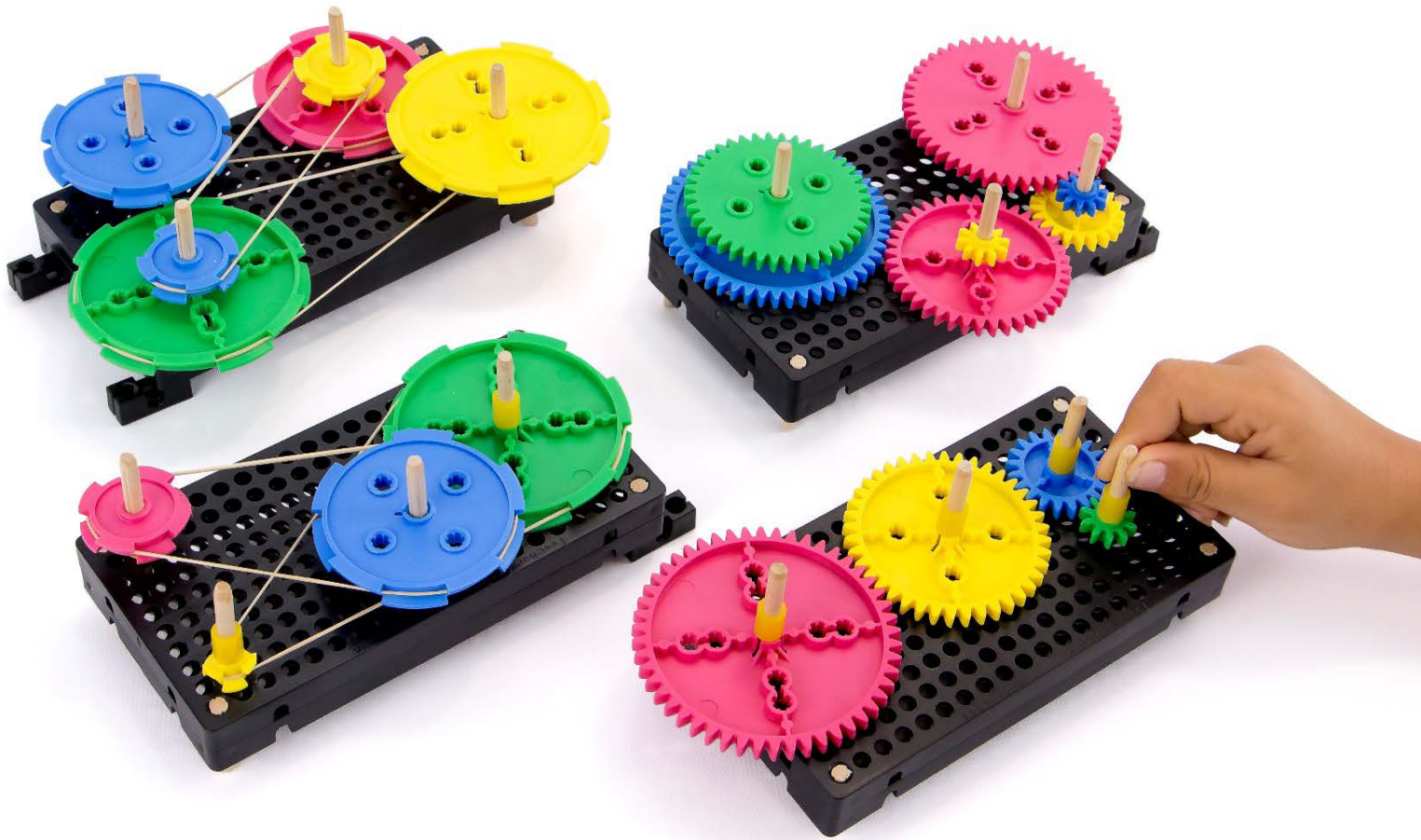




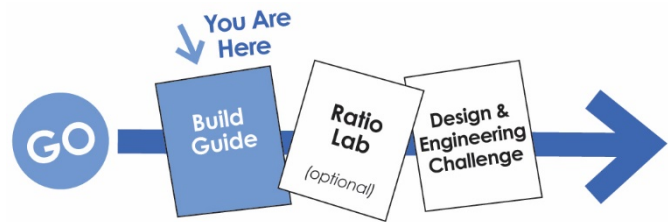
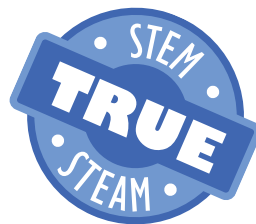
Gears & Pulleys Tinker Set - Build Guide



