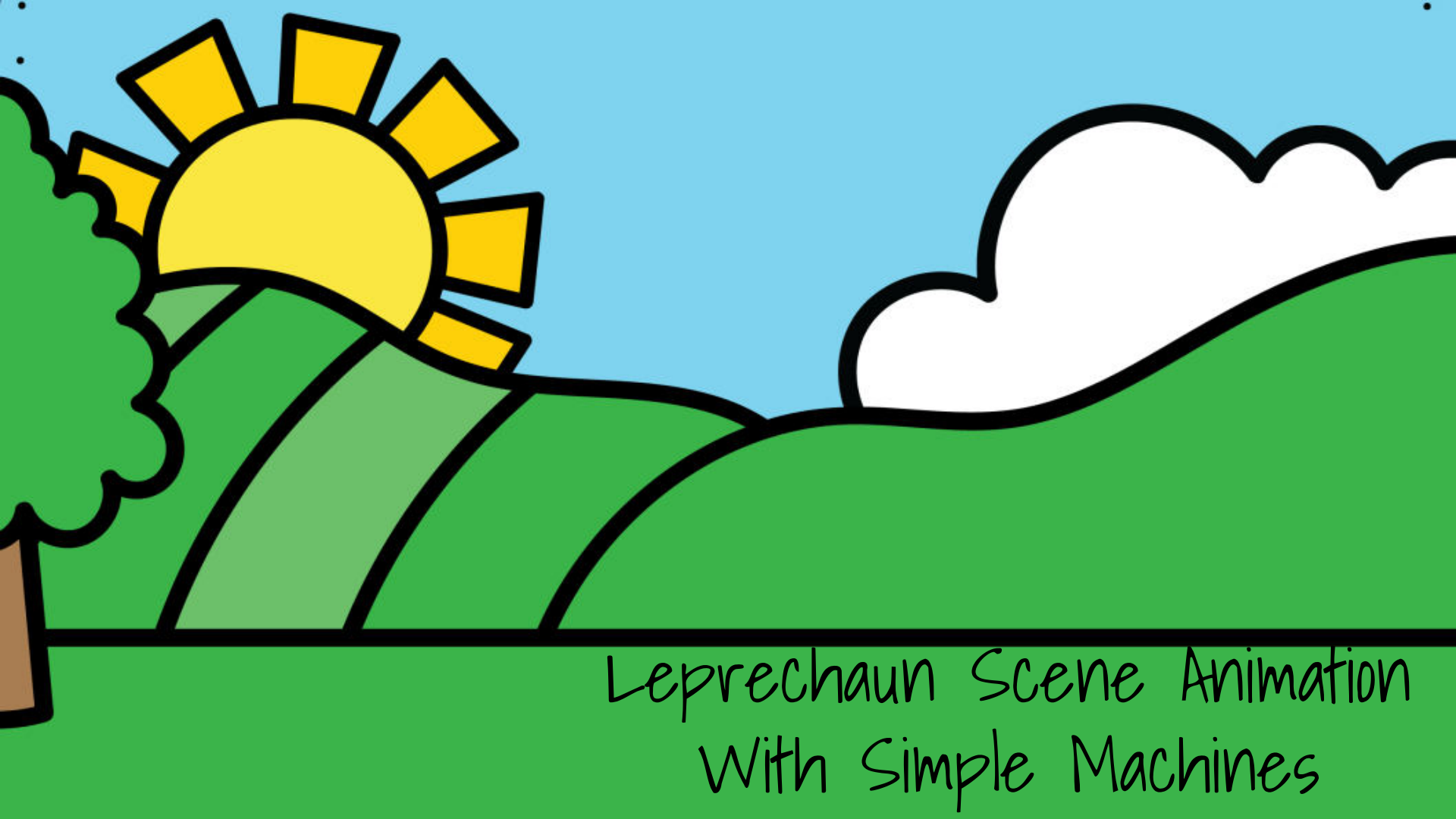

Leprechaun Scene Animation
With Simple Machines

Simple Machines

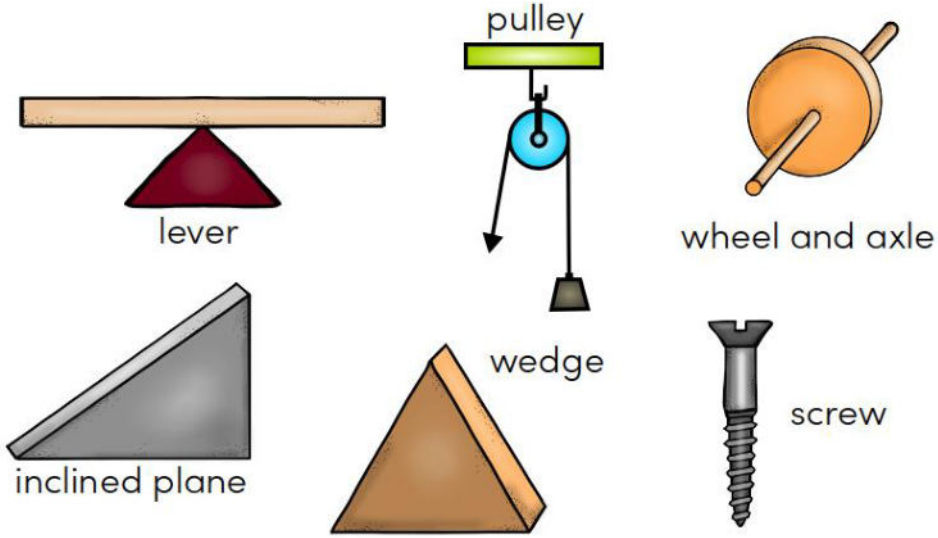
Simple Machines

A simple machine is a tool that makes work easier. Work is the amount of force needed to move an object over a distance. Force is a push or pull on an object.

Simple machines make work easier by 1) increasing the distance the force is applied, 2) changing the direction of the force, or 3), changing the magnitude, or size, of the force. Simple machines can't reduce the amount of work, but they can reduce the effort required (input force) to do the work.

There are six types of simple machines:

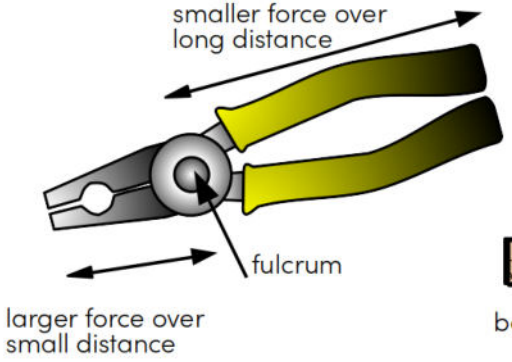
- lever
- pulley
- wheel and axle
- inclined plane
- wedge
- screw

