

Introduction

I believe that **career exploration** starts with having career **conversations** with children when they first begin to notice the world around them. These **conversations** should be more than, “What do you want to be when you grow up?” **Conversations** should be about their likes and dislikes, their interests, their skills, what problems they would like to solve and eventually, what lifestyle they would like to one day live.

I also believe that teaching STEM careers in elementary grades opens the door for teachers and students to become tomorrow’s innovators. Young children with a strong foundation in science, technology, engineering, and mathematics will play an integral role in our nation's future. Teachers can foster critical thinking through problem solving in elementary STEM lessons and provide students with a competitive edge in their future job markets.

These lessons were developed for After School programming; however, they may be integrated into regular classroom instruction or used in any setting where teachers, parents, or adults are working with students grades K-4.

Acknowledgements

These activities were developed with ideas from the book, *The Spaces You'll Go* by Rachael Mann. I love the book and thought it would be a great resource to develop lessons on STEM careers. *The Spaces You'll Go* is a wonderful children's book with artistic illustrations. The book has an age appropriate glossary on the STEM careers mentioned in the book. I would like to thank Rachael Mann for giving me her approval to create this lesson based on her book. I would also like to thank the teachers at Huntley Project Schools for their ideas and help in creating these lessons.



Please feel free to contact me with other ideas and suggestions to enhance this STEM career lesson.

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The Spaces You'll Go



OBJECTIVE:

Students will explore STEM careers, compare technologies from yesterday with today, and explore and write about their futures as STEM professionals. These lessons are **conversation** starters for career exploration.

MATERIALS:

The Places You'll Go by Rachael Mann

What are Scientists? by Rita Golden Gelman & Susan Kovacs

INTRODUCTION:

Tell students that today they will be learning about different STEM career opportunities. STEM stands for *science, technology, engineering, and math*. STEM curriculum blends these subjects in order to teach “21st-century skills,” which are tools they will need to have if they wish to be successful in the workplace of the future. In order to be prepared for the jobs of the future, students need to be able to solve problems, find and use evidence, collaborate on projects, and think critically. The website link above is a good resource to expand the **conversation** on 21st-century skills with a short video and an infographic that would be good for middle school to junior high school age students.

PROCEDURES:

Have a **conversation** about the personal characteristics STEM professionals share. Ask students to predict the differences that may be seen within the next ten years for technology-based devices and to describe different careers in science, technology, engineering, or mathematics fields. Any of these lessons can be revised or adapted for the level of your students. Parts of each lesson can be used or expanded to meet the needs of your students or your focus as a teacher.

Grade K-1 Lesson

1. Tell the students to draw a scientist. They may use [Handout1](#) if you think your students will need assistance in getting started or have them use [Handout2](#) if they do not need assistance getting started. Provide at least 15 minutes of class time to complete this assignment. Have each student give his/her scientist a name.
2. Have students share their drawings with a classmate. Ask what they notice about the scientists in the drawings.
3. Create a [KWL Chart](#) and work through what they “know about a scientist,” “what they want to learn about a scientist” and then upon conclusion of the lesson, follow up with “what they learned about a scientist.”
 - create a master list on the board of what a scientist looks like
 - who is a scientist
 - what do scientists do
 - include any specific characteristics such as clothing worn (lab coat), wears glasses (safety glasses), crazy eyes, weird hair” etc.
4. Teacher will show students two different [scientist pictures](#) and have a **conversation** with the class discussing similarities and differences between the two pictures. Point out that some scientists (careers) work indoors and some work outdoors.
 - Point out that some scientists (careers) require special clothing
 - Point out that scientist (careers) will require special training and education
5. Read the book, ***What Are Scientists?*** to the class and have **conversations** with students about the scientists in the story and what they do. Ask students, “Who has the ability to become a scientist?”
6. Go back to the KWL Chart and complete the “What I Learned” column. Discuss students’ perceptions of what a scientist looks like and what one does. Collect all drawings and use in a bulletin board on STEM Careers or create an online book using Google Slides or another online resource.
7. As an extension of this lesson, read the book, ***The Spaces You’ll Go*** and have **conversations** about the careers listed in the narrative and/or glossary of this book.

