

# Unit 2: Parts Bin Project Measurement, Layout, Sheet Metal, Manufacturing Parts, Assembly

Content Area: **Industrial Technology**  
Course(s): **Manufacturing Technology I**  
Time Period: **1 marking period**  
Length: **4 Weeks**  
Status: **Published**

## Unit Overview

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Students will be able to construct a Parts Bin out of Sheet Metal by following a drawing. They will measure correctly, cut out stock, bend hems and seams using squaring shears, box and pan brake, hand tools and measuring tools.

## Transfer

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Students will be able to independently use their learning to...

Students will be able to read prints from drawings and layout and transfer patterns to sheet metal this will be used in all phases of manufacturing and construction any project once they join the work force. SWBAT use basic hand tool, measuring tools, and machines to make parts. This will also be used once the student joins the workforce.

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For more information, read the following article by Grant Wiggins.

[http://www.authenticeducation.org/ae\\_bigideas/article.lasso?artid=60](http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60)

## Meaning

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Why is it important to be able to read the ruler in 1/16th of an inch?

Why is it important to be able to read the metric ruler?

Why is it important to read a print and understand what the lines mean and measurement mean?

How do you transfer the dimensions and lines from a drawing onto metal, wood or plastic?

Why is it important that the lines are accurately layed out and why could it affect the final assembly of the project?

How do I use the machinery to make my parts?

Does my project look like the project in the print?

## **Understandings**

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Students will understand that...

If they do not read the ruler properly their project will not turn out properly.

Layout techniques are critical for their project to be properly manufactured.

Students will properly use the machines to cut out and bend their projects. If they make a mistake their project will not turn out properly.

That craftsmanship is very important in the manufacturing of any object to make it aesthetically pleasing.

## **Essential Questions**

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Students will keep considering...

Why is it important to be able to read the ruler in 1/16th of an inch?

Why is it important to be able to read the metric ruler?

Why is it important to read a print and understand what the lines mean and measurement mean?

How do you transfer the dimensions and lines from a drawing onto metal, wood or plastic?

Why is it important that the lines are accurately layed out and why could it affect the final assembly of the project?

How do I use the machinery to make my parts?

Does my project look like the project in the print?

## **Application of Knowledge and Skill**

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Students will be able to apply all of the skills and knowledge they have learned to a parts bin project. This project will be part of their 1st marking period project.

## **Students will know...**

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Students will know...

Identify basic measuring tools and gages and explain how they are used.

Measure to 1/16th and .05 mm with a steel rule.

Read drawings dimensioned in fractional and decimal inches and metric dimensions.

Identify and understand the different types of information indicated on a typical drawing.

Describe how detail, assembly, and subassembly drawing differ.

Explain the purpose of safe layout and how it is used to prepare metal for machining.

Identify common layout tools and use them safely.

Make simple layouts.

List and observe common safety precautions used in layout work.

Identify basic hand tools used in metalworking.

Select right tool for the job

Explain how to maintain tools properly.

Safely Operate and identify parts of basic sheet metal machines.

Safely Operate Spotwelders.

Safely Apply Metal Finishes

## **Students will be skilled at...**

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Students will be skilled at...

Measurement, Layout, Safe use of Hand Tools, Safe operation of Sheet Metal Machines.

## **Academic Vocabulary**

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dial indicators

gage blocks

graduations

International System of Units

steel rule

combination set

divider

hermaphrodite caliper

layout dye

reference lines

scriber

square

aviation snips

ball peen hammer

hand seamers

spot welder

abrasive

anodizing

buffing

painting

polishing

## Learning Goal 1

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Measurement in 1/16th of an inch and layout of parts bin.

- Measurement in 1/16th of an inch and layout of parts bin.

CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
MANU.9-12.9.4.12.M.(4).3	Evaluate production operations for product and process quality to maintain quality assurance.
MANU.9-12.9.4.12.M.(6).7	Demonstrate the safe use of manufacturing equipment in order to assure health and safety in work environments.
MANU.9-12.9.4.12.M.2	Demonstrate mathematics knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.3	Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.5	Demonstrate use of the concepts, strategies, and systems for obtaining and conveying ideas and information to enhance communication.
MANU.9-12.9.4.12.M.6	Locate, organize, and reference written information from various sources to communicate with others.
MANU.9-12.9.4.12.M.7	Evaluate and use information resources to accomplish specific occupational tasks.
MANU.9-12.9.4.12.M.52	Identify and demonstrate positive work behaviors and personal qualities needed to succeed in the classroom and/or to be employable.
MANU.9-12.9.4.12.M.54	Demonstrate skills related to seeking and applying for employment in a desired job.

## Target 1

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SWBAT read the ruler in 1/16th of an inch and identify the metric system. SWBAT use proper layout techniques to layout parts of the parts bin.

- SWBAT read the ruler in 1/16th of an inch and identify the metric system. SWBAT use proper layout techniques to layout parts of the parts bin.

## Target 2

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SWBAT use layout tools and transfer lines to sheet metal and cut out basic parts of the bin.

- SWBAT use layout tools and transfer lines to sheet metal and cut out basic parts of the bin.

