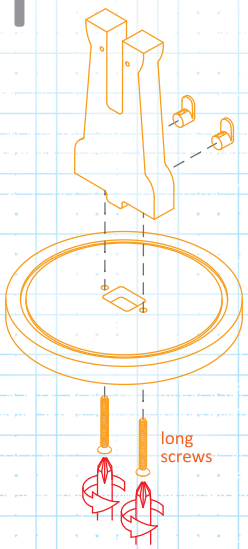
Start Here!

INCLUDES:

- base
- center support
- 2 dowel nuts
- 2 long screws
- bearing bracket
- spinner disc
- spinner post
- 6 short screws
- crank wheel
- crank knob
- crank shaft
- washer

1



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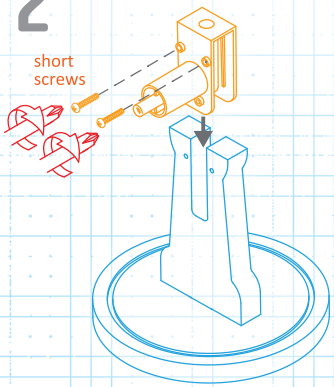
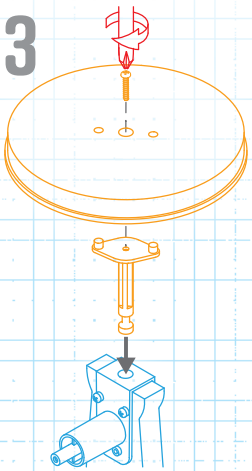


HELPFUL TIP

Turn screws clockwise to tighten.

3



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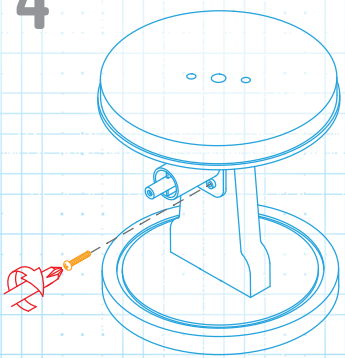

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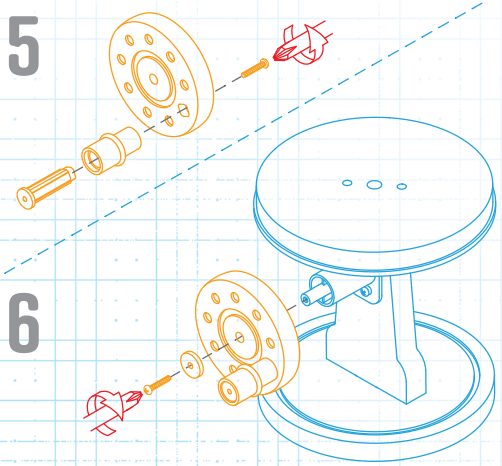
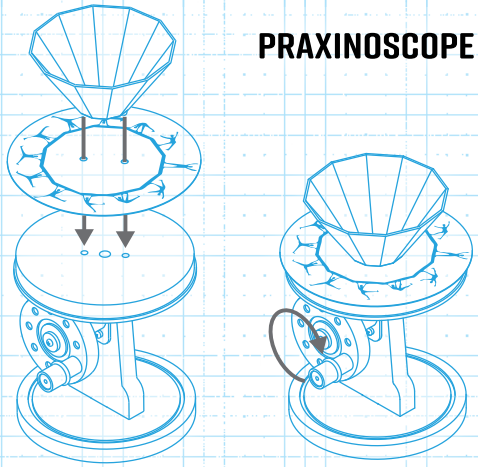
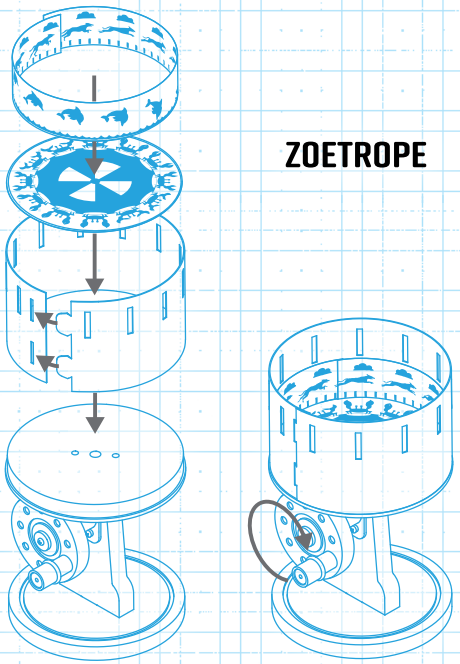


