Integrating Industry Tours with the Common Core

Using Comprehensive Instructional Systems (CIS)

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Outline

- About FLATE
- Florida Standards/Common Core
- Comprehensive Instructional Systems
- Industry awareness & exposures
- Getting the best of both

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NSF Advanced Technological Education

FLATE
FLORIDA ADVANCED TECHNOLOGICAL EDUCATION CENTER
A National Science Foundation Regional Center For Advanced Technological Education

ATE CENTERS
www.atecenters.org

Partners with Industry for a new American Workforce

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FLATE VISION

FLATE will be Florida's leading resource for education and training expertise, leadership, projects, and services to promote and support the workforce in the high performance production and manufacturing community.

Impact locally. Lead nationally.

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Outreach ◆ Curriculum ◆ Professional Development

Tell Teach Train

Advancing Excellence in Engineering Technologies

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Hillsborough County Schools Pilot

8th Largest School District

- 201, 363 Students (2013-2014)
- 18, 177 CTE Middle School Students
- 27, 630 CTE High School Students
- 1525 Career Center Students
- 433 CTE Charter School Students
- 17, 383 Industrial and Technology Education Students

- 48 Middle Schools
- 27 High Schools

Hillsborough County PUBLIC SCHOOLS
Excellence in Education

Outreach & Industry Awareness

Industry Tours

5,000 students

250 tours

100 facilities

Tours

- change perception
- relevant learning
- "applied" STEM
- career opportunities
- high-skill, high wage futures

Tours: student surveys

survey says...

Post-Visit Survey –Manufacturing Related Technologies

We hope you liked the "Made in Florida" Tour. Now, tell us what you think.

Instructions: Read the statements carefully. Circle one best answer for each question.

Scale: 5 = Strongly Agree (Yes)
4 = Agree
3 = Neither Agree nor Disagree
2 = Disagree
1 = Strongly Disagree (No)

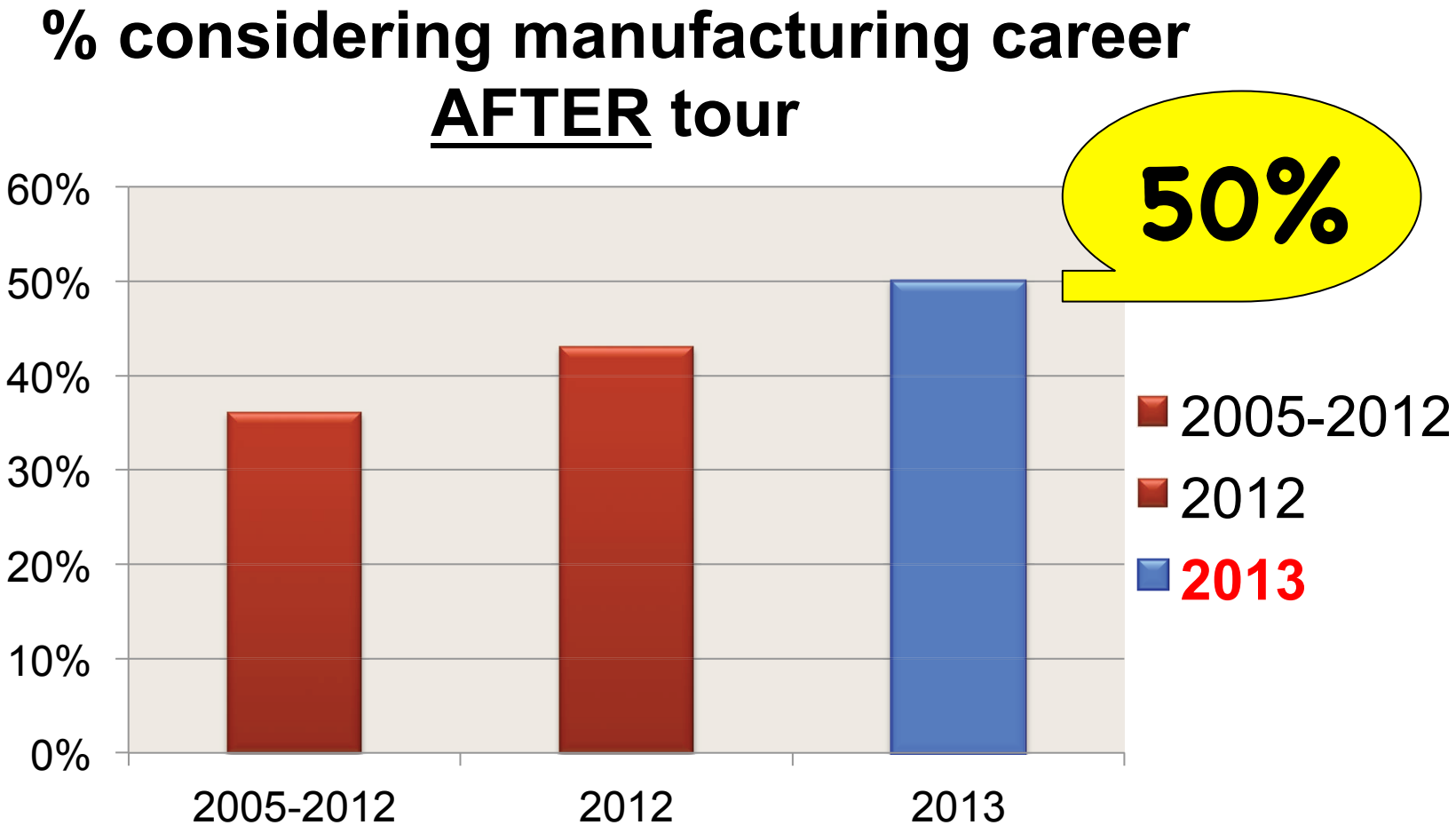
5 4 3 2 1	1)	I heard or saw employees describe their work.
5 4 3 2 1	2)	The workers looked like they enjoyed their work.
5 4 3 2 1	3)	I found that the work they described was interesting.
5 4 3 2 1	4)	I will need knowledge of science and math for my future work.
5 4 3 2 1	5)	I would be interested in technical work in industry.
5 4 3 2 1	6)	I would be interested in an engineering technology career.
5 4 3 2 1	7)	I would enjoy a career in advanced manufacturing.
5 4 3 2 1	8)	I understand the im…

Thank you very much for your feedback! It helps us make future tours better.

10: I was considering a career in manufacturing before the tour.

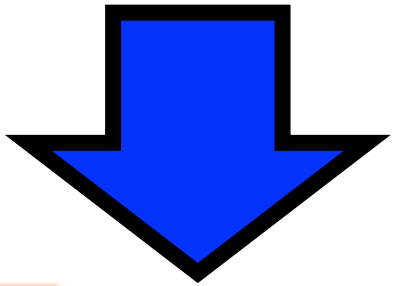
13: I am now considering a career in manufacturing or related technical industries.

Tours: student surveys



Tours: impact

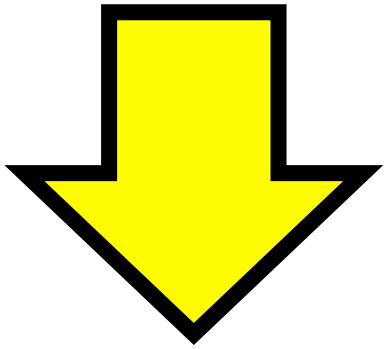
what we have



activity data

Tours: impact

what we want



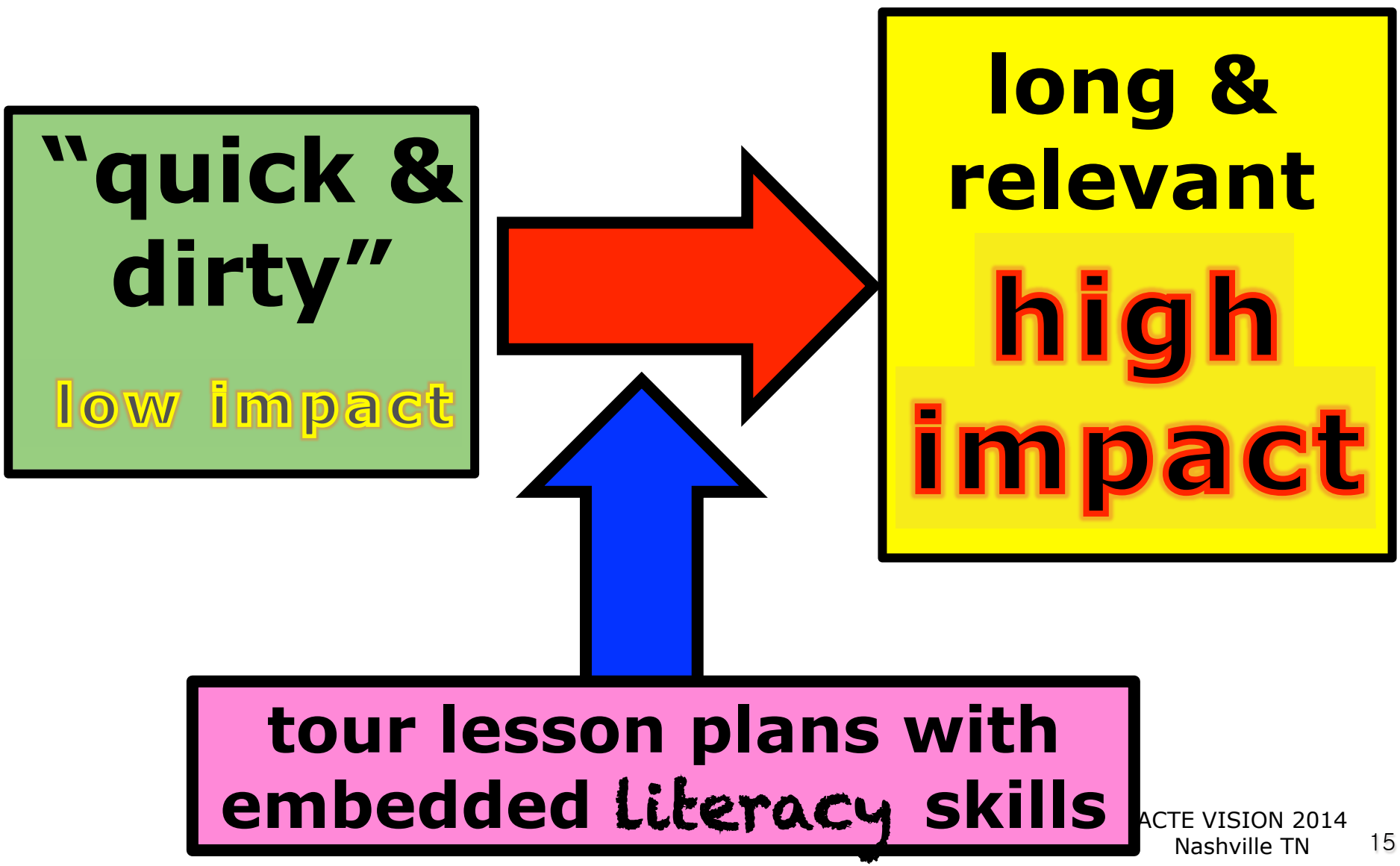
more impact

tours: impact & learning

