

63. Manufacturing Cluster - Assembling (4 hours)

Purpose/Abstract: To introduce students to assembly careers in the manufacturing cluster.			
NCCCS Adult Education Standards: R.3.2.4, W.5.2.3, M.1.2.5			
Learning Objective: <i>By the end of the session, students will be able to:</i> <ul style="list-style-type: none"> Define assembly careers and identify their roles in the manufacturing industry. Recognize the importance of communication, teamwork and problem-solving skills in assembly careers Utilize knowledge from the work safety presentation to list preventable workplace injuries, describe actions to take in emergencies, and identify key agencies responsible for enforcing health and safety laws in assembly careers. 			
Soft Skills	Communication, Teamwork, Problem-solving & Critical Thinking	Resources	Staying Safe at Work.pdf StayingSafeAtWork2016.pptx The Industrial Revolution: The Assembly Line Simulation Math: Using place value to add 3-digit numbers: part 1 (video) Khan Academy 3-minute-math-drill-addition Helper - Production Worker Career Video Handouts: Math Practice - one for each student.
Additional Materials <ul style="list-style-type: none"> Math Practice handout, one for each student. Snowflake printouts. Art supplies (glue, glitter, markers, paint, etc.) Pencils, paper, and scissors Computers for student use 			
Icons	 Activity	 Check-In	 Review

PREPARATION

- Watch [Helper - Production Worker Career Video](#) and use this information to introduce the roles to the class.
- Review [Staying Safe at Work.pdf](#) and [StayingSafeAtWork2016.pptx](#) and prepare to guide students through this information.
- Review [Using place value to add 3-digit numbers: part 1 \(video\) | Khan Academy](#) and [3-minute-math-drill-addition](#) for the Math practice.



- Read and familiarize yourself with [The Industrial Revolution: The Assembly Line Simulation](#). Print multiple copies of snowflakes for the activity.
- Review the [Instructional Support Guide](#) and print/prepare referenced scaffolds.
- Print handouts.
- Familiarize yourself with [O*NET](#)
- Familiarize yourself with [Skills to Pay the Bills](#), though it won't be used directly in this lesson.

INTRODUCTION (30 min)

Welcome students to the class!

Begin by telling students that this is the first lesson in the manufacturing cluster. Have students share one thing they know about the manufacturing industry. Let each student get a chance to think about what they know.

Play [Helper - Production Worker Career Video](#) to provide a visual introduction to assembly careers. Use simple language to define assembly careers. Discuss the roles of assembly workers in the manufacturing industry. Discuss the key points of the video and invite students to share their thoughts.

Introduce the lesson objectives.

VOCABULARY, READING & WRITING (45 min)

Soft Skills Discussion

Introduce the soft skills required for assembly careers: communication, teamwork, and problem-solving. Relate each skill to real-life scenarios by projecting the following table and leading a discussion with the class.

Communication	Teamwork	Problem-Solving
Imagine you're working on an assembly line, and a part you need to complete your task is missing. How would you communicate this issue to your team leader or colleagues to ensure production continues smoothly?	Think about building a puzzle. Each piece represents a task in the assembly line. How does working together with your teammates to fit all the pieces together make the task easier and more efficient?	Picture a scenario where a machine on the assembly line breaks down, and you're responsible for fixing it to avoid delays. How would you approach this problem? What steps would you take to get the machine running again?
Consider a situation where you have an idea to improve the assembly process and make it faster. How would you communicate your idea to your supervisor or team to get their feedback and potentially implement the improvement?	Think about a time when you had to collaborate with your coworkers to meet a tight deadline. What strategies did you use to divide tasks, coordinate efforts, and ensure everyone played their part in completing the project on time?	Imagine a quality issue arises on the assembly line, and you need to figure out the root cause. How would you use problem-solving skills to identify what went wrong and implement a solution to prevent it from happening again?



Go through the [presentation](#) with the class. Supplement the information on the slides with details found in this [document](#). Encourage students to take turns reading the slides. Pause for discussions and questions as needed. During this activity:

- Discuss recognizing workplace hazards.
- Emphasize preventable workplace injuries and illnesses.
- Explain emergency actions and problem-solving in emergencies.
- Mention laws and agencies protecting workers' health and safety.

Instructor Note: Instead of a reading comprehension activity, take students through the safety at work presentation as this is important information for roles in the manufacturing cluster. You can get students to

Lower Level	Higher Level
Encourage students to try and interpret the images in the slides and explain what they observe in their own words.	Challenge students to think about ways in which they can be better prepared for these workplace hazards.

MATHEMATICS (45 min)

Explain that the math activity focuses on the importance of counting and adding in assembly careers. Highlight that these skills are used to ensure accurate inventory, manage production quotas, and maintain quality control on the assembly line. Use the following points to explain further.

- *Assembly workers often deal with various components and parts. Accurate counting helps in keeping track of inventory levels. For example, if you're assembling bicycles, you need to ensure you have the correct number of wheels, frames, and pedals. Counting these items accurately prevents shortages and excess stock.*
- *Many manufacturing facilities have production targets or quotas that need to be met. Counting helps ensure that the right number of products is assembled within a specified timeframe. If a quota is to assemble 100 units per hour, counting each unit accurately is essential to meet this target.*
- *In assembly, precision matters. Counting ensures that the correct number of parts are used in each product. For instance, in electronics assembly, it's crucial to use the right number of screws, circuit components, and connectors. Accurate counting helps maintain product quality.*

Review how to add multiple numbers within 1000 using place values.

Distribute the Math Practice handout and allow time for completion.

 REFLECTION (10 minutes)

- ✓ Review the answers with the class.

Lower Level	Higher Level
Share this video with students to help them revise the concepts individually before they complete the worksheet.	Assign 3-minute-math-drill-addition and set a timer for 3-4 minutes to challenge students.



GROUP WORK (75 min)

Begin by providing a concise overview of the Industrial Revolution, emphasizing its historical significance. Then, highlight the direct connection between the upcoming activity and the Industrial Revolution. Explain how this simulation allows students to experience the concept of division of labor, mirroring the revolutionary changes that occurred during the transition from the domestic system to the factory system.

Snowflake Making Activity:

Explain that the goal is to make the most snowflakes in the shortest time possible while maintaining quality. Take time to explain the roles and the instructions of the activity given [here](#). Remember to provide different directions to the artisan and to the workers.

Divide students into groups of 7 and assign roles, briefly reiterating what each person will do.

- Artisan
- Worker 1: Fold the piece of paper lengthwise.
- Worker 2: Match up the top and bottom of the snowflake and fold crosswise.
- Worker 3: Cut the first portion of the snowflake.
- Worker 4: Cut the second portion of the snowflake.
- Worker 5: Cut the remaining portion of the snowflake.
- Manager

Instructor Note: Please read through the document and provide very clear instructions while getting students to reflect on the differences in tools and work conditions between artisans (skilled) and workers (unskilled).

 **REFLECTION (15 minutes)**

✓ Review the activity and have students reflect on their experiences. Guide a discussion to recap the activity objectives and what they learned from this activity. Emphasize how team work and communication are critical for these careers. Have students share how these skills helped them complete this activity.

INDEPENDENT WORK TIME (30 min)

Provide options for independent practice and allow students choose what they want to work on during this time.

- Writing activity: Have students write a short opinion piece about their experience of the simulated assembly work practice.
- Paired role plays: Students practice communication skills through role plays for scenarios they might encounter in assembly work. Students can choose a partner and create their own short scenarios based on what they've learned so far about assembly workers.
- Additional math practice or review. You can use this time to support students individually with the skills they practiced in this lesson.
- Review the workplace safety materials. Share the presentation with students.

WRAP-UP & REFLECTION (15 min)

Review the key points of the lesson. Ask students to share one new thing they've learned. Emphasize the importance of safety, soft skills, and collaboration in assembly careers.

Distribute exit slips to students.

Ask for a few volunteers to share their reflections.

Collect and review the answers.

Math Practice

Directions:

- Use the Place Value Addition Strategy to solve the following problems. A few have been done for you.

1). $28 + 29$

$$= (20+20) + (8+9)$$

$$= 40 + 17 = 57$$

6). $119 + 126$

$$= (100+100) + (10+20) + (9+6)$$

$$= 200 + 30 + 15$$

$$= 230 + 10 = 240 + 5 = 245$$

2). $26 + 37$

7). $252 + 244$

3). $38 + 23$

8). $316 + 225$

4). $18 + 47$

9). $633 + 286$

5). $47 + 52$

10). $755 + 237$

Reflection Exit Slip

In one sentence, describe what you learned in this lesson.

Today, I learned _____.

Is one of the careers discussed today of interest to you? Why or why not?

I liked / did not like _____ career because _____.

Is there anything you still need help understanding?

What's one question you have?

Circle the emoji that shows how you feel about your mastery of content in this lesson.



Happy



Smart



Confused



Sad



Angry