

## Student Exploration: Fan Cart Physics

### Gizmo Warm-up

The *Fan Cart Physics Gizmo™* shows a common teaching tool called a fan cart. Place fan **A** on the cart and turn it on by clicking the **ON/OFF** button below.



1. Look at the blue lines coming from the fan. In which direction is the air pushed? \_\_\_\_\_
2. Press **Play** (▶) and observe the cart. In which direction does the cart move? \_\_\_\_\_

By blowing to the left, the fans exert a **force** on the cart that pushes it to the right. This illustrates **Newton's third law**: A force in one direction results in an equal force in the opposite direction.

3. The **velocity** ( $v$ ) of the cart is its speed and direction. Click **Reset** (↺). Select the **Graph** tab, and click **Play**. Does the velocity change or is it constant? \_\_\_\_\_

A change in velocity is called **acceleration** ( $a$ ).

<b>Activity B:</b> <b>Newton's second law</b>	<b>Get the Gizmo ready:</b> <ul style="list-style-type: none"> <li>• Click <b>Reset</b>.</li> <li>• Set the <b>Initial velocity of cart</b> to 0.0 m/s.</li> <li>• Place all three fans on the cart and turn them on.</li> </ul>	
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**Question:** How do mass and force affect acceleration?

**4. Form hypothesis:**

- A. How do you think changing the **mass** of the cart will affect its acceleration? \_\_\_\_\_
- B. How do you think the number of fans will affect the cart's acceleration? \_\_\_\_\_

**5. Experiment:** Select the **BAR CHART** tab and turn on **Show numerical values**. For each of the situations below, record the acceleration of the cart. After recording acceleration **CLICK THE GRAPH** Tab and compare the shape of the graph for each trial. Then **Select the BAR CHART** tab and continue.

Load	Number of fans turned on	Acceleration
3 fans, 0 mass units	1	
3 fans, 0 mass units	2	
3 fans, 0 mass units	3	
3 fans, 2 mass units	1	
3 fans, 2 mass units	2	
3 fans, 2 mass units	3	

**6. Analyze:** Look at the acceleration values.

- A. How did doubling the force affect the acceleration of the cart? \_\_\_\_\_
- B. Compare the first and third lines of data. How did tripling the force affect the acceleration of the cart? \_\_\_\_\_
- C. A cart with two mass units and three fans has twice the mass as a cart with just three fans. How did doubling the mass affect the acceleration of the cart? \_\_\_\_\_

# Explore Learning Challenge Fan Cart Physics

**BM King**



## **Explore Learning Challenge Fan Cart Physics:**

## **Explore Learning Challenge Fan Cart Physics** Book Review: Unveiling the Power of Words

In some sort of driven by information and connectivity, the energy of words has be much more evident than ever. They have the capability to inspire, provoke, and ignite change. Such is the essence of the book **Explore Learning Challenge Fan Cart Physics**, a literary masterpiece that delves deep to the significance of words and their affect our lives. Written by a renowned author, this captivating work takes readers on a transformative journey, unraveling the secrets and potential behind every word. In this review, we shall explore the book is key themes, examine its writing style, and analyze its overall effect on readers.

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