

**Project 2.2.3 Windmill Construction**

|  |  |
| --- | --- |
| Introduction  As you know from your science class or Energy and the Environment unit, a windmill converts wind energy to a useful mechanical energy. One real-world use of a windmill is to grind grain into flour. The rotary movement of the sail, turned by the wind, changes the direction of motion by 90º.  Equipment   * Engineering notebook * Pencil * VEX kits | MPj04027490000[1] |

Procedure

Using your knowledge of the mechanisms recently built in class, design and build a solution to situation **A**, described below. Then modify your solution to solve the problems described in **B**. Each of the situations requires a change in direction of motion by 90º but requires a different input/output speed relationship. Each of the structures you build will need to incorporate a mechanism to change the direction of output and possibly the input/output speed relationship. Your structure must be stable, rigid, and must hold the gears in proper relationship to each other.

**Sketch:** In your engineering notebook, sketch what your first solution should look like. Label the input and output and present your sketch to your instructor before you begin building.

**A)** The output speed and torque are equal to the input speed and torque.

Mechanism’s name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**B)** The output speed is < (less than) the input speed, but the output torque is greater.

Mechanism’s name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Conclusion

1. Which of the mechanisms that you have modeled in class can be used to:
   1. Increase torque and decrease speed –
   2. Increase speed and decrease torque –
   3. Keep constant speed and torque –
   4. Transmit rotary movement at a 90 degree angle –
   5. Reverse the flow of power –
2. What is the purpose of an idler gear?