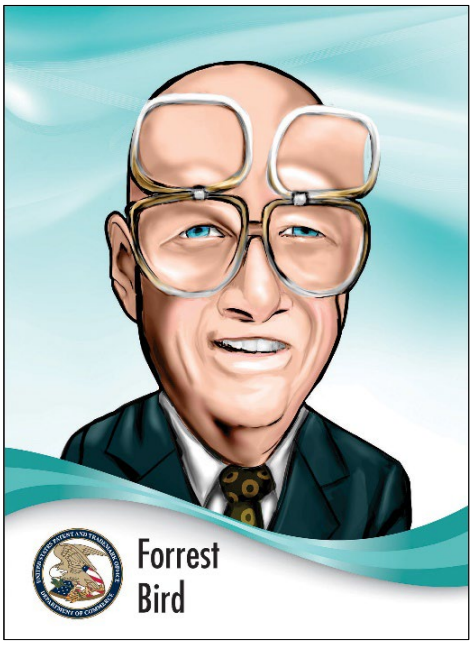
# Forrest Bird: Waiting to exhale

## A USPTO Inventor Trading Card activity challenge




### Background:

Forrest M. Bird
Medical respirator inventor
Born: June 9, 1921 in Stoughton, Massachusetts

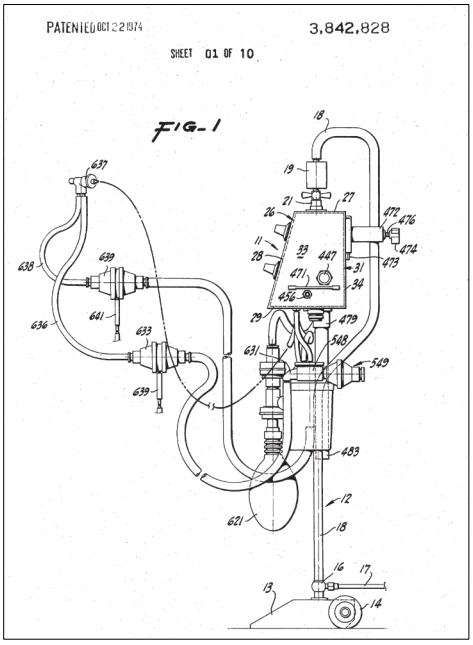
Forrest M. Bird invented the first low-cost medical respirator. His respirator helped keep babies alive when they had breathing problems. Bird's invention was nicknamed the "Babybird" respirator.

### Activity challenge: Make a lung model and invent a ventilator

To design a ventilator, Forrest Bird first needed to understand how human lungs work. He created a model of the lungs.

You'll create a lung model using the materials provided. Then, you'll invent a method of filling the lung model of the lungs with air. The "Babybird" ventilator filled babies' lungs with oxygen so they could breathe.

Forrest Bird received a U.S. patent for his invention. A patent gives an inventor the right to exclude others from making, using, selling, or offering to sell an invention for a limited period of time.




Patent No. 3,842,828
Pediatric ventilator

## Materials

For the model lung:

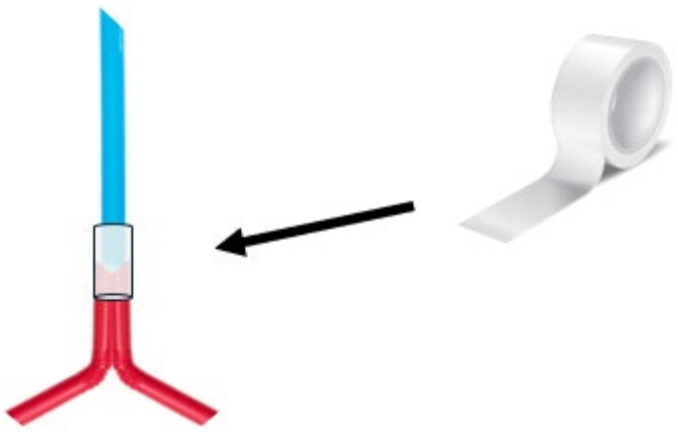
- Small balloon
- Large balloon
- Straight straw
- Bendable straws
- Small rubber bands
- Large rubber bands
- ¼" Y-shaped plastic connector
- Scissors
- Tape
- Clear plastic cup with a hole in the bottom

For the ventilator:

