

# careers in Manufacturing

## A resource tool kit for educators

Prepared By:

MAGNET, the Manufacturing Advocacy & Growth Network  
and the  
SMART Consortium  
In partnership with  
WVIZ/PBS and 90.3 WCPN Ideastream®

**A BET4KIDS Project**  
(Business and Education Together For Kids)

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**GUIDE TO CAREERS IN MANUFACTURING**  
**A RESOURCE TOOLKIT FOR EDUCATORS**

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## **I. INTRODUCTION**

Advanced manufacturing is an economic driver in the country and the region. The demands of modern advanced manufacturing require increased knowledge in the STEM (Science, Technology, Engineering, and Math) areas and a solid understanding of their applications in the industry. Additionally, the skills of problem solving, critical thinking, communication, and team work are key to the creativity and innovation required in the modern workplace. . The changing work environment, the growing use of technology, and product and process innovations require workers who are prepared to participate in ongoing training and challenging educational programs that address the demand for a highly skilled workforce.

Students must be introduced to the career opportunities available and encouraged to pursue the requisite courses early on in their high school curriculum. Although the current economic status has resulted in significant job loss in some areas, there continues to be job openings for highly skilled individuals. The importance of STEM courses as well team building and communication skills must be presented to youth if we are to address the future workforce challenges facing the manufacturing industry in Ohio. As the economy improves, those jobs will grow and young people need to begin now to pursue these career paths so as to be prepared when they complete their education.

## **II. OVERVIEW OF TOOLKIT**

This toolkit is designed to provide educators at the upper elementary, middle school and high school levels with a variety of resources they can use to introduce careers in manufacturing to their students. It is designed to inform educators about careers in manufacturing and provide information and activities to prepare a group of students for a classroom visit by a manufacturer. The activities will increase awareness and knowledge of career opportunities in advanced manufacturing.

All components are available online and can be downloaded or printed for ease of use.

Educators are encouraged to read through the materials and identify those most appropriate for their students. Suggested activities are provided for use with students prior to the classroom visit as well as for follow up reinforcement. Activities can be adapted according to the age and skill level of the students and to the specific course subject matter.

Additional information and materials can be found at [www.magnetwork.org](http://www.magnetwork.org) and [www.dreamit-doit.org](http://www.dreamit-doit.org). as well as any of the other resources listed in the last section of this toolkit.

### III. WHY MANUFACTURING ?

Manufacturing continues to be an economic driver in the United States, in Ohio and particularly in Northeast Ohio. It is what we do. We invent things and we make things that are sold all over the world. The following data support this statement and provide additional information on the impact of the industry. These facts can be used as part of a presentation to the students prior to the session to reinforce the importance of manufacturing and why young people should consider it as a potential career pathway.

The *Trade Facts* and *Energy Facts* offer more detailed information regarding aspects of manufacturing. High School students could research either of these areas to determine current status in light of the changing economy. Manufacturers are moving toward a reduction of energy use and increasing *green* practices. Magazines, newspapers, and journals often have articles about these topics that could be researched and reported on as part of the preparation for a classroom visit.

MAGNET in partnership with the Northern Ohio Technology Association (NOTA) presented six career awareness sessions in 2008-09. The sessions were broadcast live by WVIZ PBS to high schools across the state. A DVD containing all of the sessions is available from MAGNET. Each session can be downloaded from the MAGNET website at [http://www.magnetnetwork.org/education/wviz\\_nota\\_distancelearning.htm](http://www.magnetnetwork.org/education/wviz_nota_distancelearning.htm).

#### MANUFACTURING FACTS

1. Every \$1.00 in manufactured goods generates an additional \$1.37 worth of additional economic activity – more than any other economic sector.
2. Manufacturers are responsible for more than 70 percent of all business R&D, which ultimately benefits other manufacturing and non-manufacturing activities.
3. The United States is the world's 2<sup>nd</sup> largest exporter; 61 percent of all U.S. exports are manufactured goods, double the level of 10 years ago.
4. Over the past two decades manufacturing productivity gains have been more than double (actual figure 2.5 times) that of other economic sectors. These gains enable Americans to do more with less, increase our ability to compete and facilitate higher wages for all employees.
5. Manufacturing compensation averages more than \$65,000, the highest in the private sector, and manufacturers are leaders in employee training.
6. Business has been an important contributor to economic growth and tax receipts at all levels of government, contributing 43% of all corporate taxes collected by state and local governments.