► **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

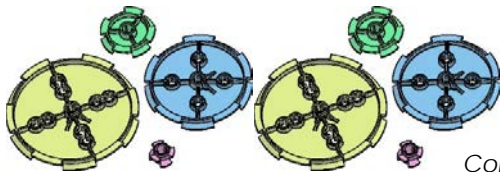


Gears & Pulleys Tinker Set - Build Guide



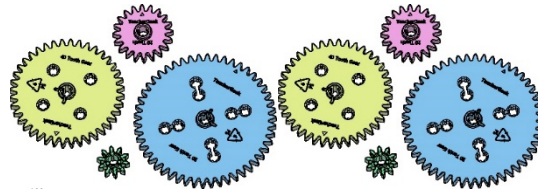
TeacherGeek Supplies

You'll need these components to create one Gears & Pulleys Tinker Set.



8 - Pulleys

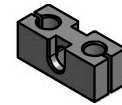
Two of the following pulleys:
9mm, 25.5mm, 55.5mm, 70mm



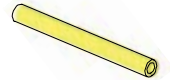
Colors will vary.

8 - Gears

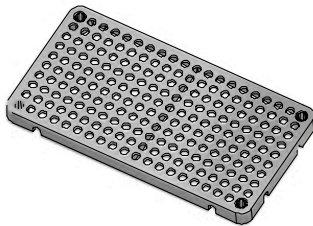
Two of the following gears:
10, 20, 40, 50 Tooth



2 - Blocks



1 - Slide Stop



2 - Hole Plates



4 - Dowels

5mmx300mm (12in)



6 - Rubber Bands

Small (#16)

TeacherGeek Tools

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

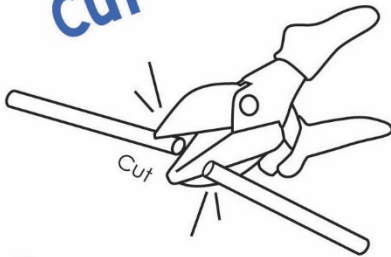
Tip: Save all your materials (even what you cut off). Keep them in a bag. They can be used later.



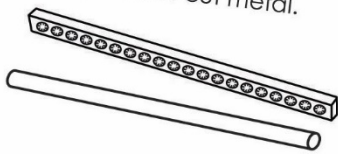
Gears & Pulleys Tinker Set - Build Guide



Cut



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

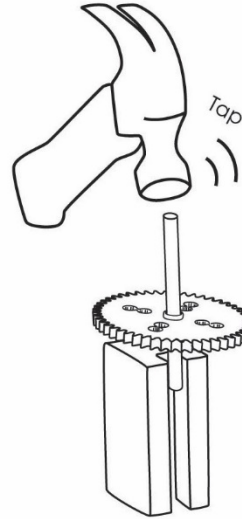


Push, Wiggle,

Push, wiggle or tap **dowels** into holes.



Tap



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

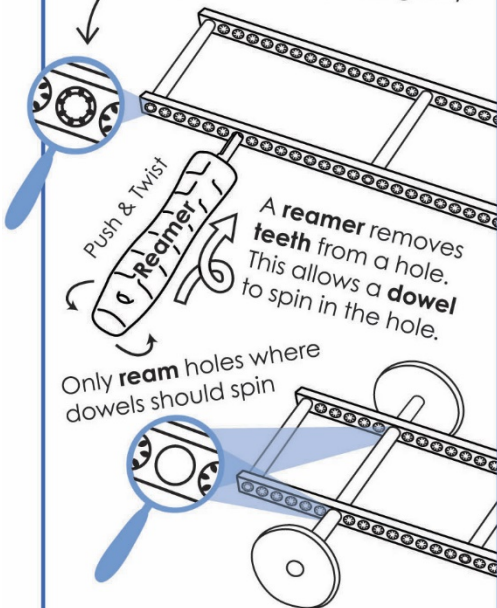
Quick Tip!



