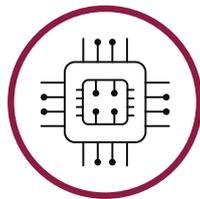
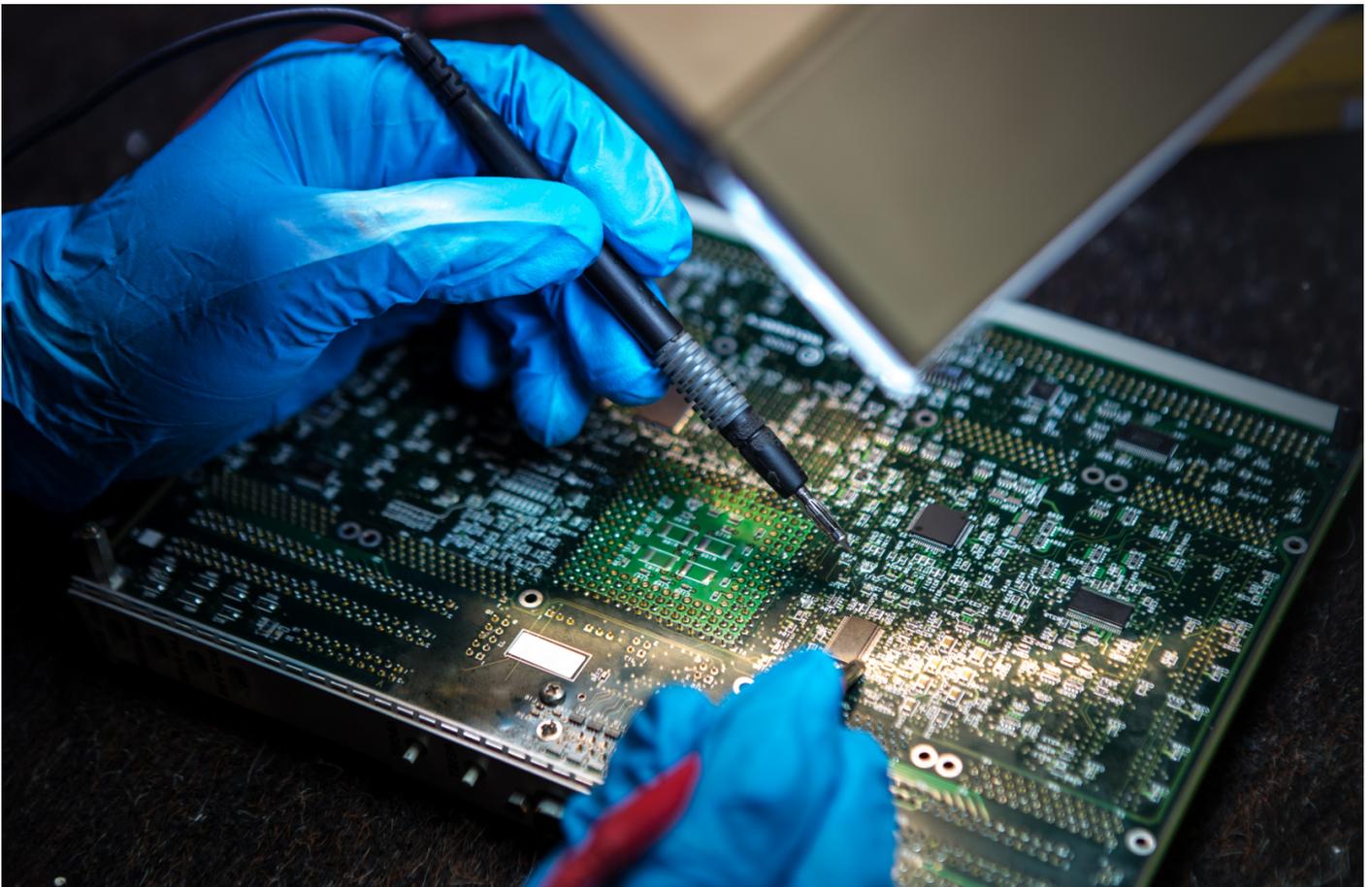




# SEMICONDUCTORS

## Lesson 5: The Future of the Semiconductor Industry and My Place in It



### **Facilitator Guide** How to Prepare for This Lesson

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## About This Facilitator Guide

This facilitator guide provides instructors with the information needed to guide students through the digital version of The Future of the Semiconductor Industry and My Place in It.

