

Sector Overview

Manufacturing – “Planning, managing and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering.”¹

As stated in the *White House Strategy for American Leadership in Advanced Manufacturing*, “the United States has long thrived on its ability to manufacture goods and sell them in domestic and global markets. Manufacturing plays a vital role in almost every sector of the U.S. economy, stretching from aerospace to pharmaceuticals and beyond. Advanced manufacturing—which includes both new manufacturing methods and production of new products enabled by innovation—is an engine of America’s economic power and a pillar of its national security. Advances in manufacturing enable the economy to continuously improve as new technologies and innovations increase productivity, enable new products, and create entirely new industries.”² There are many examples of advanced manufacturing tools and techniques, but some of the more prominent ones include computer-aided design (CAD), simulations, robotics, laser and enhanced prototyping.³ Indeed, advanced manufacturing has changed considerably since the dawn of the industrial age or the introduction of the assembly line.

Advanced manufacturing is a high-growth sector in Louisiana and across the nation. “Over the next decade, manufacturing employers need to fill 533,000 middle-skilled jobs that currently pay at least \$35,000 per year.”⁴ Some argue that Louisiana specifically is at the epicenter of the U.S. manufacturing renaissance.⁵ Despite the growing demand and anticipated growth, some groups (e.g., women) are underrepresented in the sector. Currently, women hold only 7% of advanced manufacturing jobs in the country⁶ but leaders like Marilyn Hewson, CEO of Lockheed Martin, and Phebe Novakovic, CEO of General Dynamics, are paving the way for the next generation.

Questions to consider about the sector:

- What role does advanced manufacturing play in the global economy? US? State?
- How have new developments in technology changed the advanced manufacturing sector? What new possibilities exist given these new developments in technology?
- How are the realities of advanced manufacturing potentially different than traditional views held about the manufacturing sector?
- What is the range of careers within the advanced manufacturing sector?
- What advanced manufacturing companies are located in your region and your state?
- What skills, competencies and dispositions will be necessary for future jobs in the Advanced Manufacturing

¹ <https://careertech.org/manufacturing>

² <https://www.whitehouse.gov/wp-content/uploads/2018/10/Advanced-Manufacturing-Strategic-Plan-2018.pdf>

³ <https://choosecolorado.com/wp-content/uploads/2016/06/CO-Advanced-Manufacturing-Profile.pdf>

⁴ <https://womenandgoodjobs.org/sector/advanced-manufacturing/>

⁵ <https://www.opportunitylouisiana.com/key-industries/advanced-manufacturing>

⁶ <https://womenandgoodjobs.org/sector/advanced-manufacturing/>

sector?

- What post-secondary opportunities are necessary for jobs in the Advanced Manufacturing sector?

Clusters, Pathways and Certifications

- [Career Cluster Frame](#)
- Jump Start pathways: Manufacturing Specialist; Manufacturing, Construction Crafts & Logistics
- Jump Start certifications: [Certification for Manufacturing \(C4M\)](#)

Resources

The resources below may support teacher and/or student learning about the Advanced Manufacturing sector. Teachers should select excerpts from the materials below to share with students based on the students' abilities and interests and/or identify additional resources to share.

Lexile Range: 800 - 1800

Research Papers

These are most appropriate for building teacher background knowledge, though carefully selected excerpts, infographics, etc. might be useful for student use. Teachers should consider student reading levels, prior knowledge, relevance of text, and available classroom supports in making text selections.

- [America's Advanced Industries](#) (1400L-1500L)
- [Strategy for American Leadership in Advanced Manufacturing](#) (1500L-1600L)

Articles

- [Low-skilled workers having toughest time in economic globalization](#) (820L)
- [US Manufacturing, Statistics, and Outlook](#) (800L-900L)
- [3-D Printers use Lasers to Make Jet Engine Parts](#) (890L)
- [Meet Flippy, a burger-flipping robot alternative to human workers](#) (900L)
- [A Brief Timeline of American Manufacturing Industry Moments & Innovations](#) (900L-1000L)
- [Careers: Industrial production manager](#) (1060L)
- [Types of Manufacturing Industry](#) (1000L-1100L)
- [Examples of Mass-Produced Products](#) (1000L-1100L)
- [Mech-a-what? Mechatronics – the Engineering Field You Didn't Know Existed](#) (1100L-1200L)
- [6 Exciting Advances in Manufacturing Automation](#) -(1100L-1200L)
- [Advanced Manufacturing](#) (1200L-1300L)
- [Explore Careers in Advanced Manufacturing](#) (1400L-1500L)
- [Women in manufacturing Stepping up to make an impact that matters](#) (1600L - 1700L)
- [Women in manufacturing study Exploring the gender gap](#) (1700L - 1800L)



Advanced Manufacturing

Text Sets

- [Rise of the Robots: Helpful Or Harmful?](#) Some texts available in Spanish - (810L-980L)
- [Robotics: Argument & Debate Unit](#) Some texts available in Spanish - (820L-950L)

Fact Sheets

- [Louisiana Manufacturing Facts](#) (1200L-1300L)

Videos

- [Advanced Manufacturing Overview from Lockheed Martin](#)
- [The Future of Manufacturing from Carnegie Mellon University](#)
- [How it's Made: Ice Cream](#)
- [How it's Made: Hotdogs](#)

Other

- [Manufacturing Your Future Advanced Manufacturing lesson plans and materials](#)
- [How Products Are Made website that explains the details and manufacturing process of a wide variety of products](#)
- [Manufacturing Day, an organization that connects teachers and students to the manufacturing industry](#)



Teacher Rubric Unit 2 PT1

Student Name: _____

Date: _____

Section #: _____

Unit 2 Performance Task: Web Redesign and Social Media Campaign Rubric and Checklist

Deliverables:

1. The student roles and responsibilities were defined in the team contract.	Yes	No
2. The web redesign included appropriate changes to increase diversity in the industry.	Yes	No
3. The social media campaign plan included the required components.	Yes	No
4. The student completed all of the required tasks in the web page and social media presentation.	Yes	No

Relational skills and Personal Attributes:

5. The student demonstrates effective teamwork habits which include the following:			
a.	ability to work well with others	Yes	No
b.	ability to exercise leadership	Yes	No
c.	ability to resolve conflict	Yes	No
d.	respect for individual differences	Yes	No
6. The student demonstrates effective independent work habits which include the following:			
a.	responsibility	Yes	No
b.	self-discipline	Yes	No
c.	adaptability	Yes	No

Quality Indicators	Meets or Exceeds Expectations	Not Yet or Inconsistently Meets Expectations	Does Not Meet Expectations	Comments
Applied Knowledge: Critical Thinking Skills	The web redesign and social media campaign plan demonstrate all of the requisite skills, including <ul style="list-style-type: none"> critical thinking creativity 	The web redesign and social media campaign plan demonstrate some of the requisite skills, but do not demonstrate the skills checked:	The web redesign and social media campaign plan do not include enough evidence of the requisite skills to demonstrate applied knowledge.	

<p>Applied Knowledge: Career-Related Technical Skills</p>	<ul style="list-style-type: none"> • ability to make sound decisions • ability to solve problems effectively • ability to reason logically • ability to plan well • ability to organize ideas well • ability to work with team members • ability to define and follow roles and responsibilities 	<ul style="list-style-type: none"> <input type="checkbox"/> critical thinking <input type="checkbox"/> creativity <input type="checkbox"/> ability to make sound decisions <input type="checkbox"/> ability to solve problems effectively <input type="checkbox"/> ability to reason logically <input type="checkbox"/> ability to plan well <input type="checkbox"/> ability to organize ideas well <input type="checkbox"/> ability to work with team members <input type="checkbox"/> ability to define and follow roles and responsibilities 	<p>The student's choice of a manufacturing company does not demonstrate enough of the requisite skills of applied knowledge.</p>	
<p>Executive Skills</p>	<p>The student's choice of an appropriate manufacturing company clearly demonstrates the student has the required depth of skills to make an appropriate decision. These skills include</p> <ul style="list-style-type: none"> • developing background knowledge about the manufacturing industry • understanding key concepts about the manufacturing industry 	<p>The student's choice of a manufacturing company demonstrates the student has some of the required skills, but still is unable to make an appropriate decision for the web page redesign and does not demonstrate the following skills:</p> <ul style="list-style-type: none"> <input type="checkbox"/> developing background knowledge about the manufacturing industry <input type="checkbox"/> understanding key concepts about the manufacturing industry 	<p>Student demonstrates some of the requisite skills necessary to work effectively</p>	
	<p>Student clearly demonstrates the requisite skills necessary</p>	<p>Student demonstrates some of the requisite skills necessary to work effectively</p>	<p>Student does not provide enough evidence of the skills</p>	

	<ul style="list-style-type: none"> to work effectively with team members as needed to complete research prepare the web page redesign plan the social media campaign 	<p>with team members, but does not demonstrate the skills checked:</p> <ul style="list-style-type: none"> complete research prepare the web page redesign plan the social media campaign 	<p>required to work effectively with team members.</p>	
Technology Use Skills	<p>Student demonstrates the ability to be efficient and effective in using technology to meet all of the required indicators</p> <ul style="list-style-type: none"> research various companies in the manufacturing industry use appropriate web design tools incorporate various social media platforms into a social media campaign plan 	<p>Student demonstrates the ability to be efficient and/or effective in using technology, but does not demonstrate the following:</p> <ul style="list-style-type: none"> research various companies in the manufacturing industry use appropriate web design tools incorporate various social media platforms into a social media campaign plan 	<p>Student does not provide enough evidence of the ability to use technology efficiently and effectively to complete a task.</p>	

<p>Communication Skills</p>	<p>Student clearly demonstrates all of the following communication skills required for successful participation in a team:</p> <ul style="list-style-type: none"> • communicating verbally to complete the required tasks • listening actively to other team members and incorporating feedback • observing other team members and providing meaningful feedback 	<p>Student demonstrates some communication skills required for successful participation in a team, but does not demonstrate the following skills:</p> <ul style="list-style-type: none"> <input type="checkbox"/> communicating verbally to complete the required tasks <input type="checkbox"/> listening actively to other team members and incorporating feedback <input type="checkbox"/> observing other team members and providing meaningful feedback 	<p>Student does not demonstrate enough of the requisite effective communication skills.</p>	
<p>Information Use Skills</p>	<p>Student clearly demonstrates the successful use of the following information use skills:</p> <ul style="list-style-type: none"> • compile data from the research • use student research information on the webpage redesign • use student research information for the social media campaign • present the information to a group 	<p>Student demonstrates some information use skills, but does not demonstrate the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> compile data from the research <input type="checkbox"/> use the student research information on the webpage redesign <input type="checkbox"/> use student research information for the social media campaign <input type="checkbox"/> present the information to a group 	<p>Student does not demonstrate enough of the requisite information use skills.</p>	

NOTES:

Name:	
Date:	
Class/Section:	

Performance Task Description:

Statistics on the manufacturing industry indicate that the field does not attract candidates from diverse populations. In this task, the human relations department of a company has asked your team to redesign the company website in order attract potential clients and/or future employees. Before you start the project your team will determine group roles and responsibilities and develop a team contract.

Goals:

- Work with a team to manage competing ideas and develop a shared idea of success.
- Determine roles and responsibilities across your team.
- Hold yourself and peers accountable for contributing to the team’s success.
- Develop teams whose members have diverse perspectives and strengths in order to generate creative solutions for complex problems.
- Communicate effectively using verbal and nonverbal techniques with members of a team.

Essential Questions:

- How can my knowledge of myself including my strengths and leadership style help me to achieve my goals and those of a team?
- How does verbal and **nonverbal communication** contribute to the success of a team?
- How do I identify and apply my strengths to become an effective team member?
- How do I understand the potential strengths and roles of each team member to collaborate for the benefit of the team?

Directions:

Step 1: Review the Draft Contract

- Reflect on the traits of high-performing teams. Review the draft team contract.
- Discuss the roles and responsibilities of each team member.
- Finalize each person’s role and responsibilities in the group.

Step 2: Develop a List of Criteria and Constraints for the Team

- Brainstorm with your team the types of values and ideas in each section.
- Record ideas the team generates.
- Discuss which ideas the group members have in common.
- Write a statement that captures the group’s ideas for each section of the draft team contract.

Step 3: Finalize the Team Contract

- Complete all sections of the team contract.
- Sign the team contract in the provided space to affirm your commitment.

Resources:

- Team Contract Template



Team Contract Template

Team Name

These are the terms of group conduct and cooperation that we agree on as a team.

Participation: We agree to...

Communication: We agree to...

Meetings: We agree to...



Conduct: We agree to...

Conflict: We agree to...

Deadlines: We agree to...

Team Member Signatures	

Decision Matrix Template

Team Name: **Example 1**

A decision matrix can be used to help teams make decisions through the identification of criteria and constraints. List criteria and constraints across the X axis and ideas/products down the Y axis. Rank each of your ideas/products against each criteria/constraint. For example, if you have four ideas/products, you will rank each idea/product a 1, 2, 3, or 4 for each criteria/constraint. Calculate the total number of points for each idea/product. The top scoring ideas/products are those the group thinks are best.

Criteria and Constraints

Decision Matrix Template					
Ideas or Products listed below	Criteria/ Constraint #1: Diversity	Criteria/ Constraint #2: Interest	Criteria/ Constraint #3: Flavor	Criteria/ Constraint #4:	Total Points:
#1 Tabasco Hot Sauce	3	1	1		5
#2 Zapps Potato Chips	2	3	2		5
#3 Tony Chachere	1	2	3		6
#4					

Ideas and/or Products

#5					
#6					

Decision Matrix Template

Team Name: **Example 2**

A decision matrix can be used to help teams make decisions through the identification of criteria and constraints. List criteria and constraints across the X axis and ideas/products down the Y axis. Rank each of your ideas/products against each criteria/constraint. For example, if you have four ideas/products, you will rank each idea/product a 1, 2, 3, or 4 for each criteria/constraint. Calculate the total number of points for each idea/product. The top scoring ideas/products are those the group thinks are best.

Criteria and Constraints

Decision Matrix Template					
Weights	5	2	4	2	
Ideas or Products listed below	Criteria/ Constraint #1: <i>Diversity of Company</i>	Criteria/ Constraint #2: <i>Interest in product</i>	Criteria/ Constraint #3: <i>Difficulty</i>	Criteria/ Constraint #4: <i>Public Reception</i>	Total Points:
#1 <i>Lite Tyme Boats</i>	3 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">15</div>	3 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">6</div>	2 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">8</div>	1 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">2</div>	31
#2 <i>Water Moccasin</i>	2 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">10</div>	1 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">2</div>	1 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">4</div>	2 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">4</div>	20
#3 <i>Marks airboats</i>	1 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">5</div>	2 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">4</div>	3 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">12</div>	3 <div style="border: 1px solid black; padding: 5px; width: 40px; margin: auto;">6</div>	27
#4					

Ideas and/or Products

#5					
#6					

Name:	
Date:	
Class/Section:	

Performance Task Description:

Statistics on the manufacturing industry indicate that the field does not attract candidates from diverse populations. In this task, the human relations department of a company has asked your team to redesign the company website in order to attract potential clients and future employees. Using your team contract to guide your work, your team will conduct research on the manufacturing company, current employee demographics in the company or the manufacturing industry, and the kinds of advertisements the company and/or industry uses. Research will be used to redesign the company website and create a social media campaign. The redesigned company website should help to attract potential clients and future employees to the organization. The social media campaign should also help to communicate the company’s new direction.

Goals:

- Work with a team to manage competing ideas and develop a shared idea of success.
- Hold yourself and peers accountable for contributing to the team’s success.
- Develop and lead teams whose members have diverse perspectives and strengths in order to generate creative solutions for complex problems.
- Communicate effectively using verbal and nonverbal techniques with members of a team.
- Apply the team contract to follow roles and responsibilities across your team.
- Work as part of a team to research tools to build a website.
- Learn how to redesign a web page for a specific audience with a targeted purpose.
- Work as a team to research social media and other advertisements to develop a social media campaign for presentation to a potential client.

Essential Questions:

- How can my knowledge of myself including my strengths and leadership style help me to achieve my goals and those of a team?
- How does verbal and nonverbal communication contribute to the success of a team?
- How do I identify and apply my strengths to become an effective team member?
- How do I understand the potential strengths and roles of each team member to collaborate for the benefit of the team?
- What emerging career opportunities are available in the advanced manufacturing sector?

Directions:

Step 1: Research Manufacturing Companies and Employee Demographics

- Research manufacturing companies in the State of Louisiana or your local community.
- Record company profiles, including the name of the company, specific products manufactured, and target product audience in the space provided.
- Research employee demographics for the manufacturing industry in the State of Louisiana.
- Record employee characteristics, including gender, race, ethnicity, and other factors in the space provided.

Directions:

Step 2: Evaluate and Select Companies

- List the names of and facts about the manufacturing companies you researched.
- Develop a list of criteria (standards such as group interest in the company, group interest in the product, etc.) and constraints that the team will use to evaluate and select the manufacturing company (limitations such as size of the company, location of the company, etc.).
- Use a decision matrix to chart criteria and constraints and evaluate each company.

Step 3: Research Company and Make Website Recommendations

- Research the select manufacturing company’s website and develop a set of five recommendations to help to attract potential clients and future employees to the organization.
- List recommendations as a group, pair similar recommendations, and use a decision matrix to evaluate the top five recommendations as a team.
- List the individual web pages the group will update on the company website (typically one page per group member) and develop a protocol to reach agreement.
- Assign web pages to each group member and mock up or sketch preliminary designs of the new pages that incorporate the agreed-upon recommendations.
- Share feedback with team members about their designs to reach consensus on how the recommendations will be applied to the redesigned website.

