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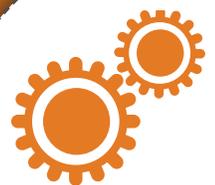


## NEBRASKA CAREER TOURS **MANUFACTURING**

Despite improvements in production technology and rising imports, manufacturing employment is expected to increase slightly as strong demand continues for high-tech electrical goods and pharmaceuticals.



TEACHER DISCUSSION GUIDE  
[www.necareertours.com](http://www.necareertours.com)





### NOTE TO INSTRUCTOR:

Below are suggested activities and questions to accompany the virtual industry tour. Each component may be used individually or modified to fit the needs of your classroom. For more information on this career cluster, visit these websites:

- [www.education.ne.gov/nce/documents/ataglance/Manufacturing.pdf](http://www.education.ne.gov/nce/documents/ataglance/Manufacturing.pdf)
- [www.glencoe.com/sec/careers/cclusters/student/clusters/manufacturing.shtml](http://www.glencoe.com/sec/careers/cclusters/student/clusters/manufacturing.shtml)
- [www.iseek.org/careers/manufacturing.html](http://www.iseek.org/careers/manufacturing.html)
- [www.onetonline.org/find/career?c=13](http://www.onetonline.org/find/career?c=13)

### ANTICIPATORY SET:



Guide the students to think about the importance of the manufacturing cluster and skills needed to be successful in this area.

Guide students through the marshmallow challenge.

**<http://marshmallowchallenge.com/Welcome.html>** The website is geared towards using this activity with a business group, but the challenge can easily be adapted to the classroom. The website suggests 18 minutes. While this is the ideal time, it would be acceptable to shorten this time based on class schedules. For more information, visit the website. Below are instructions to guide students through the activity. Divide the students into teams of 2, 3, or 4.

Materials needed for each team: 20 uncooked spaghetti sticks, one yard of string, one yard of masking tape, one regular marshmallow. The instructor also needs a measuring tape.

#### Today we are going to build towers. Here are the guidelines:

- **Build the tallest FREESTANDING tower: The winning team is the one that has the tallest structure measured from the table top (or floor) to the top of the marshmallow. The tower CANNOT be suspended from the ceiling, chair, etc.**
- **The ENTIRE marshmallow must be on top of the tower.**
- **The spaghetti, string, or tape may be broken into smaller pieces.**
- **When time is called, the team must let go of the tower so that it is freestanding. Touching or supporting the tower after time is called will disqualify the team.**

#### What questions do you have?"

Start the challenge. Be sure to walk around the room to answer questions and encourage students. Remind teams of the time.

After time runs out, ask the students to sit down so that all towers can be seen. Expect that half might have structures that remain standing when they are released.



Measure the towers. Ask a student to record the measurements on the board so that the entire class can see the results.

Be sure to recognize the winning team with a round of applause or even a small prize.

Then guide students to think more deeply about the activity.

**This class constructed towers today. What skills did you need to complete this task?**

Answers might include: teamwork, creativity, goal setting, patience, hand/eye coordination, etc.

**These are all skills that can be put to use in the manufacturing career cluster. If you like to make things, or enjoy designing things, or love being creative, manufacturing might be a great career fit for you.**

## INTRODUCTORY QUESTIONS:



Ask these questions to students; can be given as journal questions or asked aloud. If asking aloud, consider having the students share with a partner first, then calling on students to share aloud. Responses will vary. Remember that these responses are based on the students' knowledge prior to watching the virtual tour.

**When you think of manufacturing, what types of jobs come to mind?**

**Are these jobs that YOU might be interested in?**

## CONTENT:



Show the 14-minute virtual industry tour (contains all three businesses) to the class. [www.necareertours.com](http://www.necareertours.com) Students may individually view the videos online as well. Ask students to complete the student guide worksheet as they learn about the career cluster.

**“Today we will watch a video that highlights three different businesses in this area. Each business will describe their involvement in the industry, as well as the different careers associated with this field.”**



## FOLLOW-UP QUESTIONS:



Ask these questions to students after they view the virtual industry tour. Questions can be given as journal questions or asked aloud. Questions can also be assigned individually or as groups.

### 1. What surprised you about this career cluster?

- o Answers will vary.

