Start by building the example Wind Lift, then turn it into your own unique design.

For use with TeacherGeek Wind Lift Activity Pack, or Maker Cart. Find documents and activity materials at teachergeek.com.
Wind Lift Build Guide

Cut

Push, Wiggle,

Push, wiggle or tap dowels into holes.

Tap

Use a hammer and slider block to tap dowels farther through holes.

Quick Tip!
Use a crayon, or soap on the end of a Dowel to make building easier.

Ream

Most parts have holes with teeth. The teeth hold dowels (keep dowels from falling out).

Push & Twirl
A reamer removes teeth from a hole. This allows a dowel to spin in the hole.

Only ream holes where dowels should spin

Never ream pulleys, gears, wheels, or any hole a dowel stays stuck into.

Screws & Nuts

Screws (without nuts) can connect parts, and allow them to rotate.

Screws (with a nut) can connect parts, and keep them from rotating.

Stop Clip
Press a stop clip onto a dowel to keep it from sliding or use it as a hook for a string / rubber band. It takes little force to get it on.

Slide Stop
Cut slide stop into sections. Use slide stop on dowels to stop dowels from sliding through reamed holes.
Below is the list of “ingredients” you’ll need to build one Wind Lift. It includes some extra components to allow you to create your own unique design.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Blocks</td>
<td>4 - Dowels 300mm (12”)</td>
</tr>
<tr>
<td>1</td>
<td>Hole Plate</td>
<td>1 - Slide Stop 100mm (3”)</td>
</tr>
<tr>
<td>2</td>
<td>25mm Screws #10 25mm (1”)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mini Hub Screw</td>
<td>1 - Mini Hub Cover</td>
</tr>
<tr>
<td>1</td>
<td>Mini Hub Cover</td>
<td>1 - Mini Hub Base</td>
</tr>
<tr>
<td>10</td>
<td>Large Project Sticks</td>
<td>1 - Wire Roll or section</td>
</tr>
<tr>
<td>1</td>
<td>Portion Cup</td>
<td></td>
</tr>
<tr>
<td>450mm</td>
<td>Tape</td>
<td></td>
</tr>
<tr>
<td>Pennies</td>
<td>Recycling Materials (for blades)</td>
<td></td>
</tr>
</tbody>
</table>

**TeacherGeek Components**

**TeacherGeek Tools You’ll Need**

- **Multi-Cutter**
  - SKU 1823-81
- **Reamer**
  - SKU 1823-87
- **Screwdriver**
  - SKU 1823-90
- **Pliers**
  - SKU 1823-86

**Materials You Supply**

- **Tape**
- **String** 450mm (1.5ft)
- **Pennies** 100 or more to lift
- **Recycling Materials** (for blades)
Let's Get Started

1. **Attach** two **blocks** to the **hole plate** using a **25mm screw** and **nut**.

   ![Diagram of attaching blocks to hole plate]

2. **Take two dowels. Tap** each one into the **middle hole** of a **block**.

   ![Diagram of tapping dowels into block]

3. **Push dowels through the blocks** on the **hole plate** as shown.

   ![Diagram of pushing dowels through blocks]

   **Quick Tip**
   Keep block holes lined up straight.

   ![Diagram of quick tip]

   **Do not ream any holes.**
4. Cut a **15cm (4”)** dowel.

5. **Insert** the **dowel** into the **block** holes in the **uprights** as shown.

6. **Ream** the two holes marked with the + symbol.

7. Cut a **25cm (10”)** dowel.

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*Quick Tip*

Be sure to ream holes very well.
8. **Cut a 6mm (¼″) slide stop section.**

9. **Push the slide stop 5cm (2″) onto the dowel.**

10. **Push or tap the mini hub base onto the dowel as shown.**

11. **Attach the mini hub cover to the base using a mini hub screw.**

12. **Slide the dowel into the reamed holes of the blocks as shown.**

13. **Tape the 45cm (1.5ft) string onto the dowel in the reamed holes.**
14 Make a **handle** for the **portion cup** out of **wire**. **Poke** two **holes** with **scissors** or a **screwdriver** to **tie** the **wire** through.

**Quick Tip**
Add more slide stop to keep the dowel from falling out.

15 **Tie** the **handle** to the **string**.

**Congratulations!**
You did it. You made the lift mechanism of your design.
Experiment and play.
Spin the dowel to see how the cup rises and lowers.
Next, let’s add blades to use the power of the wind.
Now it’s time to make your blades. Make the example blades shown below. Then, in the Engineering Challenges, make them into your own unique design.

16 Cut **points** off the **large bamboo project sticks**.

17 Tape your **recycling materials** (cardboard, card stock, cereal boxes, etc.) to the **skewers** as shown below.

a. Cut a section of **recycling material**. This will be one of your **blades**.

b. Place **tape** half over the edge of the **blade**.

c. Place a **stick** at the edge of the **blade**, overhanging to one side.

d. Fold the **tape** over the **stick**. **Press** to secure tape.
18 **Loosen** the **mini hub screw** about **1 turn** to allow the **project sticks** to **slide** in.

**A** First, **loosen** the **mini hub screw** by **1 full turns**.

**B** Then, carefully **slide** the **sticks** into the **mini hub’s holes**. **Angle** your **blades** and **re-tighten**.

If you are going to do the optional **Wind Lift Lab**, now’s the time!