Step 4: Redesign Website

- Research ways your team can create the web pages, list potential technology tools that can be applied, evaluate those tools using defined criteria and constraints, and choose a technology product to create the website.
- Determine how your group will support each other in creating the web pages.
- Work as a team to build the redesigned web pages.

Step 5: Create a Social Media Campaign

- Research social media campaigns and record why those campaigns were successful; research the selected company’s social media activity and any advertisements that were produced; record the social media platform and target audience.
- Work as a team to determine criteria and constraints for successful social media campaigns, target platforms and types of advertisements that would match your company and target audience.
- Work as a team to create a social media campaign that addresses the following:
 - Definition of the target audience
 - Timeline for the campaign to begin and end
 - What social media platform(s) will be used
 - Examples of the social media advertisements that will be developed
 - Goal statements for the social media campaign

Step 6: Present the Website and Social Media Campaign

- Work as a team to create a presentation that captures your research, website upgrades, and social media campaign development to help the selected company attract potential clients and future employees. Your presentation should include how your team contract helped your group to establish roles and responsibilities.

Resources:



Directions:

- Company and Employee Research Template
- Decision Matrix Template

Company and Employee Research Template

Team Name:

Conduct research on manufacturing companies and employee demographics. Record information in the space provided.

Manufacturing Company Profile #1	
Name:	
Location:	
Main Products:	
Target Audience:	
Employee Profile:	
Other Facts:	

Manufacturing Company Profile #2	
Name:	
Location:	
Main Products:	
Target Audience:	



Employee Profile:	
Other Facts:	

Manufacturing Company Profile #3	
Name:	
Location:	
Main Products:	
Target Audience:	
Employee Profile:	
Other Facts:	

Manufacturing Employee Profile	
Diversity by	



Gender:	
Diversity by Race/Ethnicity:	
Other Facts:	

Decision Matrix Template

Team Name: _____

A decision matrix can be used to help teams make decisions through the identification of criteria and constraints. List criteria and constraints across the X axis and ideas/products down the Y axis. Rank each of your ideas/products against each criteria/constraint. For example, if you have four ideas/products, you will rank each idea/product a 1, 2, 3, or 4 for each criteria/constraint. Calculate the total number of points for each idea/product. The top scoring ideas/products are those the group thinks are best.

Criteria and Constraints

Decision Matrix Template					
Ideas or Products listed below	Criteria/Constraint #1:	Criteria/Constraint #2:	Criteria/Constraint #3:	Criteria/Constraint #4:	Total Points:
#1					
#2					
#3	s				
#4					

Ideas and/or Products

#5					
#6					

Unit Overview

Introduction to the unit:

Unit 2 is focused on healthy, work-based collaboration. Students will apply their strengths and leadership styles to understand effective team dynamics and peer collaboration. Students will understand the importance of communication, including verbal and nonverbal communication, during group assignments. Students will be given multiple opportunities to develop teaming skills and organize tasks to solve real world problems. The performance task asks students to design a company website that helps to attract potential clients and future employees to the advanced manufacturing sector, an important industry sector in the state.

Students Will Know and Be Able To...

- work in teams to manage competing ideas and develop a shared idea of success;
- hold themselves and their peers accountable for contributing to the team's success;
- develop and lead diverse teams to generate creative solutions to complex problems;
- communicate effectively using verbal and nonverbal techniques with members of a team;
- describe the advanced manufacturing sector, including the range of companies and careers and its significance;
- consider the audience and purpose in designing a website and social media campaign.

The following vocabulary words are used throughout the unit. All vocabulary definitions are from *Merriam Webster* unless indicated otherwise.

- **appearance:** the outward aspect or look of something (*Teacher Guide, Unit Plan*)
- **artifact:** a usually simple object (such as a tool or ornament) showing human workmanship or modification as distinguished from a natural object (*Teacher Guide, Unit Plan*)
- **body language:** the gestures, movements, and mannerisms by which a person or animal communicates with others (*Teacher Guide, Unit Plan*)
- **constraints:** a constraining condition, agency, or force; a check (*PT 2.1B, PT 2.1A, Teacher Guide, Unit Plan*)
- **criteria:** a standard on which a judgment or decision may be based (*PT 2.1B, PT 2.1A, Teacher Guide, Unit Plan*)
- **encourager:** a person who inspires others with courage, spirit, or confidence (*Teacher Guide, Unit Plan*)
- **facial expression:** the look on one's face which is responsible for a vast percentage of nonverbal communication (created definition) (*Teacher Guide, Unit Plan*)
- **facilitator:** a person who makes an action or process easier (created definition) (*Teacher Guide, Unit Plan*)
- **gesture:** a movement usually of the body or limbs that expresses or emphasizes an idea, sentiment, or attitude (*Teacher Guide, Unit Plan*)
- **innovator:** a person who introduces something as new or as if new (*Teacher Guide, Unit Plan*)
- **mediator:** a person who attempts to make people involved in a conflict come to an agreement; a go-between (*Oxford Dictionaries' Definition*) (*Teacher Guide, Unit Plan*)
- **manufacture:** to produce something with a machine (*Teacher Guide, Unit Plan*)
- **nonverbal communication:** communication that is not involving or using words (*PT 2.1B, PT 2.1A, Teacher Guide, Unit Plan*)
- **prioritize:** to list or rate (projects, goals, etc.) in order of priority (*Teacher Guide, Unit Plan*)
- **recorder:** a person who keeps records (*Teacher Guide, Unit Plan*)
- **teamwork:** work done by several associates with each doing a part but all subordinating personal prominence to the efficiency of the whole (*Teacher Guide, Unit Plan, PT 2.1 Rubric*)

Introducing, reinforcing, and using academic vocabulary with students is an important part of a student’s comprehension of the subject matter. As explained by Robert Marzano and Debra Pickering in *Building Academic Vocabulary: Teacher Manual*, there is a six-step process for direct instruction in subject-area vocabulary (2005):

1. Teacher provides a description, explanation, or example of the new vocabulary word.
2. Students restate explanation of the new vocabulary word in their own words.
3. Students create a picture or image representing the vocabulary word.
4. Students periodically do activities that help add to the knowledge of vocabulary words.
5. Students are asked to discuss the vocabulary word with another student.
6. Students periodically participate in games that allow them to play with the vocabulary words.

Many teachers incorporate this process into their bell ringers at the beginning of class or have students complete a Frayer model or K-W-L chart to build their knowledge of academic vocabulary. Some teachers also use a [word-wall](#) to provide students with high-frequency words. Most essential to effective vocabulary learning is the opportunity for students to experience new words, multiple times, and in a range of contexts—for them to hear, read, and use new words and concepts authentically. Teachers are therefore encouraged to plan for how they will introduce new words and terms, the examples they will offer and/or solicit from students, and when and how they will frequently model their own use of new words and encourage students to use new vocabulary in their own writing, discussions, and presentations. (Of note, more traditional approaches to word learning, such as having students research and/or copy definitions, complete flash card “drills,” and complete work sheets or quizzes generally “teach” vocabulary in isolation and show little positive, lasting effect on student learning.)

Throughout the unit, different vocabulary words will be introduced in each lesson. Teachers can use the above strategies and process, or leverage the strategies linked below that have other ideas for interactive strategies and activities that can be incorporated into the six-step process to help students build and utilize academic vocabulary:

- [Internalization of Vocabulary Through the Use of a Word Map](#)
- [Grades 3-8 EngageNY ELA Appendix](#)
- [15 Vocabulary Strategies in 15 Minutes](#)
- [12 Vocabulary Activities and Mini-Lessons for High School Students](#)
- [5 Brain-Based Vocabulary Activities for the Secondary Classroom](#)

Lesson One: Communication Is the Key

The power and necessity of communication and collaboration is hardly lost on people these days. A [survey of midsize and large employers](#) by the Association of American Colleges and Universities found that more than 80 percent of the employers look for collaboration skills in new hires – but fewer than 40 percent of these employers consider new graduates prepared to work in teams. Students can develop collaboration skills that prove beneficial to their academic pursuits. [One recent study](#) found that students who are taught how to be part of a team, disagree with a team, and their responsibility within team are able to create longer chains of reasoning to answer complex questions in group discussions. In addition to the academic performance benefits, students also experience [benefits in confidence building and improved psychological health](#) when they learn how to collaborate. The following lesson (and unit) is designed to help students develop those collaboration and **teamwork** skills.

Day 1: Students will discuss the meaning of the idiom “two heads are better than one.” Students will divide into teams of 4-5 and participate in an obstacle course activity. Students will discuss team activity questions provided by the teacher on how **teamwork** is essential to success. Students will share with the class their responses to the activity

questions. Students will watch a video and discuss the research.

Activity: Obstacle Course

Time Frame: 25 minutes

Class Configuration: groups of two or three

Materials: blindfold, classroom objects to form an obstacle course, stopwatch

Description:

This is a team-building activity with a classroom obstacle course created with objects like desks.

