



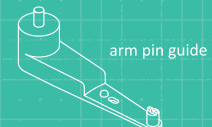
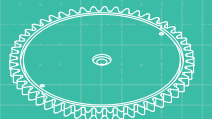
Start Here!

INCLUDES:



base

50-tooth gear



arm pin guide



15mm screw



flange bearing



4 rubber feet



3 pivot posts

16-tooth gear



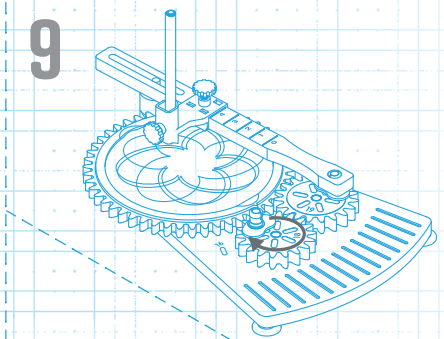
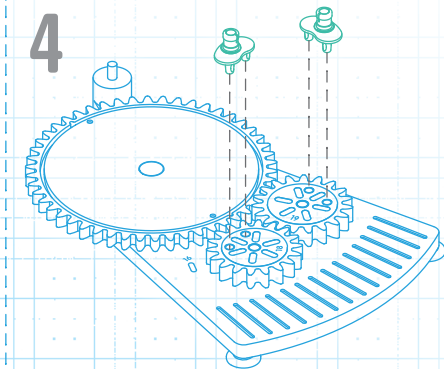
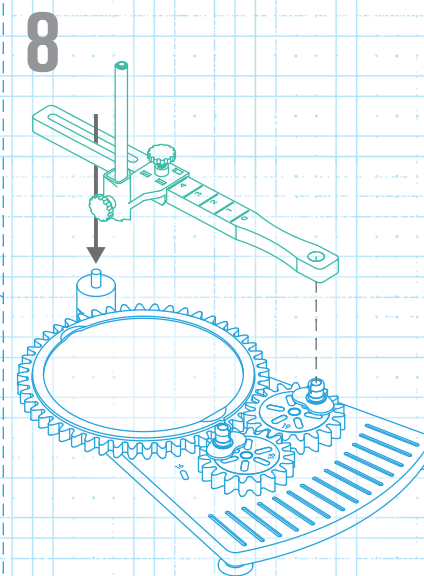
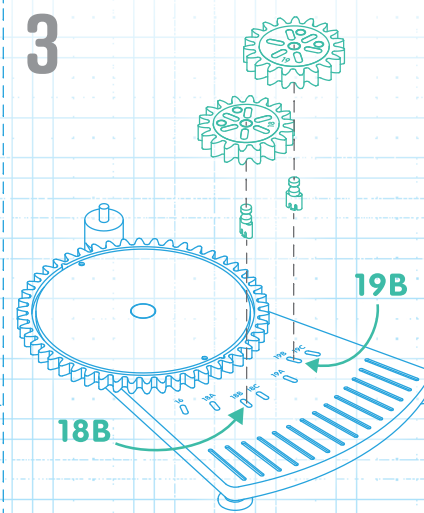
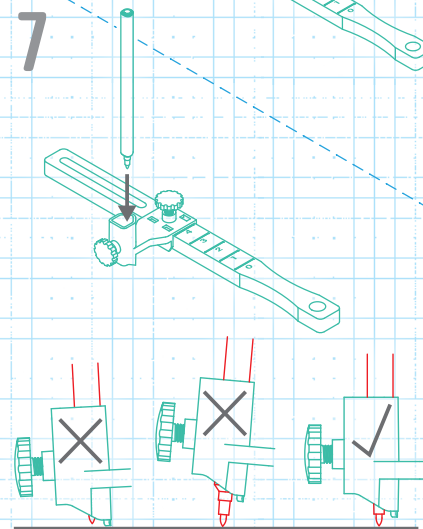
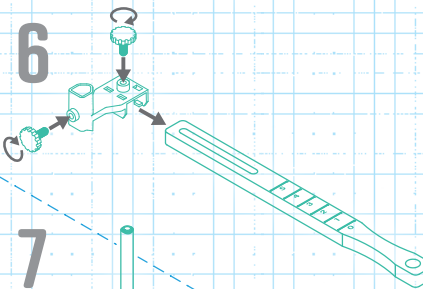
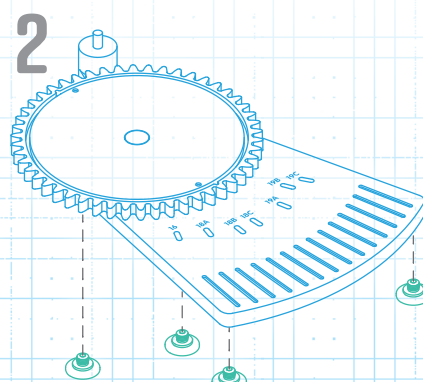
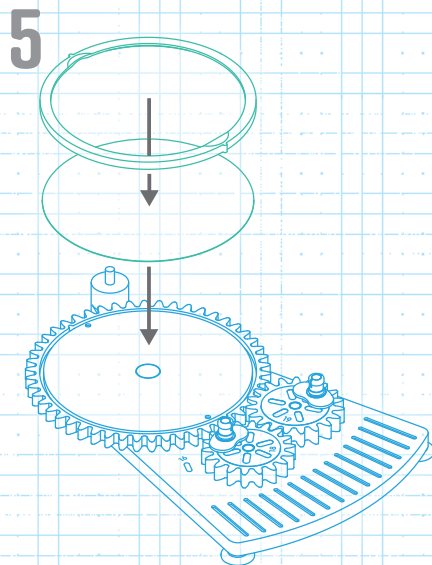
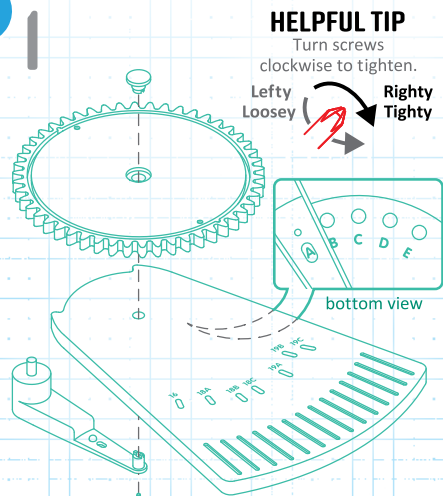
18-tooth gear