*\*Source National Association of Manufacturers*

## OHIO MANUFACTURING FACTS

- Ohio manufacturing is responsible for:
  - More than 20% of Ohio's Gross State Product
  - More than 800,000 jobs for Ohio Workers
  - An annual payroll of more than \$39 billion
  - The second highest weekly earnings of any economic sector
  - More than \$26 billion in products to more than 196 countries
  - A safer environment through decreased emissions and increased recycling
  
- Ohio ranks third nationwide in manufacturing output
- Ohio's industrial strength comes from its competitive, traditional industries. In 2004, \$56.7 billion of the state's \$82.2 billion in manufacturing output consisted of durable goods, 69% compared to 56% for the nation. Durable goods include transportation equipment, industrial machinery, primary metals and lumber and wood products.
- At 20.2%, manufacturing's contribution to Ohio's Gross State Product (GSP) is nearly double that of any other private industry sector.
- Ohio ranked second nationally in new site selections in 2005. Manufacturing accounted for 58% of those investments.
- In 2006, Ohio ranked third in manufacturing employment nationally, with 6.1% of manufacturing jobs nationwide.
- Manufacturing investments are the leading source of new Ohio private investments. In 2004-2005, nearly 700 major new investments were made in Ohio industrial machinery and fabricated metal manufacturers were the leading investors.
- Out of Ohio's 21,442 manufacturing establishments, only 293 employ more than 500 workers. In fact, 82% of Ohio manufacturing companies employ fewer than 50 workers. These small businesses make a major contribution to their local communities in job creation and taxes.
- Ohio manufacturing leads all economic sectors in total state payroll.
- In 2005, Ohio ranked seventh in exports to the world. Sixty-seven percent of Ohio manufacturing companies with one hundred or more employees are engaged in some form of export.

\*Source: [www.ohiomanufacturingfacts.com](http://www.ohiomanufacturingfacts.com)

## CAREERS IN MANUFACTURING

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The sessions begin with a presentation on a specific topic followed by questions and answers from the students. The presenters include young adults and college interns who are working in the field. The DVD includes only the presentations. The entire 45 minute session is included on the web. The topics are:

1. Introduction to Careers in Manufacturing;
2. Careers in Welding;
3. Careers in Product Development and Innovation;
4. Making Manufacturing Tools;
5. Bio-Medical Device Manufacturing;
6. Engineering Careers in Manufacturing

### **III. MAGNET AMBASSADOR PROGRAM**

The MAGNET Ambassador Program facilitates the connections between educators and manufacturers. The brochure (Attachment B) summarizes the program and ways to become involved. By requesting a classroom manufacturing presentation you automatically become an Ambassador Education Partner. The *MAGNET Ambassador Education Partner* Brochure is also available at [http://www.magnetnetwork.org/education/ambassador\\_partners.htm](http://www.magnetnetwork.org/education/ambassador_partners.htm)

#### IV. PREPARING FOR A CLASSROOM VISIT

Prior to a classroom visit by a manufacturer, it is helpful to introduce the students to the company and possibly its relationship to the specific class. For example, a math class might be interested in knowing how employees use math in this company and in which specific jobs.

Following are some suggested activities you can do with your students prior to the visit. The activities can be done with the entire class, in small groups, or as a homework assignment.

A. Manufacturing Introduction

Information presented in Section II is presented as powerpoint slides in Section VII.

These slides can be shown to the students for discussion or as background information.

1. Students could work individually or in small groups to develop one or two questions related to the content that could be asked of the presenter.

2. Students could research the number of manufacturing companies in their community or county and the size of those companies to better understand how those companies impact their area.

B. Company Research

Students can visit the company's website to learn more about their business. Questions to answer could include:

1. Size of company?

2. Number of locations in Northeast Ohio or in Ohio

3. Type of products manufactured?

4. Customers: who uses these products?

5. Are there currently any job openings in this company?

6. If yes, what are the qualifications and what is the pay?

7. What are the skills required for the job:, math, science, technology, engineering,?

Middle School students can work in small groups to locate the information.

High school students can work independently in class or as a homework assignment.

Answers can be provided in a list or students can be asked to write a paragraph about the company using some of the above information.

C. Developing Speaker Questions

Students can develop questions to ask the speaker following the presentation. These questions can be a result of the research above or a class or small group brainstorming activity. Students can also be asked to do some independent research on manufacturing and submit questions as a result of that activity.

Questions should be submitted to the teacher prior to the visit to ensure that they are appropriate and would be of interest to the class.

