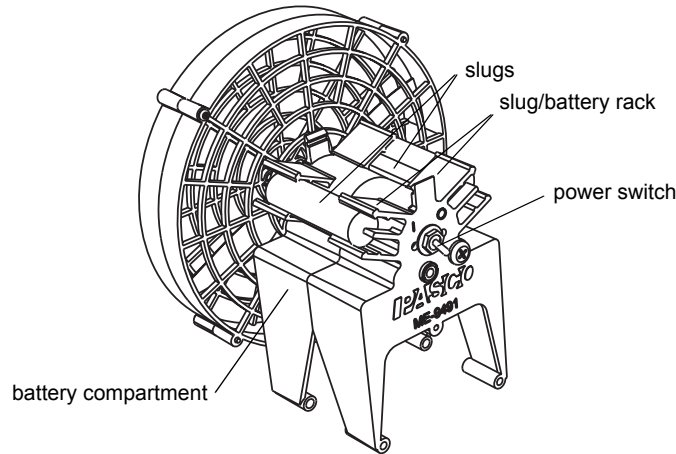


# Fan Accessory

ME-9491



<b>Included Equipment</b>	<b>Part Number</b>
Fan Accessory	ME-9491
aluminum slugs (2)	
rubber bands	
<b>Required Equipment</b>	<b>Part Number</b>
4 AA batteries	
Dynamics Cart or	ME-9430 or ME-9454
PAScar or GOcar	ME-6950 or ME-6951
<b>Suggested Equipment</b>	<b>Part Number</b>
Dynamics Track	ME-9429A or ME-9452
Tape Timer or	ME-9283
Motion Sensor and a Science Workshop™ computer interface or	CI-6529
Motion Sensor and a 750 interface or	CI-6742 and CI-7500
PASport Motion Sensor and USB Link with a USB enabled computer	PS-2103 and PS-2100
Smart Pulley and computer interface	ME-9387
Friction Cart Accessory	ME-9457

## Introduction

The PASCO ME-9491 Fan Accessory mounts on any PASCO Cart for use with a Dynamics Track (ME-9429A or ME-9452) to demonstrate principles of motion. The self-propelled Fan Accessory facilitates students' understanding of Newton's Second Law of Motion because the fan produces the applied force, and all the mass of the system is in one place. The mass and force can be adjusted for a variety of force experiments.

## Specifications

Mass of Fan Accessory (with 4 AA Energizer™ batteries and mass slugs) <sup>1</sup>	approximately 310 g
Mass of aluminum slug	approximately 20 g

<sup>1</sup>Note: The masses of batteries of different brands vary slightly.

## Assembly

assembly on the Dynamics Cart

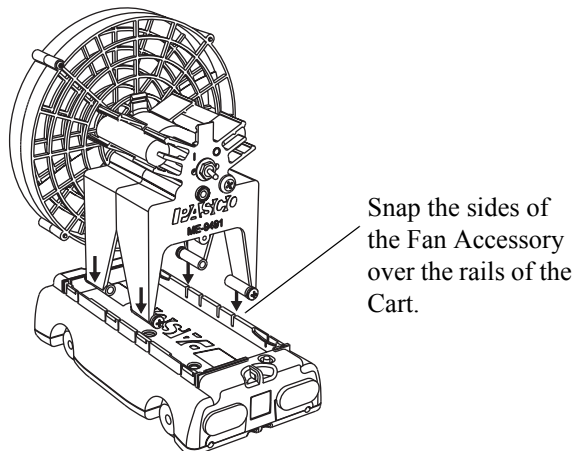


Figure 1. Attaching the Fan Accessory to the Cart

## Operation

1. Change the speed of the Fan Accessory by using two, three, or four batteries. When using less than four batteries, insert the slugs as necessary to complete the circuit (Figure 2).