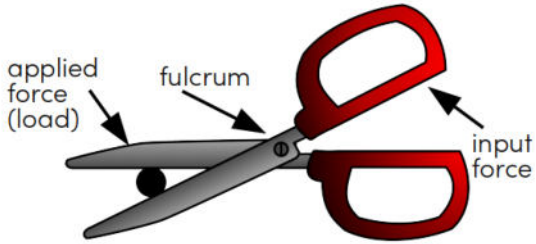


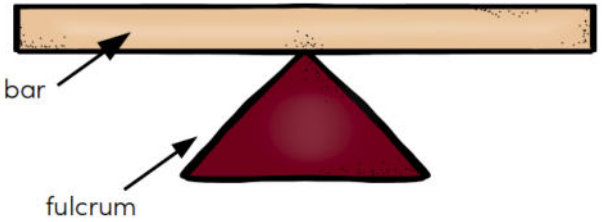
Lever

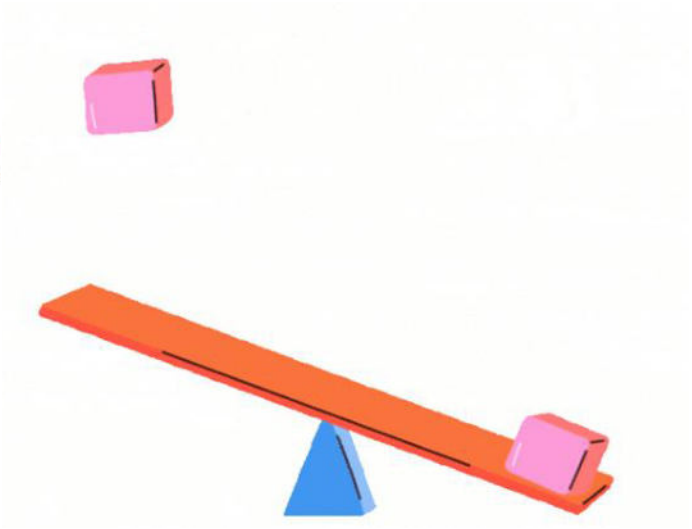
A lever is a bar balanced on a fulcrum that can help lift heavy objects. Levers make work easier by reducing the force needed to lift or move something. Levers convert a small force over a long distance to a large force over a short distance.

Have you ever played on a seesaw? A seesaw is a lever! Other examples of levers you may have used are scissors and pliers.







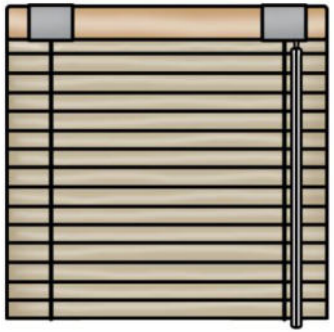


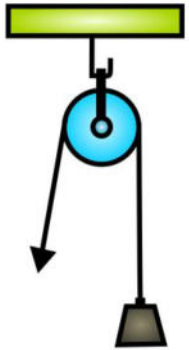
Pulley

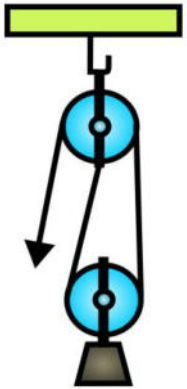
A pulley is a simple machine made with a rope looped over a wheel (or wheels). Pulleys are often used for lifting. When you pull down on one end of the rope, it creates an upward pull on the other side of the rope. The direction of the force is reversed.

You can make the work easier by adding more wheels in a pulley system.

Have you ever used a zip line or raised blinds on a window? Both use pulleys. Pulleys are used in many applications, such as flagpoles, elevators, and
in weight lifting machines.







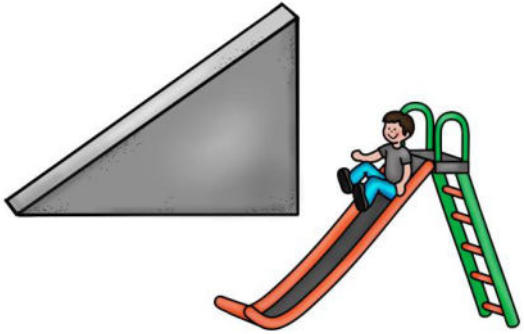
Two wheels makes the work easier!

Inclined Plane

An inclined plane is one of the easiest simple machines to understand. It is simply a ramp; a surface where one end is higher than the other and tilted at an angle. It can be used to more easily raise or lower a load.

Imagine you need to move a heavy object, such as a refrigerator, into a moving truck. Lifting it straight up, though a short distance, is very difficult. You have to work against gravity. By using an inclined plane, or ramp, you still do the same amount of work. You will just have to move the refrigerator a longer distance to accomplish the task.

The longer the inclined plane, the easier the work! An example of an inclined plane you have probably used before is a slide. The ladder is also an inclined plane!

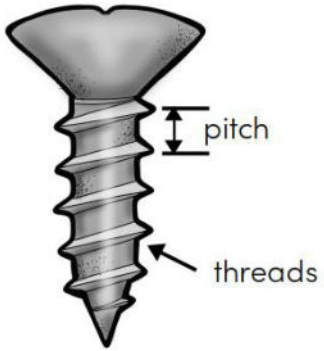


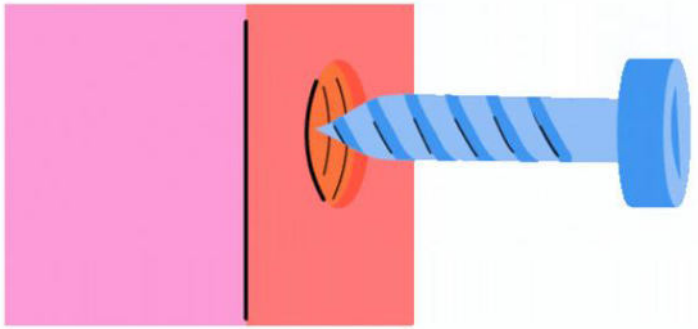
Screw

A screw is a simple machine just like an inclined plane, but it's wrapped around a rod or pole. It converts rotational motion (motion that goes around and around) to linear motion (motion that goes in a straight line).

The grooves that wrap around a screw are called threads. The distance between the threads on a screw is called the pitch. The pitch can be different on different sizes or types of screws. The closer the threads are, the less force it will take to turn the screw (but it will take more turns). The farther apart the threads are, the more force it will take to turn the screw (but it will take fewer turns).

Screws are useful for joining things together. They can also be used to lift heavy objects, or to make holes in materials (a drill bit). Every time you open a jar or bottle with a screw on lid, you use a screw.





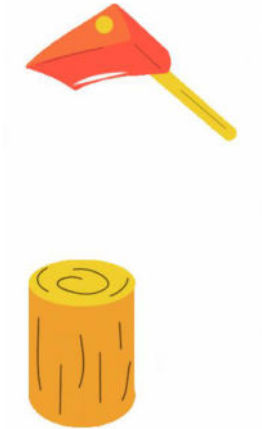
Wedge

A wedge is a simple machine that is very much like two inclined planes put together, and while an inclined plane is stationary (stays in one place), a wedge moves. A wedge helps push things apart.

The blade of a knife is an example of a wedge. Nails, axes, chisels, and doorstops are wedges. Even your teeth are examples of wedges!

Just like inclined planes and screws, the longer and thinner a wedge is, the easier the work is (but it may take longer to drive the wedge all the way in). The shorter and wider a wedge is, the harder the work is.

Scissors are actually made up of two simple machines. They are made levers and wedges. The arms of the scissors are levers and the blades of the scissors are wedges!



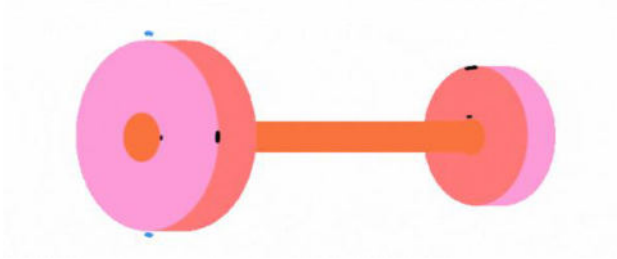
Wheel and Axle

The wheel and axle is a simple machine that has been around for thousands of years. This simple machine has two parts: the wheel, or round part, and the axle, the rod that goes through the center of the wheel and is connected to the wheel.