Tip: The teacher may want to set up two similar obstacle courses and assign two students as timekeepers so that more than one group can go at a time. The teacher may want to rearrange the obstacle courses before the next set of groups start the activity to keep the activity fresh. Teachers will also want to consider issues of physical accessibility when completing this activity so that all students can participate.

1. Use the personality traits chart from the previous unit to place students with others of the same domain (e.g., all diplomats in the same group). Each team should choose one person in the team to wear a blindfold. The others will tell the blindfolded student how to navigate the obstacle course.
2. In groups of three, one student will be wearing the blindfold, one student will have the opportunity to speak, and the third student will need to communicate with his/her peers using **nonverbal communication**. Student teams determine the role and responsibility for each member. Teams have two minutes to prepare for how they will navigate the course. The timekeeper uses a stopwatch to record the amount of time it takes the student teams to complete the course.
3. As part of the formative assessment, the teacher will monitor the responses to the following questions:
 - What was most difficult about this task? How might the experience have been different if you had had more time or no time constraints?
 - How did communication vary by different team members?
 - What types of communication worked best? Why did those types of communications work for this activity?
 - What types of communication worked the least? Why did those types of communications not work for this activity?
 - How did the team work together to determine methods of communication?
 - What could the team have done to improve communication? Would better communication between team members have helped students navigate the course? Why?
 - What factors contributed to the success of the group? Do things like personality domains play a role in the success of a group? Why?
 - What two ideas would have helped your team to be more effective?
 - What are the ways different teams (e.g., basketball team, McDonald’s drive-thru, drama club) communicate?
4. Show the video, [“How Google Builds the Perfect Team”](#) (2:12 minutes). Ask: Did you find the results of the study surprising?

- Discuss with students the importance of effective communication (communicating verbally, listening actively). Teachers are encouraged to draw on some of the verbal and nonverbal communication they observed in the obstacle course exercise and/or in their classrooms and across the school, as well as from their broader personal experience. As you discuss the meaning/interpretation of various non-verbal cues, be sensitive to variations across cultures and prior experiences.

Tip: In addition to this lesson on teamwork, the following are other resources, tips, and suggestions that teachers may use to help students develop collaboration and **teamwork** skills. As articulated in “PBL for 21st Century Success: Teaching Critical Thinking, Collaboration, Communication, and Creativity,” successful project-based learning includes providing students with the autonomy to lead in their projects and teams while also providing them with supports and structures to make this possible. For some students who are used to working alone on more traditional class assignments, working in a team can sometimes be a difficult transition. Teachers may need to help students learn to work with other students from different backgrounds or perspectives. Techniques such as developing shared leadership, conducting team-building activities, developing norms, encouraging accountability, teaching how to give and receive feedback, and reinforcing conflict resolution strategies are all critical actions that teachers can take to help students develop a collaborative culture. More in-depth information about each of these techniques can be found in “PBL for 21st Century Success.” Some of other resources, which also include specific recommendations for increasing collaboration including suggested group size, group norms, protocols, etc. are:

- [20 Collaborative Learning Tips and Strategies for Teachers](#)
- [5 Strategies for Deepening Student Collaboration](#)
- [The After-Action Review Strategy for Student Collaboration](#)
- [Essential Student Collaboration Strategies for the Diverse Classroom](#)

Day 2: Students will practice speaking and listening as a team and understand the importance of recognizing and correctly interpreting nonverbal cues. Students will be introduced to the idea of **nonverbal communication** by watching an animated short film and participate in a pantomime activity to practice **nonverbal communication**. Students will explore the ways this kind of communication can be used to express feelings in an appropriate and inappropriate manner.

Activity: Circle of Voices

Time Frame: 20 minutes

Class Configuration: teams of three or four

Materials: video

Description: This activity provides the opportunity to practice effective communication techniques by encouraging students to work with students from a different personality trait domain.

Tip: Use a topic of relevance—a current event or an important issue in the school or community. Allow students to have a few minutes to organize their thoughts about the issue.

- Form students into circles and provide them with a relevant topic. Students will take turns speaking.
- Once a topic is established and students have had time to collect thoughts the discussion begins. Each student will have up to three minutes (or less) of uninterrupted time to speak. During this time, no one else is allowed to communicate. Each student will begin by paraphrasing the comments of the previous student or by showing how his or her remarks relate to those of the previous student. After everyone has spoken once, each group will

engage in general discussion. Specify that students will only build on what someone else has said, not on their own ideas; also, at this point, they should not introduce new ideas. Students will then work in their teams to answer the questions below.

3. As part of the formative assessment, monitor responses to the following questions which guide the post-activity discussion:
 - Was it easy or difficult to engage in individual discussions building from each other's ideas? Why?
 - Was it easy or difficult to engage in group discussion building from each other's ideas? Why?
 - What factors contributed to the group's ability to dialogue as a team? Did the group configuration aid or detract from the group's ability to dialogue?
 - In what ways did students in the group communicate in other ways besides verbal communication? Explain.
4. Show the video, "[Pixar: For the Birds](#)" (3:25 minutes). Ask: Could you tell the emotions, thoughts, and feelings of the birds? How?
5. Discuss the various types of **nonverbal communication**:
 - **appearance**
 - **artifacts**
 - **body language and posture**
 - **facial expressions**
 - **gestures**

Teachers may consider using one of the previously mentioned games or activities at the beginning of the unit to build this academic vocabulary.

Activity: Pantomime

Time Frame: 20 minutes

Class Configuration: pairs

Materials: slips of paper with a different pantomime activity on each one

Description: As a way to consider the many ways we use nonverbal communication, students will take turns acting out an activity and guessing what another student is acting out.

1. Give each student the chance to draw a slip of paper that describes an activity to pantomime.
2. Move students into pairs, where they will take turns acting out the activity and guessing their partner's activity. The activities can be repeated. Sample activities include
 - choking in a restaurant, needing help; others' reactions
 - coming home late, parents waiting up angry
 - walking down a scary street late at night
 - finding out a favorite celebrity is coming to town
 - receiving a bad grade on a test unexpectedly
 - arguing about a sporting event
 - opening a gift, surprised at contents; others' reactions
 - begging parents for car, parents resisting

3. Ask: What was easy and what was hard about acting out the activity? What was easy and what was hard about guessing the activity? How did nonverbal cues help?
4. Ask: Do you think nonverbal cues can be misinterpreted? Why or why not?
Be prepared to share examples of possible miscues, e.g., does a nodding head always mean agreement; when is a waving hand a greeting and when is it the “brush-off”; when is silence respectful, active listening and when is it ignoring/tuning out and how do you know?
5. Observe students doing the pantomime activity as a formative assessment.

Lesson Two: Using Teamwork to Solve a Problem:

Day 1: Students will understand team roles and responsibilities and explore how teams determine functions. Students will discuss the variety of roles within a team: **facilitator, innovator, mediator, encourager, prioritizer** and **recorder**. Students will identify which role they believe matches their strengths and values and work with a group of students who self-identify with their same role and then move into alternative groups in which each student identifies with a different role. Students will discuss the importance of team members fulfilling their roles and responsibilities and the potential impacts to teams if all individuals are not functioning as part of the team. Students will participate in a team-building activity with students who each fulfil a different role of their choosing.

Students will understand there are specific team roles and responsibilities that each team member has and if these are not fulfilled the team will not be successful.

Activity: Think-pair-share

Time Frame: 25 minutes

Class Configuration: pairs

Materials: self-stick notes

Description:

1. Students will work with a partner to think-pair-share different times that they were part of a team project or on another team such as a sports team, drama performance, choir, or band and the types of roles that they played on the team (10 minutes).
2. If students cannot identify different roles, have the students identify words that sound like the roles listed below. Students should then predict what roles each of the team members might play based on their prior knowledge. The teacher may divide students up in pairs or triads to complete the activity.
 - **Encourager:** a person who inspires courage, spirit, or confidence
 - **Facilitator:** a person that makes an action or process easier
 - **Innovator:** a person who introduces something as new or as if new
 - **Mediator:** a person who attempts to make people involved in a conflict come to an agreement; a go-between
 - **Prioritizer:** a person who lists or rates (projects, goals, etc.) in order of priority
 - **Recorder:** a person who keeps records

3. Ask students to write on a self-stick note which role they believe best suits them and share it with the class.
4. Break students into groups of three or four with students who identified with the same role. Students will discuss and list the characteristics that correspond with to their shared role.
5. Break students into different groups of three or four in which each student has a different role. Students will share and discuss the characteristics that correspond to their role.
6. Ask students to review their note to determine if their stated role is the role that best suits their personality (10 minutes).

