# Windmill

**Name(s):**

**Date:**

<table>
<thead>
<tr>
<th>NGSS GOALS</th>
<th>BRONZE</th>
<th>SILVER</th>
<th>GOLD</th>
<th>PLATINUM</th>
</tr>
</thead>
</table>

## 1. Student work related to this Crosscutting Concept:

In this project, we built a windmill to lift a treasure chest and a mechanism to power a spinning top.

### Energy and Matter: Flows, Cycles, and Conservation:

Energy may take different forms and can be tracked as energy flows through a design system.

- We built a windmill to lift a treasure chest.
- We built windmill blades with different numbers of sails.
- We met Bronze.
- We built and tested a ratchet mechanism.
- We met Silver.
- We used the gearbox from the windmill to power a spinning top.
- We met Gold.
- We invented and tested new spinners or a spinning game.

## 2. Student work related to this Practice:

In this project, we picked different variables to test so we could investigate what affected the motion of our windmill, the treasure chest, and our spinning tops.

### Planning and Carrying out Investigations:

Plan an investigation and in the investigation identify independent and dependent variables and controls

- We completed at least two out of the three possible investigations on our student worksheet.
- We identified at least one 'control' (e.g. sails, ratchets or spinning tops) and to keep the same through our experiments.
- We met Bronze.
- We completed all three investigations.
- We chose the correct measurement tools.
- We identified at least two 'controls' (e.g. sails, ratchets or spinning tops) to keep the same through our experiments.
- We met Silver.
- We identified at least three 'controls' (e.g. sails, ratchets or spinning tops) to keep the same through our experiments.
- We met Gold.
- We proposed at least one new experiment.
- We identified the independent and dependent variable for our new experiment.
- We identified at least three 'controls' for our new experiment.

## 3. Student work related to this Practice:

In this project, we labeled our design for a windmill.

### Obtaining, Evaluating, and Communicating Information:

Integrate qualitative and/or quantitative information in written text with visual displays to clarify claims and findings.

- We labeled one important part of our 'magnificent mill' design.
- We met Bronze.
- We labeled two more important parts of our 'magnificent mill' design.
- We explained how one of the important parts of our 'magnificent mill' works.
- We met Silver.
- We explained how all three important parts of our 'magnificent mill' work.
- We met Gold.
- We created and shared our diagram and explanation with classmates.
- We revised our work and made it more clear for our classmates to understand.

Notes: