

# STRANDS AND STANDARDS

## PLASTICS 1



### Course Description

This course is the first in a series of two courses focusing on the types of plastics, properties of plastics, and molding methods. A specific emphasis is given to the plastic injection molding as it relates to the manufacturing of components for consumer products.

<b>Intended Grade Level</b>	10-12
Units of Credit	0.5
Core Code	38.02.00.00.241
Concurrent Enrollment Core Code	None
Prerequisite	None
Skill Certification Test Number	None
Test Weight	N/A
<b>License Area of Concentration</b>	CTE or Secondary
<b>Required Endorsement(s)</b>	Plastics

## STRAND 1

**Students will follow safety practices.**

### Standard 1

Identify potential safety hazards and follow general laboratory safety practices.

- Assess workplace conditions regarding safety and health.
- Identify potential safety issues and align with relevant safety standards to ensure a safe workplace/jobsite.
- Locate and understand the use of shop safety equipment.
- Select appropriate personal protective equipment.

### Standard 2

Use safe work practices.

- Use personal protective equipment according to manufacturer rules and regulations.
- Practice a culture of safety, maintain an attitude of safety in daily operations.
- Follow correct procedures when using any hand or power tools.
- Ref: <https://schools.utah.gov/file/4de1dd59-0425-4f76-9e33-fdcf5de45dbf>

### Standard 3

Complete a basic safety test without errors (100%) before using any tools or shop equipment.

## STRAND 2

**Students will research the importance of plastics in our society.**

### Standard 1

Describe the history of plastics and their origin (i.e. petroleum industry).

### Standard 2

Investigate how the use of plastic molding helps drive innovation.

### Standard 3 (Optional)

Investigate how plastic products used in the health care industry to improve and save lives.

## STRAND 3

**Students will outline the basic methods of plastic processing.**

### Standard 1

Identify a variety of plastic processing methods.

For example:

- Injection molding
- Extrusion
- Thermoforming
- Blow molding
- Compression molding

**Standard 2**

List a variety of everyday products/parts that are made from various plastic processing methods.

**Standard 3**

Define what plastic injection molding is.

**Standard 4**

Give a brief history of the plastics molding process and its development.

**STRAND 4**

**Students will identify the basic materials used in the plastic injection molding process.**

**Standard 1**

Identify the types of materials used in the plastics injection process.

- Thermoplastic (properties and examples)
- Thermoset (properties and examples)

**Standard 2**

Develop a basic understanding of resins and identify their properties.

- Explain why different materials are better for certain applications than others.

**Standard 3**

- Provide examples of products manufactured by Utah's plastic injection molding industry.

**STRAND 5**

**Students will identify components of a plastic injection molding machine.**

**Standard 1**

Identify what a hopper is and describe its function.

**Standard 2**

Identify what an injection unit is and describe its function.

- Barrel
- Screw

**Standard 3**

Identify what a nozzle is and describe its function.

**Standard 4**

Identify what a mold is and describe its function.

**Standard 5**

Identify what a clamping unit is and describe its function.

**Standard 6**

Identify what an ejection unit is and describe its function.

- Outline the part ejection/removal process.

**STRAND 6**

**Students will identify basic components of an injection mold.**

**Standard 1**

Identify and label the following:

- mold base
- locating ring
- cavity
- core
- material delivery system
  - sprue
  - runners
  - gates
- part ejection system

**STRAND 7**

**Students will produce simple injection molded parts.**

**Standard 1**

Establish a repeatable process.

**Standard 2**

Identify the common quality defects.

- Short shot
- Flash
- Sink marks, blush, flow lines & knit lines
- Material degradation (burning, discoloration, black specs)

**Standard 3**

Ensure that the product meets quality specifications.

**Performance Skills**

1. Produce simple injection molded parts to specification.
2. Demonstrate practice of the *Technology & Engineering Professional Workplace Skills*.  
<https://schools.utah.gov/cte/engineering/resources>
3. Participate in a significant activity that provides each student with an opportunity to render service to others, employ leadership skills, or demonstrate skills they have learned through this course, preferably through participation in a Career & Technical Student Organization (CTSO) such as SkillsUSA.