Activity: Build a Tower

Time Frame: 15 minutes

Class Configuration: groups of four

Materials: 10 balloons or 20 straws for each team of four, masking tape (in 3-foot strips), yard stick (activity can be done with balloons or straws)

Description:

1. Divide students into groups of four. Give each team balloons or straws and a strip of masking tape. Explain that the object of this challenge is to build the tallest free-standing tower using just the balloons (or straws) and provided masking tape. The tower must be built on the floor (or table) and may not use any other objects to help support it. Students will have ten minutes to build their tower. Remind students of the ten-minute deadline when there is five, then two, minutes remaining. Give a final reminder at 30 seconds.
2. Give students five minutes to answer the following questions as a team.
 - a. What happened?
 - How tall was your team's tower?
 - Did your team plan before you started to build?
 - Did your group change the plan after starting to build? How?
 - Did everyone provide input to the plan? Why or why not?
 - As you had less time to work, what happened in your group?
 - Was your end product satisfactory? What would you change next time?
 - b. What does it mean?
 - What can this activity tell us about working in teams?
 - In what ways was communication important among your team members?
 - What problems did your team encounter during this activity? How were you able to overcome them?
 - What types of roles did members of your team assume? Did a **facilitator** emerge? Why or why not?
 - Were some people more involved than others? Why?

Day 2: Students will form groups to discuss project guidelines, **criteria** and **constraints**, and a new performance task rubric. Students will determine roles and responsibilities and develop a list of team rules and norms that they agree to follow and discuss other functions of a team contract.

1. Introduce the first performance task by providing students with an overview of the project, including the final team formation (teams of three or four students each), the PT 2.1A student handout, the PT 2.1B student handout, and the PT 2.1 rubric. Provide time for students to ask questions.
2. Allow students to meet with their teams and determine roles and responsibilities. Students will develop their team member contracts (see PT 2.1A).

Day 3: Students will watch a video about advanced manufacturing and individually complete research on the sector with the goal of understanding what it is and what the sector looks like (range of careers, major companies/products, etc.) in their region and across the state and report back to their team. Leveraging the *Advanced Manufacturing Sector Overview* documents, the teacher will select and/or identify resources for students to review. The *Advanced Manufacturing Sector Overview* includes a brief description of the sector; questions for teachers and/or students to consider about the sector; a list of clusters, pathways, and certifications connected to the sector; and a list of resources (texts, videos, etc.) for further teacher and/or student research about the sector

Teachers should select or adapt appropriate resources, or excerpts of them, based on students' abilities and interests and/or identify additional resources to share. Lexile levels are listed for the readings in the resources section.

1. Introduce advanced manufacturing by starting a K-W-L chart as a class and filling out the "K" and the "W". What do students already know about the manufacturing and advanced manufacturing sectors? What do students know about robots and automation? Do students know of any local manufacturing companies? If so, what do those companies produce? Do students know what types of jobs are available in the advanced manufacturing sector? What do they want to learn? What will they be required to learn during the performance task? (10 minutes).
2. Students will then watch the [Advanced Manufacturing Overview from Lockheed Martin video](#) (2 minutes, 51 seconds) and, time permitting, the [How it's Made: Ice Cream video](#) (4 minutes, 42 seconds). After the video(s), spend a few minutes beginning to complete the "L" section of the chart.
3. Advanced Manufacturing Jigsaw Activity. (20 minutes)
4. After the Advanced Manufacturing Jigsaw Activity, one student from each group reports to the whole class about what his/her group learned to complete the "L" section of the chart. The teacher will present any missed information about the sector. (10 minutes)

Tip: Read about Achieve the Core's [Text Set Project](#) to learn about how text sets can help build students' knowledge and vocabulary. Review one of the Achieve the Core text sets ([Bacteria and Viruses](#), for example) to review additional supports for struggling students and a text set protocol for ELL students (pg. 4-6). Teachers can utilize these resources and the presented protocol to potentially supplement their instruction to go deeper into readings on the Advanced Manufacturing sector.

Activity: Advanced Manufacturing Jigsaw

Time Frame: 20 minutes

Materials: printed or electronic readings or excerpts

Description:

The teacher will divide students into [jigsaw groups](#) so that reading levels and interests are evenly distributed across groups. If possible, each performance task group (established on Day 2) will have at least one representative for each reading.

The teacher will assign each jigsaw group one reading or excerpt about advanced manufacturing from the *Advanced Manufacturing Sector Overview*. The students will complete the reading for the jigsaw activity, synthesizing the most important information that they will then share with their respective performance task group. Depending on the selected readings, sample questions that students can consider include:

- How have new developments in technology changed the advanced manufacturing sector? What new possibilities exist given these new developments in technology?
- How are the realities of advanced manufacturing potentially different than traditional views held about the manufacturing sector?
- What are the various careers within the advanced manufacturing sector?
- What advanced manufacturing companies are located in your region and your state?
- What skills, competencies and dispositions will be necessary for future jobs in the Advanced Manufacturing sector?
- What post-secondary training and experiences are necessary for jobs in the Advanced Manufacturing sector?

Once all students have synthesized their information on their reading, students will return to their performance task groups and share their findings.

Day 4: Students will individually complete research on various occupations within the manufacturing industry and identify current demographics of the workforce including gender, race, and ethnicity of people who hold these positions. Students will document underrepresented populations in the workforce and identify potential audiences for recruitment. Students will individually research various companies within the manufacturing industry and document products and potential clients. The team will develop a decision matrix and apply categories within the matrix to determine one company website that the team will review and redesign.

Tip: *The teacher may want to provide students with links to manufacturing company sites in their state.*

1. Allow students time to individually research the manufacturing industry by reviewing various company and organization websites. Students will record types of companies and/or organizations and the products they manufacture (15 minutes).
2. Have students individually research employee demographics in the manufacturing industry. Students will record the current demographics of the manufacturing industry including gender, race, ethnicity, etc. and hypothesize why different groups may or may not be well represented. Ask students to discuss why a lack of diversity may or may not be good for an organization. (15 minutes).
3. Ask student teams to list the company and/or organization names and the types of products that were manufactured (on paper or white board). Student teams will list facts depicting employees in the manufacturing industry, including workforce demographics like gender, race, ethnicity, etc.

4. Allow students to develop a list of **criteria** and **constraints** they can use to evaluate each company to determine which company the team will select. Students will record the top five **criteria** and **constraints** in the decision matrix (see PT 2.1B). The team will use the decision matrix to select their company.

Tip: To learn more about Decision Matrices visit [What Is a Decision Matrix? Definition and Examples](#) and/or [What is a Decision or Pugh Matrix?](#) To make the assignment more challenging for students, consider requiring them to assign weights to each criteria and constraint. See [Unit 2_PT1B_DecisionMatrix_Example2](#).

5. Monitor the industry research for a formative assessment. Review information gathered by students and ensure that student work reflects the industry.

Tip: Teaching students online research skills can often be a tricky endeavor. Students may need to understand which search engines to use or how to evaluate content or websites. The teacher as a “modeler” of this process can be an effective instructional strategy that may be helpful for students. The following resources also provide other strategies to help students develop online research skills:

- [Teaching Students Better Online Research Skills](#)
- [10 Strategic Steps for Teaching Online Research Skills to Your Learners](#)
- [5 Tips for Teaching Students How to Research and Filter Information](#)
- [11 Ways to Teach Savvy Search Skills](#)

Days 5 and 6: Students will individually research the selected company’s website and document recommendations to attract potential clients and future employees. The team will apply categories within a decision matrix to determine the top five recommendations to incorporate in the redesigned website. Students will develop a mock-up or sketch of the redesigned web page and share it with their team for feedback.

1. Have students reflect on what makes an attractive website. Ask: What websites do you go to often? What features about the websites make that an attractive website? What features lure you back to the website? As a follow-up question, have students think now about a company’s website. Ask: What features lure a customer back to the website?
2. Allow students time to individually research the select company or organization’s website and develop a list of five potential recommendations that will help to attract potential clients and/or future employees, specifically those from underrepresented employee demographics.
3. Have teams list each team member’s recommendations. Teams will group similar recommendations and develop a final list of ideas. Student teams will develop a list of **criteria** and **constraints** to evaluate the final list of ideas.
4. Demonstrate how to develop a decision matrix and apply the **criteria** and **constraints** within the matrix to determine the top five ideas as a group (see PT 2.1B). Student teams will select the top five recommendations. Student teams will determine which three or four web pages need to be redesigned (matching the number of students in the group). Student teams will agree to how the top recommendations can be applied to each page.

5. Allow students to work independently to develop a mock-up of the redesigned company web page and share that with their group for feedback. Students will revise their designs based on group feedback.

Days 7, 8, and 9: Students will research the best method to create their website and subsequent web pages. Students will work in teams to select the technology used to redesign the website and provide support to others in their team to design their pages.

Tip: The teacher will want to research the available web design resources ahead of time.

1. Allow student teams time to research the best method to create their redesigned company website. Encourage student teams to brainstorm the best method to support each other or train each other on developing the website. Student teams may choose to update their team contract.
2. Suggest resources such as wix, hibu, blogger, web.com, or Google Sites to develop the company website. Review potential website products in advance of the lesson to determine limitations to the technology tools that students will use and apply and speak with building technology staff to ensure students have access to various website resources. Students can log onto wix.com and Google sites with student email addresses (if your district is a Google district). The lesson is designed to allow students to research, evaluate, and select free website tools. The teacher can determine what additional limitations are applied to technology tools. Both advanced tools and low-tech tools are provided below.
 - <https://globaldigitalcitizen.org/8-free-website-creator-tools>
 - <https://support.google.com/blogger/answer/1623800?hl=en>
 - <http://www.freetech4teachers.com/2011/02/10-ways-for-teachers-and-students-to.html#.WtH24ljwa70>

If students cannot make a website online, they can always use Microsoft Word to create the website. The following links provide instructions on that process.