tours & literacy

impact

Tours: impact & learning



Outreach & Industry Awareness

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Outreach Educational Resources - FREE!

madeinflorida.org

flate.pbwiki.com

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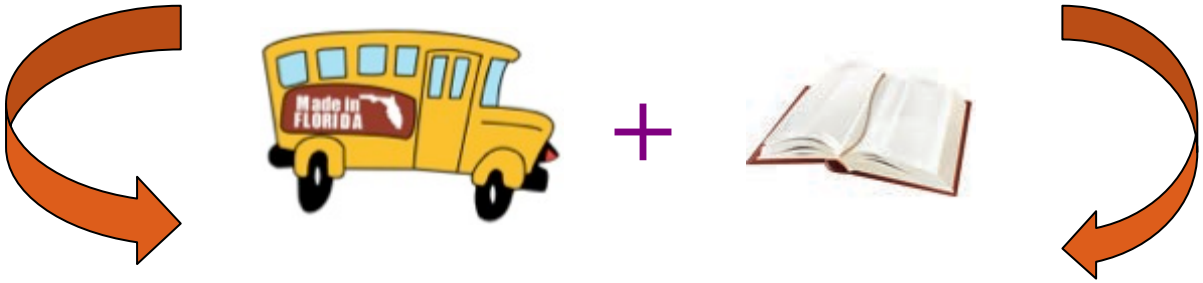
Outreach◆Curriculum◆Professional Development

Bringing Together Industry Tours & The New Standards



Comprehensive Instructional Systems (CIS)

Implementing new standards is one thing . . .

Making them effective for All students - is quite another

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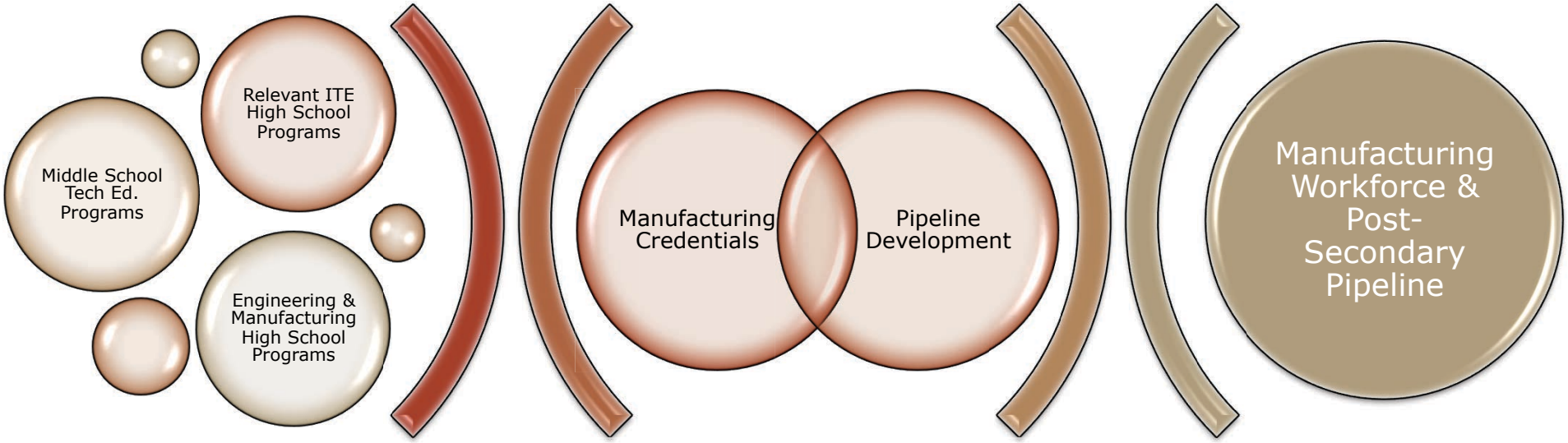
Building Manufacturing Curriculum



Existing Programs → **Critical Components of Curriculum Design** → **Program Goals**

Comprehension Instructional Sequence

- Multiple-strategy instruction
- Promotes student development in
  - Reading comprehension
  - Vocabulary
  - Content-area knowledge
  - Critical thinking about complex texts
- Students interact with in-depth, content-area information

Domains of Curriculum Design

- usability
- standards-based/generalizable
- contextual teaching & learning

Comprehension Instructional Sequence

- a complex form of multiple-strategy instruction that promotes student development in reading comprehension, vocabulary, content-area knowledge, and critical thinking about complex texts
- supportive challenges in interacting with complex content-area information

Comprehension Instructional Sequence

A CIS lesson has 3 steps with integrated and sustained text-based discussions and writing used throughout.

1. It has explicit instruction in vocabulary and close reading through text-marking and directed note-taking
2. Students generate questions that launch them into collaborative inquiry, supporting the practice of lifelong learning
3. It challenges students to use text evidence to validate positions they have formed over the course of the lesson

Comprehension Instructional Sequence (CIS)

Brandy Meetze

Hook Question	Students discuss in groups or pairs
Predictive Writing	Students respond in writing and then discuss
Text Coding	Students code the text while reading (with initial modeling from teacher) and compare codes
Written Response to Text	Students respond in writing and then discuss
Directed Note Taking	Students take notes with a focus and discuss
Final Discussion	Teacher poses debate question to encourage reflection and preparation for final writing
Final Written Response	Students respond in writing and discuss
Question Generation	Students develop their own questions with direction from the teacher

CIS Summary

Research

Read

Tour

Write

Students compile their experience to create a written statement/reflection

Students discuss their statements by generating questions and using evidence (text and tour) to support their opinions

8 Manufacturing Focused CIS Lessons

- Additive Manufacturing
- Assembly
- Automation
- Design
- Electronics Assembly
- Quality
- Subtractive Manufacturing/Machinig
- Welding

