

# Theme-01

## Robotic Arm

### UNIT 01 [ Beginner ]

↳ Chapter 01 : Mechanics.

### LESSON 01

Case Scenario.

## Project Overview

Adam and Laila's school organized a field trip to an industrial area where they visited one of the factories.

As they observed the workers, they noticed that the workers were struggling to lift and move heavy objects.

The process was not only time-consuming but also costly due to the manual labor involved.

Adam and Laila realized that this was a problem that could be solved with a smart solution, and they were determined to help the factory workers improve their efficiency.



# Learning Objectives

**By the end of the theme students will be able to:**

- ✓ **Recognize internal and external gears.**
- ✓ **Identify Pascal's and Bernoulli's Principles in fluid systems.**
- ✓ **Recall hydraulic and pneumatic basics in robotic arms.**
- ✓ **Recognize robotic arms' roles in industries.**
- ✓ **Minimize vibrations in robotic arms.**
- ✓ **Describe robotic arm joint movement.**
- ✓ **Use "IF Then ELSE" rules with Arduino.**
- ✓ **Build a Python GUI for robotic arm control.**
- ✓ **Assess control algorithms and servo motors.**
- ✓ **Design and assemble a robotic arm.**
- ✓ **Develop a user interface for the robotic arm.**
- ✓ **Program and refine control algorithms.**

## Project Task:

**Follow Engineering Design Process to help Adam and Laila design and build a robotic arm that can assist the factory workers in lifting and moving heavy objects.**



**Name:** .....

**Project:** .....

**Ask**



**Imagine**

**Improve**

**Plan**

**Create**



**let's  
Think**



**Why is it important to find a solution to reduce the time and effort required for lifting and moving heavy objects in an industrial setting?**

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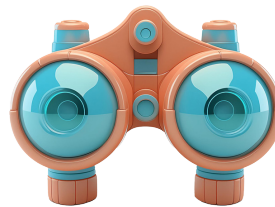
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**How can the robotic arm you design help improve efficiency and safety in the factory Adam and Laila visited?**

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# Explore



**Use the robotic arm to move some objects from one point to another, record the time you needed to do that each time.**

Object	Time

**Watch it..**

To understand more about how efficient the robotic arm is let's watch the following video:



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



**Scan Here!**

**Read about it**

Read more about benefits of robotic arm :

<https://www.intel.com/content/www/us/en/robotics/robotic-arm.html>



**Scan Here!**

# Assessment

## Focus



**Choose the correct answer:**

**1. What is another name for industrial robotic arms?**

- A) Metal helpers.**
- B) Articulated robotic arms.**
- C) Factory machines.**
- D) Moving tools.**

**2. Which of these is NOT a benefit of using industrial robotic arms?**

- A) Improved safety.**
- B) Enhanced precision.**
- C) Increased worker fatigue.**
- D) Greater flexibility.**

**3. How many joints do most industrial robotic arms typically have?**

- A) 1-3.**
- B) 4-6.**
- C) 7-9.**
- D) 10-12.**

**4. Which of these tasks can robotic arms perform?**

- A) Welding.**
- B) Palletizing.**
- C) Inspection.**
- D) All of the above.**

# Practice



## **Task: Design a Robotic Arm**

**Choose a common daily task that could be made easier with the help of a robotic arm, such as opening jars, planting seeds, or sorting items.**

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**Design a robotic arm that could perform your chosen task. Your design should include a detailed drawing of the robotic arm with labelled parts.**

**Present your design to the class, explaining how the robotic arm will solve the problem and what benefits it offers.**