NOTE: You may need to read only parts of the ***What Are Scientists?*** or substitute with another age appropriate book on scientists, depending on your students. Consider using a document camera to show pages of the book on the board and “read” it as a class, allowing for vocabulary discussion and reading with assistance. You may even have them collect evidence of things that are similar and things that are different with the scientists. Another idea would be to use [Padlet](#), ([How to use Padlet in the Classroom](#)), to collect student responses to any and all **conversations** with these lessons.

Grade 2-3 Lesson 1

1. Tell the students to draw a scientist on a piece of paper or use the [Handout2](#). Provide at least 15 minutes of class time to complete this assignment. Have each student give his/her scientist a name.
2. Have students share their drawings with a partner. Have each pair of students make a list of similarities and differences between their drawings.
3. Create a master list on the board of what a scientist looks like, what gender a scientist is, and what the scientist does. Include any specific characteristics such as ‘clothing worn (lab coat), wears glasses (safety glasses), crazy eyes, weird hair” etc. Teacher can then ask questions such as, “Why do scientists wear glasses?” Safety could then be discussed.
4. Watch the [STEM video](#).
5. Read the book, ***What Are Scientists?*** to the class and have **conversations** with students about what are scientists and what they do.
6. Discuss students’ perceptions of what a scientist looks like and what one does. Collect all drawings and use in a bulletin board on STEM Careers or create an online book using Google Slides or another online resource.
7. You could also include a [KWL Chart](#) like in the lesson for K-1 above.

Grade 2-3 Lesson 2

1. Hand out or share [Yesterday-Today-Tomorrow](#) with students. Discuss each of the inventions of today. Have a **conversation** with your students on what these technologies were like in the past. Part of the **conversation** should be around how our language with these inventions has changed--such as landline, mainframe, cassette, VHS Tape and Walkman--with the advancement of new technologies. Teacher may want to even bring to class a landline phone or any other technologies from the past for students to visualize and experience.
2. Have students draw what they envision the category items would be like tomorrow (in the future).
3. Lead a **conversation** about the changes in technology over the past four, five or six years (depending upon the age of the student). Have students explain why they think the objects/items will change in the way they’ve predicted.
4. Read aloud ***The Spaces You’ll Go***.
5. Lead a group **conversation** on how science and technology has transformed how we communicate, are entertained, and find out information.
6. Show the YouTube video, [Human Exploration of Mars](#).

7. Lead a **conversation** on space travel and one day landing on Mars.
8. Have small groups of students generate up to 10 objects that people use on a regular basis that their grandparents didn't have when they were the same age as the students. Ask why these items are useful and what life would be like without them. This [link](#) is a good resource to discuss inventions that resulted from space exploration. Or this [link](#) is an infographic on 20 things we would not have without space travel.
9. You could also include this as a homework assignment and have your students have a **conversation** with their grandparents about what they have seen in the advancement of technology in their lifetimes.
10. Require students to choose two or three of the 10 items and write a short description of what they think the item might look like or be capable of doing 10 years in the future. (This can be assigned as a group task for two or three students or an individual homework assignment.) You may want to consider students sharing their information using an online tool such as [Flipgrid](#). Here is a link for [How to Use Flipgrid: A Guide for Teachers](#).