Wheels make work easier in two ways. To understand the first way, you need to know what friction is. Friction is a force that makes it harder to slide an object. Would you rather push a heavy box across a frozen smooth surface or rocky ground? Smooth ice has much less friction than rocky ground, so it would be much easier to push something heavy on the ice. The wheel helps reduce the friction.

The second way the wheel and axle makes work easier be either increasing the output force, or decreasing the output force, depending on the application.

Wheels and axles are everywhere!
They are in cars, bicycles, skateboards, and more.



Simple Machines Trap

Trap a leprechaun!

Step 1. Think about how you will **trap the leprechaun using at least one simple machine.** Show or write about your idea below:

Step 2. Pick the **backdrop** from the Backdrops section (or create your own) that you want to use and move it to the the following slide.

Step 3. Show how your idea will work on the slide. Label the simple machine(s).

Stop Motion Animation

Animating in Google Slides

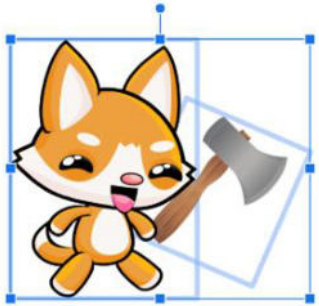
Start with the moving objects mostly off the slide to the left or right if you want them to make an entrance. You can also have them start completely on the slide.

Duplicate the current slide, then select all of the moveable and move them to the right or left (use the arrow key once or twice, such as right+right or right+up). The white vertical line makes it easier to see that the images have moved.

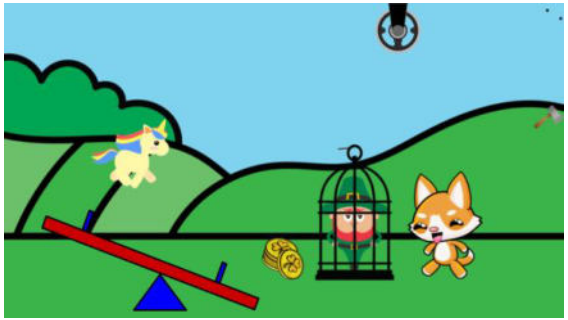
Helpful tips

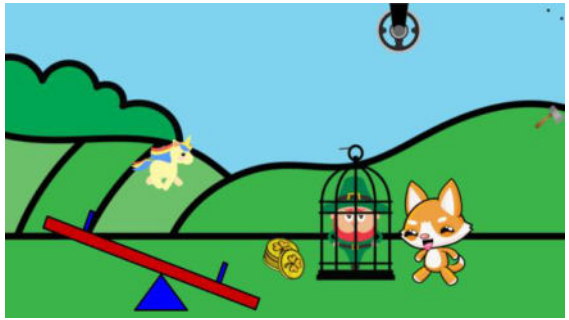
If you are moving objects together, group them first.

Try it! Select the dog and axe by either holding Shift while you click both, or dragging a box around them. Then right click → Group or use Ctrl + Alt + D to group the objects. When you select them, they should be grouped as shown on the right.



To make an object look like it's moving farther away to the background or closer to the foreground, change its size (look at the unicorn).





How to Animate

Duplicate the slide again, and move your images. You will keep duplicating each slide and moving the images each time, until the animation is complete.

Different Ways to Make Objects Move

You can manipulate the objects in several ways:

- Changing the **size** of the object (this makes it look closer to the viewer or father away)
- **Rotating** the object to the left or right
- Changing the **aspect ratio** of the object (stretching it or shrinking it in one dimension). This can make an object look like it is changing its direction.

Make the object larger or smaller.

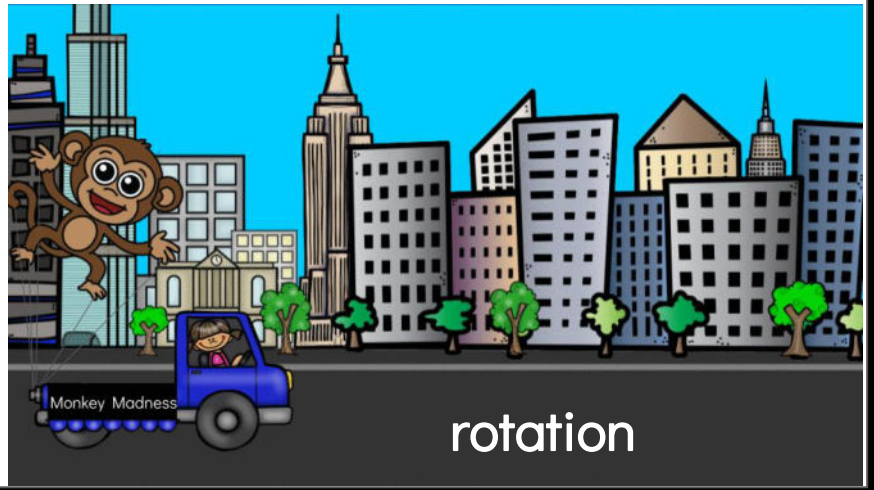
Rotate the object a few degrees to the right or left.

Increase or decrease either the height or the width.

Examples of size, aspect ratio, and rotation changes

These GIFs show a different stop motion animation but the **techniques** are the same for any stop motion animation.

In some cases, you may want to change size **and** rotation, or even all three (size, rotation, and aspect ratio)!



You are now ready to create a stop motion animation.

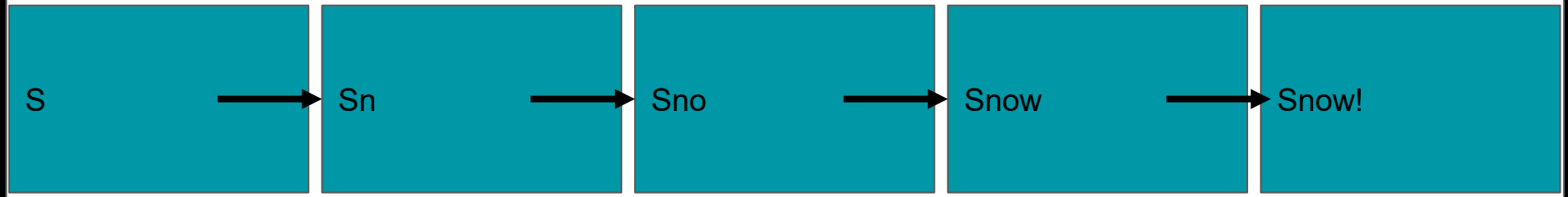
Step 1. Think about how you will **trap the leprechaun using at least one simple machine.** The animation will tell a short story. Show or write about your idea below:

Step 2. Pick the **backdrop** from the Backdrops section (or create your own) that you want to use and move it to the end of this slide presentation. Right click on the slide on the left and choose "Move slide to end." This will be the first slide of your animation.

Step 3. Use the characters and objects provided, create your own, or use Insert → Image → Search the web to find the objects you need for your scene, whether they are static (not moving) or animated. **Copy and paste** the objects to the background slide.