FLATE Tour CIS Lesson Resources

- Teacher lesson plan
- Company information sheet
- Guiding PowerPoint presentation
- Words to know
- Related "coded" reading
- Student note taking handout
- Writing template
- Grading rubric

Sample Lesson

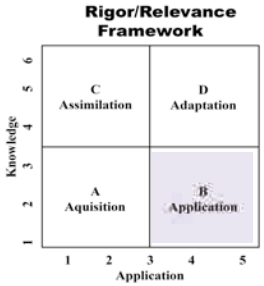
Technology Education Curriculum
Recommended for 7th - 10th grade

Assembly

- 4 Days
  - Research
  - Read
  - Tour
  - Write

Teacher Lesson Plan: page 1

Technology Education Curriculum
Recommended for 7th - 10th grade
Teacher Lesson Plan



INDUSTRIAL & TECHNOLOGY EDUCATION
Career & Technical Learning Activity - CTLA

Lesson Objectives & Student Expectations
Rigor/Relevance Framework: B
Length of lesson: 4 class periods

The student will:
1. Explore the history of the assembly line process.
2. Identify how manufacturing assembly has been made more efficient.
3. Analyze the affect new technologies have on the modern assembly line process.

Common Core Standards Addressed

Benchmark#	Description
LACC.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.
LACC.68.RST.1.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions
LACC.68.RST.3.7	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).
LACC.68.WHST.1.1	Write arguments focused on discipline specific content
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.

Key Vocabulary Terms

Crude	Efficient	Hydraulic	Innovation	Leisure
Monotonous	Productivity	Precise	Specialization	Standardize

Standards alignment

Key vocabulary terms

Teacher Lesson Plan: page 2

Teacher Sequence To Present Lesson ***Day 1 of 4***

Est. Time (minutes)	Description of Teacher Action	Notes
5	Bell work activity - Have students answer the question then review the answer.	Use the Assembly power point to guide your lesson.
10	Have students come up with a plan of how to quickly assembly 100 mechanical pencils. Have students do a think pair share to address the question.	Prepare groups ahead of time
5	Review vocabulary words with students	Prepare word boards or add words to your word wall
15	Hand out the "Ford Assembly Line" article and student worksheets. Prepare students for reading by explaining the text marking process and that students will read the article silently marking the portions of the article. Mark "H" if something is describing the history of assembly lines. Mark "M" if something is modern methods or new technology. Mark "E" if something is referencing making things more efficient.	Prepare copies ahead of time
10	Have students answer the questions from the text.	
5	Have students clean up and complete a daily reflection.	Do any type of reflection, ex. Exit slip, daily reflection log, discussion, or answering a question.

Hook

Text coding

Written response

Student Procedures To Do This Lesson ***Day 1 of 4***

1. Begin Bellwork activity per teacher's directions.
2. Participate in Bellwork discussion.
3. Plan out how to assemble 100 mechanical pencils.
4. Answer the discussion question.
5. Review vocabulary terms and mark paragraphs in the article.
6. Read the article and answer questions.

Lesson Plan: reading

Ford Launched the Modern Assembly Line a Century Ago and Changed Society

The assembly line cut the amount of time it took to assemble a Model T from 12.5 hours to just 93 minutes.

Oct. 7, 2013 **Agence France-Presse**

1 DETROIT - It began on Oct. 7, 1913, when engineers constructed a crude system using a rope and winch to pull a Ford Model T past 140 workers in a sprawling new factory dubbed the Crystal Palace.

2 Henry Ford launched the modern assembly line in a suburb of Detroit a century ago -- and helped spark a radical transformation of both manufacturing and society.

3 By drastically reducing the cost of production with standardized parts and more efficient assembly, Ford (IW 500/8) was able to bring the luxury, convenience and freedom of the automobile to the masses.

4 Other industries soon adopted the innovation and today, everything from cereal to caskets is made on assembly lines.

5 "It had a huge, huge impact," said Stephen Burnett, a professor with Northwestern University's Kellogg School of Management. Standardization led to lower costs, higher quality and more reliable products.

From Hours to Minutes

6 Most critically, the assembly line cut the amount of time it took to assemble a Model T from 12.5 hours to just 93 minutes.

Text coding

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Lesson Plan: writing

Pre-Reading – What process would you use, if you had to make 100 mechanical pencils in the shortest amount of time possible?