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).



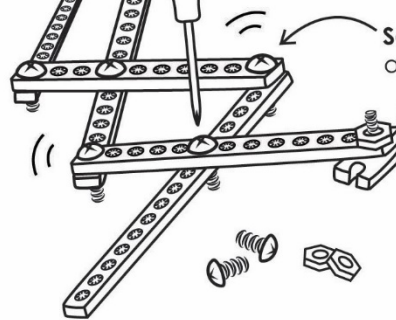
A **reamer** removes **teeth** from a hole. This allows a **dowel** to spin in the hole.

Only **ream** holes where dowels should spin

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

Screws & Nuts

Do not **ream** holes you will put **screws** into.



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

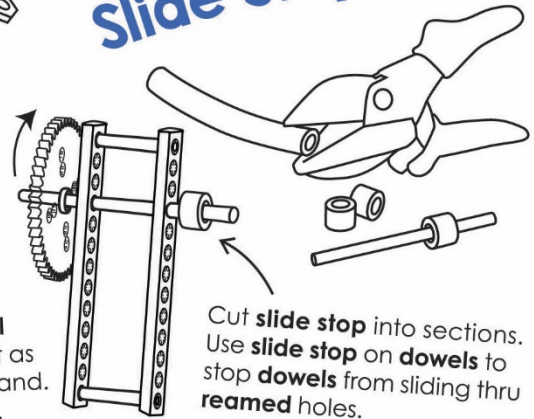
Screws (with a nut) can connect parts, and keep them from rotating.

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 thru **reamed** holes.

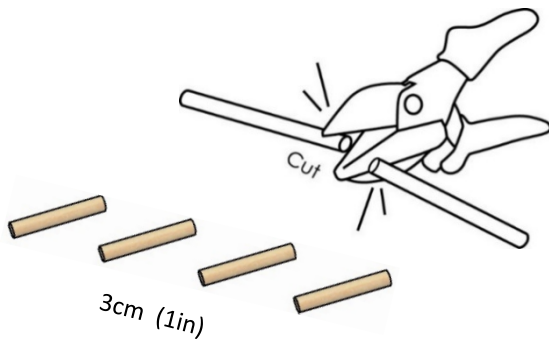


Gears & Pulleys Tinker Set - Build Guide



Build the Base

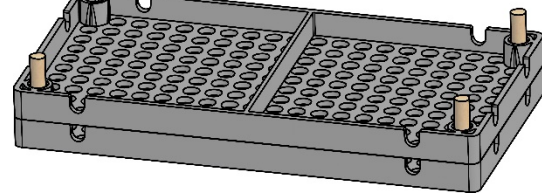
1 Cut four 3cm (1in) dowels.



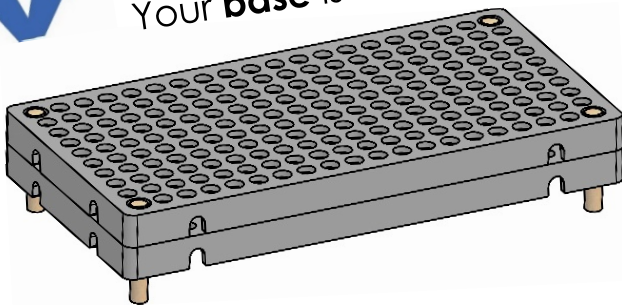
2 Tap or push the dowels into two, stacked, upside-down hole plates.



Do not ream any holes.

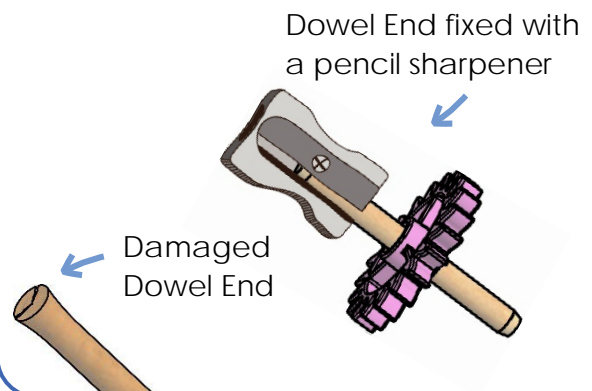


✓ **Congratulations!**
Your **base** is done.



▶ Now, it's time to construct your gears and pulleys for your tinker set.

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



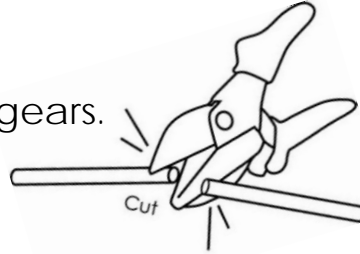
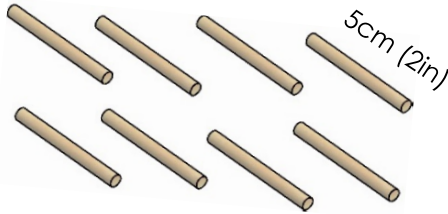


Gears & Pulleys Tinker Set - Build Guide

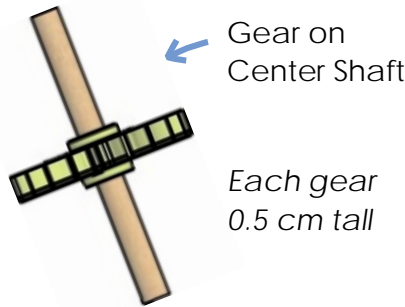


Gears & Pulleys

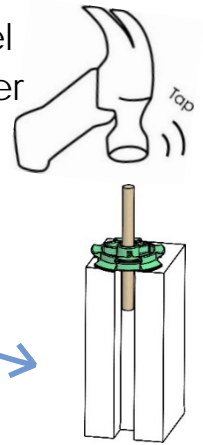
3 Cut two 5cm (2in) dowels.
These will become **shafts** for gears.



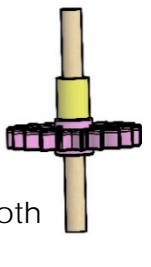
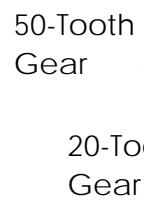
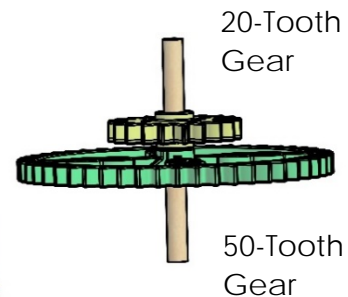
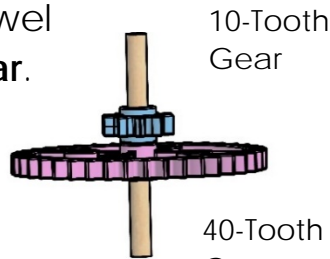
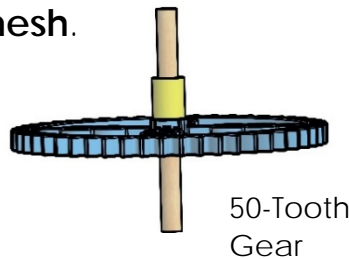
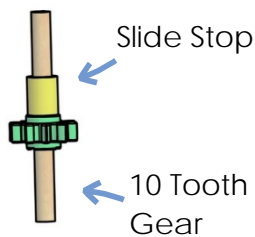
4 Tap a **shaft** into each gear center **hole**, so the gear is in the **center** of the shaft.



Tip: Tap the dowel through the center hole of a gear or pulley, and down into the groove on a wooden **tapping block**.



