If Doing This Activity With Young Children:
Have an adult assemble it first (using this build guide), and then give to children to tinker and engineer with.

WARNING!
Small Parts, Choking Hazard, For ages 4 and Up. Use only with Adult Supervision.

Download Documents at teachergeek.org/learn
You’ll need these components to create one Gears & Pulleys Tinker Set.

8 – Pulleys
Two of the following pulleys:
9mm, 25.5mm, 55.5mm, 70mm

8 – Gears
Two each of the following gears:
10, 20, 40, 50 Tooth

4 – Blocks

2 – Hole Plates

4 – Dowels
5mmx300mm (12in)

10 – Rubber Bands
Small (#16)

This isn’t a kit. With TeacherGeek, you get to really build (cut, ream, screw). Here are tools you’ll need to get started. They can be shared, between kids/groups, if needed.

- TeacherGeek Multi-Cutter
- Tapping Block
- Small Hammer

Get individual tools, or the complete TeacherGeek / Maker Tool Set
Single SKU 1823-24
Class Set SKU 1823-85
Tools for ages 13 and above, or with adult supervision.

Tip: Save all your materials (even what you cut off). Keep them in a bag. They can be used later.
**Gears & Pulleys**

**Tinker Set - Build Guide**

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**Cut**

*Multi-Cutters* cut wood & plastic (like *dowels* and *connector strips*). They do not cut metal.

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**Push, Wiggle,**

Push, wiggle or tap *dowels* into holes.

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**Tap**

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

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**Quick Tip!**

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

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**Ream**

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

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**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.

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**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.

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**Slide Stop**

Cut slide stop into sections. Use slide stop on *dowels* to stop *dowels* from sliding thru reamed holes.

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

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Components from teachergeek.com.

Adult supervision required for children under 12.
Build the Base

1. **Cut** four 3cm (1in) **dowels**.

   ![Dowels](image1.png)

2. Tap or push the **dowels** into two, stacked, upside-down **hole plates**.

   ![Dowels in plates](image2.png)

   *Tip:* Use a pencil sharpener to clean up damaged dowel ends. Don’t sharpen it to a point; only take a little off.

   ![Dowel END fixed with a pencil sharpener](image3.png)

   **Congratulations!**
   Your **base** is done.

   ![Base](image4.png)

   Now, it’s time to construct your gears and pulleys for your tinker set.
3 Cut 16 5cm (2in) dowels. These will become shafts for gears.

4 Tap a shaft into each gear’s center hole, so the gear is in the center of the shaft.

5 Tap a shaft into each pulley center hole, so the pulley is in the center of the shaft.

Tip: Tap the dowel through the gear or pulley, and down into the groove on a tapping block.

Do not ream any holes.
**Gear Mechanisms**

6. **Place gears into the base.** Position them so that the teeth **mesh**. If gears are too close, or too far away, the teeth will not mesh correctly.

7. **Keep experimenting…** Rearrange how the gears mesh.

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**Pulley Mechanisms**

8. **Place pulleys into the base.** They should not touch each other. Use **rubber bands** (belts) to connect them.
Want more room to play with gears and pulleys? **Bases can be combined using blocks.**

Bases can be combined long, or wide.

If you are going to do the optional **Ratio Lab**, now's the time.

If you are going to do the optional **Challenges**, now's the time.

Documents at teachergeek.com/learn