Post Reading – Using Textual Evidence

1. What two factors allowed Henry Ford to reduce the cost of production?

2. How did the assembly line change the way people worked and lived?

3. What new technological innovations have made manufacturing even more efficient?

Directions: Write your answer to the question using information you learned from the article, in your discussion and on your tour. Be sure to use information from the text to justify your answer. Be sure to use complete sentences and correct punctuation and grammar.

Reflection

How do new machines, like robots, create changes to the assembly line in manufacturing products?

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Lesson Plan: company host profile

Company Profile

Student Name: _____ **Date:** _____ **Period:** _____

Directions: Using the internet or the specific company website to answer the following questions for the company you will be visiting.

1. What is the name of the company you will be visiting? _____
2. When and where was the company started?
3. When the company first started did it make products differently than it does now, if so what was different?
4. What products does the company make now?
5. Who is the customer for this company?
6. What manufacturing processes does the company use to make its products?
7. What quality control measurements does the company take to make sure their products are to specifications?
8. What are two technical jobs available at the company and what education/skills would be needed for that job?

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Lesson Plan: directed note taking

Directed Note-Taking

"Ford Launched the Modern Assembly Line a Century Ago and Changed Society"

Guiding Question: How do new machines, like robots, create changes to the assembly line in manufacturing products?

Paragraph Number	Evidence from Tour (check box)	Write your notes from your reading and tour in the rows below, check the appropriate boxes based on the type of observation you make.	Assembly Process	Machines Used	Jobs People Do	Improving Efficiency or reducing costs

Guiding question

Directed notes

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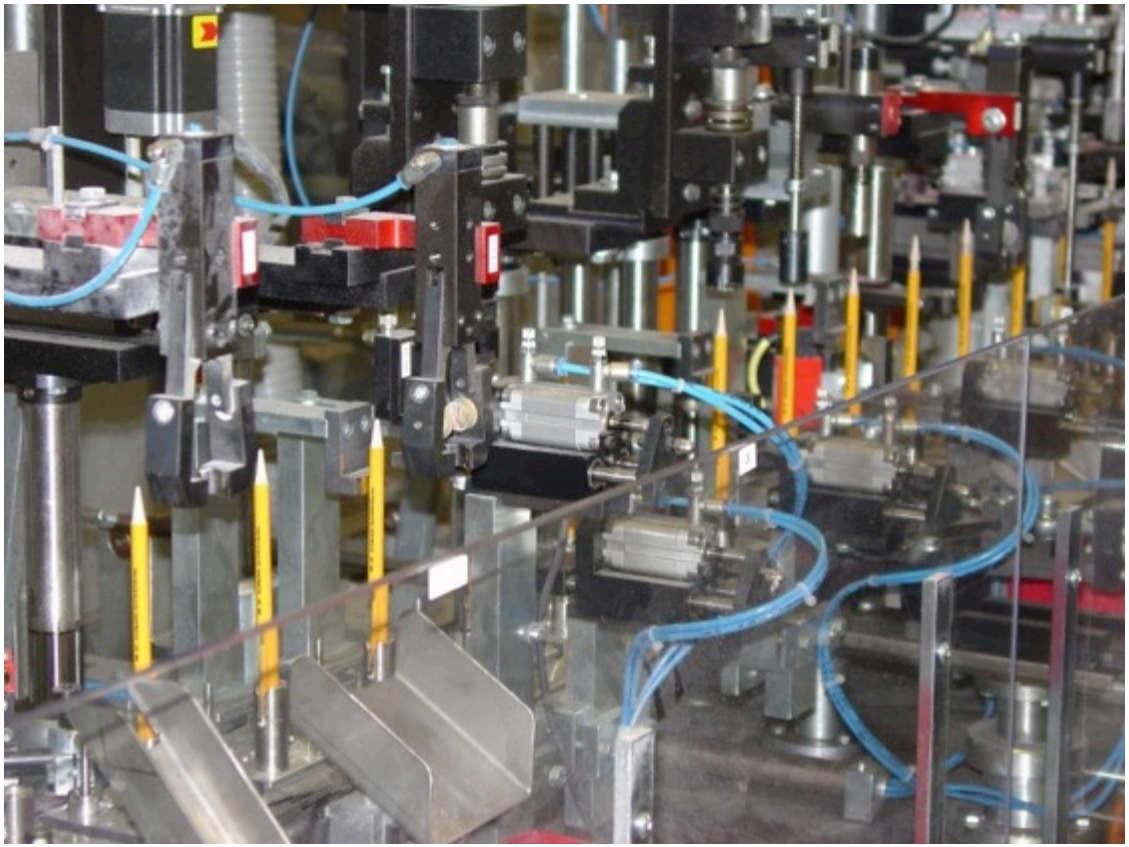
Lesson Plan: presentation