- <https://www.wikihow.com/Make-a-Website-With-Word>
 - <https://www.youtube.com/watch?v=oSfNIDR2WSY>
3. Remind students that they will create a webpage incorporating the design ideas necessary to attract potential clients and future employees, specifically under-represented employee demographics.
 4. Support students as they create a series of web pages in an overall effort to redesign a company website. Work with students individually and as teams to check to understanding of the assignment and ensure that each team member is actively engaged in the assignment. Ask questions about how the students made decisions using the decision matrix and observe how students are applying their recommendations as part of the website redesign.

Days 10 and 11: Students will individually research media campaigns. Students will document the types of advertisements as verbal or nonverbal and discuss their effectiveness as a team. Student teams will brainstorm **criteria** for an effective social media campaign. Student teams will determine which **criteria** can be used to promote their

company website to attract potential clients and future workforce. Student teams will complete their social media campaign plan.

1. Teachers should present the different components of a social media campaign. Teachers may present the concept within the context of a presidential campaign. Each presidential candidate utilizes multiple platforms and medias to make sure voters understand his or her message. This may mean that the candidate utilizes different platforms (Facebook, Twitter, Instagram, etc.) and different messages to target different voters. A campaign therefore is different from just a single ad or tweet.
2. Allow students to individually research marketing techniques to build a social media campaign. Students will record the types of techniques they find (10 minutes).
3. Have students research various advertisements and social media activity for the selected company and/or related products. Students will record the types of advertisements, social media formats, and the types of social media activity for the company or for related products (10 minutes).
4. Allow teams time to brainstorm ideas or **criteria** for an effective social media campaign. Student teams may list ideas and develop a decision matrix to **prioritize** the best ideas.
5. Instruct student teams to create a social media campaign plan that would make people aware of the changes to the website, specifically updates to attract potential clients and future employees. The social media plan should include the following:
 - definition of the target audience
 - timeline for the campaign to begin and end
 - which social media platform(s) will be used
 - examples of the social media advertisements that will be developed
 - goal statements for the social media campaign
6. Work with students individually and as teams to check to understanding of the assignment and ensure that each team member is actively engaged in the assignment. Ask questions about how the target audience was determined, the types of social media platforms that the social media campaign will apply, and types of advertisements that will be effective in reaching the target audience.

Days 12 and 13: Student teams will develop a team presentation to demonstrate the updates to their company website, outline their social media plan, and explain how their team contact supported group work and the overall success of the team. The following are resources to help students develop good presentations:

- [Structuring a presentation](#)
- [How to Give a Good Presentation—Without Anxiety](#)
- [13 Ways Designers Screw Up Client Presentations](#)
- [How to present like a pro: Seven tips for your upcoming projects.](#)
- [Three Tips for Great Presentations](#)
- [How to Give a Good Presentation](#)

1. Provide student teams with enough time to develop their team presentation, which will include updates to their company's website, a social media plan, and their team contract.
2. Instruct student teams to determine the roles and responsibilities of team members during the presentation and allow time for teams to rehearse their presentation.

Day 14: Student teams will present their website, social media campaigns, and team contracts to another class or to members of the manufacturing industry.

To close the unit, the teacher will explain to students that they now have experience working in teams. In the next unit they will use their team skills to initiate, plan, execute, monitor, and close a project.

Website Links Referenced in Unit 2

- <http://www.readwritethink.org/classroom-resources/lesson-plans/internalization-vocabulary-through-word-307.html>
- <https://www.engageny.org/resource/grades-3-8-ela-curriculum-appendix-1-protocols-and-resources>
- <http://learningtasks.weebly.com/vocabulary-strategies.html>
- <https://k12.thoughtfullearning.com/blogpost/12-vocabulary-activities-high-school>
- http://www.readingrockets.org/content/pdfs/World_Walls_A_Support_for_Literacy_in_Secondary_School_Classrooms.pdf
- <https://www.readingandwritinghaven.com/5-brain-based-vocabulary-activities-for-the-secondary-classroom/>
- <https://www.aacu.org/leap/public-opinion-research/2015-survey-falling-short>
- <https://www.youtube.com/watch?v=v2PaZ8NI2T4>
- <https://www.edweek.org/ew/articles/2017/05/17/children-must-be-taught-to-collaborate-studies.html>
- <https://resourced.prometheanworld.com/collaborative-learning-students/>
- <https://www.edutopia.org/article/5-strategies-deepen-student-collaboration-mary-burns>
- <https://www.teachthought.com/pedagogy/20-collaborative-learning-tips-and-strategies/>
- <https://www.edutopia.org/article/strategy-effective-student-collaboration>
- <https://www.teachingchannel.org/blog/2018/05/16/surviving-group-work>
- <https://www.youtube.com/watch?v=YInrcXHG4mc>
- <https://achievethecore.org/page/2784/text-set-project-building-knowledge-and-vocabulary>
- <https://achievethecore.org/page/2701/bacteria-and-viruses>
- <https://www.teachhub.com/jigsaw-method-teaching-strategy>
- <https://www.businessnewsdaily.com/6146-decision-matrix.html>
- <https://asq.org/quality-resources/decision-matrix>
- <https://www.edweek.org/ew/articles/2013/05/22/32el-studentresearch.h32.html>
- <https://www.wabisabilearning.com/blog/10-steps-teaching-online-research-skills>
- <http://www.kathleenamorris.com/2018/02/23/research-filter/>
- <https://www.weareteachers.com/11-ways-to-teach-savvy-search-skills/>
- <https://globaldigitalcitizen.org/8-free-website-creator-tools>

- <https://support.google.com/blogger/answer/1623800?hl=en>
- <http://www.freetech4teachers.com/2011/02/10-ways-for-teachers-and-students-to.html#.WtH24Ijwa70>
- <https://www.wikihow.com/Make-a-Website-With-Word>
- <https://www.youtube.com/watch?v=oSfNIDR2WSY>
- <https://www2.le.ac.uk/offices/ld/resources/presentations/structuring-presentation>
- <https://business.tutspus.com/tutorials/how-to-give-a-good-presentation-without-anxiety--cms-27476>
- <https://muledesign.com/2014/09/13-ways-designers-screw-up-client-presentations>
- <https://www.ue-germany.com/blog/en/how-to-present/>
- <https://www.youtube.com/watch?v=IRqsCVgeiG8>
- <https://magneticspeaking.com/3-tips-on-how-to-give-a-good-presentation/>
- <https://cte.careertech.org/sites/default/files/CCFrame-Manufacturing.pdf>
- <https://www.louisianabelieves.com/docs/default-source/jumpstart/c4m-manufacturing-certification.pdf?sfvrsn=13>
- https://www.brookings.edu/wp-content/uploads/2015/02/AdvancedIndustry_FinalFeb2lores.pdf
- <https://www.whitehouse.gov/wp-content/uploads/2018/10/Advanced-Manufacturing-Strategic-Plan-2018.pdf>
- <https://newsela.com/read/lib-convo-globalization-us-china-workers/id/32317/>
- <https://www.thebalance.com/u-s-manufacturing-what-it-is-statistics-and-outlook-3305575>
- <https://newsela.com/read/manufacturing-3d/id/571/>
- <https://newsela.com/read/elem-flippy-hamburger-robot/id/41047/>
- <https://www.rodongroup.com/blog/a-brief-history-of-the-american-manufacturing-industry-infographic>
- <https://newsela.com/read/career-industrial-production-managers/id/32521/>
- <https://jcadusa.com/types-of-manufacturing-industry/>
- <https://jcadusa.com/examples-of-mass-produced-products/>
- <https://medium.com/mistyrobotics/mech-a-what-mechatronics-the-engineering-field-you-didnt-know-existed-1b6edc7b3fa9>
- <https://www.arnoldmachine.com/6-exciting-advances-manufacturing-automation/>
- <https://www.autodesk.com/industry/manufacturing/engineering-leadership/advanced-manufacturing>
- <https://www.energy.gov/eere/education/explore-careers-advanced-manufacturing>
- <https://newsela.com/text-sets/207930>
- <https://newsela.com/text-sets/408272>
- <https://www.nam.org/Data-and-Reports/State-Manufacturing-Data/2014-State-Manufacturing-Data/Manufacturing-Facts--Louisiana/>
- <https://www.youtube.com/watch?v=cNAi1JhCf6g>
- <https://www.cmu.edu/advanced-manufacturing/>
- <https://www.youtube.com/watch?v=P5R12zXuSvk&feature=youtu.be>
- <https://www.youtube.com/watch?v=2NzUm7UEEiY>
- <https://www.manufactureyourfuture.com/>
- <http://www.madehow.com>
- <https://www.mfgday.com/>

Unit Focus:

Unit 2 is focused on healthy, work-based collaboration. Students will apply their strengths and leadership styles to understand effective team dynamics and peer collaboration. Students will understand the importance of communication, including verbal and **nonverbal communication**, during group assignments. Students will be given multiple opportunities to develop teaming skills and organize tasks to solve real world problems. The performance task asks students to design a company website that helps to attract potential clients and future employees to the advanced manufacturing sector, an important industry sector in the state.