Step 4. Include optional enhancements to the stop motion animation:

- Add multiple animated elements at the same time.
- Add other **static** (not moving) or **animated** components to the slide, such as trees, people, an airplane flying by, etc.
- Add an animated GIF to the slide! Go to Insert → Image → Search the web and search for a "gif" such as "winter gif," "snow gif," etc.
- Add text to the animation. To make the text animated, add just one letter at a time (one per slide):

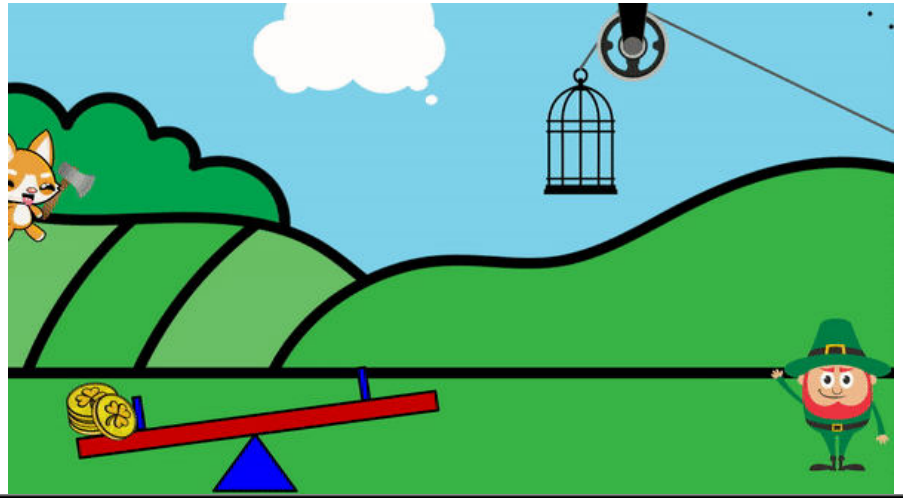


How to Watch Your Stop Motion Animation

When you have completed all of the slides, go to File → Publish to the web
Click to check "Start slideshow as soon as the player loads"
Copy the link in the text box and paste it into a new tab **but do NOT hit Enter.** At the **end of the link** you will see the number **3000**. Change the number to a much smaller number, such as **75** or **100**, then hit enter. Your animation should play.

Animation Example

This leprechaun trap uses a lever (seesaw), a pulley (where the trap is lowered from), and a wedge (the axe the dog uses to cut the pulley cable and trap the leprechaun.



Describe Your Animation

Your Name:	Name of Animation:	Number of Slides/Frames:	Animated Object(s):	Setting
Add text here	Add text here	Add text here	Add text here	Add text here

Describe the stop motion animation:

Add text here

Leprechaun Trap

Simple Machine(s) Used:

Add text here

Describe the leprechaun trap. How does it work?

Add text here

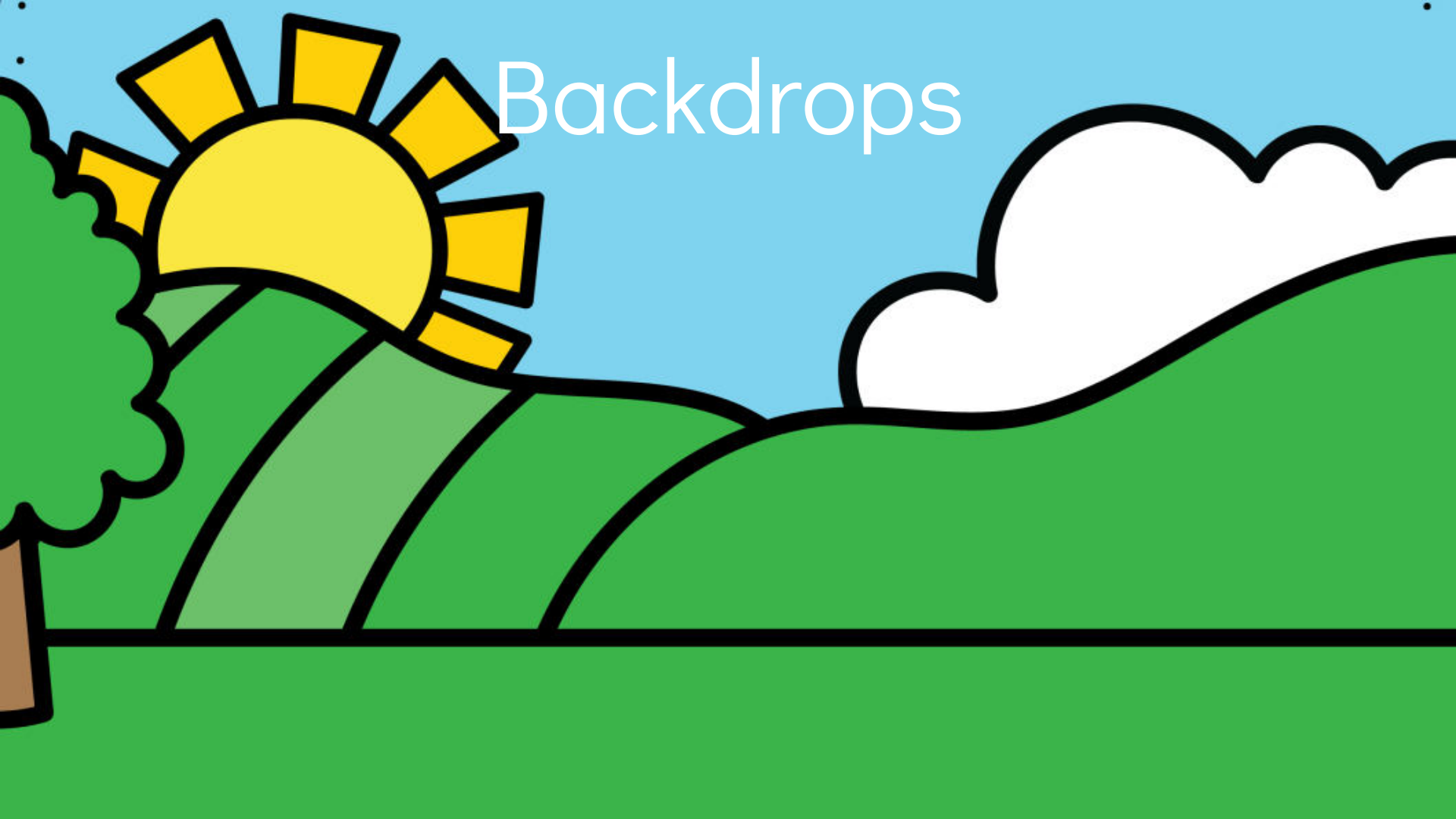
List the materials you would need to build the trap in real life:

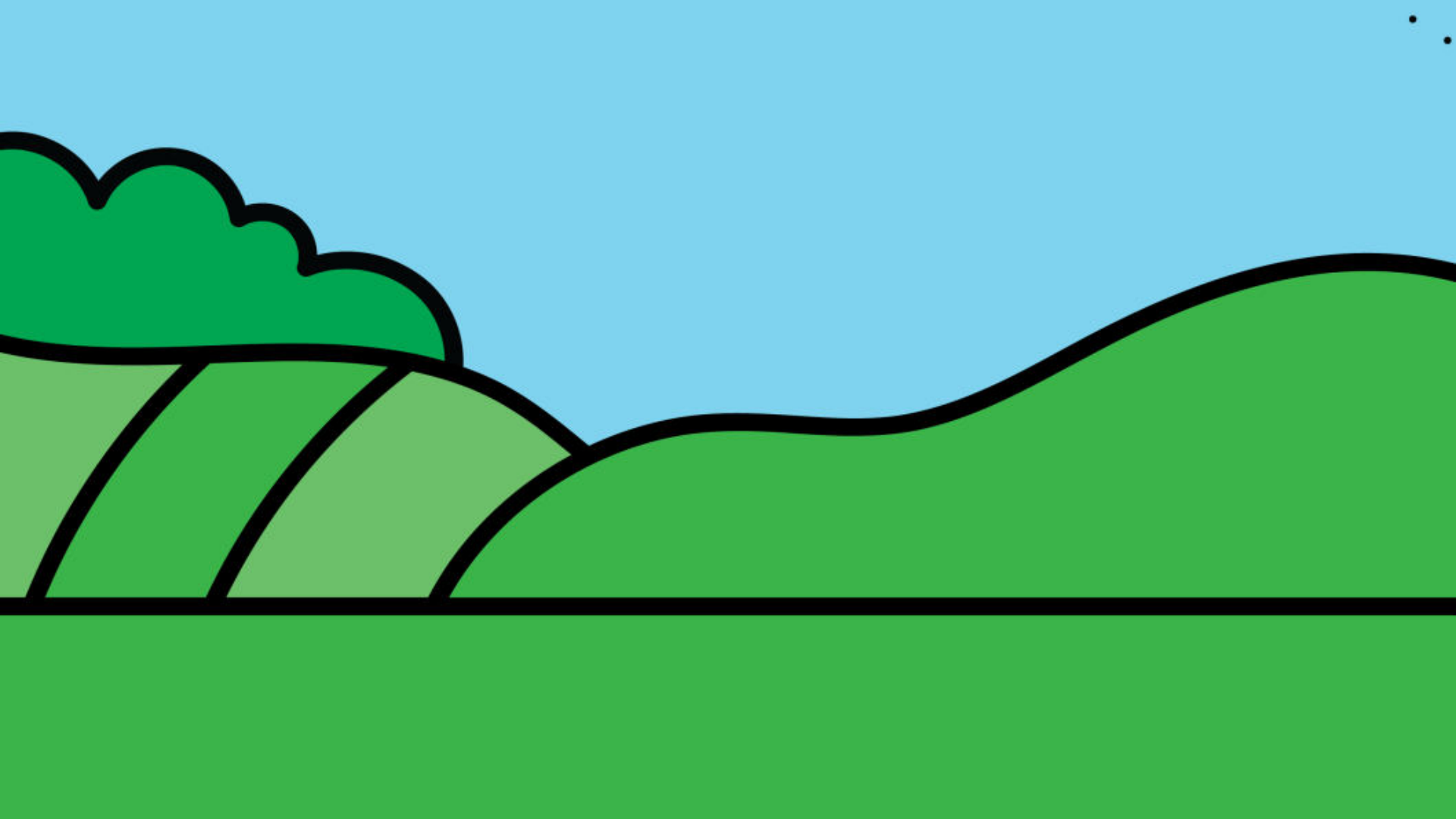
- Add text here

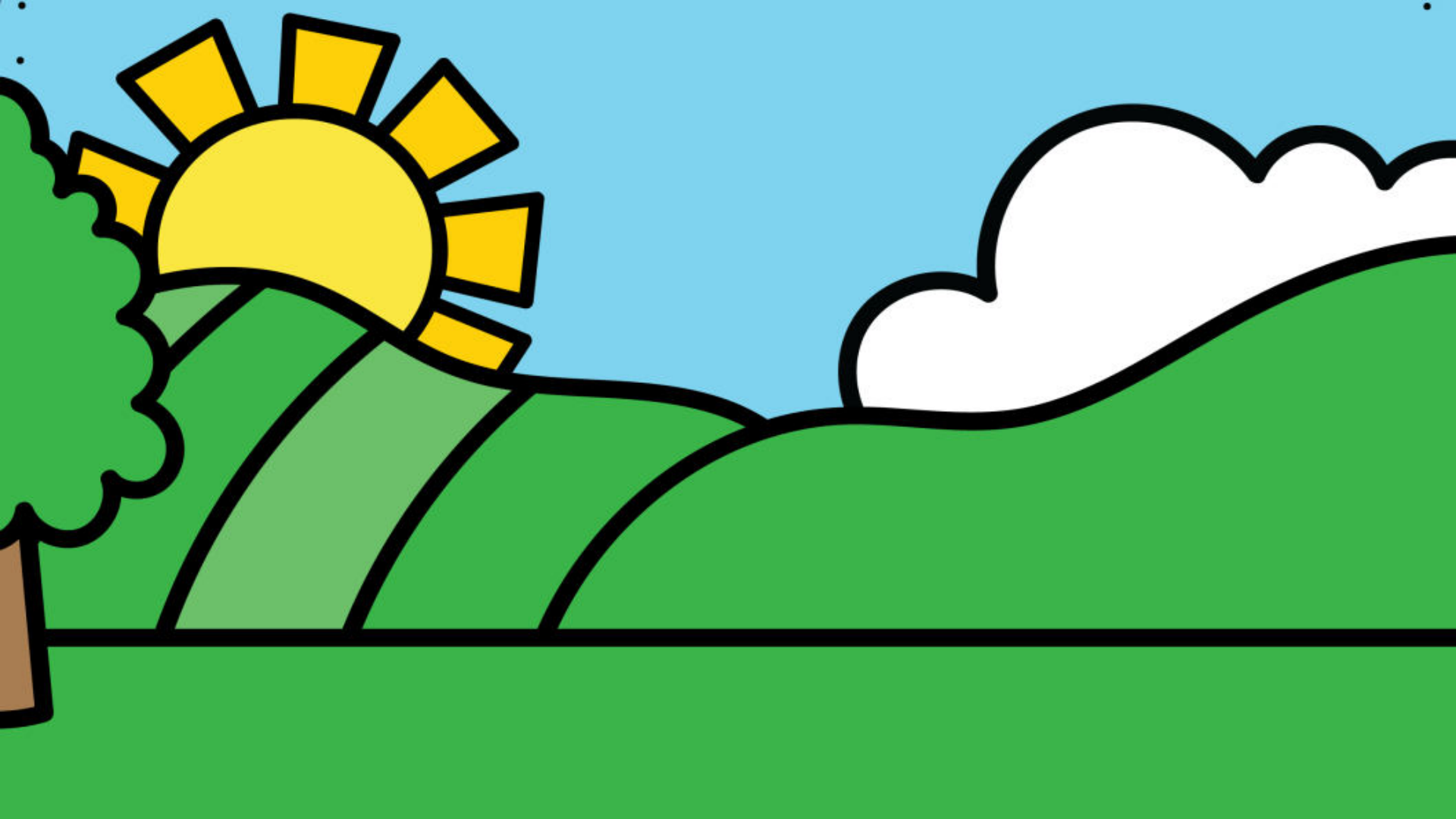
What features could you add or change to make the trap work better?