### Before You Get Started

Before you get started with this lesson, please be sure to do the following:

- Read through the facilitator guide
- Review the Rise lesson
- Prepare any resources needed for the lesson

### Using Editable PDFs

Most lessons include using an editable PDF for students to capture responses to questions and other activities.

Guiding language is included in the lesson to help students access and use the editable PDFs where they appear.

Students who will be using Chromebooks will need to use the Print to PDF function to save their editable PDFs to their devices. Here's how to do this:

1. Open the editable PDF and select Ctrl + P.
2. Open the file destination where the file will be saved.
3. Select "Save as PDF."
4. Select "Print." Your document is now "printed" as a PDF file, which will save your work.

PDFs cannot be submitted via the Rise interactives. If you plan to collect these documents for career planning portfolios or grading, you will need to coordinate that with your students.

### Unit Overview and Alignment of Learning Targets

This unit contains five lessons, as follows:

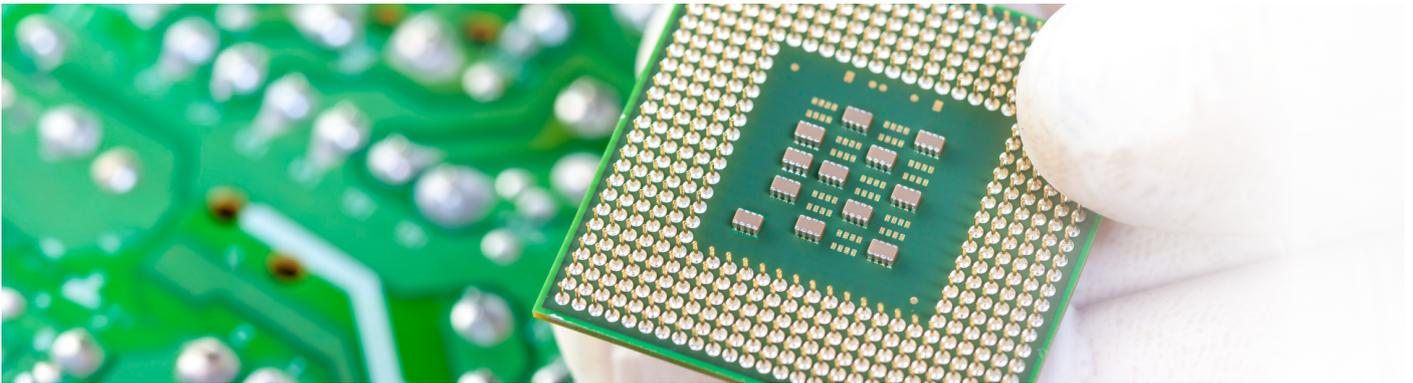
- Lesson 1: Introduction to Semiconductors
- Lesson 2: The Magic of Raw Materials and Design
- Lesson 3: Fun With Front End Design and Machinery
- Lesson 4: A Beginner's Guide to Back End Assembly and Functions
- Lesson 5: The Future of the Semiconductor Industry and My Place in It

For students to get the most value from this unit, please plan on implementing all lessons in this unit in sequential order.

## Tracking Completion of Lessons

If you are using SCORM Cloud or Canvas with the lessons in this unit, completion tracking options are available. If you are not using either platform, please determine if and/or how you plan to track the completion of lessons by the students.

# Lesson 5: The Future of the Semiconductor Industry and My Place in It



## Lesson 5 Components

### Pacing

In this lesson, students will learn about the semiconductor manufacturing ecosystem before exploring the types of careers available in each part of it. Then, they will retake the interest assessment and learn if their career interests have changed. Finally, students will explore other careers available in the semiconductor industry and discuss what they found interesting about the different careers they found.

### Materials

This lesson includes an in-class activity “Stick It Where It Belongs.” For this activity, the following materials will be required:

- Tape (for attaching the paper signs to the classroom walls)
- Paper (eight pieces to use as signs on the walls)
- Pen
- Sticky notes (three per student)

Be sure to review any Extension Activities that may be suggested at the end of this lesson and consider when and how your students will complete them.



## Guiding Questions

The guiding question is intended to provide a focal point for each lesson. This lesson's guiding questions are as follows:

- What is the future of semiconductors and my place in this industry?



## Lesson Overview

In this lesson, students will review the key phases of the back end assembly process. They will take a closer look at the steps for packaging a semiconductor before they get to explore what semiconductors do in a cell phone. Finally, they will learn about the software used to create the necessary circuits and program semiconductors to do their jobs.



## Vocabulary in This Lesson: Flip Card Activity

The flip card activity is designed to familiarize students with key vocabulary terms and definitions for this lesson. These vocabulary words are bolded throughout the lesson. Students must flip each card to proceed with the lesson.