### 2. What types of careers are included in this career cluster?

- o Lathe operator, plant manager, engineer, human resources, information technology, finance, control specialist, welding, drafting, marketing, programmer, estimator (quotes), machine operator
- o Other careers not mentioned in the video: Environmental engineer, safety coordinator, dispatcher, logistical engineer, materials handler, computer repairer, design engineer, assembler, inspector, lab technician, factory production worker, millwright, sheet metal worker, automotive body repairer, bicycle repairer, meat cutter, chemical plant operator, tool repairer, hand sewer, shoe and leather workers, biofuel technician, etc.
- o *Note to instructor: This would be a good time to explain to the students that this career cluster can be divided into six programs of study including:*
  - Health, safety, and environmental assurance
  - Logistics and inventory control
  - Maintenance, installation and repair
  - Manufacturing production process development
  - Production
  - Quality assurance

### 3. What careers/jobs in this career cluster could be obtained immediately after high school graduation?

- o Machine operator, welding, lathe operator,
- o Other examples not mentioned in this video: Automotive body repairer, biofuels processing technician, meat cutter, chemical plant operator, automotive glass installer, cabinet maker

### 4. Where could you go to receive education/training for these careers?

- o Answers will vary. Remind students that there are over 200 programs in Nebraska alone that offer education in this area.



**5. Why are new jobs being created in this career cluster?**

- o Global demand for products is increasing as developing countries continue to grow. New innovations and products also increase demand. The continued growth of demand of products drives the addition of jobs in this career cluster.

**6. The Metal Quest video mentioned an internship. What is an internship? Why would it be valuable for someone to have an internship?**

- o An internship is time spent learning about a business through work experience. Some internships are paid, while others are experience only. Either way, internships allow a person to learn about the industry and discover if this is a career path that they are truly interested in. Internships also provide real work experience, which is a great asset on a resume and can lead to a full-time job in the future.

**7. What skills should someone have to work in this career cluster?**

- o Answers will vary.

**8. During the Metal Quest video, we were introduced to a Lathe Department Leader. What type of education did the department leader have? How would work differ for a department leader versus a machine operator?**

- o He had an associate's degree from a community college. He recommended a degree in machining or manufacturing engineering.
- o Answers will vary. He oversees employees in the lathe department. If a machine operator has an issue, they would come to him. He also operates a lathe, but is responsible for others work and machines. He would receive more pay for his title of department leader.

**9. The average salary for a Nebraskan working in this career cluster is \$43,600. Is this more or less than you expected?**

- o Answers will vary.
- o Only 26% of jobs in this career cluster require education above a high school diploma. Keeping that in mind, the average salary is acceptable. It is higher than some other career clusters, but lower than some others as well.



- o *Note to instructor: This would be an effective time to start a discussion with students about living expenses. Most students do not have a realistic understanding of the expenses that they will be responsible for paying as an adult. Share with them about salaries, taxes, insurance, house payments, cell phone bills, car payment, electricity, cable TV, etc. Be sure to emphasize the importance of money management and budgeting at any level of income.*

**10. The Becton Dickinson video mentioned video mentioned a tuition reimbursement program. What does this mean?**

- o Many businesses offer a type of tuition reimbursement program. Most times, employees pay the tuition cost upfront, but then are reimbursed for those expenses. Conditions can apply including: the class must be related to the current career field, the cost stays under a maximum allowed amount, and a certain grade must be obtained. Sometimes other expenses are covered as well including textbooks.
- o Two advantages for a business to offer this type of benefit are smarter/better-trained employees and tax breaks.
- o During job interviews, a great question to ask is if the company has a tuition reimbursement program.

**11. Core academic skills include reading, written communication, listening, speaking, and scientific and mathematical reasoning (with problem solving). How might these core academic skills be used in this career cluster?**

- o Answers will vary.
- o Here are a few examples: Estimators and engineers will use mathematics to design buildings and then provide an estimate of the cost of the building. The lathe department manager must have effective verbal communication to discuss the week's schedule with department employees. Machine operators must be able to accurately read instructions and orders for the day and week. Welders must be able to accurately read blue prints, measure angles, and calculate dimensions and measurements.

**12. The virtual industry tour mentioned five traits that employers seek when hiring; what other personal traits and characteristics should a desirable applicant possess?**

- o Answers will vary.



## EXTENDED LEARNING ACTIVITIES:



The following are suggested activities that will increase student learning and exposure to this career cluster.

- Explore the website of each of these businesses. Report to the class about components found on the website. Be sure to look for employment opportunities.
- Watch additional videos about specific careers in this pathway. CareerOneStop produces the one-minute videos.  
**[www.careeronestop.org/Videos/CareerandClusterVideos/career-and-cluster-videos.aspx](http://www.careeronestop.org/Videos/CareerandClusterVideos/career-and-cluster-videos.aspx)**
- Select a career that could be obtained in this career cluster. Research the career and present information to the class in the form of an oral presentation, poster, PowerPoint, iMovie, Prezi presentation, etc. Information to find includes: Salary, education required, typical day schedule, positive aspects of the job, negative aspects of the job, etc.
- Make a list of personal skills/behaviors that are strengths. Also make a list of present personal skills that should be strengthened in order to obtain a desired career.
- Complete a mock job application.
- Construct a resume for a specific career in this career cluster.
- Participate in a mock job interview.
- Meet with school counselor to discuss high school classes that would help prepare a student for careers in this career cluster. Also, discuss certifications that can be obtained during high school, including AWS (American Welding Society).
- Identify a post-secondary institution that offers certification or degrees that could be utilized in this career cluster. Obtain and complete admissions and scholarship applications for the school or program.