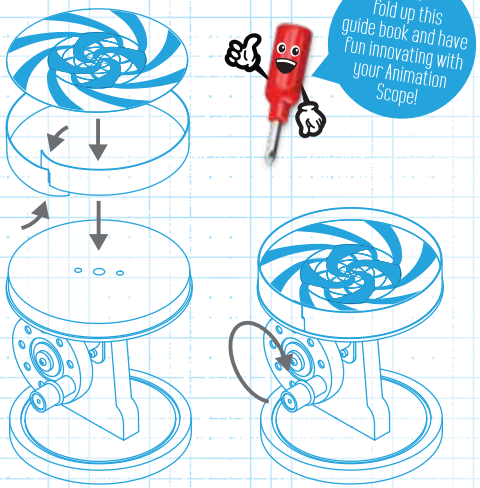
PRAXINOSCOPE



ZOETROPE



ILLUSION MACHINE



- mirror drum
- illusion hoop
- animation drum
- 4 animation wheels
- 4 illusion disks
- 4 animation strips
- 2 sticker sheets
- Phillips screwdriver

Please retain for information.

Innovation Academy
Animation Scope #30586

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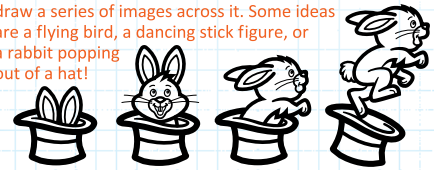
Innovation Station

UNLEASH YOUR INNER INNOVATOR!

There are countless ways to innovate, imagine, and play with your animation scope!

ZOETROPE Use the printed strip and UFO stickers provided to create space animation! Face stickers can go on the blank side. Then cut out your own paper strip and draw a series of images across it. Some ideas are a flying bird, a dancing stick figure, or a rabbit popping out of a hat!



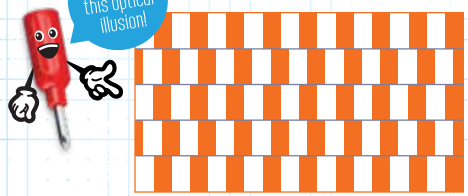
Spin the zoetrope backwards. Is the animation more or less effective? Try your zoetrope in a brightly lit room. Then try it in a dark room shining a flashlight on the images. Which way makes the animation clearer?

PRAXINOSCOPE Use the animation wheel provided and place face stickers around it. UFO stickers work, too! Then cut out your own paper wheels. Create 12 sections and draw an image in each one. On another wheel, draw two images in each section. Is the animation smoother with more images or fewer?

Turn Page

ILLUSION MACHINE Use the blank illusion disk provided or cut out your own paper disks. Then draw unique patterns on them. Try rings, stripes, or zigzags in different sizes and colors. Which patterns and colors create your favorite illusions?

Draw your favorite illusion machine design here:



Are the horizontal lines sloping or straight?

All the lines are straight! Hold a ruler along the lines to check. The orange and white blocks don't line up, so they fool the eyes and the brain into thinking the lines slope.

Did it trick your brain? Show it to others and see how many brains and eyes you can trick!

Think About It

OPTICAL ILLUSIONS trick our eyes to see things incorrectly, like movement when there is none.