Bell Work Day 1: Assembly Line



Manufacturing Assembly: words to know

- ✓ **Crude** - constructed in a rudimentary or makeshift way.
- ✓ **Standardized** - to conform to a certain level of quality.
- ✓ **Innovation** - the action or process of innovating.
- ✓ **Productivity** - the state or quality of producing something.
- ✓ **Specialization** - the act of specializing; making something suitable for a special purpose.
- ✓ **Monotonous** - dull, tedious, and repetitious; lacking in variety and interest.
- ✓ **Leisure** - free time.

Manufacturing Assembly: words to know

- ✓ **Hydraulics** - the conveyance of liquids through pipes and channels.
- ✓ **Precise** - marked by exactness and accuracy of expression or detail.
- ✓ **Efficiency** - achieving maximum productivity with minimum wasted effort or expense.

Day 2 (Reading)

Mark "H" if something is describing the history of assembly lines

Mark "M" if something is modern methods or new technology

Mark "E" if something is referencing making things more efficient.

Questions about the reading

1. What two factors allowed Henry Ford to reduce the cost of production?
2. How did the assembly line change the way people worked and lived?
3. What new technological innovations have made manufacturing even more efficient?

Day 3 (Touring): Bell Work

- **Based on your company profile research and the article read, write one question you plan to ask on the tour to help gain further understanding of the companies use of robotics.**

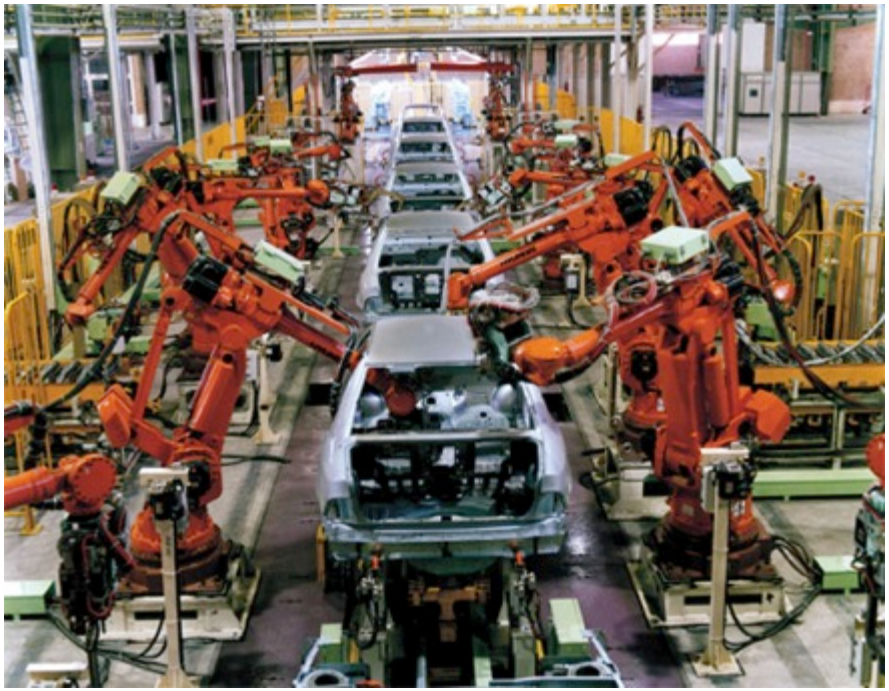
Industry Tour

While your on your tour, complete the directed note taking activity.

Bring your observations back to class to discussion and review.

Day 4 (writing) Bell Work: reflection

Discussion



WHAT MACHINES OR TECHNOLOGIES MADE THE ASSEMBLY OF PRODUCTS FASTER OR EASIER?

Day 4 (writing)

- Review tour notes
- Discuss tour observations with in teams or whole class
- Write essay

Thank you!

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