## MANUFACTURING

Name: \_\_\_\_\_

1. Manufacturing employment is expected to increase over the next few years. List four specific areas of manufacturing (from the website) that will see an increase:

- 1.
- 2.
- 3.
- 4.

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*Instructions: Questions 2 and 3 should be answered by watching all three sections of the virtual industry tour. [www.necareertours.com](http://www.necareertours.com)*

2. List eight careers mentioned during the virtual industry tour:

- |    |    |
|----|----|
| 1. | 5. |
| 2. | 6. |
| 3. | 7. |
| 4. | 8. |

3. List five career readiness skills employers want employees to use everyday on the job:

- 1.
- 2.
- 3.
- 4.
- 5.

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*Instructions: The following questions are specific to the Metal Quest Unlimited section.*

4. Where is Metal Quest based? \_\_\_\_\_

5. How many educational programs are offered in Nebraska in the Manufacturing career cluster?  
\_\_\_\_\_

6. In Nebraska, how many students graduate with degrees related to Manufacturing?  
\_\_\_\_\_

7. Describe what Metal Quest does:

8. How many new manufacturing jobs will be created in the next few years? \_\_\_\_\_

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*Instructions: The following questions are specific to the Becton Dickinson (BD) section.*

9. Describe what Becton Dickinson does:

10. Becton Dickinson has four different facilities in Nebraska. Where are two of those buildings located?

- 1.
- 2.

11. How many employees work for Becton Dickinson? \_\_\_\_\_

12. What is the average salary for a Nebraskan working in this career cluster? \_\_\_\_\_

13. What percent of jobs in the Manufacturing career cluster require an education ABOVE the high school level? \_\_\_\_\_

14. In Nebraska, how many employers are in this career cluster? \_\_\_\_\_

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*Instructions: The following questions are specific to the Chief Buildings section.*

15. Where is Chief Buildings located? \_\_\_\_\_

16. Describe what Chief Buildings does:

17. How many employees work for Chief Buildings? \_\_\_\_\_

18. In Nebraska, how many people work in this career cluster? \_\_\_\_\_



## MANUFACTURING

1. Manufacturing employment is expected to increase over the next few years. List four specific areas of manufacturing (from the website) that will see an increase:

1. **Pharmaceutical and medicine**
2. **Plastics and rubber**
3. **Machinery**
4. **Fabricated Metal Products**

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*Instructions: Questions 2 and 3 should be answered by watching all three sections of the virtual industry tour. [www.necareertours.com](http://www.necareertours.com)*

2. List eight careers mentioned during the virtual industry tour:

1. **Lathe department leader**
2. **Plant manager**
3. **Operations manager**
4. **Engineer**
5. **Human resources (HR)**
6. **Information technology (IT)**
7. **Finance**
8. **Control specialist**

**Welder, Drafting, Marketing, Programmer, Estimator**

3. List five career readiness skills employers want employees to use everyday on the job:

1. **Possess fundamental knowledge**
2. **Ability and interest to learn**
3. **Teamwork**
4. **Good work ethic/effort**
5. **Time management skills**

**Timely (arrive on time), Flexible, Accountable, Fun (enjoyable to work with)**

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*Instructions: The following questions are specific to the Metal Quest Unlimited section.*

4. Where is Metal Quest based? Hebron

5. How many educational programs are offered in Nebraska in the Manufacturing career cluster?

200+

6. In Nebraska, how many students graduate with degrees related to Manufacturing?

3000

7. Describe what Metal Quest does:

**Metal Quest is a contract manufacturer that makes precision machine parts.**

8. How many new manufacturing jobs will be created in the next few years? **9,600**

*Instructions: The following questions are specific to the Becton Dickinson (BD) section.*

9. Describe what Becton Dickinson does:

**Becton Dickinson is a medical manufacturer that makes and sells medical devices and instruments.**

10. Becton Dickinson has four different facilities in Nebraska. Where are two of those buildings located?

1. **Columbus**
2. **Broken Bow**

11. How many employees work for Becton Dickinson? **2,500**

12. What is the average salary for a Nebraskan working in this career cluster? **\$43,600**

13. What percent of jobs in the Manufacturing career cluster require an education ABOVE the high school level? **26%**

14. In Nebraska, how many employers are in this career cluster? **1,990**

*Instructions: The following questions are specific to the Chief Buildings section.*

15. Where is Chief Buildings located? **Grand Island**

16. Describe what Chief Buildings does:

**Design and make metal buildings.**

17. How many employees work for Chief Buildings? **340**

18. In Nebraska, how many people work in this career cluster? **95,000**