19-tooth gear

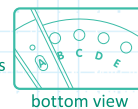


2 press cranks



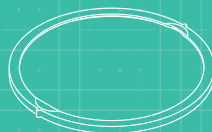
TRY DIFFERENT SETTINGS!

1. Plug arm pin guide into holes A, B, C, D, or E.
2. Position pen holder on the left or right side of the drawing arm.
3. Slide the pen holder on the drawing arm to positions 0, 1, 2, 3, 4, or 5. Just make sure the pen always stays inside the ring!
4. Use two- or three-gear combinations to create different patterns.
5. Trace the template onto paper to create additional drawing disks. For more color options, use your own ballpoint or felt tip pens!



bottom view

Now fold up this guide book and have fun innovating with your Art Gears!



paper ring



pen holder



2 thumb screws



drawing arm



3 felt tip pens



5 blank disks



disk template



Phillips screwdriver

Please retain for information.

Innovation Academy
Art Gears #30577

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Innovation Academy™

Art Gears

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Your journey to innovative discovery begins here! This Innovation Academy project will challenge you to create, invent, experiment, and play as you explore

Physics & Mechanisms

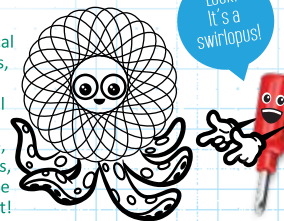
Ready to accept the challenge? Then let the quest begin!

Imagination Station

GET IMAGINATIVE WITH ART!

Take your symmetrical drawings to the next level, adding details with paints, markers, stickers, and other materials.

