

# LESSON 7:

# CONVEYER BELT CINEMA

## SUPPLIES

### MAIN BIN

- Boxes (5)
- Cardboard tube (10)
- Wooden skewers (10)
- Pushpins (5)
- Paperclips (5)
- Masking Tape (2)
- Liquid Glue (2)

### HANDOUT FOLDER

- Paper (15)
- Cardstock (5)

### PENCIL BOX

- Pencils
- Markers
- Scissors
- Gluesticks
- Tape
- Rulers


## OBJECTIVES

- Understand how conveyors work and explore the mechanics of motion
- Create a conveyer belt cinema

## HOOK 2-3 min

- Lights, Camera, Action! Before green screens and computer-generated imagery animations, artists and filmmakers often used conveyers to create a moving movie background.
- Today's lesson, we will couple our engineering skills with the magic of movie making to create our own conveyer belt film background!

## INTRODUCTION

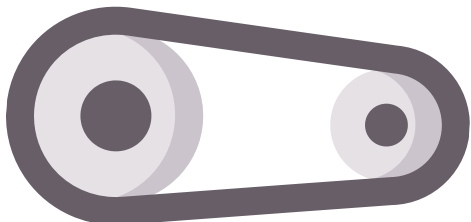
 3-5 min

Lights, Camera, Action! Have you ever wondered how films are created, or how animations come to life frame by frame?


Today, we'll explore the science behind motion and mechanics as we build our very own conveyer belt cinema! In this activity, you'll create a conveyer belt mechanism that will move images frame by frame, just like in the movies! By understanding the basic principles of motion, you'll be able to construct a working model that demonstrates how an image can be transformed into motion.

Before we begin, let's review what a conveyer belt is and how it works. Conveyer belts are all around us. From airport baggage retrieval, to treadmills at the gym, even grocery store cashiers use conveyer belts to move food forward at check out. A conveyer belt is a large, flat, moving belt that helps carry things from one place to another. Often powered by a motor, the belt, which is situated on wheels or rollers, moves around and around on a constant loop continuously moving items forward to its next location.

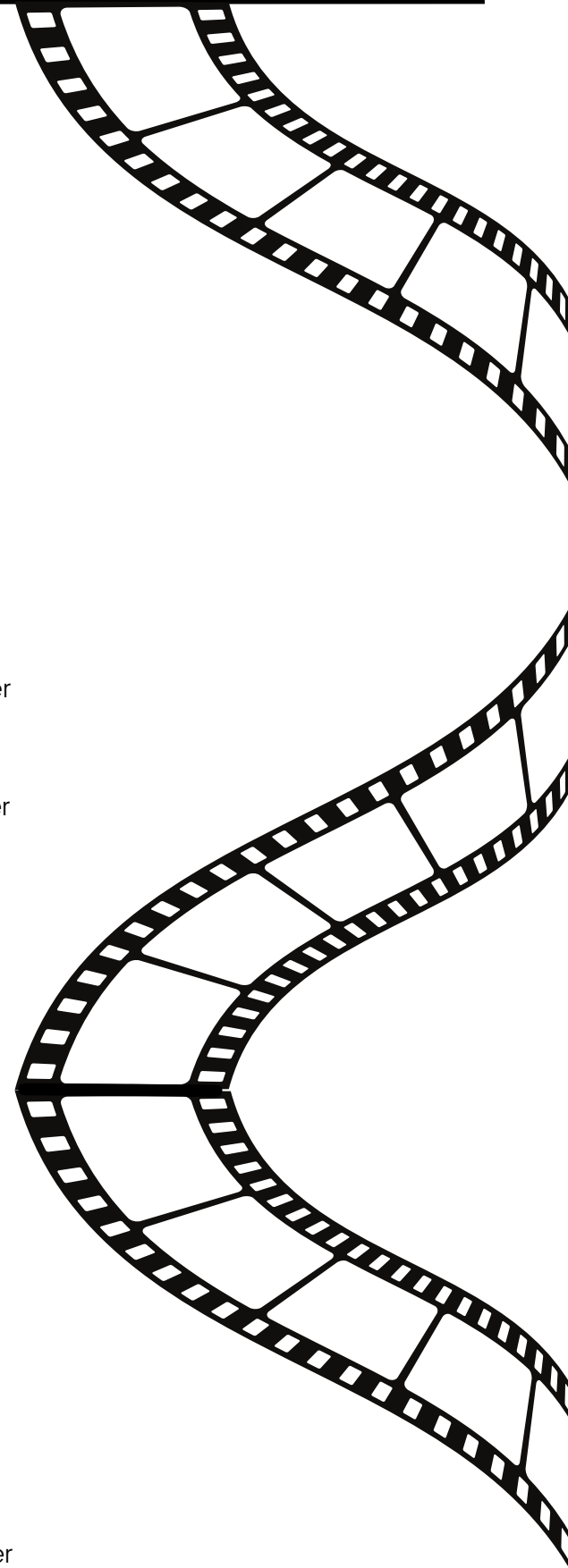
Let's combine mechanics and movie making magic to build our very own conveyer belt cinema that will turn pictures into a cinematic masterpiece, one frame at a time!