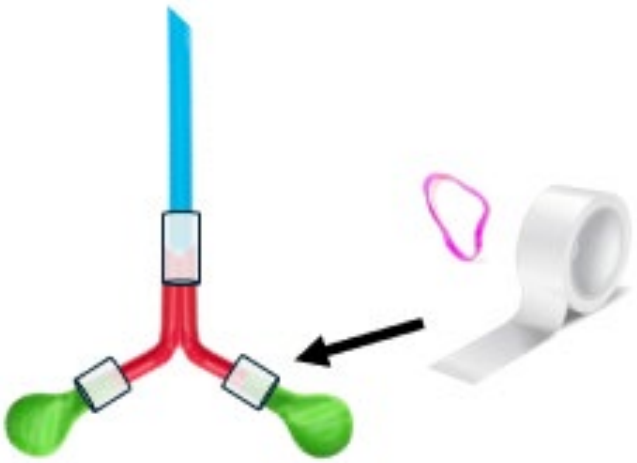
- Clear plastic bottles with caps (water or drink bottles)
- Glue gun with glue sticks
- Ceramic safety box cutters
- 5/16" Vinyl tubing
- 1/8" Vinyl tubing
- DC mini air-pump set (motor/pump, 9V battery holder, vinyl tubing, switch)
- 4.5 mil pneumatic syringe
- 20 cc pneumatic syringe

## Build a model of the lungs

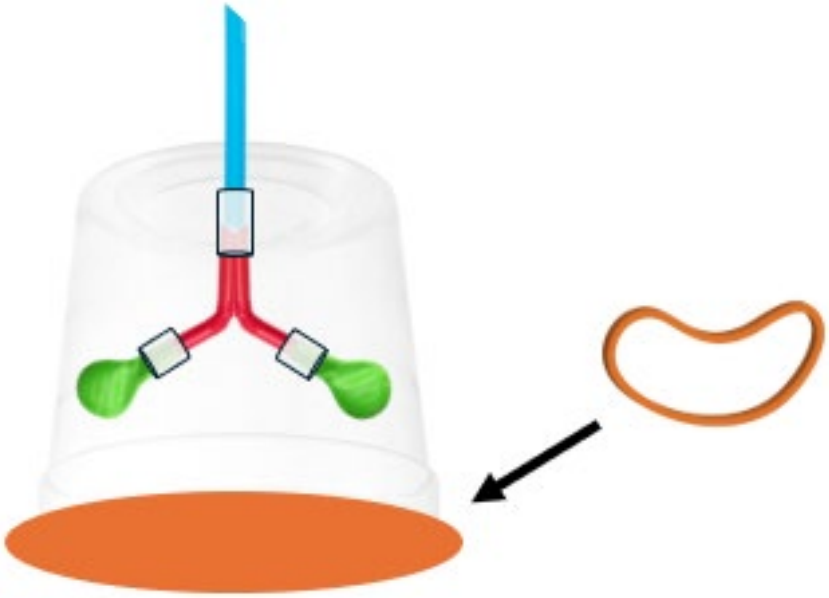
1. Cut a straight straw in half.
2. Cut two 3-inch pieces of a bendable straw.
3. Tape the bendable straws to the straight straw.



4. Attach balloons to the end of the bendable straws using small rubber bands and tape. These two balloons represent the lungs.



5. Grab the cup with the hole in the bottom. Put the top of the lung model through the hole.
6. Seal the lung model to the cup using tape.
7. Cut the open end of a large balloon.
8. Stretch the large balloon over the bottom of the cup.
9. Place the large rubber band around the bottom of the cup to hold the stretched-out balloon in place.

