

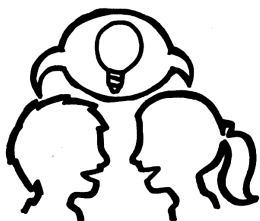
# What is Engineering? Wind Powered Vehicles



**Overview:** Kids will engineer a vehicle that will move as far as possible using only three puffs of air for power.

**Note to Educator:** Who are engineers? Engineers are people who use science, math, and creativity to solve problems. Today kids will be engineers as they use the Engineering Design Process to design wind powered vehicles.

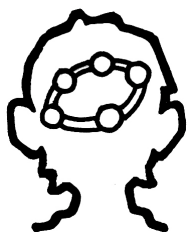
Set the Stage (5 min)



Activity (35 min)



Reflect (5 min)



## Materials

### For the entire group:

- EDP Poster
- Example Vehicles*, p. 5
- 10 foam trays
- 100 index cards
- 8 pairs of scissors
- 50 brass fasteners
- 30 paper or foam cups
- 30 drinking straws
- 8 rolls of tape
- 8 rulers
- 100 craft sticks
- 20 plastic grocery bags
- 30 sheets of construction paper

### For each group of 3-5 kids:

- Masking tape
  - 1 pair of scissors
- For each kid:**
- Reflect Page*, p. 7

## Preparation

*Time Required: 10 minutes*

1. Copy one *Reflect Page* for each kid.
2. Optional: Make samples of the items found on *Example Vehicles*.



# What is Engineering? Wind Powered Vehicles



## Kids will learn:

- the Engineering Design Process is a tool they can use to help solve problems.

## Set the Stage (5 min)



- Tell kids that today they are going to be engineers and use the Engineering Design Process to solve a problem.
- Tell kids that a fictional car company has asked them to create an air powered vehicle. Kids need to create a vehicle that will move as far as possible using only three puffs of air from a group member for power.
- Show groups the Engineering Design Process poster and tell them they are going to Ask questions about the problem, Imagine ways to solve it, Plan a design, Create and test it, and then think about ways to Improve it.
- To check for understanding, ask:
  - What is the problem the company wants us to solve? Engineer a vehicle that can move using only three puffs of air.**

## Imagine (5 min)

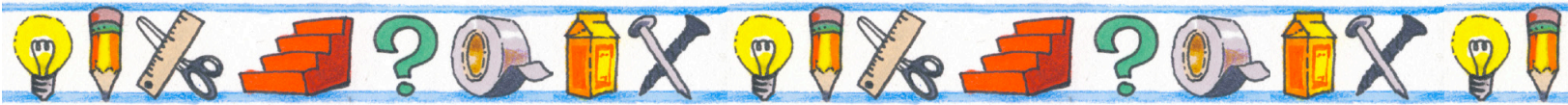


- Tell kids it's time to look at the materials they can use and Imagine different ways to make them work.
- Split kids in groups of 3-5 and have them walk around the Materials Store. Ask:
  - Can you Imagine any ways you could use these materials to engineer a vehicle?**
- If your kids want to see examples, show them the samples you prepared, or have them look at *Example Vehicles*. Ask:
  - Do you think any of these ideas might work well? Why?**

## Plan and Create (at least 20 min)

- Tell kids it is time to plan and create their vehicles.
- Explain that:
  - The challenge is to work in groups to engineer a wind powered vehicle that will move as far as possible with three puffs of air for power.
  - Each group will have (at least) 20 minutes to create.
  - You can only use five materials in your design. The scissors are a tool only and cannot be used in the vehicle.
- As groups work, circulate around the room. Ask questions like:
  - Why do you think your design will work well?**

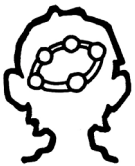
**Tip:** If you can, you may want to offer more time for this challenge.



- Which step of the Engineering Design Process are you using right now? How do you know?

### Engineering Showcase (10 min)

1. Have each group present their vehicle. Ask each group questions like:
  - Can you tell me about your design?
  - What parts of your design are working well?
  - Which steps of the Engineering Design Process did your group use?
2. Pick a starting point on a table top and mark it with tape. Each group will get 3 puffs in order to make their vehicle move as far as possible.
3. After testing, ask:
  - What parts would you improve if you could design your vehicle again? Why?



### Reflect (5 min)

1. Go through the Engineering Design Process poster with kids and have them talk about how they used each step to solve the problem. Ask questions like:
  - How did you use this step of the Engineering Design Process to solve the problem? *We Asked about the challenge; we Imagined ways to build with the materials; we Planned when we decided what design to use; we Created and Improved when we built and fixed the vehicle.*
  - Why do you think it's important to use these steps? *It helps us keep track of our ideas and make sure we're meeting our goal.*
  - Do you think you are an engineer? Why?
2. Tell kids that they've just used the same steps that engineers use to solve problems. This means that they are engineers, too!
3. Give kids time to record their thoughts on the *Reflect Page*.