## DESIGN & BUILD DIRECTIONS

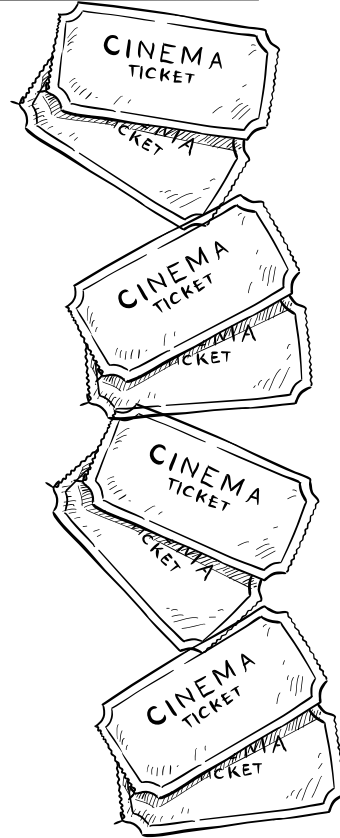
 45-50 min

1. Divide students into groups of three. Pass out materials to each group.
2. Assemble your cardboard box using masking tape to secure the structure.
3. Trace the end of the cardboard tube onto cardstock paper 4 times. Then, cut out each circle.
4. Using your push pin, carefully create a hole in the center of each cardstock circle large enough to fit the wooden skewer through.
5. Using the liquid glue and masking tape, attach the circles to the end of each cardboard tube. Slip the skewer through the cardboard tube and glue so that both the tube and the skewer rotate as one. Once complete, set this aside to dry.
6. Allow students to design their cinema background using paper and markers. Remind students that their group images should be continuous and based on one background theme. Instruct students to use their rulers to measure their cardboard tube and their paper (turned longways) ensuring height of the paper matches the height of the tube. The cardboard tube should not be visible over or under the trimmed paper.
7. Turn your cardboard box on it's side longways so that you are looking into the inside bottom of the box. Using the push pins, carefully puncture four even holes in your cardboard box (two on the top lip and two on the bottom lip) about 2.5 inches from the nearest edge.
8. Carefully insert the cardboard tube into the box. Carefully place the skewers through the push pin holes. Younger students may need teacher assistance.
9. Carefully wrap the cinema background around the tubes. Using clear tape, tape the cinema background pieces of paper together, ensuring the paper is pulled tight. Younger students may need teacher assistance.