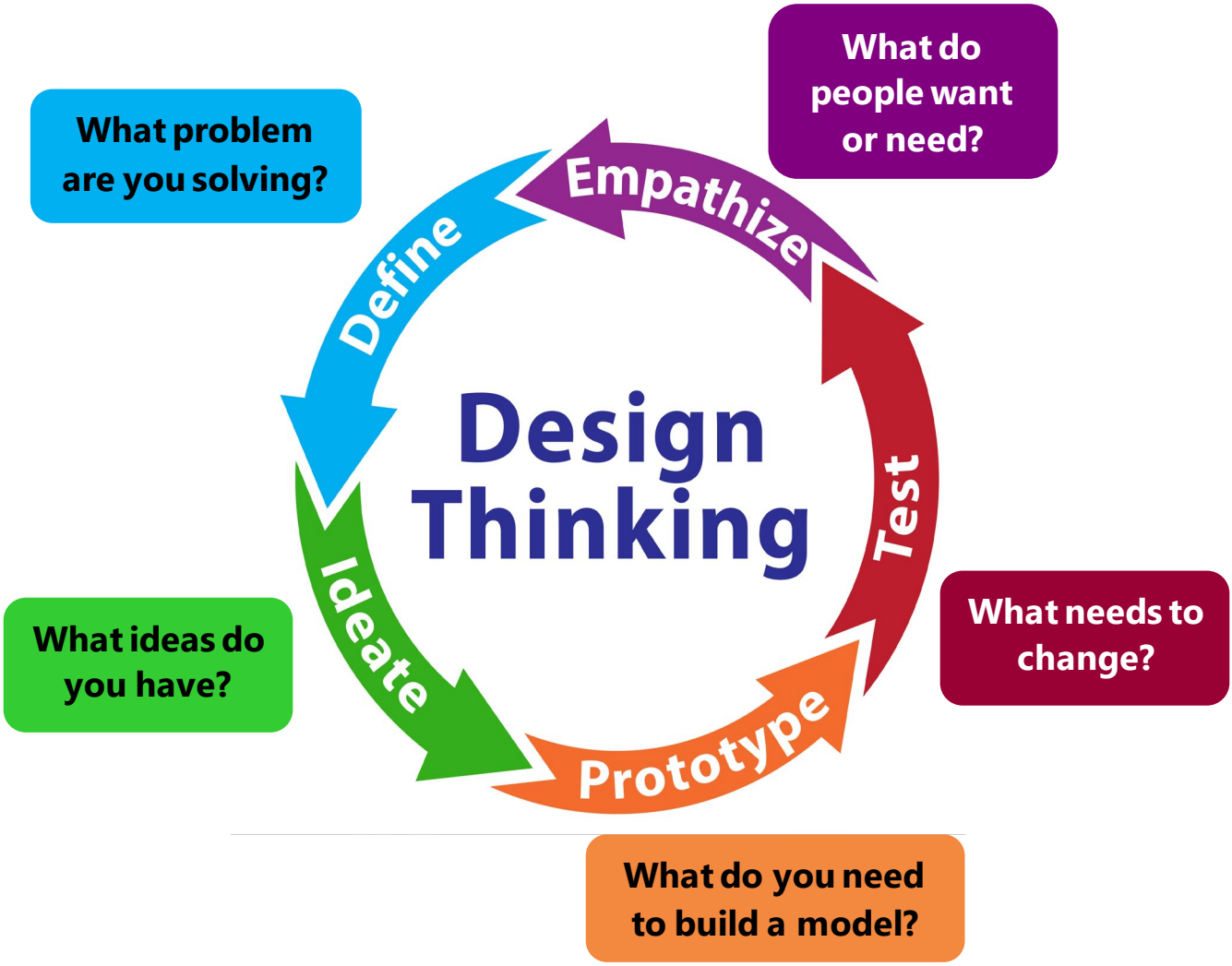


**Invent a ventilator**

In the lung model you built, the two small balloons represent lungs. The large balloon that is stretched over the bottom of the cup is the diaphragm. The diaphragm is a muscle that helps control breathing. Sometimes, sick people can have trouble breathing.

Your next task is to invent a ventilator like the one Forest Bird invented. Your invention should make the small balloons inflate, just like Forrest Bird's ventilator helped babies' move air into their lungs.

Look at the materials your teacher provided. Use the design process chart to help you plan your invention.



10. List the materials you want to use to invent your ventilator.

11. Sketch your invention. Label the parts – you should be able to explain what each of them do.

12. Use the materials to build a **prototype** of a respirator that moves air in and out of the lung model. You might have to try a few different ways of building the ventilator before figuring out what works – that's okay! Failing and trying again until you get it right is part of the invention process.

**Forrest Bird's Trademarks**

A trademark helps people know who makes or sells a product or service. A trademark can be words, designs, a cool symbol, or a combination of these.

Below are trademarks for Forrest Bird's medical equipment. These trademarks were registered by the company he created to sell his inventions, the Bird Products Corporation. Which is your favorite and why?

BIRD®

**U.S. Reg. No. 0706080** for respirators and other medical devices.


**U.S. Reg. No. 1692749** for ventilators designed for babies and children.


**U.S. Reg. No. 1592881** for a wide variety of medical instruments.

**Create a brand for your own ventilator invention!**

1. Come up with a brand name for the ventilator you invented. You can use words that inspire people to think about what your invention does. You can also make up a word – just make sure it easy to pronounce. It should be short!

2. Draw a logo for your invention. Logos can be symbols, letters, words, or a combination. Get creative!