Desired Results (both skills-based and concept-based)

<p>Big Ideas:</p> <p>Collaboration is the key to solving complex problems in a global society. When individuals use their strengths and leadership styles and maximize the strengths of the team, they can achieve their goals. Students can utilize teamwork and other communication skills to present information in diverse formats such as through websites and social media campaigns. There are many emerging career opportunities, including opportunities to utilize communication skills, in the advanced manufacturing sector.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> • How can my knowledge of myself including my strengths and leadership style help me to achieve my goals and those of a team? • How does verbal and nonverbal communication contribute to the success of a team? • How do I identify and apply my strengths to become an effective team member? • How do I understand the potential strengths and roles of each team member to collaborate for the benefit of the team? • What emerging career opportunities are available in the advanced manufacturing sector?
<p>Students Will Know and Be Able To...</p> <ul style="list-style-type: none"> • work in teams to manage competing ideas and develop a shared idea of success; • hold themselves and their peers accountable for contributing to the team's success; • develop and lead diverse teams to generate creative solutions to complex problems; • communicate effectively using verbal and nonverbal techniques with members of a team; • describe the advanced manufacturing sector, including the range of companies and careers and its significance; • consider the audience and purpose in designing a website and social media campaign. 	

Goals	
<p>Career and Life Readiness Competencies:</p> <p><i>Applied Knowledge</i></p> <ul style="list-style-type: none"> • Critical Thinking Skills: <ul style="list-style-type: none"> ○ thinking critically ○ thinking creatively ○ making sound decisions ○ solving problems ○ reasoning ○ planning ○ organizing • Career Navigation Skills <ul style="list-style-type: none"> ○ maintaining knowledge of industry sectors and pathways <p><i>Relational Skills and Personal Attributes</i></p> <ul style="list-style-type: none"> • Interpersonal skills <ul style="list-style-type: none"> ○ Working well with others ○ Exercising leadership ○ Resolving conflicts through negotiation ○ Respecting individual differences • Personal qualities <ul style="list-style-type: none"> ○ demonstrating responsibility and self-discipline ○ adapting and showing flexibility ○ taking initiative <p><i>Executive and Communication Skills</i></p> <ul style="list-style-type: none"> • Information Use • Technology Use <p><i>Career Navigation Skills</i></p> <ul style="list-style-type: none"> • developing self-awareness 	<p>Louisiana K-12 Student Standards English Language Arts</p> <p><i>Reading Standards for Literacy in Science and Technical Subjects, Grades 6-8</i></p> <p>RST.6-8.2: Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.</p> <p>RST.6-8.7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).</p> <p><i>Writing Standards, Grade 8</i></p> <p>W.8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.</p> <p>W.8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.</p> <p>W.8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p><i>Speaking and Listening Standards, Grade 8</i></p> <p>SL.8.5: Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.</p> <p><i>Reading Standards for Informational Text, Grades 9-10</i></p> <p>RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p><i>Writing Standards, Grades 9-10</i></p> <p>W.9-10.2 Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.</p> <p>W.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.</p> <p>W.9-10.8 Gather relevant information from multiple authoritative sources using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p> <p><i>Speaking and Listening Standards, Grades 9-10</i></p> <p>SL.9-10.2: Integrate multiple sources of information presented in diverse media or formats.</p>

Goals	
<p>Support for Diverse Learners:</p> <ul style="list-style-type: none"> • Provide notes on nonverbal communication and team roles ahead of time for students that include additional details and background information. • Provide additional support for vocabulary. <ul style="list-style-type: none"> ○ Preview the text or topic and identify vocabulary or sentence structures that might be new for the students. ○ Write these words and phrases on the board and have students write them in their notebooks or on index cards. ○ Use visuals, acting, translation or synonyms to relay the meaning of the word to the students. ○ Reinforce the newly learned language by asking the students to draw it, act it out, or use it in an appropriate sentence. • Send out video links early and provide students with time to ask questions and retell the key points to the teacher. • Model directions and use gestures to support student understanding. Ask students to restate instructions to check for understanding. • Use checklist for modifying lesson plans. • Refer to Guidebook for Supporting Students with Disabilities and English Learner Guidebook as needed. 	<p>Targeted Career Cluster(s): Advanced Manufacturing</p>

Evidence of Student Learning

Unit 2: Effective Teams

Suggested Timeline: 14 Days

<p>Curriculum-Embedded Performance Task(s):</p> <p>Performance Task 1A: Team Contract</p> <p>Students will form teams and work together to</p> <ul style="list-style-type: none"> determine roles and responsibilities; create a group contract; develop action steps; and define roles and responsibilities to achieve a common goal. <p>Performance Task 1B: Web Redesign and Social Media Campaign</p> <p>Students will</p> <ul style="list-style-type: none"> redesign a company website; research various occupations within the manufacturing industry; identify current workforce demographics; research various companies within the manufacturing industry; identify current products that are developed and distributed; develop a social media campaign; develop a group presentation for an external audience; define the criteria and constraints of the assignment. 	<p>Formative Checkpoints:</p> <ul style="list-style-type: none"> Class Discussion—class discussions throughout unit Self-Evaluation—reflections on success competencies at the beginning of each unit, goals for improvement, and reevaluation of progress Teacher Observation—student progress in team settings toward increased collaboration, communication, critical thinking, and creativity Reflection Paragraphs—goals for areas of growth Industry Research—various occupations in the manufacturing industry, demographics of current employees, and research on companies and their products Website Production and Social Media Campaign—attention to potential clients and future employees Group Presentation—overview of the website development, social media campaign, and associated team contract criteria to accomplish team goals.
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Lessons		Learning Plan Overview	
Lessons Overview		Lessons Overview	
<p>Lesson One: Communication Is the Key</p> <p>2 days</p>	<p>Day 1: Students participate in an obstacle course activity and discuss how teamwork is essential to success. Students watch a video about team building and discuss the research.</p> <p>Day 2: Students practice speaking and listening as a team and understand the importance of recognizing and correctly interpreting nonverbal cues. Students watch a video and discuss the idea of nonverbal communication. Students practice nonverbal communication and discuss how it can be used to express feelings in an appropriate or inappropriate manner.</p>	<p>Lesson Two: Using Teamwork to Solve a Problem</p> <p>12 days</p>	<p>Day 1: Students discuss the roles of facilitator, idea-generator, mediator, encourager, and recorder. Students identify their strengths and values and discuss the importance of roles and responsibilities and the potential impacts to teams. Student teams complete the “Build a Tower” problem.</p> <p>Day 2: Students form groups and discuss the project guidelines, criteria and constraints, and the performance task rubric. Students determine roles and responsibilities within a group and develop a list of team rules and norms and finalize an outline of the team contract.</p>

Learning Plan Overview	
<p>Day 3: Students watch a video about advanced manufacturing and individually complete research on the advanced manufacturing sector with the goal of understanding what it is and what the sector looks like (range of careers, major companies/products, etc.) in their region and across the state and report back to their team.</p> <p>Day 4: Students individually complete research on various occupations and companies within the manufacturing industry and identify current demographics of the workforce. Students document underrepresented populations in the workforce and identify potential audiences for recruitment. Students develop a decision matrix and apply categories to determine one company website to review and develop recommendations for attracting potential clients and/or future employees, specifically under-represented employee demographics.</p> <p>Days 5 and 6: Students individually research the selected company’s website and document recommendations to attract potential clients and future employees. Student teams develop a decision matrix and apply categories to determine which web pages they would like to redesign. Students share a mock-up or sketch of the redesigned web page with their team for feedback.</p> <p>Days 7, 8, and 9: Students research the best method to create their website and subsequent web pages. Students use technology to develop a web page.</p> <p>Days 10 and 11: Students research social media campaigns and document the types of advertisements as verbal or nonverbal and discuss their effectiveness. Student determine which criteria for an effective social media campaign can be used to attract potential clients and their future workforce and complete their social media campaign plan.</p> <p>Days 12 and 13: Student teams develop a presentation to include updates to their company website, outline of their social media plan, and how their team contract supported the overall success of the team. Student teams complete their group presentation and determine roles and responsibilities for giving the presentation.</p> <p>Day 14: Student teams present their website, social media campaigns, and team contracts to another class or members of the manufacturing industry.</p>	<p>Addresses Essential Questions:</p> <ul style="list-style-type: none"> How does verbal and nonverbal communication contribute to the success of a team?

