Work with your assigned educator to determine the applicable items from the checklist above, along with which platform will be used to connect online. Download all software in advance and test your connection in advance of your presentation.

You may want to ask the educator, based on the setup in their learning space, how you can help by sharing your screen, walking students through the directions, and responding to student questions or comments in the chat box. You must practice a couple of times in advance, to ensure technical difficulties

are resolved. Walk through the information you will be presenting, and time yourself to help work within the time frame you have available for your visit that day. Confirm that your camera placement, sound, and lighting allow you to communicate effectively with your audience. Your camera placement should be placed at or near eye level to help engage with your audience.

It is recommended that you use headphones, equipped with a speaker, to prevent an echo effect and provide clarity of sound. To prevent backlighting, make sure that lighting or windows are in front of you and ensure that you are easily visible to all participants.

SPECIAL EVENTS

Schools and community centers often have family night events or other event types that would be great opportunities to share your expertise and engage the community in STEM activities. For these types of events, it is recommended that you engage other volunteers to assist you throughout this opportunity. The items below should be discussed with your point of contact:

- Size of event: Depending on the event size and participants, you will need to determine the appropriate number of volunteers needed.
- Materials: Determine the quantity of supplies and handouts needed for family participation in the activity. This includes tablets or laptops, provided by the campus, that have internet connectivity.
- Activity: Decide which activity would be best for the event you are participating in. Things to include are rotation times and the average age level of student participants.
- Script: With your volunteers, create a script that quickly introduces the activity and the real-world connection before families begin the activity. This should also include your closing remarks, when families complete the activity.

ACTIVITIES

When previewing the activity materials, note opportunities to share real-life stories that make connections to the topics. Some of the resources may exceed the amount of time allocated for your visit, so you may need to select relevant information for the specific situations in which you will be interacting with students. To better prepare, practice pacing sections of the activity and make note of areas to pause for questions, engage with a personal story, or point out parts of a visual.

Activities for Keys to Connect are designed for grades 6–8—Science, math, and engineering classes, or for children ages 11–14. Each activity has an expected duration of 45–60 minutes and includes an overview, materials, procedure, and capture sheets. You will want to review these activities with the educator or leader to determine which activity to facilitate or where to focus if there is limited time.

KNOW YOUR AUDIENCE

The students you are working with are considered adolescent learners. They are intellectual, social, and emotional learners. They are very curious and enjoy interacting with peers during learning activities. They like to be active learners and are still experimenting with ways of talking and acting as they learn and grow. A student environment may include a handful of students or up to 30! Sometimes educators will have students seated in small groups and others will have students in rows. Walking around the space and making eye contact with different students can help personalize the experience.

VOLUNTEER INTRODUCTION

As students enter the room (virtual or physical), or as you enter, say hello and take a few minutes to introduce yourself. Start by telling students your name and why you are visiting their class. Tell them about your experience with STEM, what your interests were at their age, and what inspired you to pursue the career you have today. Explain to them what you will be learning together and be sure to keep things brief, friendly, and relatable. Students are going to be interested in having a special guest and will likely have a lot of questions! Work with the educator to determine the best method for inviting students to ask questions before, during, and throughout the activity.

Activity 1

The Impact of Collision

OVERVIEW

After the career profile video, students will continue to build their understanding of the connection between understanding data and improving mobility. In this data-focused activity, students will learn about colliding objects, the impact of a collision through investigation, and how these ideas impact the engineering design of a product. They will learn about changing an object's motion by forces acting upon it, and they will apply Newton's third law of motion with a problem involving the motion of two colliding objects. Students will apply scientific concepts like fair tests and variables as they plan an investigation. Once the investigation is planned, they will run a series of experiments and record the data/results on the impact of collisions between two moving objects and between one moving object and something stationary. After collecting the data, students will analyze it and use it to adjust the design through a reflection protocol.

MATERIALS CHECKLIST

- Toy cars
- Wooden blocks
- Tape
- Note paper
- Ruler or measuring tape
- Stopwatch
- Video: NASA's STEMonstrations (Newton's Third Law)
- Handout #1: Data Collection
- Handout #2: Thinking about the Lab

PREPARATION

- This activity can be paired with the [Tellis Bethel Career Profile](#) video. You may want to watch the video ahead of time to create connections between the activity and the video. Check with the educator about projection and sound capabilities. In some cases, it may be easiest for you to send the video link to the educator in advance. In other cases, you may be able to easily connect your laptop.
- Connect with the educator ahead of time to copy all handouts, as well as to determine if students will have enough room to collect their data.
- Take a moment to read through the lesson directions, but do not worry about following all directions precisely. If student engagement leads you briefly in another direction, that's fine. Just make sure students can collect data and draw conclusions.

