

Project Title: Motion Simulation of a Slider-Crank Mechanism

Task 3: Mechanism Assembly & Kinematics

Objective

The goal of Task 3 was to create a functional **Slider-Crank Mechanism** using the previously designed Connecting Rod, a new Crank arm, and a Piston block to simulate real-world engine kinematics.

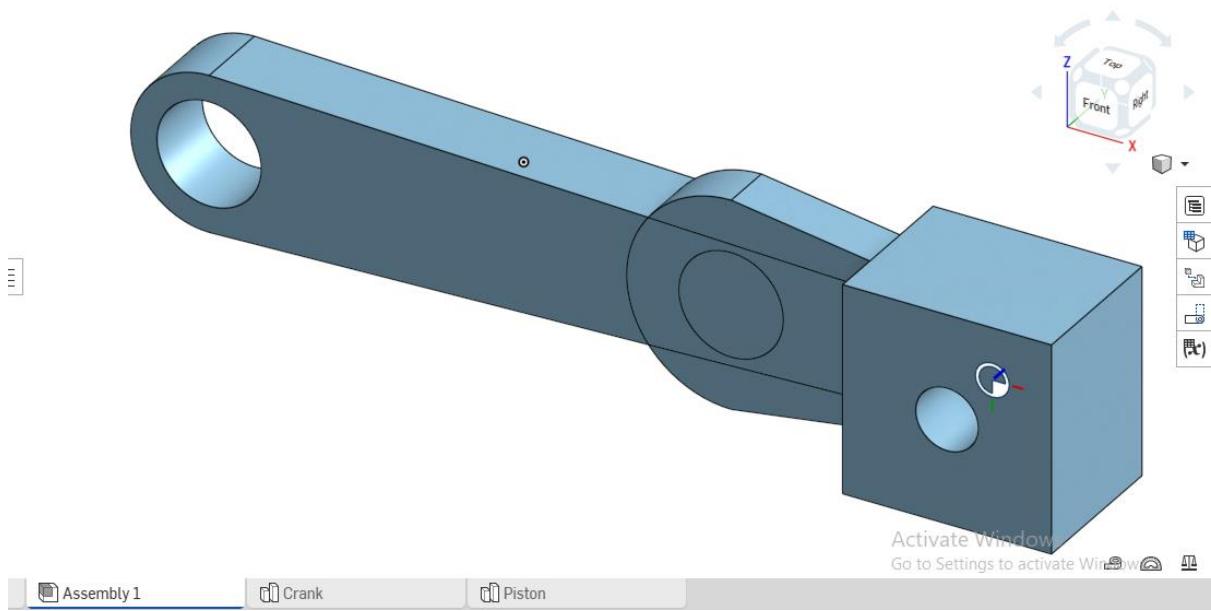
Components & Assembly

- **Crank:** A 50mm offset arm designed to convert rotational motion into linear motion.
- **Connecting Rod:** The bridge between the Crank and the Piston (150mm length).
- **Piston (Slider):** A block constrained to move in a linear path, simulating the piston stroke in a cylinder.

Constraints and Mates

To achieve realistic motion, the following **Mates** were applied in the Assembly:

1. **Fixed Mate:** Applied to the base of the Crank to stabilize the entire mechanism.
2. **Revolute Mate 1:** Applied between the Crank and the Connecting Rod (Big End).
3. **Revolute Mate 2:** Applied between the Connecting Rod (Small End) and the Piston.
4. **Slider/Parallel Mate:** Applied to the Piston to ensure it moves only along a single axis.



Motion Analysis

By animating the first Revolute Mate, the mechanism successfully demonstrated the conversion of **360° rotation** (Crank) into **reciprocating linear motion** (Piston).