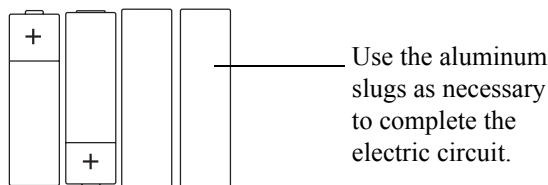


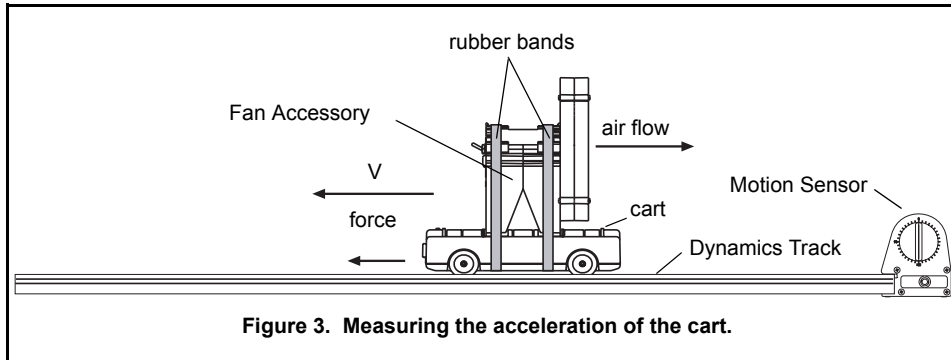
Figure 2. Supplying three different voltages by installing two, three or four batteries.

2. Store unused batteries or slugs in the storage rack on the top of the Fan Accessory.

- Vary the mass of the Fan Accessory by placing or removing the slugs or batteries in the storage rack.

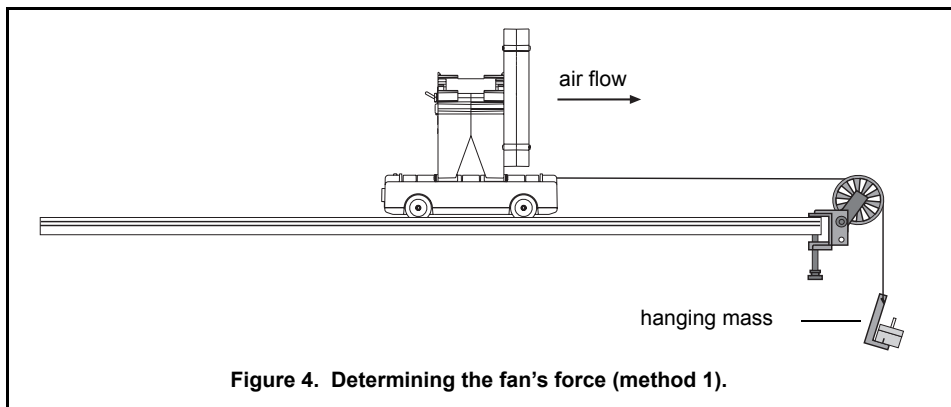
## Suggested Experiments<sup>1</sup>

**Experiment #1:** Measure the acceleration of the cart using the Motion Sensor, Smart Pulley or Tape Timer. Vary the mass of the Fan Accessory or the speed of the propeller and repeat (Figure 3)

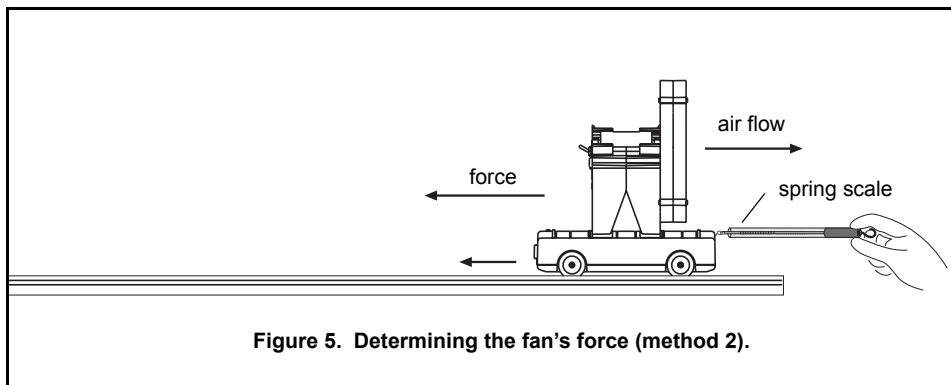


**Note:** To prevent the Fan Accessory from popping off the cart during a collision with a wall or End Stop, secure it to the cart with the included rubber bands as shown in Figure 3.

