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Technology **TEACHER GUIDE**

How to Use your Field Trip Guide

Field Trip Guides provide structure and suggestions on a particular theme within COSI's exhibition areas. This will allow you, your students and your chaperones to be prepared to explore science and discover fun. We suggest you begin by selecting goals for your visit. These goals may include enhancing aspects of your science curriculum, understanding what it means to be a scientist, or showing your students that science learning can be cool and fun! If you have particular curriculum goals, use this Field Trip Guide to connect what you are doing in your classroom with our pre- or post visit activities. We recommend making copies of the Scavenger Hunt for each of your chaperones, so that they can guide the students through the exhibits and help record information. Our Scavenger Hunts are designed to be open-ended, and focus on process skills and scientific thinking. As a result, there may not be one right answer for each of the questions. This means you will NOT find an answer key for any of the scavenger hunts. Instead, you'll find descriptions the science concepts that we hope you'll experience. If you feel you need more clarification, you can always contact us at fieldtrips@mail.cosi.org.

COSI is a big place. As a result, you may not see everything in one day. Take your time- don't rush, and allow your students to explore the things that they find interesting. All too often kids are pulled away to the next area just as they start to get involved in an experience. Rather than trying to see it everything, select just a few areas to spend your day. You will see less, but you will learn more.

Some COSI Exhibits related to Technology & Innovation

COSI is a great place to learn about the science and technology. If not for creative and innovative scientists, we would not have many of the luxuries we have today, like cars, cell phones, or even indoor plumbing. Use this Field Trip Guide to explore the technology of the past, present and future.

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PROGRESS

Listen to what old lady Progress has to say about technology and innovation, then step into the past to explore topics like communication, transportation, and recreation. Travel through time to the small Mid-western town of Progress and interact with the technology of 1898. Around the corner, find yourself a generation later in 1962 and see the changes progress makes.

Wires and Waves

The electric telegraph translates mechanical action (dots and dashes from the telegraph key) into electrical pulses, and then back into mechanical action at the other end. It was all made possible by Hans Christain Oersted's 1820 discovery of the connection between electricity and magnetism. The last piece of the puzzle was a code to translate the up-and-down movement into letters, numbers, and words. Samuel Morse was able to put the machine and the code together into the first practical electric telegraph.

The Horseless Carriage

The modern automobile arose in direct response to the limitations of the most common 19th century mode of transportation, the horse. The typical horse would produce 22 pounds of manure a day, and would often bite or kick passersby. The horseless carriage, or automobile, replaced the popular use of horse by the early 20th century.

Food Preparation

The challenge of food preparation is an ancient one. By preserving food, more people can eat, and less food goes to waste. However, if food is preserve improperly you run the risk of food poisoning. The citizens of 1898 relied on fresh produce and meats, but 1962 brought us preservatives, additives, and the convenience of TV dinners.

While exploring Progress, discuss these questions and issues with your students:

- Have your students make observations about the storefronts, people, and technology in 1898. Make note of the food in the stores, the music, the toys, the modes of transportation, and the communication devices. Did they have electricity? Cars? Radios? How would they cook dinner or entertain friends. Pay close attention to detail in 1898, so you can compare and contrast the same town in 1962.

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GADGETS

Gadgets are tangible proof of how creativity advances technology. The Gadgets exhibition area contains a variety of exhibits that allow guests to explore the building blocks of complex gadgets: pulleys, gears, lasers, and electric circuits.

Some technology related exhibits in Gadgets:

Things that help us see at night. . .

There are a variety of light sources, from lasers, which produce just a pinpoint, to the crazy electron sphere. The most conventional are the florescent and phosphorescent light bulbs at the end of the long table of exhibits. Describe how life would be without electric light.

Things that help us move from place to place. . .

Transportation can be accomplished using the giant engine at the entrance to gadgets, using the pulley chairs, or even the propellers. Be creative in finding things that move in different ways.

Things that help us build. . .

Work together to build a bridge using screws, nuts, bolts, and bars. Watch the Gadgets TV to see how common objects are made. Examine the inner workings of everyday gadgets by taking them apart in the Gadgets Café. Groups of up to 66 guests can reserve a space in the café on weekday mornings. Groups of 10 or less can drop in to any open café.

Ocean gives examples of underwater technology, the Weather Stage shows us technology that predicts the weather, and Space has technology for space travel. What other forms of technology can you find at COSI?

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Vocabulary Words – Discuss the meanings of the following words.

Invention
Think

Inventor
Make

Build
Create

Science Standards

Science and Technology 1.4 Explore ways people use energy to cook their food and warm their homes

Technology Standards

Nature of Technology:

Benchmark A. Recognize the characteristics and scope of technology.

K.2 Describe how people use tools to help them do things

1.1 Distinguish between the natural and human-made world

1.2 Cite examples of how people use tools and processes to perform tasks

2.2 Describe and give examples of how people use tools and processes to solve problems

Benchmark C. Describe the relationships among technologies, and the connections between technology and other fields of study.