D. Manufacturing Quiz

The attached quiz references specific websites with information on manufacturing and careers in manufacturing. High school students can be assigned to visit the websites and locate answers to the questions. Middle school students can be assigned specific websites and questions related to that website. The web references are provided with each set of questions.

Any grade level students could be assigned to visit one of the websites and write a paragraph about what they learned or develop 2 or 3 multiple choice questions to share with the class.

MANUFACTURING QUIZ

1. What role do engineers play in the shoe design process?
  - a. Protection development
  - b. Performance enhancement
  - c. Maximize comfort
  - d. All of the above
2. Engineers play a vital role by helping provide national security for the United States
  - a. True
  - b. False

For more information and explanations of answers:

-Source: 1-2 [www.manufacturingiscool.com](http://www.manufacturingiscool.com) (Society of Manufacturing Engineers)

3. In what year did U.S. manufacturing output reach its all time peak?
  - a. 1966
  - b. 1976
  - c. 1986
  - d. 1996
  - e. 2006
4. In what year did U.S. manufacturing revenue reach its all time peak (inflation adjusted)?
  - a. 1966
  - b. 1976
  - c. 1986
  - d. 1996
  - e. 2006
5. In what year did U.S. manufacturing profits reach their all time peak (inflation adjusted)?
  - a. 1966
  - b. 1976
  - c. 1986
  - d. 1996
  - e. 2006
6. In what year did U.S. manufacturing exports reach their all time peak (inflation adjusted)?
  - a. 1966
  - b. 1976
  - c. 1986
  - d. 1996
  - e. 2006

7. Average annual compensation for (wages+benefits) for U.S. manufacturing jobs is:
  - a. \$36,000
  - b. \$46,000
  - c. \$56,000
  - d. \$66,000
8. What are the relative sizes of the U.S. and Chinese manufacturing sectors?
  - a. China outputs 2.5 times the U.S.
  - b. Equal
  - c. U.S. outputs 2.5 times China
9. Which country produces the world's largest share of total manufacturing output?
  - a. China
  - b. Japan
  - c. Germany
  - d. France
  - e. United States

For more information and explanations of answers:

Source: 3-9 <http://www.freetrade.org/ManufacturingQuiz> (Cato Institute)

1. What is the name of the first robot to work in an assembly plant?
  - a. Weldmate
  - b. Automate
  - c. Robotmate
  - d. Unimate
2. What kind of material do manufacturing plants recycle?
  - a. Cardboard
  - b. Plastic
  - c. Chemicals
  - d. All of the above?
3. How hot does a robot's weld gun get?
  - a. 2804 degrees
  - b. 2500 degrees
4. Only parts needed right away come to the plant. This is called?
  - a. Good timing
  - b. Fast service
  - c. Just in time
  - d. Amazing
5. A robot's every move is mapped out using?
  - a. 3D mathematical modeling
  - b. Diagrams
  - c. Pencil and paper
  - d. Computer games

For more information and explanations of answers:

Source 1-5: [http://www.gm.com/experience/education/5-8/games/plant\\_quiz/plant\\_quiz.jsp](http://www.gm.com/experience/education/5-8/games/plant_quiz/plant_quiz.jsp)  
(General Motors)

## **V. FOLLOW UP ASSIGNMENTS**

Following a classroom presentation, assignments can be given to reinforce and enhance students' learning. They can be done in small group or individually as appropriate for the class and age of the students. The online resources found in the following section offer a wide range of web sites for students to explore the manufacturing industry and career opportunities. They provide an efficient way to accomplish any of the following activities.

### **A. Career research**

Students choose a career that was mentioned in the presentation, such as engineer, product designer, scientific researcher. They research that career to find out more information about:

1. education and training requirements for the job
2. description of the kind of work
3. location in the company, ie. office, shop floor, laboratory
4. salary range
5. where one would go to get training in this position, i.e. college, university, in Ohio, out of state
6. academic skills required for the job: math, science, technology, engineering,

Answers to the questions can be submitted in a list or written in a paragraph.

### **B. Industry research**

Students would search the internet to find out other companies in the area or state that perform the same or similar work. This assignment would require more sophisticated research skills. Students would write a paragraph summarizing their findings.

### **C. Vocabulary Research**

Students are assigned to write down at least three words from the presentation that are unique to the industry or company. Words such as polymers, RFID tags, pneumatics, etc. Students would research the words and write the definition and use in a sentence.