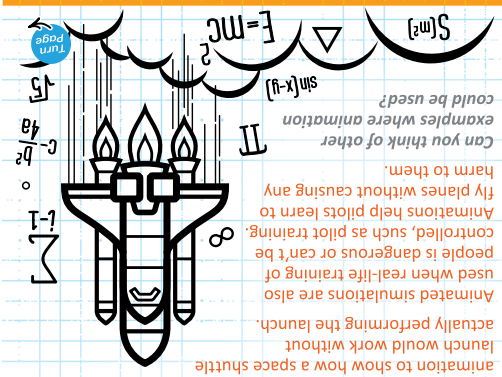
ANIMATION works by presenting many still images quickly so we see them as a continuous moving scene.

ANIMATION ISN'T JUST FOR CARTOONS

Engineers and scientists can use animations to help explain things. For example, an engineer could use animation to show how a space shuttle launch would work without actually performing the launch.

Animated simulations are also used when real-life training of people is dangerous or can't be controlled, such as pilot training. Animations help pilots learn to fly planes without causing any harm to them.

Can you think of other examples where animation could be used?



Turn Page

LET'S GET READY TO ANIMATE! YOUR ANIMATION SCOPE CONTAINS THREE ACTIVITIES:

Fast Fact The word "animation" comes from the Latin word "anima," meaning "the action of giving life to."

1. ZOETROPE

The *zoetrope* is a cylinder with slits. Place an animation strip inside the cylinder, spin, and look through the slits. The images look like they're moving! But how? Viewing the images through the slits keeps them from blurring together, so your eyes see the illusion of motion.

2. PRAXINOSCOPE

The *praxinoscope* creates animation using mirrors. Place a disc on the spinner and give it a whirl. How does the animation you view in the mirrors compare to the animation of the zoetrope?

3. ILLUSION MACHINE

The *illusion machine* produces dizzying optical illusions. Place a disc on the illusion machine and spin it. The image is two dimensional and flat. But the rotating motion tricks your brain into seeing the image in 3-D!

What's Going On?

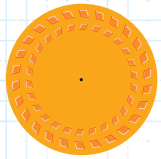
Your animation scope creates animation through optical illusions.

So what is an optical illusion? Let's find out!

OPTICAL ILLUSIONS ARE IMAGES THAT TRICK OUR EYES INTO SEEING THINGS THAT MAY NOT BE REAL

LET'S LOOK AT ONE

Stare at the dot in the center of the image and move your head closer to it. The image looks like it's moving, but it's not.



Optical illusions occur because our brain is trying to make sense of what we see.

An illusion is something seen incorrectly by the eyes.

Animation works by using an optical illusion. When many still pictures flash quickly before your eyes, one after the other, your brain is able to "blend" them together to give the illusion of movement.

Turn Page

Welcome To Innovation Academy

INNOVATORS SHAPE THE WORLD BY:

- Making observations
- Taking risks and thinking outside the box
- Trying, failing, and trying again until they succeed

It's time to have some serious fun with your animation scope! **But first, you must build it.** We have step-by-step instructions to help you. Once you've built it, you can create some awesome optical illusions and animations!

Animation is an imitation of real-life through moving pictures. Animated features are sometimes called cartoons. Quick! Name your favorite animated cartoon!

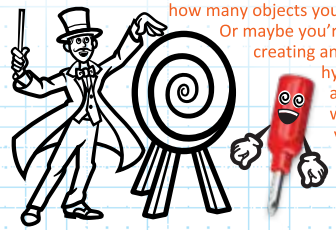
Favorite cartoon:

Building instructions are back here!

Imagination Station

GET IMAGINATIVE WITH ILLUSIONS!

Use your imagination and create a unique purpose for your animation scope. Are you a motorcycle stunt performer that needs an animated simulation to figure out how many objects you can jump over? Or maybe you're a magician creating an illusion that can hypnotize your audience. What will you make your hypnotized audience do?



EXCELLENCE IN INNOVATION

Place Seal Here

You spun the wheel to become an incredible Innovator in Animation. Place your Innovation Academy seal here to mark your accomplishments in **Light & Optics**. Well done!

AGES 8-12

Melissa & Doug

Innovation ACADEMY™

Animation Scope

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

Light & Optics

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