Activity 2

Operation Smart City

OVERVIEW

In this activity, students will explore the concept of freedom of mobility to investigate how this core principle can be used in creating a smart city. Students will build a foundation of understanding how energy travels and engage in the design of a smart city that will maximize energy transfer while leveraging technology. In addition, students will learn how a smart city has been defined and be introduced to modern examples of "smart" technologies used in cities. Finally, students will discuss the influence of modern technologies on everyday life and get acquainted with the professions that focus on the study of urban planning as well as the "Internet of Things."

MATERIALS CHECKLIST

- Smart cities slide deck
- **Handout 1:** Common Misconceptions about Energy
- **Handout 2:** Creating Smart City Solutions
- Pieces of chart paper (posted around the classroom, one per group)
- Scratch note paper

PREPARATION

This activity can be paired with the [Billie Jo Johnson Career Profile](#) video. You may want to watch the video ahead of time to create connections between the activity and the video. Check with the educator about projection capabilities. In some cases, it may be easiest for you to send the slide deck to the educator in advance. In other cases, you may be able to easily connect your laptop.

Connect with the educator ahead of time to copy all handouts and determine if more supplies are needed or if the chart paper will be visible around the room.

Take a moment to read through the lesson directions, but do not worry about following all directions precisely. If student engagement leads you briefly in another direction, that's fine, just ensure that students are making connections between the concept of mobility and the opportunities that the IoT brings to smart cities.

Activity 3

Understanding Supply Chain

OVERVIEW

In this activity, students will examine the application of supply and demand on the movement of goods and services through the production process. Students will be divided into groups and provided the engineering task of moving a straw from one end of a fishing line to another while working through the supply chain process. Students will be provided with tools to move the straw through and instructed to add challenges and phases of the supply chain process along the way. The end product will be a plan to efficiently move the straw from production to customer satisfaction, which includes important economic factors. At the end of the scenario, students will review a supply chain overview and embark on a discussion on the lessons learned and roles that were implemented throughout the process.

MATERIALS CHECKLIST

- Balloon
- Magnet
- Drink Straw
- String
- Tape
- Two objects of the same height that you can tie a string to (ex: chairs)
- **Handout 1** Vehicle Supply Chain Example
- **Handout 2** Moving the Straw: A Mobility and Engineering Challenge (one per group)
- **Handout 3** Understanding the Supply Chain Process (one per student)
- Access to the internet and a device

PREPARATION

This activity can be paired with the [Briana Nelson Career Profile](#) video. You may want to watch the video ahead of time to create connections between the activity and the video. Check with the educator about access to computers with an internet connection. In some cases, the teacher may need to reserve a computer lab or laptop cart if the classroom does not have computers available.

Connect with the educator ahead of time to copy all handouts and determine if more supplies are needed. For this activity, it may be helpful to divide the materials into premade groups to make for easier distribution.

Take a moment to read through the lesson directions before arriving. It might be helpful to reserve a little more time for the “explore” section so that students can better understand the connections from the activity to the bigger idea of the supply chain.

Virtual Field Trip: “Moving to Market”

OVERVIEW

Students will utilize new and existing knowledge to develop a sound understanding of the important role supply chain management has in today's business environment and the role it plays in promoting mobility for all. While students may not always notice the supply chain in action, these activities will help students connect STEM concepts in the supply chain to the world around them. In addition, students will become familiar with current supply chain management trends, how factors like inclusion and accessibility impact supply chains, and how changes have occurred over time to meet the growing demand for products.

MATERIALS

- Paper
- Pencils and markers
- Supply Chains and Factors of Production capture sheet
- Moving to Market Capture guide
- Board Game Design notetaker
- Game materials (posterboard, color paper, glue, scissors, rulers)

PREPARATION

Be sure to view the [Virtual Field Trip](#) ahead of time—this will help guide the conversation and create opportunities for you to stage discussion or connection questions for the students.

Check with the educator about access to computers with an internet connection. In some cases, the teacher may need to reserve a computer lab or laptop cart if the classroom does not have computers available.

Connect with the educator ahead of time to copy all handouts and determine if more supplies are needed. For this activity, it may be helpful to divide the materials into premade groups to make for easier distribution.

Take a moment to read through the lesson directions before arriving. Based on class time, you may only choose to focus on a pre- or post-activity.

WRAP-UP

At the end of your lesson, you may want to provide students with additional links to learn more about your role and Toyota's mission to address mobility issues globally. Students may want to continue learning, after your time with them is complete. Thank students and the educator for their time and the opportunity to facilitate a STEM activity at their school or community center. If applicable, follow-up with the educator to set-up future dates for you to help facilitate future events.