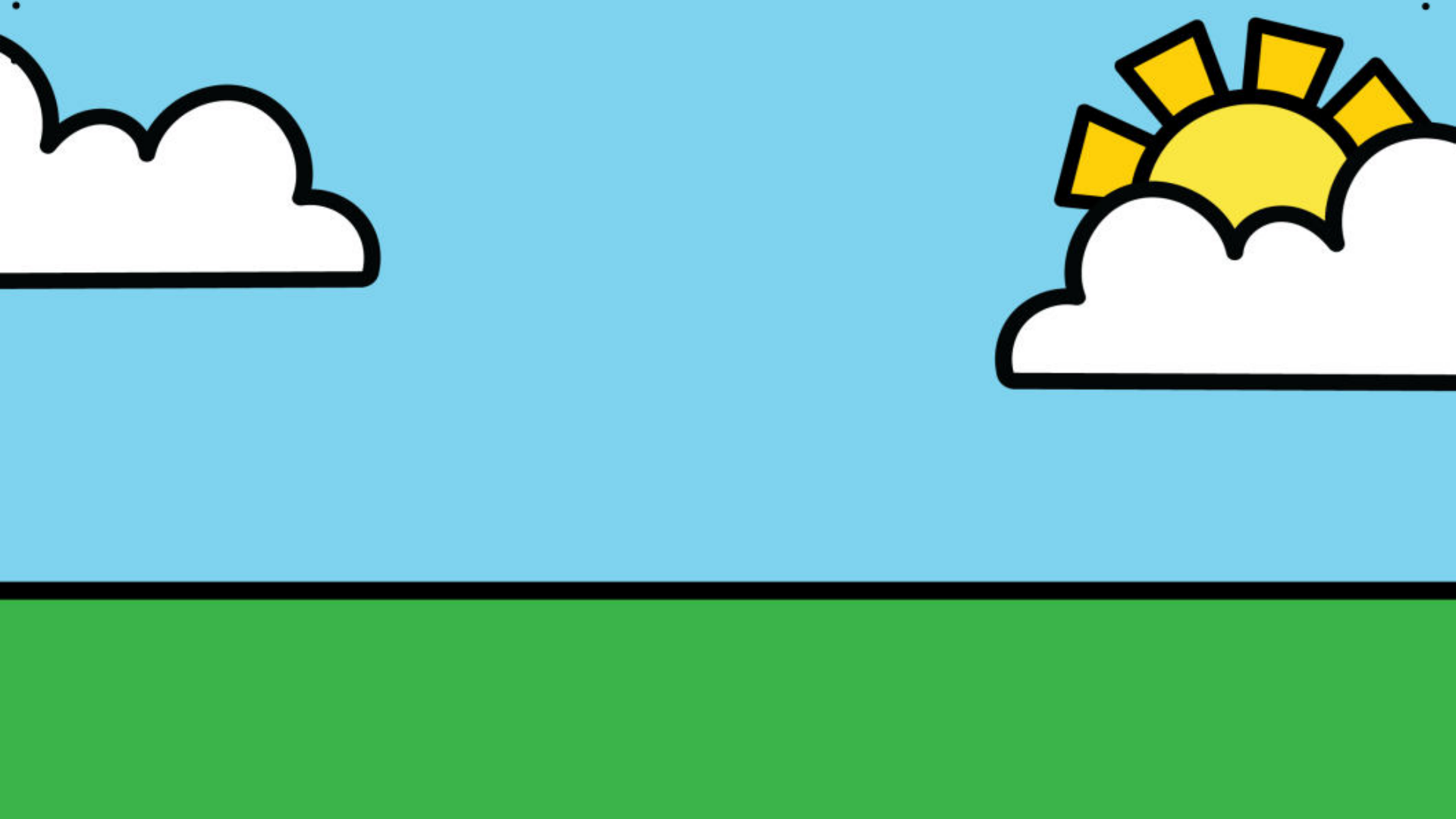
Add text here

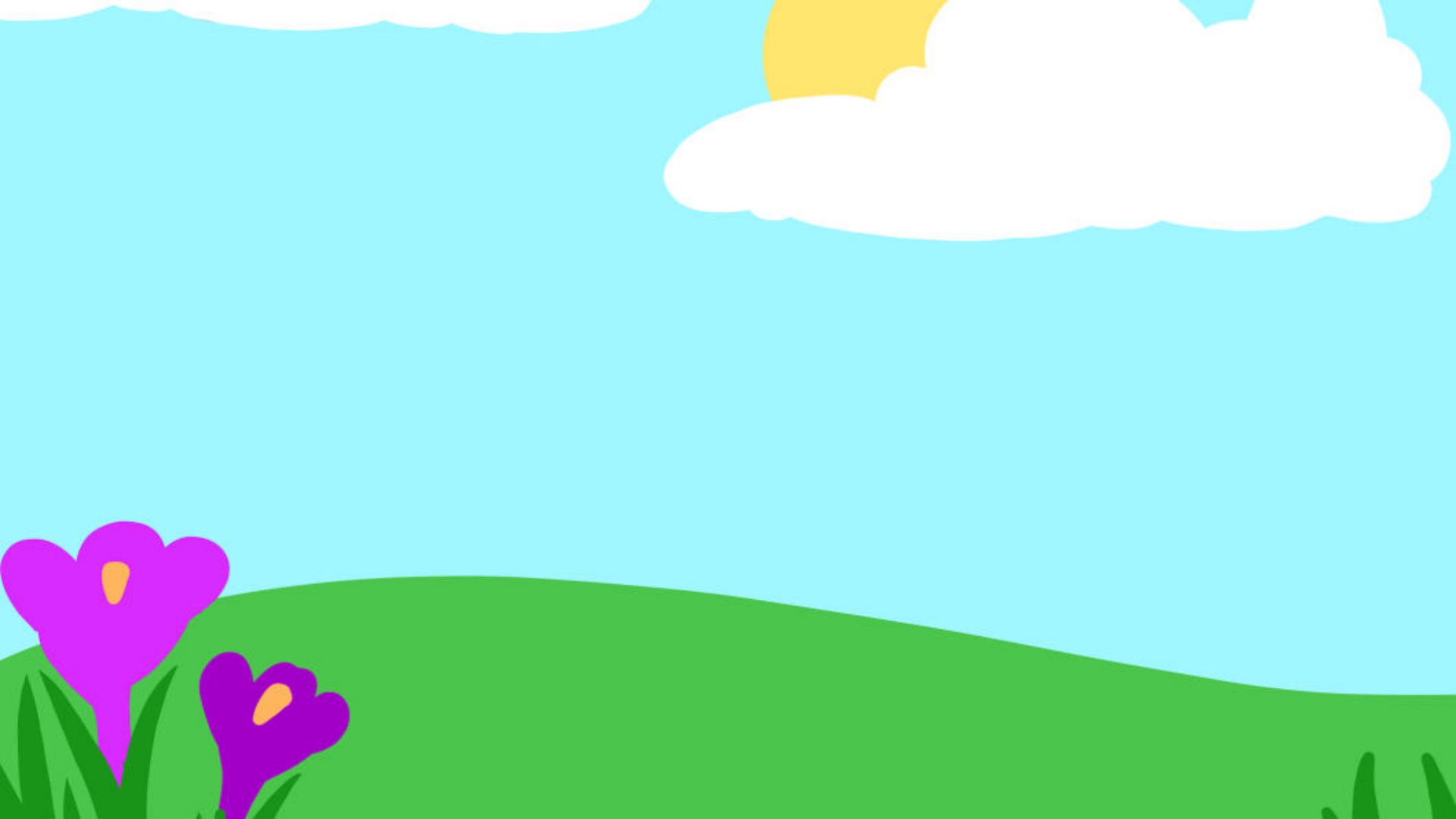
Backdrops

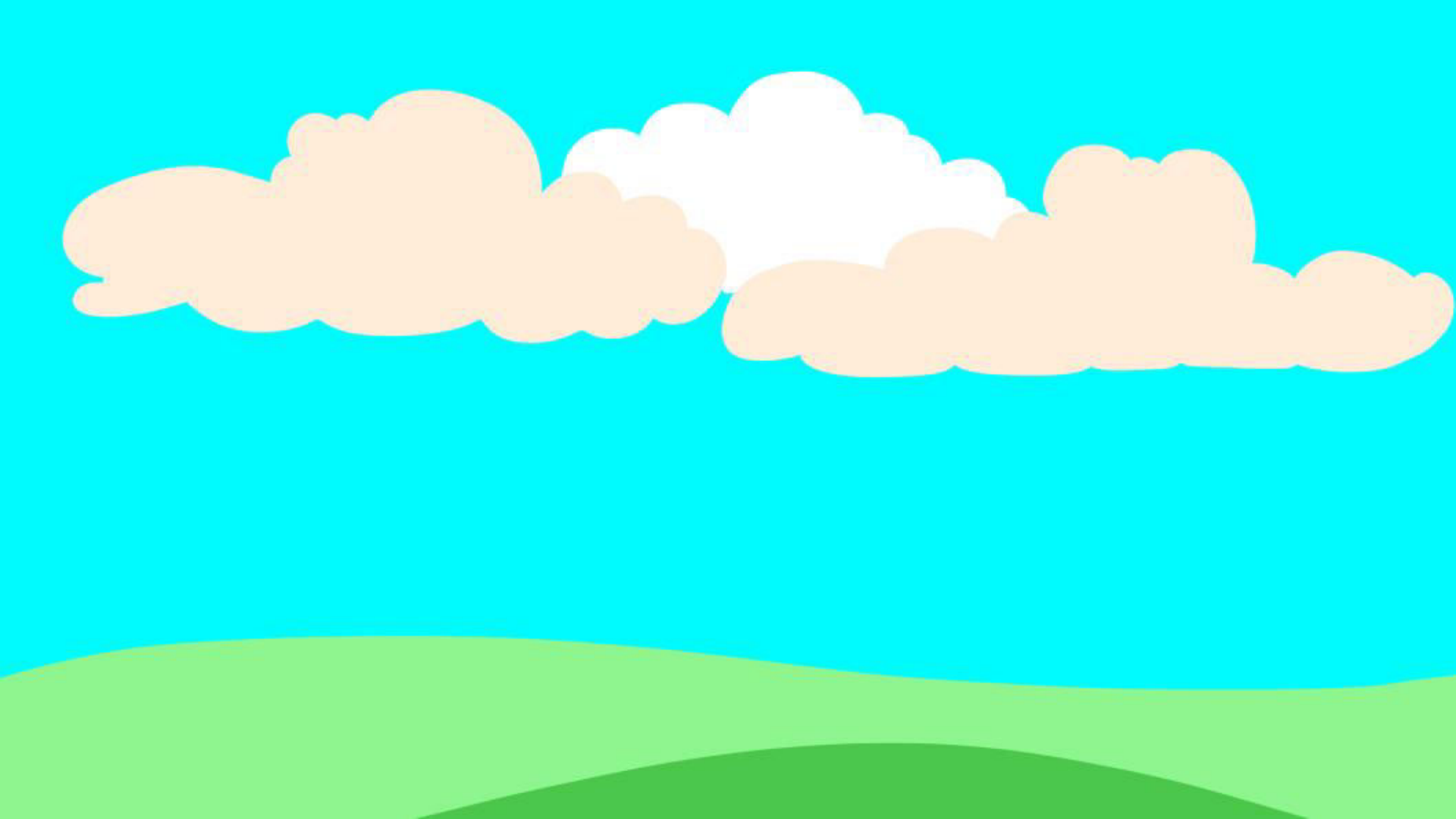


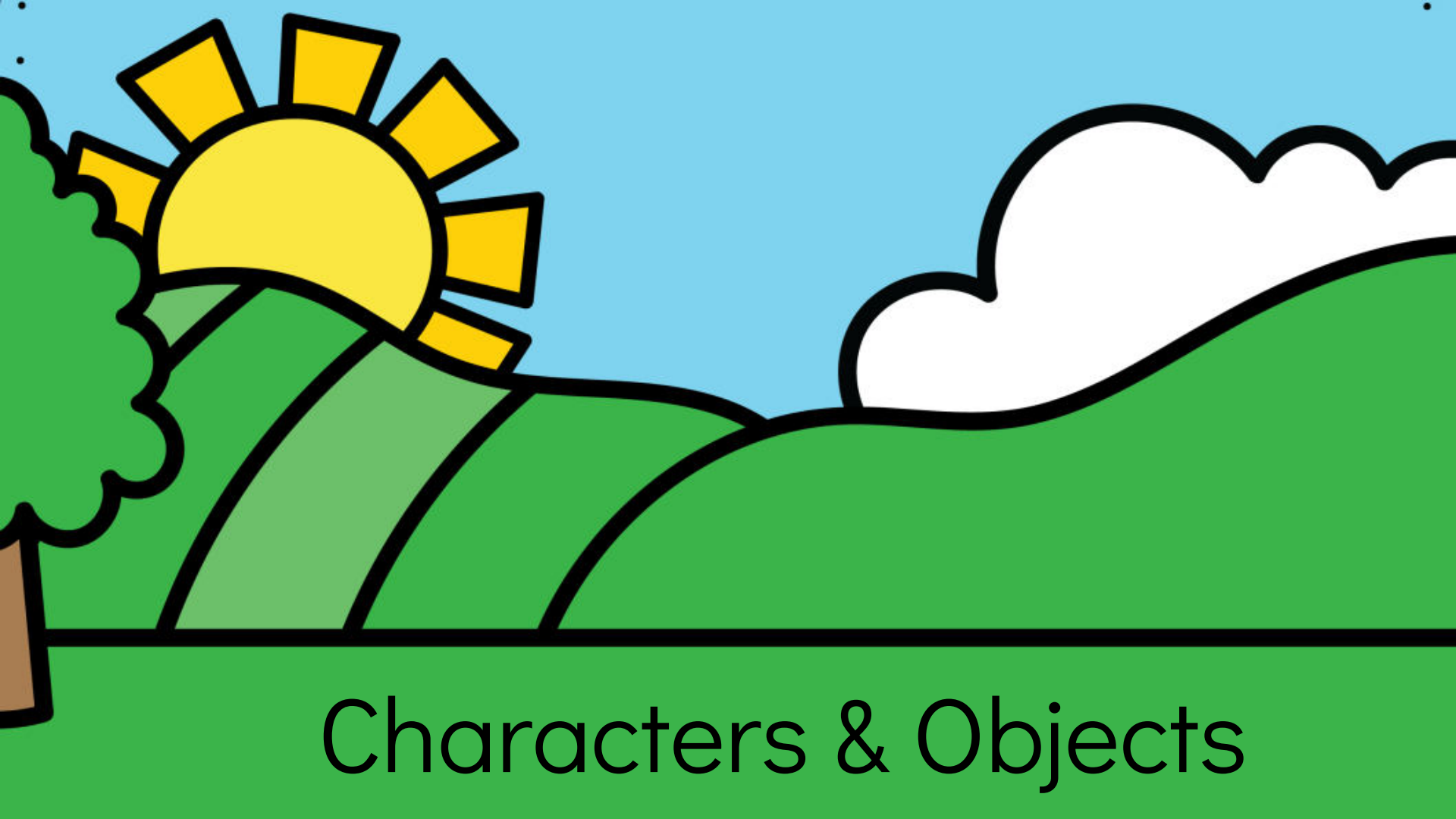




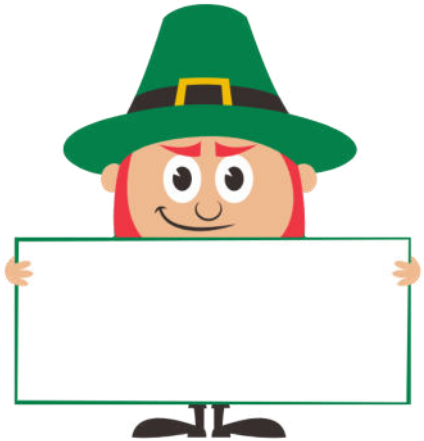




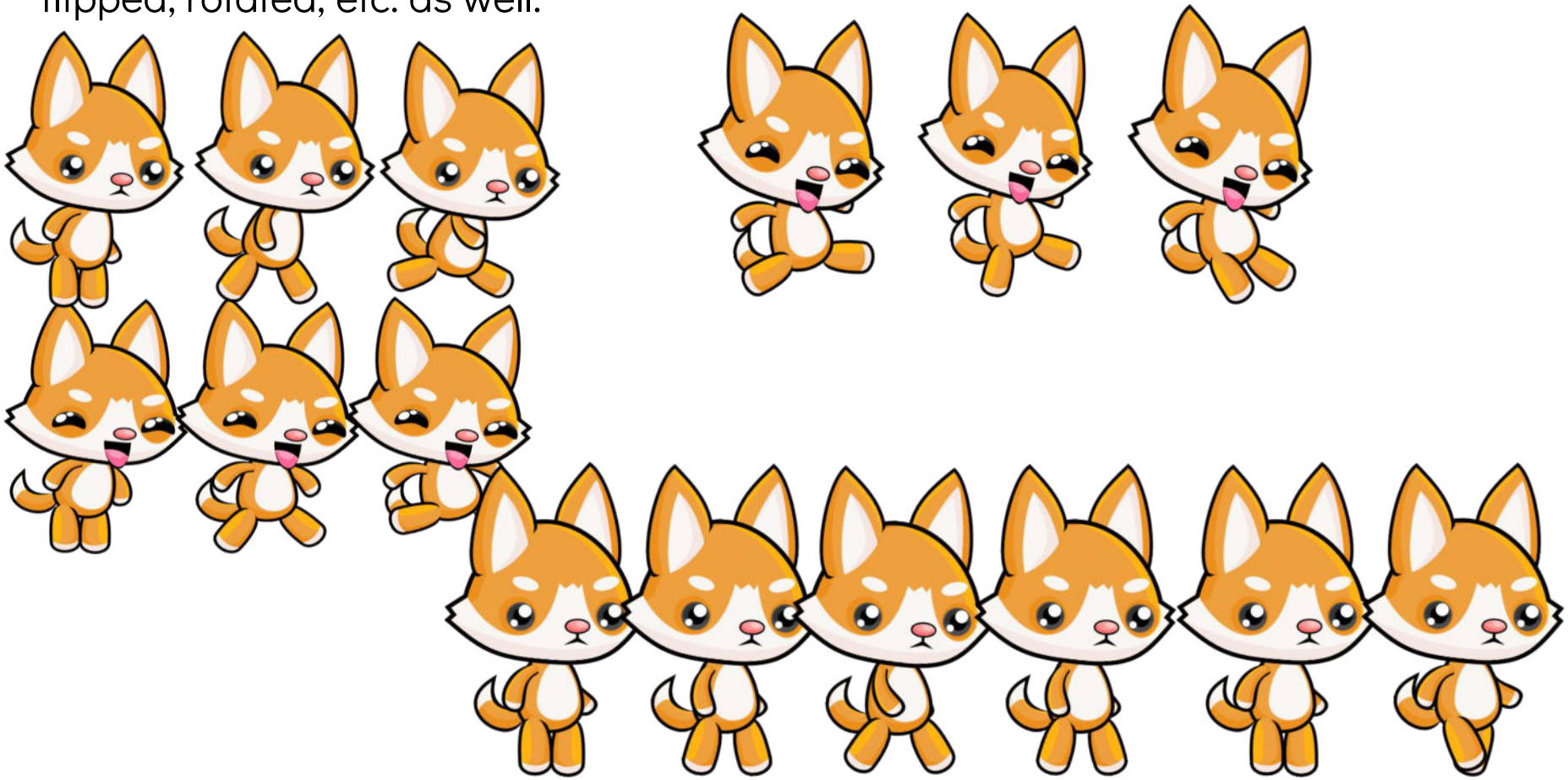



Characters & Objects

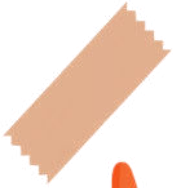
Leprechaun Poses and Gold: Use various poses to animate the character/sprite. Characters can be flipped, rotated, etc. as well.