## **VI. ADDITIONAL RESOURCES & STUDENT ACTIVITIES**

Attached are a list of URL's that can be used for either pre or post visit activities.. These can be used for individual assignments or small group work. Students can use these for class assignments or for personal use in exploring career options The focus should be to explore careers in manufacturing, training requirements, challenges and opportunities. The importance of the STEM curriculum should be stressed in these activities.

### **A. Manufacturing Websites for Educators**

### **B. Power point slides with manufacturing facts**

## WEBSITES FOR EDUCATORS

### Career Voyages in Advanced Manufacturing

<http://www.careervoyages.gov/advmanufacturing-main.cfm>

Excellent for advanced middle school and high school students, educators, and parents. Walks you through steps to get started for each career area and provides research for the area of interest. Easy to maneuver around the site and includes videos and other helpful links.

### Cool Stuff Being Made

[http://www.dreamit-doit.com/content/videos/cool\\_stuff\\_being\\_made.php](http://www.dreamit-doit.com/content/videos/cool_stuff_being_made.php)

Good site for undecided high school students. Includes videos, and research on different areas of interest to help the student find their area of interest through a variety of tools. Helpful for educators assisting students in career decision-making.

### How Everyday Things are Made

<http://manufacturing.stanford.edu/>

-- This site is excellent for high school students who are interested in engineering, especially mechanical or design engineering. It tests individual's knowledge and desire to learn more about the process of engineering different products. Educators could use as a teaching guide. Includes professional videos and links to additional information. Useful information for younger students with teacher assistance.

### How Products are Made

<http://www.madehow.com/>

Good site for research in manufacturing. A little more difficult to navigate. Information listed in article format that will then take you to another area with more articles.

### In Demand-Advanced Manufacturing

<http://www.zinio.com/express?issue=139857355&flipEnabled=false&flipNotSupported=true>

Information and sources for manufacturing research for the high school student or the person looking into information on certain manufacturing careers. Consists of articles and research data. Educators could access articles and statistics from this site. This is more of a Q & A site for in-depth research.

### I was wondering-Women in Science

<http://www.iwaswondering.com/>

--Great information for the younger student, focusing on girls and science. This site is colorful, exciting and has interactive games. Educators could use this as a teaching guide and tool for getting the female students interested in exploring the world of science. A fun site for younger students.

### Junior Engineering Technical Society

<http://www.jets.org/>

Website for high school students who are members of the Engineering Technical Society or who want to learn more about this organization. This site lists the organizations events, winners and other areas of interest for those interested in engineering. This site includes news and issues for this society and displays content for students who take part in their events.

### Manufacturing is Cool

<http://www.manufacturingiscool.com/>

Great for the high school student looking for more information on manufacturing careers. Very easy to access and provides information from curriculum to job opportunities. Great tool for the educator to also explore the curriculum needed for the careers. Useful links focused on manufacturing. Very user-friendly. May be helpful to the advanced grade school student who wants to learn more about manufacturing careers.

### Manufacturing Tours

[http://www.dmoz.org/Kids\\_and\\_Teens/School\\_Time/Science/Technology/Manufacturing/](http://www.dmoz.org/Kids_and_Teens/School_Time/Science/Technology/Manufacturing/)

This site provides links to a variety of online plant tours appropriate for middle school and high school age students. Could be a good resource for individual research in manufacturing careers or industries.

### Modern Marvels

<http://www.history.com/video.do?name=modernmarvels>

-- Good site for educators. There is a "classroom" section with a library of materials to present as well as interactive learning games. There is also a wide array of videos and other classroom materials. Appropriate for younger students and high school students. This is more of a research or history learning site.

### General Motors Education

<http://www.gm.com/experience/education/teachers/index.jsp>

--This site is a GM teaching/education site. Strictly limited to the GM research and findings in different areas; technology, quality and safety. Good for the high school student or educator who is doing research or wants to learn more about the auto industry through the GM perspective.

<http://www.pmaef.org/educator/> (PMA's resources for educators)

--Link to the Precision Metalforming Association's website with additional tools for educators.

<http://corporate.honda.com/america/public-policy/factory-tour.aspx> (Honda factory virtual tour)

Dedicated site to Honda Corporation in America with virtual plant tour.