5 Stack two **gears** on the dowel to create a **compound gear**. Slide one 0.5 cm piece of **slide stop** on single gear dowels – this will help each level, **mesh**.



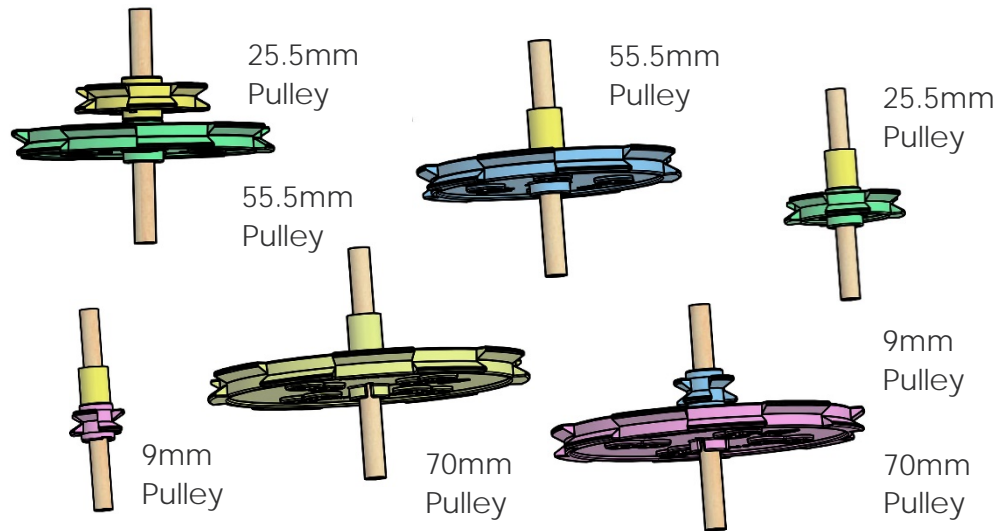
Finished Compound Gears



Gears & Pulleys Tinker Set - Build Guide



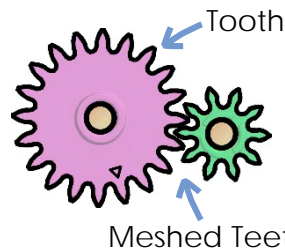
6 Stack two **pulleys** on the dowel to create a **compound pulley**. Slide one 0.5 cm piece of **slide stop** on single pulley dowels – this will help each level line up.



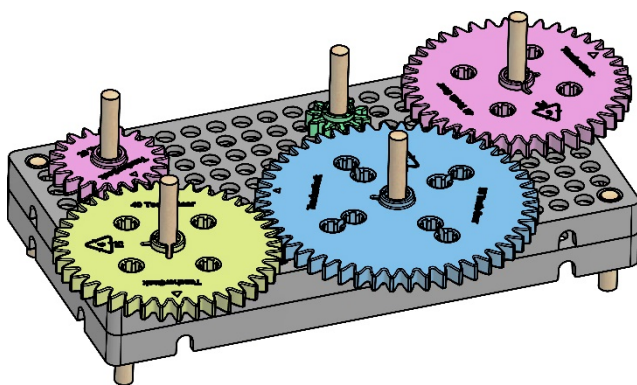
Finished Compound Pulleys

Gear Mechanisms

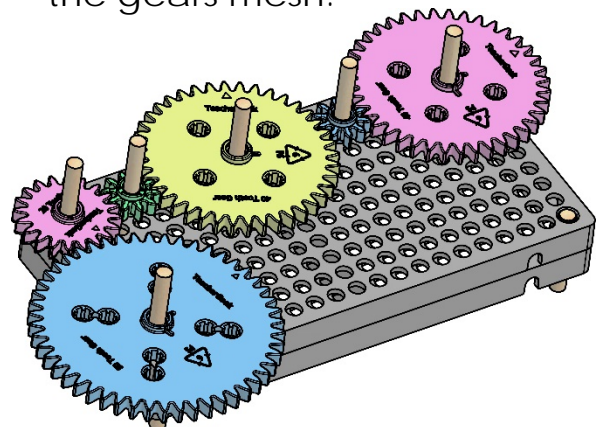
7 Place **gears** into the **base**. Position them so that the teeth **mesh**. If gears are too close, or too far away, the teeth will not mesh correctly.