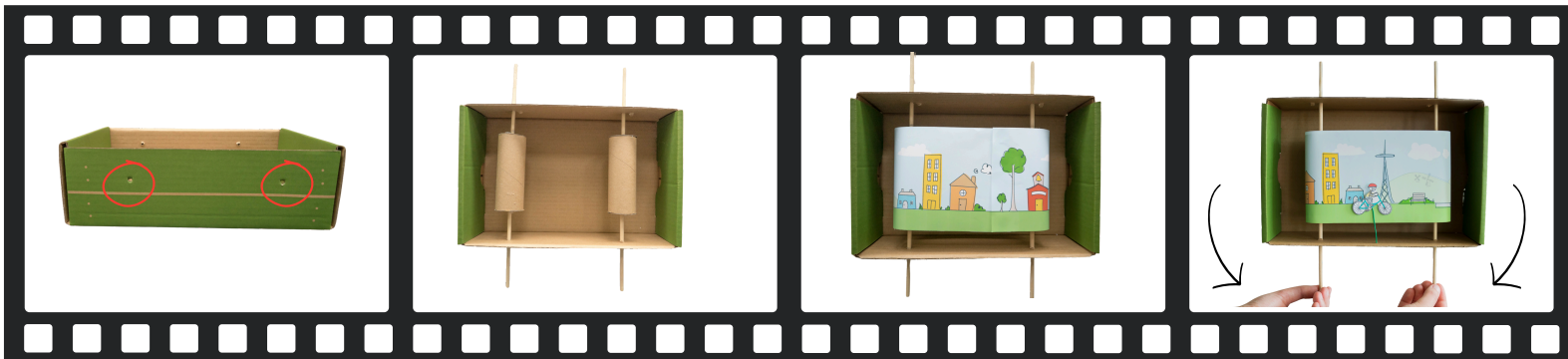
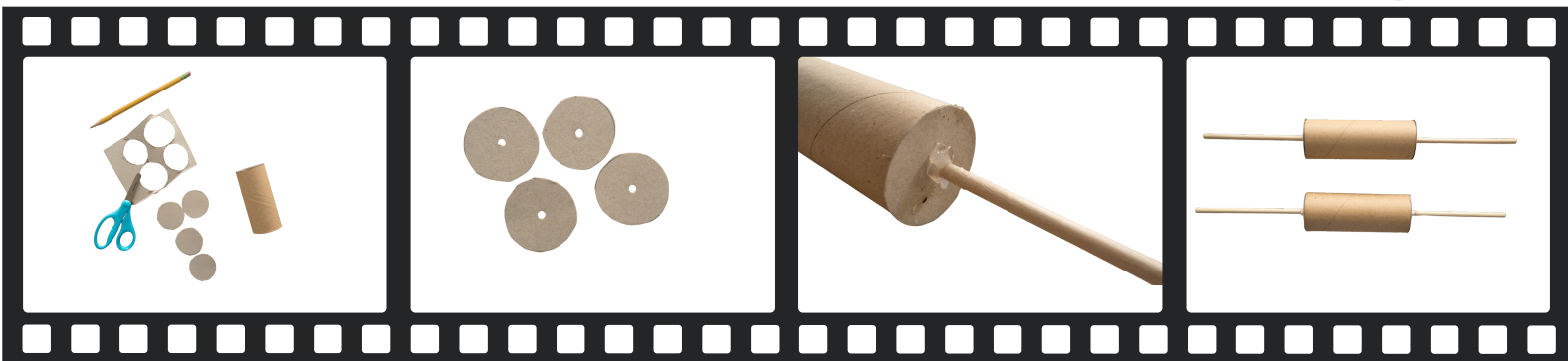


## TAKE TWO: DESIGN & BUILD DIRECTIONS CONTINUED


10. Optional Addition: Students can draw and cut out an immovable piece to add to their cinema. (Example: a person on a bicycle). Once the image is cut out, use masking tape to attach the image to a straightened paperclip. Then, poke the paperclip through the front bottom of the box in front of the cinema and bend to keep it in place.
11. Lastly, move your sin one direction and watch the movie take place! Try it in reverse to watch your movie backwards!



## DESIGN & BUILD EXAMPLES



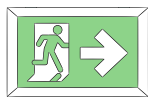
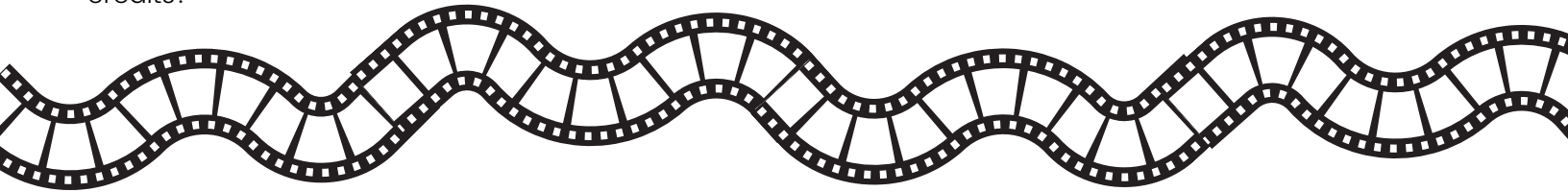
## CONCLUSION

 3-5 min

That's a wrap! The cinema conveyor belt that you created today is very similar to those used in early filmmaking. A conveyor belt is a mechanical system most often used to transport items from one place to another. For example, airport baggage carousels, treadmills, and even grocery store check outs use conveyor belts to move items from one place to another.

In order to function, the belt of a conveyor belt moves in a circular motion, looping over two or more pulleys. The pulleys of a conveyor belt are often cylindrical wheels that guide the belt and propel it forward. Most conveyor belts use motors to power the pulleys in order to keep the cylindrical pieces rotating and the conveyor moving.

The conveyor belt that you created today is powered by hand and allows the background image to move continuously at a steady speed, just like a mechanical one! As the conveyor moves, the image moves, creating the illusion of motion. Roll the conveyor belt and the credits!



## Exit Ticket



Ask each student one of the following questions as they walk out the door.

- Q: Can you name an every day example of a conveyer belt?
  - A: Escalator, grocery check out counter, treadmill, airport baggage claim, ski lift and manufacturing facilities.
- Q: Can you name the parts of a conveyor belt and what they do?
  - A: The **Belt** creates a moving surface.
  - A: The **Pully** move, guide and support the belt.
  - A: The **Motor** powers the pully.