<http://marylandmanufacturing.info/cms/node/193> The TIME Center and RMI have been working to identify a collection of interesting, entertaining, and educational websites – targeted for students and educators. Review a list of great online technology resource web sites. These are great resources to learn more about manufacturing technology and for educators to use to develop curriculum. (there are over 30 new websites in this list)

<http://www.nasa.gov/offices/education/about/index.html> (NASA's education website-lesson plans, online programming, classroom activities)

## MANUFACTURING LESSON PLANS

<http://www.gm.com/experience/education/teachers/index.jsp>

<http://www.khake.com/page94.html> (scroll down to math and science, engineering, welding and manufacturing)

[http://www.lessonplanet.com/directory/Social\\_Studies/Economics\\_and\\_Business/Business/Manufacturing](http://www.lessonplanet.com/directory/Social_Studies/Economics_and_Business/Business/Manufacturing) (lessons reviewed by teachers-can do a trial membership-then will have to pay)

<http://web.bsu.edu/teched2/resource.htm> (robotics power point)

<http://web.bsu.edu/teched2/manufact.htm> (2 lesson plans)

<http://www.sciencenetlinks.com/matrix.cfm> a variety of plans for all grade levels-need to scroll for the ones related to manufacturing

<http://teachershare.scholastic.com/toer/ShowLessonPlan.htm?id=524> (scholastics website-perhaps just give the basic site and teachers can search on their own)

<http://dnet01.ode.state.oh.us/IMS.ItemDetails/LessonDetail.aspx?id=0907f84c80531ae3> (state of Ohio-grade 4 re: mfg.)

<http://www.tryengineering.org/lesson.php> (dozens of lessons by age level)

<http://www.crayola.com/lesson-plans/detail/forests-grow-pencils-lesson-plan/> (elementary lesson plan re: pencil manufacturing)

# **FACTS ABOUT OHIO MANUFACTURING**

## **CHARTS**

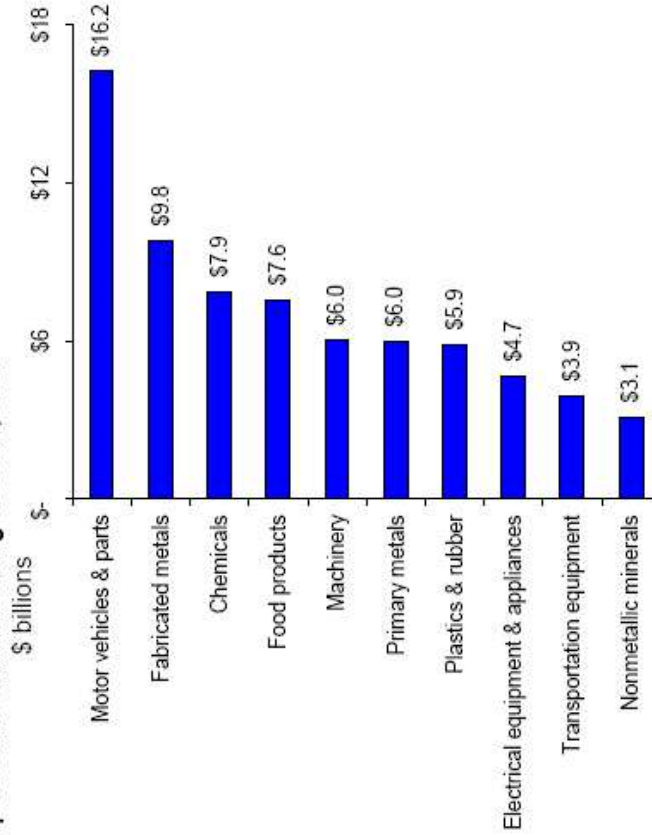
# Facts About Ohio Manufacturing

Manufacturing Employment and Wages	
Employees, December 2007	774,300
Manufacturing businesses, 2004	17,979
Average annual manufacturing wages*, 2006	\$50,024
Average annual state wages*, 2006	\$38,572

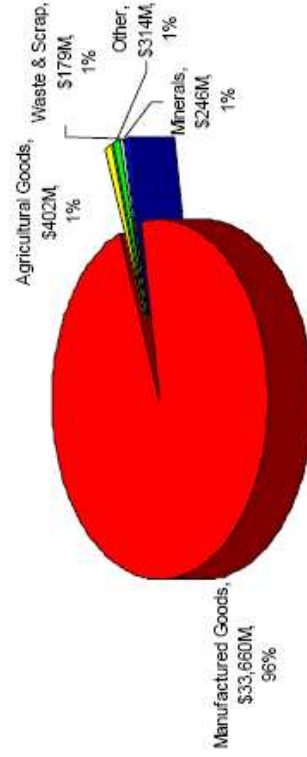
\*Wages do not include benefits as data is not available by state