## **Learning Goal 2**

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SWBAT to Identify Hand Tools and their correct usage.

- SWBAT to Identify Hand Tools and their correct usage.

MANU.9-12.9.4.12.M.4	Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.
MANU.9-12.9.4.12.M.52	Identify and demonstrate positive work behaviors and personal qualities needed to succeed in the classroom and/or to be employable.
MANU.9-12.9.4.12.M.53	Develop a Personalized Student Learning Plan to meet career goals and objectives.
MANU.9-12.9.4.12.M.54	Demonstrate skills related to seeking and applying for employment in a desired job.  Employability skills and career and entrepreneurship opportunities build the capacity for successful careers in a global economy.

## **Target 1**

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SWBAT identify each tool and then identify how the tool is used correctly.

- SWBAT identify each tool and then identify how the tool is used correctly.

## **Target 2**

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SWBAT cut out project parts using the aviation shears.

- SWBAT cut out project parts using the aviation shears.

## **Learning Goal 3**

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Safe operation of Squaring Shears, Box, and Pan Brake, Notcher.

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CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
MANU.9-12.9.4.12.M.(1).2	Research new manufacturing processes to manage production of new and/or improved products.
MANU.9-12.9.4.12.M.(2).3	Recognize problems related to production processes, and design corrections to assure that products meet quality standards.
MANU.9-12.9.4.12.M.(2).6	Research the safe use of manufacturing process equipment in order to protect personal well-being in the work environment.
MANU.9-12.9.4.12.M.(2).7	Identify equipment safety resources (e.g., equipment manufacturers and national safety organizations).
MANU.9-12.9.4.12.M.(2).8	Maintain equipment, tools, and workstations to provide safe work environments and

	meet company regulations.
MANU.9-12.9.4.12.M.(6).3	Evaluate preventive inspections of health, safety, and/or environmental hazards in order to ensure healthy and safe manufacturing work environments.
MANU.9-12.9.4.12.M.(6).8	Examine and summarize health, safety, and/or environmental programs, projects, policies, or procedures in order to ensure healthy and safe manufacturing work environments.
MANU.9-12.9.4.12.M.3	Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.4	Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.
MANU.9-12.9.4.12.M.10	Interpret verbal and nonverbal cues/behaviors to enhance communication.
MANU.9-12.9.4.12.M.16	Employ critical thinking and interpersonal skills to resolve.
MANU.9-12.9.4.12.M.18	Conduct technical research to gather information necessary for decision-making.
MANU.9-12.9.4.12.M.19	Employ technological tools to expedite workflow.
MANU.9-12.9.4.12.M.33	Demonstrate knowledge of personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.
MANU.9-12.9.4.12.M.35	Identify emergency procedures that are necessary to provide aid in workplace accidents.
MANU.9-12.9.4.12.M.39	Maintain safe and healthful working conditions and environments to ensure employee safety.
MANU.9-12.9.4.12.M.43	Summarize safety, health, and environmental management systems to convey an understanding of how manufacturing businesses comply with governmental policies and procedures.
MANU.9-12.9.4.12.M.52	Identify and demonstrate positive work behaviors and personal qualities needed to succeed in the classroom and/or to be employable.
MANU.9-12.9.4.12.M.54	Demonstrate skills related to seeking and applying for employment in a desired job.
MANU.9-12.9.4.12.M.65	Describe and employ technical knowledge and skills required for careers in manufacturing in order to perform basic workplace activities.

### **Target 1**

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Students will be able to identify parts of the Squaring Shear and Safely operate the machine.

- Students will be able to identify parts of the Squaring Shear and Safely operate the machine.

### **Target 2**

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Students will be able to identify parts of the Box and Pan Brake and Notcher and Safely operate the machines.

- Students will be able to identify parts of the Box and Pan Brake and Notcher and Safely operate the machines.

### **Target 3**

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Students will be able to identify parts of the Spot Welder and Safely operate the Spot Welder to assemble project.

- Students will be able to identify parts of the Spot Welder and Safely operate the Spot Welder to assemble project.

## **Summative Assessment**

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Students will be able to pass a safety test on each piece of equipment. Students must pass the safety test in order to use the machines.

## **21st Century Life and Careers**

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CAEP.9.2.12.C.1

Review career goals and determine steps necessary for attainment.

CAEP.9.2.12.C.4

Analyze how economic conditions and societal changes influence employment trends and future education.

## **Formative Assessment and Performance Opportunities**

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Students will be watched by the instructor as to the correct usage of the equipment and progress on the Parts Bin Project. Students will make corrections to projects.

## **Accommodations/Modifications**

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Students that have completed project may help other students that are behind on the project.

## **Unit Resources**

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Layout Print of Parts Bin, Safety Sheets for equipment, Safety Tests, Internet Resources.

Modern Metalworking Instructor's Manual by John R. Walker

Modern Metalworking Textbook by John R. Walker

Modern Metalworking Workbook by John R. Walker



## **Interdisciplinary Connections**

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LA.RST.11-12.3

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

MA.K-12.1

Make sense of problems and persevere in solving them.