Lesson One Learning Plan	
Communication is Key	
<p>Synopsis: Students will be introduced to the unit on teamwork. Students will understand the importance of communication and its role in teamwork. Students will</p>	<p>Addresses Essential Questions:</p> <ul style="list-style-type: none"> How does verbal and nonverbal communication contribute to the success of a team?

Lesson One Learning Plan	
Communication is Key	
discuss how to be an effective team member and will be provided opportunities to practice teamwork .	<ul style="list-style-type: none"> How do I identify and apply my strengths to become an effective team member?
Assessed Career and Life Readiness Competencies:	
<p><i>Understanding teamwork and being able to work with others is demonstrated by students working in teams to move through an obstacle course.</i></p> <p><i>Communicating verbally is demonstrated by students as they provide verbal instructions to peers in an obstacle course and as peers discuss relevant topics.</i></p> <p><i>Listening actively is demonstrated by students as they discuss relevant topics with their peers.</i></p> <p><i>Observing carefully is demonstrated by students as they use nonverbal cues through pantomime.</i></p>	
Suggested Texts and Resources:	
<p>Resources</p> <ul style="list-style-type: none"> How Google Builds the Perfect Team Pixar: For the Birds <p>Materials</p> <ul style="list-style-type: none"> blindfold classroom objects to form an obstacle course stopwatch video link 	<p>New Vocabulary for the Learning Plan:</p> <ul style="list-style-type: none"> appearance artifacts body language eye gaze facial expression gesture nonverbal communication teamwork
Learning Events and Formative Checkpoints:	
<p>Day 1</p> <p>Students will know the importance of both verbal and nonverbal communication. Students will be able to communicate effectively within teams and manage competing ideas to accomplish an obstacle course.</p> <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion teacher observation of student responses to activity questions teacher observation of student teamwork <p>Materials/Resources:</p> <ul style="list-style-type: none"> blindfold classroom objects to form an obstacle course stopwatch video link 	

Lesson One Learning Plan Communication is Key	
Day 2	Students be able to use nonverbal communication to express different feelings in an appropriate way.
	Formative Assessment <ul style="list-style-type: none"> • teacher observation of class discussion • teacher observation of student responses to activity questions • teacher observation of student teamwork
	Materials/Resources <ul style="list-style-type: none"> • slips of paper with different pantomime activities • video link

Lesson Two Learning Plan Using Teamwork to Solve a Problem	
Brief Synopsis:	Addresses Essential Question: <ul style="list-style-type: none"> • How can my knowledge of myself including my strengths and leadership style help me to achieve my goals and those of a team? • How do I identify and apply my strengths to become an effective team member? • How do I understand the potential strengths and roles of each team member to collaborate for the benefit of the team? • What emerging career opportunities are available in the advanced manufacturing sector?
Career and Life Readiness Competencies:	
<p><i>Thinking critically is demonstrated by solving a problem to create a tower, creating a redesigned webpage and designing a social media campaign.</i></p> <p><i>Thinking creatively is demonstrated through creating a redesigned webpage and designing a social media campaign.</i></p> <p><i>Making sound decisions is demonstrated through developing a decision matrix.</i></p> <p><i>Solving problems is demonstrated by creating a tower and by redesigning a webpage to attract potential clients and future employees.</i></p> <p><i>Reasoning is demonstrated by recommending changes to the website to attract potential clients and future employees.</i></p> <p><i>Planning and organizing is demonstrated through the mock-up of the redesigned web page.</i></p> <p><i>Background knowledge and understanding of key concepts about the occupation, career pathway or industry is demonstrated by researching the manufacturing industry.</i></p> <p><i>Understanding teamwork and being able to work with others is demonstrated through the use of a team contract.</i></p>	



Unit 2: Effective Teams

Suggested Timeline: 14 Days

Communicating effectively with others in multiple formats (speaking, writing, listening) is demonstrated by creating a social media campaign and by presenting to industry leaders.
Using technology efficiently and effectively is demonstrated by researching the manufacturing industry and by selecting appropriate technology resources to develop the website.
Listening actively is demonstrated by working with team members and incorporating feedback.

Suggested Texts and Resources:	
<p>Resources:</p> <ul style="list-style-type: none"> PT 2.1A: student handout PT 2.1B: student handout Advanced Manufacturing Sector Overview Web Redesign and Social Media Campaign Rubric https://globaldigitalcitizen.org/8-free-website-creator-tools https://support.google.com/blogger/answer/1623800?hl=en http://www.freeteach4teachers.com/2011/02/10-ways-for-teachers-and-students-to.html#.WtH24Iwz0 https://www.wikihow.com/Make-a-Website-With-Word 	<p>New Vocabulary for the Learning Plan</p> <ul style="list-style-type: none"> encourager facilitator innovator mediator prioritize recorder
Learning Events and Formative Checkpoints:	
<p>Day 1</p> <p>Students will know and be able to:</p> <ul style="list-style-type: none"> work in teams and manage competing ideas to build a tower. work with teams whose members have diverse perspectives and strengths. <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion teacher observation of the class activity teacher review of notes <p>Materials/Resources</p> <ul style="list-style-type: none"> ten balloons for each team of four people masking tape (in 3-foot strips) yard stick 	<p>Day 2</p> <p>Students will know and be able to hold themselves accountable for contributing to a team's success by developing a team contract.</p> <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion

	<ul style="list-style-type: none"> teacher review of team contracts
	<p>Materials/Resources</p> <ul style="list-style-type: none"> Team contracts PT 2.1A: student handout PT 2.1B: student handout PT 2.1: rubric
Day 3	<p>Students will know and be able to:</p> <ul style="list-style-type: none"> communicate effectively using verbal and non-verbal techniques with members of a team. understand what advanced manufacturing is and what the sector looks like (range of careers, major companies/products, etc.) in their region and across the state. <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion <p>Materials/Resources</p> <ul style="list-style-type: none"> Team contracts PT 2.1A: student handout PT 2.1B: student handout PT 2.1 rubric
Day 4	<p>Students will know and be able to</p> <ul style="list-style-type: none"> work in teams to develop a shared idea of success and while managing and respecting competing ideas hold themselves accountable for contributing to the team's success. hypothesize why different groups may or may not be well represented in the advanced manufacturing sector. make sound decisions by developing a decision matrix to select their company for the performance task. <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion teacher review of students' research <p>Materials/Resources</p> <ul style="list-style-type: none"> Team contracts PT 2.1A: student handout PT 2.1B: student handout PT 2.1 rubric
Days 5 and 6	<p>Students will know and be able to</p> <ul style="list-style-type: none"> work in teams to develop a shared idea of success while managing and respecting competing ideas.

	<ul style="list-style-type: none"> communicate effectively using verbal and non-verbal techniques with members of a team. research different websites to develop a list of recommendations that will help to attract potential clients and/or future employees. complete a decision matrix to select their company for the website performance task. <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion teacher review of students' recommendations teacher review of students' decision matrix <p>Materials/Resources</p> <ul style="list-style-type: none"> Team contracts PT 2.1A: student handout PT 2.1B: student handout PT 2.1: rubric
<p>Days 7, 8, and 9</p>	<p>Students will know and be able to</p> <ul style="list-style-type: none"> work in teams to develop a shared idea of success while managing and respecting competing ideas. hold themselves and their peers accountable for contributing to the team's success. communicate effectively in order to design a new web page to attract potential clients and/or future employees for the advanced manufacturing company. plan and organize to mock-up the redesigned web page. <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion teacher review and feedback of students' webpage teacher feedback of the decision matrix <p>Materials/Resources</p> <ul style="list-style-type: none"> Website design resources PT 2.1A: student handout PT 2.1B: student handout PT 2.1: rubric
<p>Days 10 and 11</p>	<p>Students will know and be able to</p> <ul style="list-style-type: none"> work in teams to develop a shared idea of success while managing and respecting competing ideas. communicate effectively in order to develop a social media campaign for their company's new website. <p>Formative Assessment</p> <ul style="list-style-type: none"> teacher observation of class discussion teacher review and feedback of students planning the social media campaign



Unit 2: Effective Teams

Suggested Timeline: 14 Days

	Materials/Resources
Days 12 and 13	<p>Students will know and be able to</p> <ul style="list-style-type: none">• work in teams to develop a shared idea of success and while managing and respecting competing ideas.• hold themselves and their peers accountable for contributing to the team's success.• communicate effectively in order to develop a team presentation to demonstrate updates to the website and the social media campaign. <p>Formative Assessment</p> <ul style="list-style-type: none">• teacher observation of students planning their presentation <p>Materials/Resources</p> <ul style="list-style-type: none">• Team contracts• PT 2.1A: student handout• PT 2.1B: student handout• PT 2.1: rubric
Day 14	<p>Students will know and be able to communicate effectively using verbal and nonverbal techniques in order to present their social media campaign with other team members.</p> <p>Formative Assessment</p> <ul style="list-style-type: none">• teacher observation of students giving their presentations <p>Materials/Resources</p> <ul style="list-style-type: none">• Team contracts• PT 2.1A: student handout• PT 2.1B: student handout• PT 2.1 rubric