Manufacturing Share of Ohio, 2006	
Manufacturing Growth in Ohio (2001-2006)	12.1%
Ohio GDP, \$ billions	\$461.3
Manufacturing share of Ohio GDP, \$ billions	\$89.3
Manufacturing share of Ohio GDP, %	19.4%

Top 10 Ohio Manufacturing Sectors, 2004



Bulk of Ohio Exports are Manufactured Goods 2005<sup>a</sup>,  
\$ millions,  
as a percent of merchandise exports



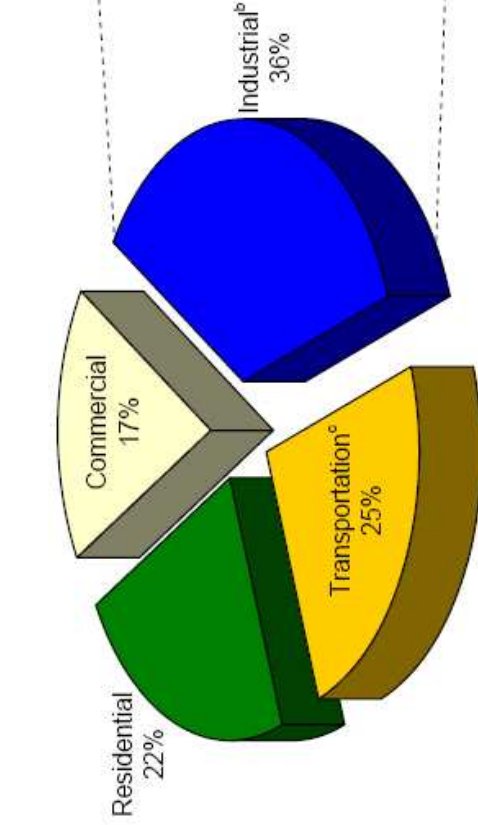
Ohio Total 2005 Merchandise Exports: \$34.8 billion

Sources: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, U.S. Census Bureau and Commerce Department  
<sup>a</sup>/ Service exports data are not available by state.

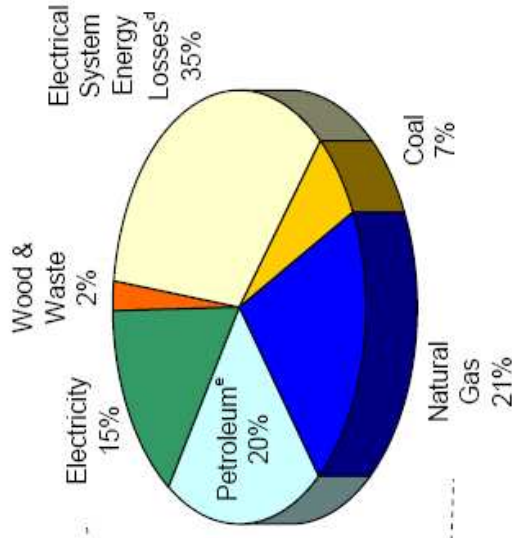


# Energy Facts: Ohio Industries

**Ohio Industries Use Bulk of Energy Supply,**  
End-Use Sectors of Energy,  
as a percent of total energy consumed<sup>a</sup>



**Ohio Industries' Energy Usage<sup>b</sup>,**  
as a percent of total energy usage<sup>a</sup>



**Fact:** Despite enactment of the 2006 Gulf of Mexico Energy Security Act, more than 80% of the area in the Outer Continental Shelf is off-limits to energy development. The U.S. Energy Department estimates that maintaining U.S. economic growth through 2025 will require a 40% increase in natural gas.

Source: Department of Energy, Energy Information Administration (EIA)

a/ Energy usage is measured in trillions of British thermal units (Btu).

b/ The manufacturing sector consumes 70 percent of industrial's usage nationwide, according to EIA's Manufacturing Energy Consumption data. The industrial sector includes manufacturing, agriculture, forestry, fishing, and hunting, mining (including oil and gas extraction), and construction sectors. Ohio industries consumed 1,429 trillion Btu or 36% of the total 3,982 trillion Btu consumed in the state, according to the EIA's 2001 statistics.

c/ The transportation sector includes residential, commercial and industrial energy usage. Disaggregated data for transportation is not available.

