**Lesson Plan Template**

**Teachers Name:**

**Course** Manufacturing Technology TMJ4M

**Lesson Title** Electric Car Manufacturing with injection molding

**Unit Title:** Automotive Industry Production Molds

**Lesson Number:** 1

**Specific Expectations** (List Ministry Specific Expectations which will be covered in the lesson)

A1.2 describe and explain activities associated with product development in manufacturing (e.g.,product research,product testing,product improvement);

A2.3 explain the technological systems approach to a manufacturing enterprise (e.g.,with respect to people,knowledge,materials,energy,finance, capital);

B4.3 manage and control quality using industry standard techniques and processes (e.g.,statistical process control [SPC],total quality management [TQM]);

C2.2 explain the importance of demographics, geography, and strategic plant location as factors to be considered in setting up a successful manufacturing facility, and describe possible short-term and/or long-term societal implications locally and beyond (e.g.,regional or provincial planning issues,effects on the indigenous population,ecosystem and/or habitat considerations);

**Prior Learning**

Milling machine safety and operation

Basic milling tools

Basic lathe operations

Measurement with precision measuring tools

Material Identification

**Key Learning Goals**

Students will identify the process for creating car parts using the injection molding process.

Students will understand the quality control process.

Students will describe components of the electric car.

**Key Learning Questions** (List any key questions you will ask during the lesson which may seek student prior learning or knowledge)

Why does the EV industry use injection molding?

What type of material is used in the injection process?

How will modernizing the automotive industry change EV access?

**Universal Design for Learning** (How will you Embed UDL’s three principles, Multiple means of Representation, Expression and Engagement)

Using Video, Socratic lesson, Worksheet, and visuals to assist students in the understanding of the lesson materials.

**New Pedagogy for Deeper Learning (NPDL)** (How will you Embed the 6C’s into your lesson plan) (Collaboration, Citizenship, Character, Creativity, Critical thinking, Communication)

The lesson will review the processes used by the EV industry and show the creativity of the companies working to improve the process. The questions and worksheet connected to the lesson will allow for critical thinking about the processes around injection molding, so they can see the connections to the EV industry.

<https://theenthusiasticlearner.wordpress.com/new-deep-learning-pedagogy/>

**Enduring Understandings and Essential Skills:** (List the Enduring Understandings and Essential Skills the students will take away from completion of this lesson i.e.; Foundational Knowledge and skills, Transferable skills etc.)

The essential skills covered in this lesson is critical thinking. Students will learn the concepts about mold use in the automotive industry and make connections to their work in the classroom.

<https://www.skillszone.ca/essential_skills/index.htm>

**Technological Concepts** (List the Fundamental Technological Concepts (13) covered in this Lesson that the students will take away at completion of this lesson i.e.; Aesthetics, Ergonomics, Control Systems, Mechanism, Power and Energy, etc...)

**Innovation** is the focus that the industry (Tesla) is using new technology with the Giga-Press to change the future of car production. They are getting better quality and more electric cars on the market for consumers.

**Mechanisms** is a concept used with the construction of injection molds, the function and build of the Giga-Press, and the productions of electric cars in the industry.

**Structure** is a concept that the students will understand when they see the components coming out of the press. They can see the design turn into a part that is used in the current electric cars.

**Materials List** (List the materials which may be needed to deliver the lesson whether it is a Socratic or Demonstration lesson format)

Aluminum injection molded parts for demonstration

**Teaching Aids** (List any teaching aids needed for the lesson; Handouts, Power Points,videos, etc. and include them with this plan)

Projector with screen

Tesla Giga Press Video

<https://www.youtube.com/watch?v=tf8CCyL3BYE>

Video Questions worksheet

Visual pictures and aid materials

Technology Student Injection Molding

<https://www.technologystudent.com/grp08/manu1.html>

**Teaching Strategies** (Give step by step instruction on how to deliver the lesson, this should be clear and precise and there should be enough information given so that another teacher would be able to deliver the lesson)

-Start the lesson with a conversation about the Electric Vehicle industry and how EV car is built.

-Use the link [How Do All-Electric Cars Work?](https://afdc.energy.gov/vehicles/how-do-all-electric-cars-work) And show the students different parts of the car.

-Speaking about automotive production in North America, ask questions.

-Play [The Incredible Logistics Of The Tesla Giga Press!](https://www.youtube.com/watch?v=tf8CCyL3BYE) Tesla Giga Press Video (14min)

-Hand out the video worksheet and review the questions before the video

-Take up the questions and make connections to the terminology

-Use pictures for visual assistance with content

-Show and pass around some aluminum injection molded parts

**Modifications and Accommodations** (List any possible modifications or accommodations to the lesson needed to help students achieve the key learning goals of the lesson)

Review the needs for the classroom. Make notes for the students that may require accommodations for the lesson or the work. Have a scribe ready if a student requires that.

**Terminology List** (List all new terminology that may be learned during the lesson)

Electric Vehicle (EV)

Injection Mold

Liquid Metal

Pressure

Aluminium Alloy

Metallurgy

**Literacy and Numeracy** (List any literacy strategies and numeracy strategies which may be addressed or delivered during the lesson)

Literacy will be reviewed with the worksheet to determine an understanding of the content in the video. Student understanding of key terminology.

Numeracy is used with the technical specifications of the press used in the video. Breaking down the units used to measure the capacity of the Giga Press will help students to understand the application and compare it to items they use everyday.

**Closing Questions** (List any closing questions which may be used to reflect student participation during the lesson)

How will this help you to create your own mold?

What do you think is next for the EV industry?

**Lesson Plan Reflections (What went right/What went wrong)**

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