Use your imagination and create a fantastical creature, adding arms, legs, and other fun features to your spiral drawing. Then give your creature a name, describe where it lives, what it eats, and make up a fun story about it!



Look! It's a swirltopus!

EXCELLENCE IN INNOVATION

Place Seal Here

You geared up to become an awesome Innovator in Gears and Symmetry. Place your Innovation Academy seal here to mark your accomplishments in Physics & Mechanisms. Well done!

What's Going On?

Your art gears drawing machine creates mesmerizing designs out of perfectly formed curves and loops with the help of gears.

So what are gears? Let's find out!

GEARS ARE WHEELS WITH TEETH THAT CONNECT TO AND POWER OTHER GEARS

When one gear is turned, other connected gears turn as well. Multiple gear wheels can be put together in different combinations. Once they are connected, you only need to power one gear to turn all of them.

Fast Fact
The first gears invented were wooden and had wooden spokes. They were used in clocks.

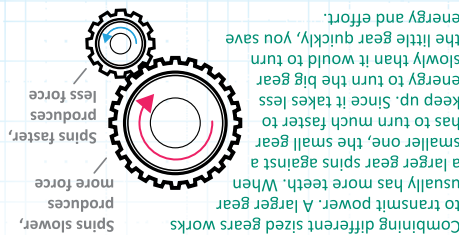
Just Jokin'
What do you get when you cross a clock and a chicken? A cluck!



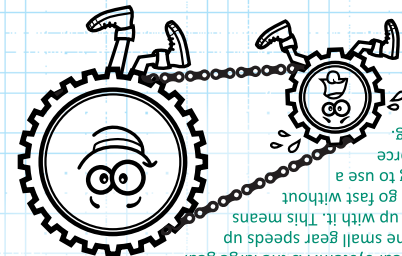
Turn Page

IT'S ALL ABOUT POWER!

The gears of your drawing machine connect to make art. But what is the purpose of gears in everyday life?



Gears on a bicycle work the same way, only they're connected by a chain. When you ride a bike, energy gets transferred from the pedals to the gear system. As the large gear turns, the small gear speeds up. This means you can go fast without needing to use a lot of force pedaling.



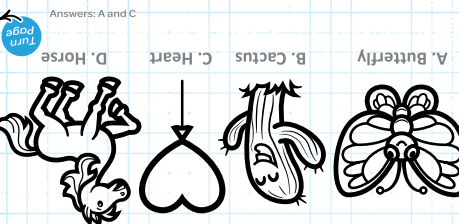
Think About It

Your drawing machine uses gears to power the arm and draw a pattern of looping curves on paper. Do you like the patterns your art gears make? Many people are drawn to objects that have symmetry.



SYMMETRY IS ALL AROUND YOU

You can find symmetrical patterns like the ones you create with your art gears in nature. The petals of a flower, the leaf of a tree, and a honeycomb all have symmetry. Look around. Can you spot other examples of symmetry? Which of the images below are symmetrical?



Turn Page

Innovation Station

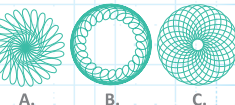
UNLEASH YOUR INNER INNOVATOR!

There are countless ways to innovate, imagine, and play with your art gears!

LET'S EXPERIMENT!

Set up your art gears following the diagram and coordinates shown here with the drawing arm on gear #16. Turn gear #19 until the pattern starts to repeat.

Which image most closely matches the pattern you created?



Count the number of loops in your drawing.

Number of loops: _____

Answers: C: 25

On a blank paper disk, create a new drawing! Move the press crank to gear #18 and put the drawing arm on it. Turn gear #19 until the pattern starts to repeat. Count the loops.

Grab another paper disk, move the drawing arm to gear #19, and turn gear #18 until the pattern starts repeating. Count the loops.

Which gear did you place the drawing arm on to create the most loops?

Which gear arrangements created the same number of loops?

Keep playing with the arrangement of the gears, the pen holder, and the drawing arm to create more amazing works of art!

Answers: #19; #16 and #18