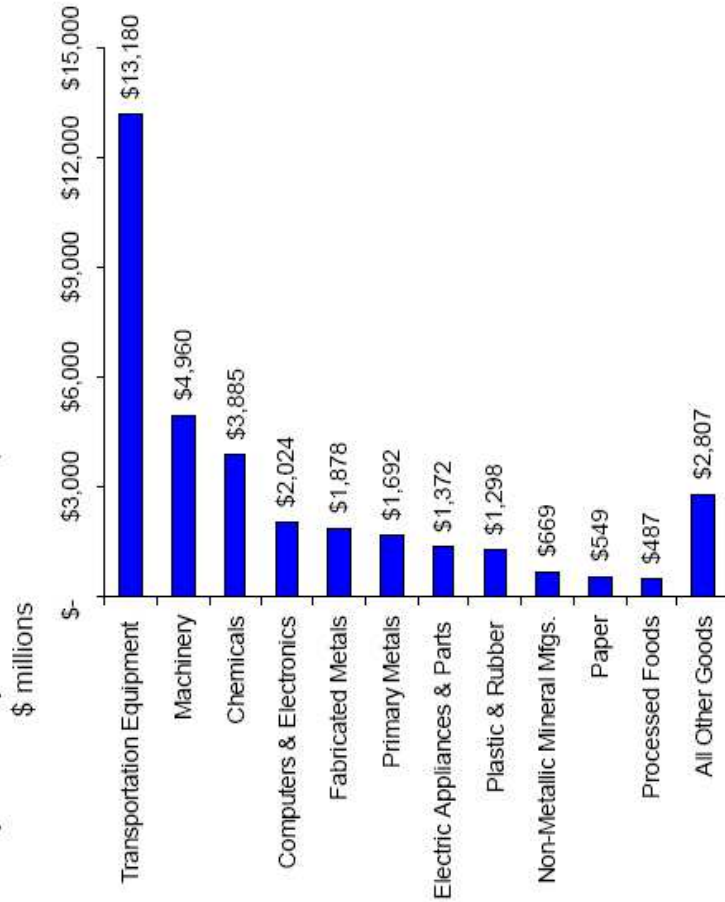
d/ Incurred in the generation, transmission and distribution of electricity plus plant use and unaccounted for electrical system energy losses.

e/ Petroleum includes the following sources: asphalt and road oil, distillate fuel, kerosene, LPG (Liquefied Petroleum Gas), lubricants, motor gasoline, residual fuel and other petroleum products.

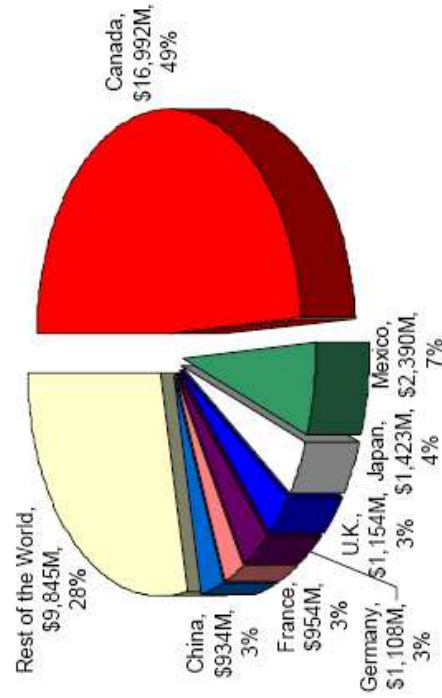


# Trade Facts: Ohio Manufacturing

**Top Ohio Export Sectors 2005,**

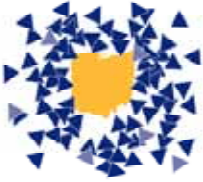


**Ohio Top Export Markets 2005,**  
\$ millions,  
as a percent of total exports



**Fact:** Ohio manufacturers in 2005 exported \$33.6 billion of the \$34.8 billion in total goods, or 94% of exports.  
(Source: U.S. Commerce Department).





**MAGNET**  
Manufacturing Advocacy & Growth Network

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# **MAGNET**

## The Manufacturing Advocacy and Growth Network

*Serving 16 counties in Northeast Ohio*



## WHY MANUFACTURING?

- Manufacturing output has increased despite losing employment
- U.S. manufacturers produce more today than any other time in U.S. history - GDP
- U.S. manufacturers continue to be the world's leader with 24% of "share of world-wide manufacturing."
  - Japan is second with 22%.