### **Quantum Scale (aka Quantum):**

If you look at a ruler, there are marks for an inch, half an inch, and even an eighth of an inch. These marks are what is known as a scale. The quantum scale is a measurement scale that, if it were to appear on a ruler, would be smaller than a tiny dot of ink.

“Quantum scale” defines the unit of measurement of objects on an extremely tiny scale, even smaller than the individual components of an atom.

### **Quantum Effects:**

The seemingly unpredictable behavior of electrons on the quantum scale that can cause disruptions in the operation of a semiconductor.

### **Manufacturing Ecosystem:**

The series of steps and manufacturers necessary to produce an end product. For example, making bread includes the farms and facilities that produce the ingredients, the factories that process those ingredients, the shipping companies that ship the

ingredients from various factories and producers, the bakeries that make the bread, and the grocery stores that sell it.



## Learning Targets

By the end of this lesson, students will be able to do the following:

- Recall the manufacturing process of semiconductors
- Identify career paths along the manufacturing process
- Compare their initial and current interests in the semiconductor industry
- Explore the future of semiconductors in Arizona

## The Semiconductor Supply Chain: A Brief Overview

In this section, students will watch a YouTube [video](#) that provides an overview of the semiconductor ecosystem.

## Typical Global Semiconductor Production Process

In this section, students will examine a typical global semiconductor production process through an image. The image is presented in a Rise course component called a labeled graphic block, where students can select markers to access detailed information about various components.

## Explore Your Interests Again

In this section, students will complete a [survey](#) to assess how their interests in the semiconductor industry may have shifted after watching the previous video. The graphic character Sami will introduce this section to the students.



## Let's Think About It

After reviewing the various professionals in the semiconductor industry, students will reflect on how their views have changed compared to their initial survey results. They will then use the editable PDF to answer the following questions:

1. What careers do you find interesting and would like to further explore?
2. How do you think the semiconductor field is going to change in the future, and where do you see yourself fit into those changes?
3. Have your interests changed since your initial survey results? How?

## Exploring Your Options

In this section, students will select and explore the [semi.org career exploration](https://www.semi.org/career-exploration) site, which connects to their survey results to highlight how their interests align with various careers in the semiconductor industry. The site provides educational resources and outlines the typical career pathways for each role.

Guide students as they navigate the website to identify and select three careers that interest them, which may differ from those suggested by their survey results.

Encourage students to reflect on any discrepancies between their selected careers and survey matches, and consider why their interests might differ from the survey outcomes.



### Let's Think About It

In this section, students will reflect on their findings from the semiconductor career portal.

Ask the students to choose three careers that they found interesting, whether they are from the same career path or different ones. They will then use the editable PDF to answer the following questions.

1. What is it about these careers that you find interesting or cool?
2. What education might you need in order to pursue these careers, and does that align with your education goals?
3. What is the typical career pathway for someone in this career?

## Stick It Where It Belongs

In this section, students will complete an individual in-class activity. Around the classroom, they will find signs representing different career paths in the semiconductor industry.

Distribute three sticky notes to each student.

Instruct students to write their names on each sticky note and list a career that piqued their interest.

On your signal, have students get up, place their sticky notes on the corresponding signs, and then return to their seats.

Once all students are seated, review the sticky notes on each sign and share the careers listed. Invite students to explain why they selected their chosen career paths.

At the end of the activity, provide time for students to walk around and see which other students are interested in similar career paths.

## Preclass Setup

Have the following eight signs taped along the walls of the classroom:

- Engineering
- Installation, Maintenance, and Repair
- Business Management and Operations
- Information Technology
- Manufacturing and Production
- Marketing and Public Relations
- Sales
- Construction

## Thinking About Your Future

**Students will see the following statement in Rise:** In this lesson, you explored a career in the semiconductor industry.

Before moving on to the next lesson, take some time to reflect on these questions:

- What part of the global production pattern did you find the most interesting?
- Which career are you interested in? Is it specific to a single part of the production pattern?
- What skills do you think you need to learn to be successful in this career pathway?

## Career Pathways

**Share the following with your students:** It's never too soon to start exploring future career options!

Students can access the resources at this link: [PipelineAZ](#)

## Lesson Completion

**At the end of the lesson, students will see the following message in Rise:**

This lesson is just the beginning of your journey into the world of semiconductors. If you have found an interest in this career pathway, there are many resources that can help you learn what you need to succeed. Good luck as you forge a new path!