## Extensions

### Try Again!

Does your design work the same way on a different surface, like a sidewalk or a tile floor? Can you improve your design so it works on a few different surfaces?

### Transporting "Passengers"

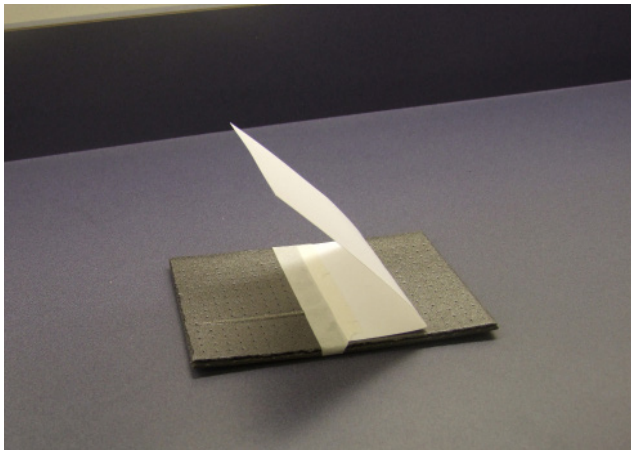
Can your vehicle transport passengers? Use small weights or beads to represent people. How many passengers can your vehicle carry? Does it go as far when you add weight?

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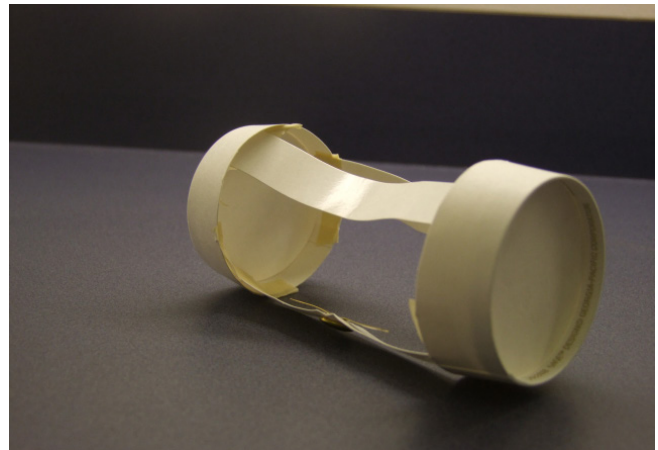
Here are three different example of air powered vehicle designs.

An index card that works like a sail taped onto a piece of foam.



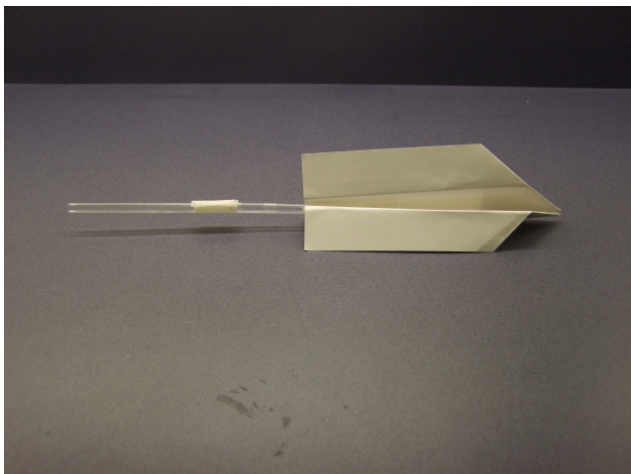
Slide!

The bottoms of two paper cups held together with paper cup strips.



Roll!

A paper airplane powered by shooting it out of a straw.



Fly!

Will any of these ideas help your group build a vehicle?  
What other ideas do you have?

Talk with your group to figure it out!

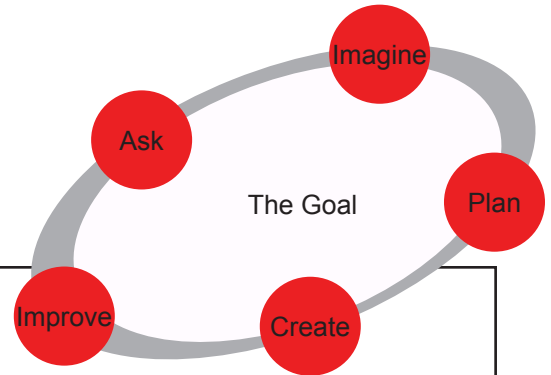


# What is Engineering? Wind Powered Vehicles



## Draw Your Vehicle

Use the space below to draw a picture of your vehicle. Circle the parts you would improve.



## For the Record

I think engineering is:

- Fun
- Exciting
- Difficult
- \_\_\_\_\_