Grade 4-6 Lesson 1

1. Hand out or share [Yesterday-Today-Tomorrow](#) with students. Discuss each of the inventions of today. Have students research what the inventions looked like in the past (yesterday) and then have them draw what they envision the category items would be tomorrow (in the future). One resource is [World Book Kids](#) which is a great resource in many school libraries.
2. Choose one or more of the technologies and lead a **conversation** with students on the history of the item: Where did it come from? What problem does it solve? Will it continue to solve that problem?
3. Lead a **conversation** about the changes in technology over the past four, five or six years (depending upon the age of the student). Have students explain why they think the objects will change in the way they've predicted. How could these technologies be improved?
4. Read aloud *The Spaces You'll Go*.
5. Lead a group **conversation** on how science and technology have transformed how we communicate, are entertained, and find out information.
6. Have students discuss how rapidly changing technologies create new jobs and radically change old jobs, or even render jobs obsolete.
7. Discuss how STEM professionals cannot work in isolation, but need to work with teams of people whom they may never actually meet in person, due to effective methods of electronic communication.

8. Facilitate a **conversation** about the careers listed in the Glossary of *The Spaces You'll Go*, using the following questions plus any others that come up during the **conversation**:
 - Which of these careers interests you the most? Why?
 - What jobs or careers will be in space or on Mars someday?
 - What will farming be like in space?
 - What will space travel be like?
 - What will houses be like in space?
9. Complete the worksheet, [Career Assignment](#), by having students choose one of the STEM Careers in the Glossary of *The Spaces You'll Go* that they are interested in learning more about.
10. From the information gathered from the Career Assignment, have the students complete the [STEM Careers Project](#). They will be creating a presentation from the information they have learned.
11. You could also bring in guest speakers to discuss their careers in STEM.

For 6th - 8th Grade: Have students research one career in depth and devise an educational plan for the remainder of their school career to choose the proper courses that would allow them to enter a degree or certificate program after high school graduation. Resources they could use are: [Department of Labor Occupational Outlook Handbook](#) or [Montana Career Information System](#).

Ask students, "If you were applying for this job, what attributes and accomplishments would you mention in a cover letter or interview?"

RESOURCES:

(Poster)

[Scientist Poster](#)

(YouTube Videos)

- [What Does a Scientist Look Like?](#)
- [What Is A Scientist](#) by Barbara Lehn
- [Scientist, Scientist, Who Do You See? - Science for Kids Read Aloud](#)
- [Sid the Science Kid](#)
- [The Steps of the Scientific Method for Kids - Science for Children: FreeSchool](#)

EXTENSIONS:

- Free [STEAM lesson plans and citizen science projects](#) for Elementary and Middle School. Hands-on activities that introduce students to science, technology, engineering and math (some paired with art for creative enhancement).
- Another option would be to use information from the [Department of Labor Occupational Outlook Handbook](#), and have students research the [quickly growing careers](#) that have the largest expected growth from 2018–2028. Have **conversations** on why these might be the fastest growing careers/jobs.
- STEM Poster - Have students create a STEM poster on the STEM career that they want to research and learn more about. They could also create a digital poster with Canva, Google Draw or any other online resource of their choosing.
- Ask students how many different kinds of scientists they can name. Read, ***What is a Scientist*** and/or ***The Space You'll Go*** and have students research one of the scientists mentioned in these books.
- With Grades 5-6, you could have students research STEM careers and compare and contrast the education requirements needed in different STEM careers, and devise an educational plan for the remainder of their school career.
- There are literally thousands of lessons and resources that are available for free on [NASA's website](#) that could be used in conjunction with these lessons.
- How will scientists solve problems that will impact society in the future? Have students answer this question by writing a [letter to the future](#). Students will receive an email in the future that is from themselves. This will present an opportunity for your students to reflect on what progress has been made in pursuing solutions to potential problems in the world.
- Collaborate globally on STEM careers using [ePals](#) which is a huge network of classrooms and teachers who want to get a pen pal collaboration started. Teachers choose the language, age range, class size, and subject that match up with their own classrooms. Students can then connect, communicate, and collaborate with one another. You could set up a classroom and have students exchange ideas on scientists, sharing scientists in their state or country.

Quote to include in any of the conversations:

“Advances in technology will go ahead, whether we join or not. Those who keep up will own the future. Make that connection in education by preparing kids to build the future rather than waiting for it.” -- Rachael Mann