**Experiment #2:** Determine the force of the fan by connecting the cart to a mass that hangs over a pulley. Adjust the hanging mass until the cart doesn't move. Vary the fan speed and repeat (Figure 4)

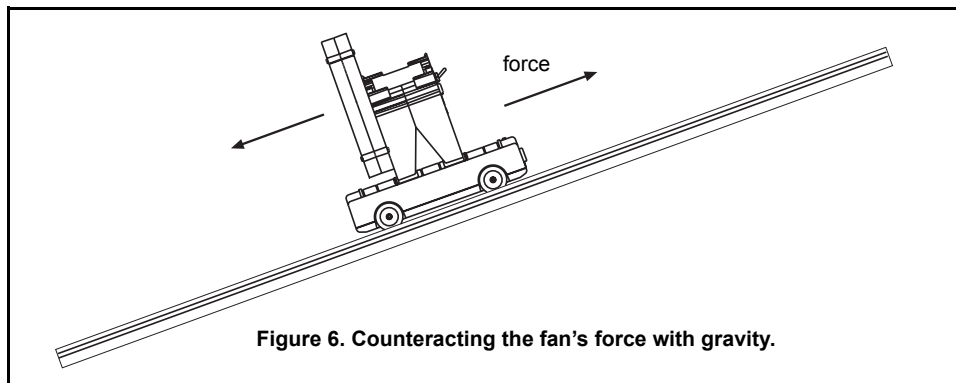


**Alternative method:** Use a spring scale to determine the fan's force at three different propeller speeds (Figure 5)

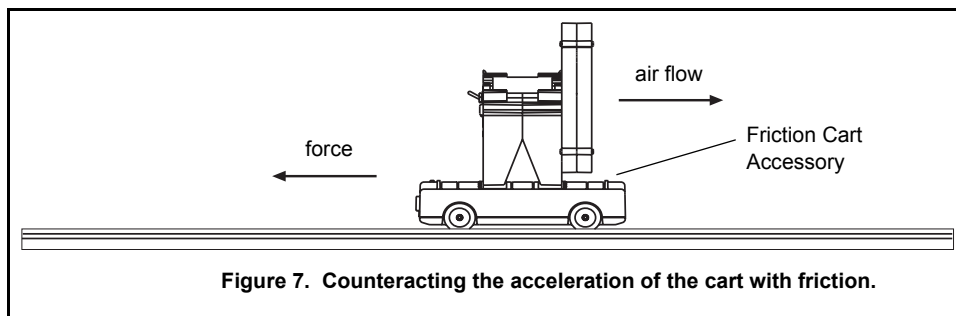


<sup>1</sup> For a discussion of fan cart experiments, refer to Robert A. Morse, "Constant Acceleration Experiments with a Fan-Driven Dynamics Cart," *The Physics Teacher*, October, 1993, pp. 436-438.

**Experiment #3:** Counteract the fan's force with the force of gravity by inclining the track until the cart cannot climb it. Vary the fan speed and repeat (Figure 6)



**Experiment #4:** Counteract the acceleration due to the fan's force with friction by attaching a Friction Cart Accessory to the Dynamics Cart and adjusting the friction until the cart moves at constant speed. Vary the fan speed and repeat (Figure 7).



## Technical Support

For assistance with any PASCO product, contact PASCO at:

**Address:** PASCO scientific  
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Roseville, CA 95747-7100

**Phone:** 916-786-3800 (worldwide)  
800-772-8700 (U.S)

**Fax:** (916) 786-7565

**Web:** [www.pasco.com](http://www.pasco.com)

**Email:** [support@pasco.com](mailto:support@pasco.com)

### Limited Warranty

For a description of the product warranty, see the PASCO catalog.

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