Dog Poses: Use various poses to animate the character/sprite. Characters can be flipped, rotated, etc. as well.

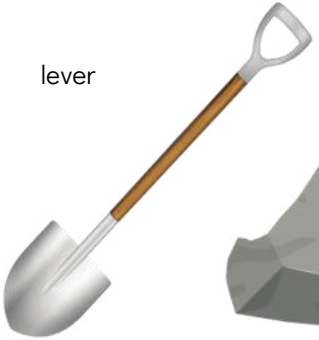


Other objects: Pick objects and **at least one simple machine** from the ones below, create your own, or search for one: Insert→ Image → Search the web.



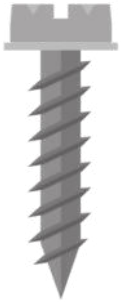
wedge

lever

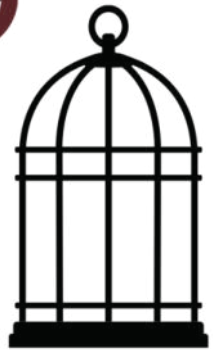


fulcrum

screw



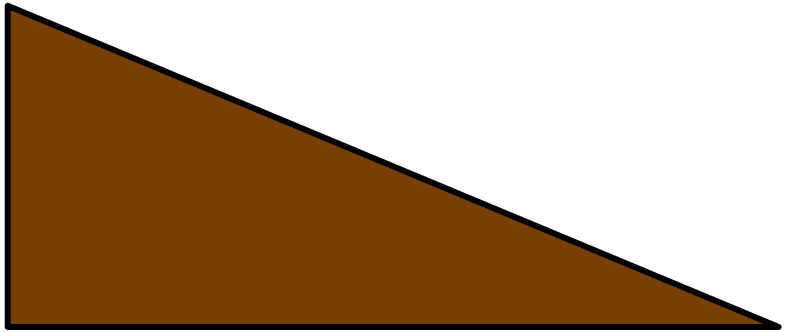
pulley

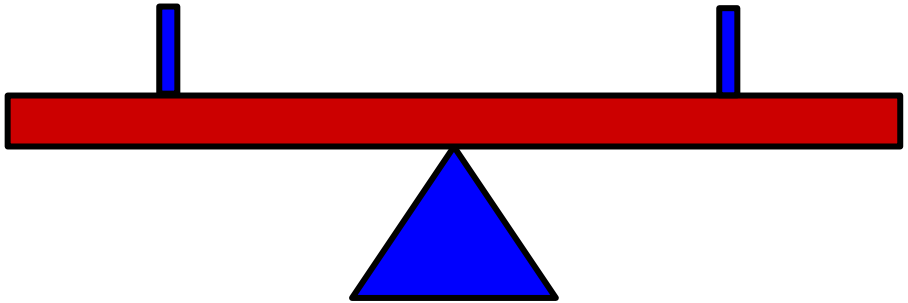


Inclined plane

wheel & axle

Other objects: Pick objects and **at least one simple machine** from the ones below, create your own, or search for one: Insert→ Image → Search the web.





Animated objects: You can add in elements that are already animated. You can add your own by searching for animated GIFs.