Animation At Home: The Zoetrope

WHAT YOU'LL NEED:

- 2 black pieces of cardstock with slots cut out
- Cardboard base with a hole in the center
- A sharpened pencil
- Clear tape
- Glue
- Animation strips or blank templates
- A pencil with eraser
- A marker (black or another very dark color works best)

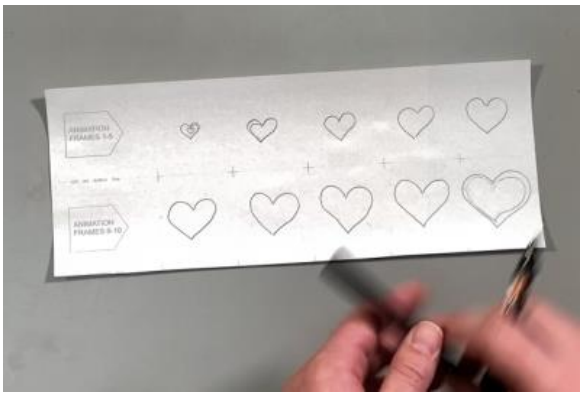
WHAT TO DO:

ASSEMBLING THE ZOETROPE:

Fold both black cardstock pieces in half, lengthways.
Insert one inside the other at the ends and tape in place. Curve the cardstock pieces into a circle around the cardboard base to get the right circumference and tape them together to hold the circle. Push the cardboard base into the circle and tape along the bottom in several places.

Poke the pencil through the center hole in the bottom of the cardboard. Adjust the pencil until it is as straight up and down as possible. Use glue to fix the pencil in place. Once the glue is dry, your zoetrope is ready to use! Now you just need to create your animation.

CREATING THE ANIMATION:

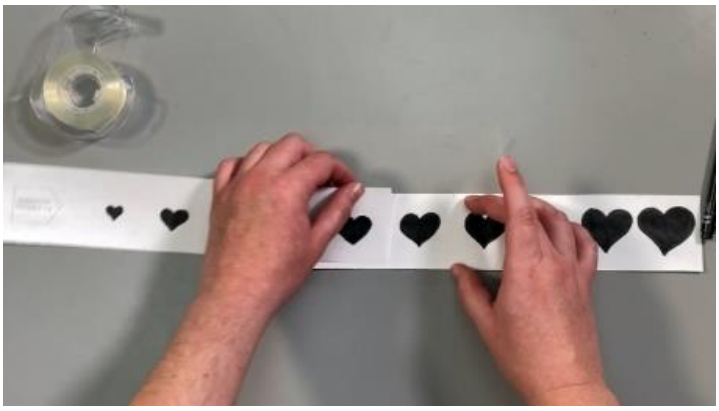


Cut a blank animation template in half. (Each sheet provides two sets of animation strips total.) Notice that there are spaces for ten total frames and markings indicating a square for each frame. The frames are designed to hold a sequence of images that change just slightly from one to the next, kind of like pictures in a flip book.

Plan out your design. For example, a tiny heart that gradually grows larger. If you start out with a small heart, in each subsequent frame the heart needs to be a little bigger than in the last one. It can be helpful to draw your first frame and then the last frame so you know what range your middle frames should fall within. (Draw your initial design with a pencil so you can make corrections as needed!) Once your design is complete, go over it and fill it in with a marker.

Cut your frames into two strips along the dotted line. Arrange the frames in order from 1 to 10 and tape the two strips together. Now your animation is ready to be tested out! Insert your animation around the inside of your

zoetrope. Make sure it's up against the edge and every frame is showing. Looking through the slots of the cardstock, roll the pencil between your hands, causing the zoetrope to spin. What do you see? Does the same affect occur when you look view the animation strip spinning from the top (not through the slots?) How do you think the zoetrope works?



WHAT'S GOING ON:

An important concept in animation is "Persistence of vision". Our brains will typically retain an image sent from our eyes for just 1/16 of a second after it disappears. If a second image in a sequence is introduced within that time, our brains will blend the two images together to create what looks like a smooth transition from one to another. String a bunch of still images together in quick enough succession and what you get is animation, or an illusion of movement.

But, how does our zoetrope work? Why do we not experience the same effect looking straight at the animation strip as it spins than we do looking through the slots on the side? Well, in order for the persistence of vision effect to work, the images must be introduced as separate frames, flashing before our eyes separately instead of running in a continuous line. This is called the "Stroboscopic Effect" and our zoetrope achieves it by separating the frames we see through the slots with the black tabs in between.

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