Thaumatrope Illusion
Contributed by: St. Louis Science Center

Objective
Create a thaumatrope and investigate the phenomenon of persistence of vision.

What You Need
- Index Cards (4”x6”)
- Markers
- Drinking Straw
- Transparent Tape
- (Optional) – Small Stickers, Confetti, Buttons, Rubber Stamps, etc.

To Do and Observe
1. Fold the index card in half forming a double 4”x3” surface.
2. Draw two pictures that, if combined, would form one picture. Draw one on each side. For example, you can draw a bird on one side and a cage on the other. **NOTE:** Make sure that you draw in the middle of each side of the card so your drawings will match up.
3. Place the drinking straw in the center of the index card as shown. Tape the straw in place.

4. Fold the index card over to hide the straw. Tape and secure the three sides together with tape.

5. Hold the straw between the palms of both hands and twirl quickly. The best view is at about 18” from the face at eye level.

**What's Going On**

When you flip the thaumatrope back and forth you are able to see both pictures at once, thanks to the phenomenon of the persistence of vision that other optical toys use to create illusions of motion. Persistence of vision is the eye's ability to retain an image for roughly 1/30 of a second after the object is gone (the actual time depends on the brightness of the object). If you flip the thaumatrope fast enough your brain retains the two different images long enough to build up a composite image. The faster you flip it, the more clear the illusion appears.
Cartoons and Movies work in the same way. Whether individual drawings (as in cartoons) or individual photo frames (as in a reel of film) if separate images move quickly enough, our eyes cannot see that they are separate. Our brain interprets the frames as one, moving, composite picture.

**Parent/Teacher Tips**

**For Younger Children**
You can have the children use predetermined images that the children and color and then glue onto the index card. You can even make scaled down copies of their favorite characters that they can use on one side and add something to the drawing on the other side of the index card.

**For Older Children**
This activity can be done as an introduction to making flipbooks or any other activity that relates to the eye. Attaching two strings to the ends of the cards and twisting the card so that the images flip up and down rather than side to side can also create a thaumatrope. Older children can create their own images and can even try it with words or sentences. You can have them create a thaumatrope so that when they spin it they can read their names or give a message. When doing this the letters must carefully be lined up so the word is readable. It is fun and useful to adapt this activity to illustrate specific content. For example, children may design a thaumatrope that depicts any of the following: Biomes and native species Predator and prey relationships Holiday themes Scenes and characters from a story.