Virtual Field Trip Educator Guide

Objectives

Students will be able to:

- Explore the meaning and scope of technology.
- Learn about STEM careers and consider careers they may be passionate about.
- Investigate innovations in tech and consider how they can be used to change the world for the better.

Overview

Join us as we travel virtually to The Tech Interactive, a world-famous science and technology center in San Jose, California. We will explore The Tech Interactive's science labs, hands-on activities, and design-challenge experiences. We will meet professionals who work nearby in Silicon Valley in a variety of cutting-edge tech fields. And throughout the entire experience, we will consider the idea of technology—including what it means, the role it plays in our lives, and how it can be used to help make the world a better place.

The pre-field trip activity in this companion guide has been designed to engage students and activate prior knowledge, and the during- and post-field trip activities have been designed to connect and extend student learning to classroom concepts.

National Standards

Next Generation Science Standards

Disciplinary Core Ideas:

- ETS1.B: Developing Possible Solutions: At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)

MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

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Standards for Technological Literacy
Standard 1: Students will develop an understanding of the characteristics and scope of technology.
Standard 4: Students will develop an understanding of the cultural, social, economic, and political effects of technology.
Standard 6: Students will develop an understanding of the role of society in the development and use of technology.

Common Core Standards for English Language Arts
SL.1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

National Core Art Standards
Anchor Standard 2: Organize and develop artistic ideas and artwork

Materials

- Tech Brainstorm sheet, one per student
- Be Inspired sheet, one per student
- Robotic Potential sheet, one per every three students
- Digital Art sheet, one per student
- Blank pieces of paper, one per student
- Drawing and art materials, for the class to share
- Laptops or devices, one per student (or as many as are available)

Before the Virtual Field Trip

Tech Brainstorm
Before your class participates in the Virtual Field Trip, guide students in using the Tech Brainstorm sheet to record the innovations that come to mind when they think of technology. After working independently to fill the four letters with words and sketches, students should form small groups and continue to brainstorm together. Then further probe the students' thinking by encouraging groups to brainstorm tech products and innovations that fall into the following categories:

- Medicine and healthcare
- Fitness
- Art
- Science
- Transportation
- Entertainment

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During the Virtual Field Trip

Defining Tech

Students should have their Tech Brainstorm sheet available while they watch the Virtual Field Trip. As they learn about new tech innovations or tech fields that they had not previously considered, they should continue to add words or brief sketches to their handout. After the Virtual Field Trip, you can discuss what students learned through the lens of the words and pictures that they added. When recapping the experience, be sure students have included words or images that represent the 4C skills that people who work in tech use to solve problems: Collaboration, Critical Thinking, Communication, and Creativity.

After the Virtual Field Trip

Activity #1: Be Inspired

Your class just heard from STEM professionals who are passionate about what they do. In this activity, encourage students to consider what they are interested in and excited about. They will then use a device to research possible careers connected to their passions, and they will ultimately create a job description for their ideal career.

If time allows, students may share key details about their dream job in a career fair-style presentation.

Activity #2: Robotic Potential

Divide students into groups of three or four and challenge them to communicate, collaborate, think critically, and be creative as they consider how robots could be used to help humanity.

After brainstorming problems in our world today, students will select a focus area and describe how a robot could be programmed to help solve this problem.

Note: While additional research is not required for this activity, groups may use the Internet to further research their problem as they complete Step 3: Critical Thinking, if time allows.

Activity #3: Digital Art

Discuss the different forms of digital art that were introduced during the Virtual Field Trip. Then explain that students will now have a chance to produce their own!

After creating a piece of traditional art, students will use one of the apps or websites recommended below (or another one that you have selected) to create a digital version. They will then collaborate with a partner to compare and contrast the two forms and discuss their pros and cons.

Possible free digital art platforms:

- Apps: iPastels, Drawing Box, Autodesk SketchBook, Adobe Illustrator Draw
- Websites: http://aminahsworld.org; http://bomomo.com; https://sketch.io/sketchpad

Tech Brainstorm

Tech (nology)

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Be Inspired

Directions: You just heard from four different STEM professionals who love their jobs. Follow the steps below as you investigate jobs that are perfect for you. Then create your own dream job description!

Step 1: Brainstorm

Spend a couple minutes quickly brainstorming different activities that you love to do or subjects you are passionate about. For instance: Do you love video games? Are you an expert chocolate chip cookie maker? Create a list!

Step 2: Focus

Review your list and choose the one activity or subject that you are most excited about. Ask yourself: What careers may involve this activity or subject? Jot your ideas below.

Then grab a device to complete some research. Type "career related to _____" in your Internet search engine. Once you review your search results, record additional career opportunities that you find interesting.

Step 3: Describe

Finally, apply what you have brainstormed and researched as you describe your dream job. It may be a job that already exists or one that you design! Be creative as you fill in this job description.

Job Title: _____

Skills Needed: What skills would help you do well in this job?

_____

_____

_____

Job Responsibilities: What exactly would you be responsible for doing in this position?

_____

_____

_____

Work Environment: Where would you work and what would this workplace be like?

_____

_____

Experience or Education Required: What should you learn or know before starting this career?

_____

_____

Robotic Potential

Directions: You recently learned about several ways that robots are helping humanity: They build important products, explore Mars, assist the military, improve healthcare, and more. Follow the steps below as you consider: What other problem(s) could robots solve to help make the world a better place?

Step 1: Collaborate: What problems exist in today's world? As you discuss, jot a list below—no problem is too small or too large to include!

Step 2: Communicate: Review the problems that your team brainstormed and select one problem that your group will focus on. Be sure to choose a problem that, if solved, could make the world a better place. Circle this problem in the list above.

Step 3: Critical Thinking: Why is this a problem? What is not working? What needs to be solved? Discuss these questions as a group and record your responses below.

Step 4: Creativity: How could a robot(s) be used to solve or help solve this problem? Describe what the robot could be programmed to do and how this would help solve the problem. Think carefully about how the robot could impact people's lives and/or the environment.

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Digital Art

Directions: Explore digital art as you complete the following steps.

1. On a separate sheet of paper, use drawing materials to create a piece of art. The style, design, and colors are up to you!

2. Next, use an art app or website to create a digital version of this artwork. You may change or enhance parts of your artwork based on the app's or website's special features.

3. Then share your traditional art and digital art with a partner. Compare and contrast both versions of your artwork, and record your thoughts in the chart below.

Traditional Art	Both	Digital Art

4. Once you have reviewed your art and your partner's art, discuss:

- What are some of the advantages and disadvantages of traditional art? What are some of the advantages and disadvantages of digital art?

- As technology continues to develop, what do you predict digital art may look like in the future?

- How could digital art be used for good or to help make the world a better place? Be creative!

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