## **MANUFACTURING FACTS**

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- Manufacturing compensation averages more than \$65,000, the highest in the private sector, and manufacturers are leaders in employee training.
- Business has been an important contributor to economic growth and tax receipts at all levels of government, contributing 43% of all corporate taxes collected by state and local governments.
- *\*Source National Association of Manufacturers*



## WHY MANUFACTURING IN OHIO ?

- Ohio ranks third in manufacturing among the states (behind Texas and California)
- 12,000 manufacturing companies in NEO
- 40% of products made in Ohio are made in NEO
- 300,000 people work in manufacturing in NEO
- The average manufacturing salary in NEO is \$ 50,000.



## **OHIO MANUFACTURING FACTS**

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  - More than 20% of Ohio's Gross State Product
  - More than 800,000 jobs for Ohio Workers
  - An annual payroll of more than \$39 billion
  - The second highest weekly earnings of any economic sector
  - More than \$26 billion in products to more than 196 countries
  - A safer environment through decreased emissions and increased recycling
- Ohio ranks third nationwide in manufacturing output



## **OHIO MANUFACTURING FACTS**

- Ohio's industrial strength comes from its competitive, traditional industries. In 2004, \$56.7 billion of the state's \$82.2 billion in manufacturing output consisted of durable goods, 69% compared to 56% for the nation. Durable goods include transportation equipment, industrial machinery, primary metals and lumber and wood products.
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- In 2006, Ohio ranked third in manufacturing employment nationally, with 6.1% of manufacturing jobs nationwide.
- Manufacturing investments are the leading source of new Ohio private investments. In 2004-2005, nearly 700 major new investments were made in Ohio industrial machinery and fabricated metal manufacturers were the leading investors.
- Out of Ohio's 21,442 manufacturing establishments, only 293 employ more than 500 workers. In fact, 82% of Ohio manufacturing companies employ fewer than 50 workers. These small businesses make a major contribution to their local communities in job creation and taxes.



## **OHIO MANUFACTURING FACTS**

- Ohio manufacturing leads all economic sectors in total state payroll.
- In 2005, Ohio ranked seventh in exports to the world. Sixty-seven percent of Ohio manufacturing companies with one hundred or more employees are engaged in some form of export.
- \*Source: [www.ohiomanufacturingfacts.com](http://www.ohiomanufacturingfacts.com)



## **WORKFORCE DEMANDS**

- NEO manufacturers will need between 5,000 and 6,000 employees each year for the next ten years
- Requirements for these jobs vary from 6 months of training to advanced degrees
- Jobs require skills in STEM (Science, Technology, Engineering, & Math) as well as communications, problem solving, teamwork, and creativity



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## Careers in Manufacturing

NEO manufacturing jobs in demand

Categories include

- Manufacturing & Production
- Engineering
- Information Technology
- Other openings: accounting, finance, and human resources, sales.



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## MAGNET INTERNET RESOURCES

- [www.magnetnetwork.org/education](http://www.magnetnetwork.org/education)
- [www.dreamit-doit.com/northeastohio](http://www.dreamit-doit.com/northeastohio)

## **ABOUT MAGNET**

**MAGNET, the Manufacturing Advocacy and Growth Network, supports and champions manufacturing and is the voice for the region's manufacturers.**

**Since 1984, MAGNET has assisted thousands of manufacturers through its Edison Technology Center programs, Manufacturing Extension Partnership Services and business incubation programs.**

**Recently MAGNET has expanded its mission to assist manufacturers through initiatives that address manufacturing-related Education, Competitiveness, Innovation and Regulatory Affairs.**

**MAGNET is a "one-stop shop" for entrepreneurs and technology-driven manufacturers seeking resources to become or remain globally competitive.**

**Visit: [www.magnetnetwork.org](http://www.magnetnetwork.org)**

## **ABOUT THE SMART CONSORTIUM**

**The SMART Consortium represents the collective efforts of more than 50 public school districts in five northeast Ohio counties (Cuyahoga, Lake, Lorain, Summit and Geauga) to foster continuous, dramatic improvement in K-12 science and mathematics teaching and learning.**

**At present, 55 northeast Ohio school districts are members of SMART. The K-12 population in these districts ranges from 620 to 68,000 students. Members include 3 large city, 9 urban, 34 suburban, 4 rural, and 2 joint vocational districts, as well as 3 Educational Service Centers (ESCs). Minority students constitute approximately 40 percent of the Consortium's total student population.**

**SMART is a member-driven, member-governed organization that consists of school districts, educational service centers and private, civic, and government/public sector organizations. Its Management Council consists of the superintendents of SMART's member school districts, as well as representatives of partnering organizations and the regional business community. An Executive Committee directs the work of the consortium at the senior/policy level.**

**Visit: [www.smartconsortium.org](http://www.smartconsortium.org)**