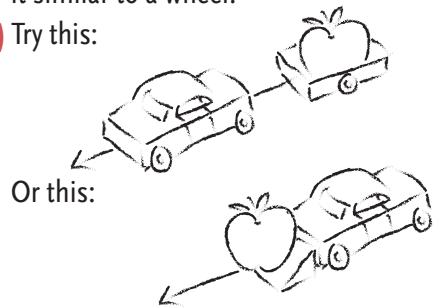




### 1. ENGINEERING TIPS:

- 1) Think about the shape of an apple. How is it similar to a wheel?
- 2) Try this:

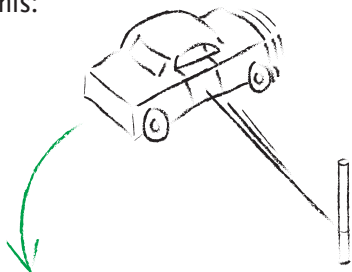


- 3) The challenge says that the table must be flat, but you can add a ramp or incline on top of the table!

**IMPORTANT NOTE:** You can change the racecar build however you want. In fact, you will probably need to alter it in order to solve the challenges.

### 2. ENGINEERING TIPS:

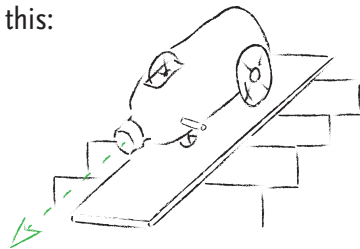
- 1) Think about the size of the wheels. Do they have to be the same size on both sides of the car?
- 2) The car can run on a track like a train. What if the track was curved?
- 3) Try this:



**IMPORTANT NOTE:** You can change the racecar build however you want. In fact, you will probably need to alter it in order to solve the challenges.

### 3. ENGINEERING TIPS:

- 1) Think about how a sailboat gets its power. Is it windy outside? If not, how else can you create wind?
- 2) Is there something in your house that already moves? Can you attach the three-wheeler to it?
- 3) Try this:



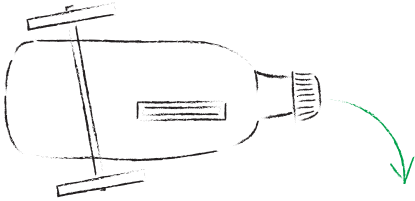
**IMPORTANT NOTE:** You can change the three-wheeler build however you want. In fact, you will probably need to alter it in order to solve the challenges.



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#### 4. ENGINEERING TIPS:

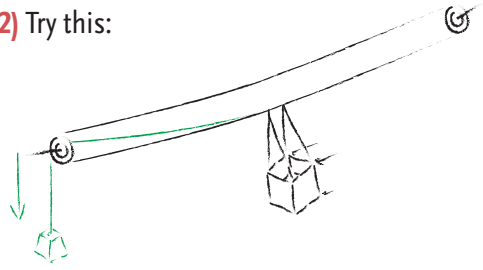
- 1) Think about what you learned from challenge #2. Can any of the same methods be used to solve this challenge?
- 2) What will happen if the three-wheeler is attached to a long curved rod or pole?
- 3) Try this:



**IMPORTANT NOTE:** You can change the three-wheeler build however you want. In fact, you will probably need to alter it in order to solve the challenges.

#### 5. ENGINEERING TIPS:

- 1) Instead of using the crank, try using weight and gravity to move the cable car.
- 2) Try this:

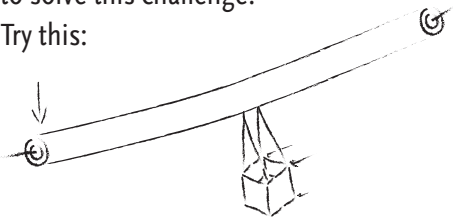


- 3) What happens if you change the size of the gears? Do some arrangements give the crank more power? (This is an engineering concept for increasing the TORQUE.)

**IMPORTANT NOTE:** You can change the cable car build however you want. In fact, you will probably need to alter it in order to solve the challenges.

#### 6. ENGINEERING TIPS:

- 1) Think about what you learned from challenge #3. Can you use the same concept to move the cable car? Can any of the same methods be used to solve this challenge?
- 2) Try this:

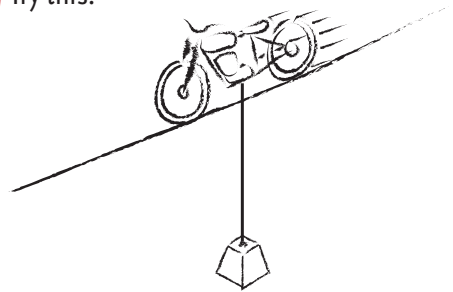


- 3) If the cable car was hanging over moving water, could you use the water current to power the cable car?

**IMPORTANT NOTE:** You can change the cable car build however you want. In fact, you will probably need to alter it in order to solve the challenges.

#### 7. ENGINEERING TIPS:

- 1) Find or build wider wheels for the motorcycle.
- 2) Try this:



- 3) Do some research. What does a sidecar look like and how can you build one?

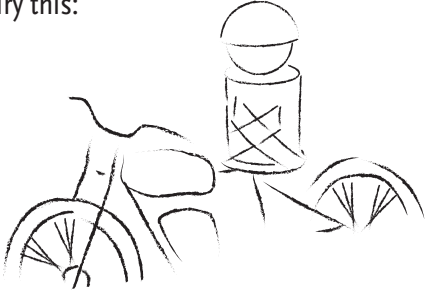
**IMPORTANT NOTE:** You can change the motorcycle build however you want. In fact, you will probably need to alter it in order to solve the challenges.



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### 8. ENGINEERING TIPS:

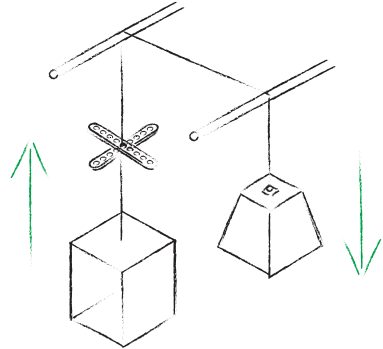
- 1) Find another toy or game piece that is about the right size to ride.
- 2) Think about how you can attach the rider so it won't fall off. Can you find craft supplies that will help with this?
- 3) Try this:



**IMPORTANT NOTE:** You can change the motorcycle build however you want. In fact, you will probably need to alter it in order to solve the challenges.

### 9. ENGINEERING TIPS:

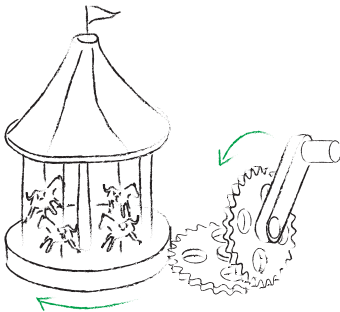
- 1) Find a small box and something heavy (but not breakable!) to use as a counter-weight. Stop the elevator with parts from this set.
- 2) Try this:



- 3) Think about what you learned from the cable car crank. Can you use the crank to power the elevator more slowly?

### 10. ENGINEERING TIPS:

- 1) Do some research. What kind of fair rides are there? Decide which you want to make.
- 2) Don't forget the things you learned when solving the previous challenges. How can you apply those concepts to this challenge?
- 3) Try this:



- 4) What toys do you have that can enjoy your Fair Ride? Let them try it out!

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