A gear is a wheel with teeth. The teeth **mesh** (connect) with other gears.



8 Keep experimenting... Rearrange how the gears mesh.



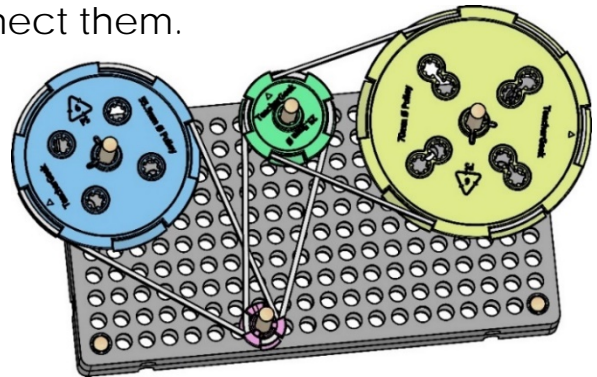
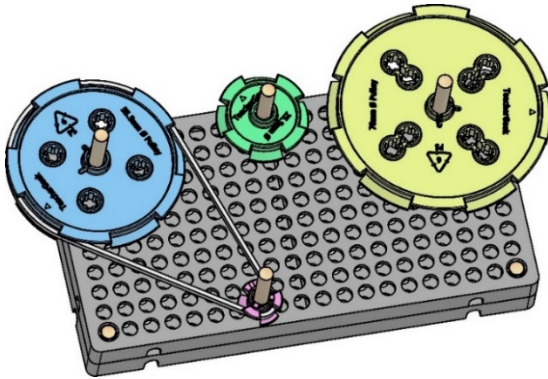


Gears & Pulleys Tinker Set - Build Guide



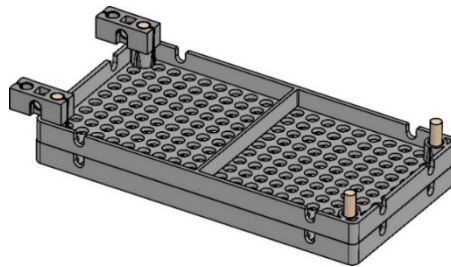
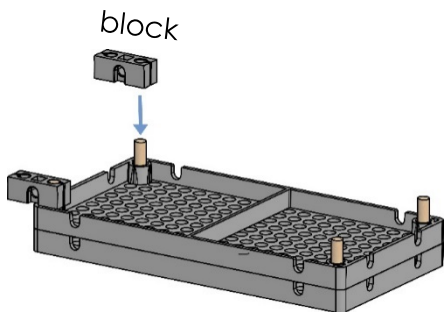
Pulley Mechanisms

9 Place **pulleys** into the **base**. They should not touch each other. Use **rubber bands** (belts) to connect them.

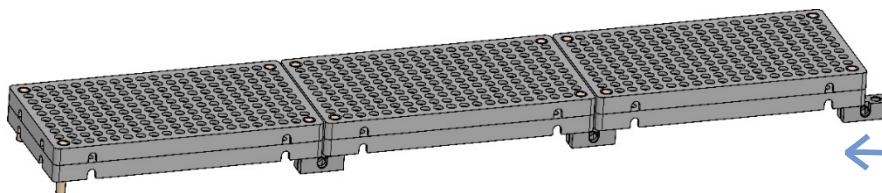


Bigger Bases

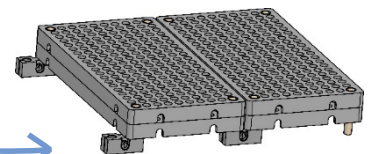
10 Want more room to play with gears and pulleys? Bases can be combined using **blocks**.



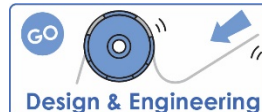
Do not ream any holes.



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