K.1 Identify technology devices in the classroom

K.2 Recognize the connection between technology and other fields of study

1.2 Describe the connections between technology and other fields of study

2.2 Explore the use of technology in different fields of study

Technology and Society Interaction:

Benchmark C. Describe and demonstrate how technology has had an influence on our world

K.1 Recognize that technology changes the way people live and work

1.1 Describe or list ways technology has changed the way people lived and worked throughout history

2.1 Demonstrate and give examples of how technology has changed the way people lived and worked throughout history.

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Technology Standards con't

Design World:

Benchmark A. Develop and understanding of the goals in physical technologies

- 1.3 Understand that vehicles move people or goods from one place to another in water, air or space and on land

Social Studies Standards

Economics

- K.3 Identify goods and services.
- 1.2 Describe the ways people produce, consume and exchange goods and services in their community.
- 1.3 Explain ways that people may obtain goods and services that they do not produce including the use of money and barter.

History

- 2.4 Use historical artifacts, photographs, biographies, maps, diaries and folklore to answer questions about daily life in the past
- 2.5 Identify the work that people performed to make a living in the past and explain how jobs in the past are similar and/or different from those of today.
- 2.6 Identify and describe examples of how science and technology have changed the daily lives of people and compare:
 - a. Forms of communication from the past and present;
 - b. Forms of transportation from the past and present.

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Process Skills are the actions that it takes to “do science.” These are some of the scientific process skills that your students will be using as they explore the exhibits at COSI.

Observing - Use your senses to gather information.

Measuring- Use tools and numbers to quantify objects or phenomena.

Categorizing - Place objects into groups based on similarities or differences.

Communicating - Use words, pictures, graphs and diagrams to share your ideas.

Investigating - Follow a scientific method to formulate questions, conduct an experiment.

Applying - put the information you’ve gathered to use.

Inferring – Make an assumption based on your observations.

Questioning – Wonder and ask about things and find ways to discover answers.

Predicting - Decide what will happen in the future based on your observations.

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Classroom Connections

Your visit to COSI should not be a one day event, soon to be forgotten. Help your students make connections between the classroom lessons and your field trip by doing activities related to your visit. Before your visit, review the vocabulary words that the students will encounter, and brainstorm things they already know about technology or COSI in general. Give them descriptions of each of the areas and some of your expectations. If possible, review with the chaperones, so they know what to expect. After your visit, have your students draw pictures or write letters of stories about their experience, and list questions they still have that you could explore together.

Below are some lessons that you can use as pre-visit or post-visit activities to help connect your field trip to your classroom experiences and extend your students' learning. Consider doing one activity every day for a week before your visit.

What is technology?

Objective: Understand the nature of technology and invention

Materials: your classroom

Procedure:

1. Ask your students if they have heard the word 'technology.' If they haven't, tell them that technology is any invention that makes life easier or better for us.
2. Can they see any examples of technology around the classroom? They will usually describe things that plug in or look hi-tech, but even things like pencils and doorknobs are examples of technology.
3. Ask students to draw a picture of some sort of technology, and then tell a story about what life would be like without that technology.

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Making Predictions about the Future

Objective: Think about technology in the future

Materials: cell phone, picture of a car

Procedure:

1. Show students an example of current technology, like a cell phone or a car. Talk about what is good about the phone or car, and what is not good.
2. Ask students to think about the future, when they are adults. What will a cell phone or car look like then? How will it be different? Ask them to draw a picture of the futuristic car or phone.

Back in Time

Objective: Begin to understand what life was like in 1898.

Procedure:

1. In Progress, you will see what life was like over 100 years ago. Students will probably not be able to grasp the concept of a century, so you may want to make a timeline, or tell them that it was when their grandparent's grandparents were alive.
2. In 1898, people did not have cars, TVs, or videogames. They did not have refrigerators for food and only a few people had electric lights. Write following list of words on the board, or stick a picture of each of these things on the wall. If you'd prefer, give a copy of each picture or word to a small group of students.

CAR (no)	HOUSE (yes)	REFRIGERATOR (no)
PHONES (yes)	TELEVISION (no)	BOOKS (yes)
AIRPLANES (no)	EYEGLASSES (yes)	RADIOS (no)

3. Ask students to decide which of these things people had in 1898, and which ones were not invented yet. Talk about the ones that did not exist yet. What would you have to use instead?

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Prepare for your field trip

Objective: Prepare students for their day at COSI.

Procedure:

1. Ask your students if they have been to COSI before. For those that have, find out some of their favorite things, and write these on the board.
2. Ask students to tell you the things that they have learned over the past week about technology. Tell them to look for examples of inventions as they explore COSI.
3. Review the Code of Conduct and all of your rules.

After Your Visit

Use the information and inspiration you have gained at COSI to create your own invention. Spend a few weeks working in small groups on an invention of your choice. Select something that will somehow improve your lives in your classroom, or solve a problem that you have been having. What are the benefits of your invention? How much will it cost? Do you foresee any challenges? Send pictures or stories of your inventions back to COSI, c/o Field Trips, 333 W. Broad St., Columbus, OH 43215.

Below are some invention ideas to get you started:

- An invention that will help me to remember to do my homework.
- An invention that will help me wake up and get to school on time.
- An invention to keep my desk organized.
- A new game for the playground or for Gym Class.