

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Student Exploration: Cannonball Clowns

**Vocabulary:** approximate, estimate

**Prior Knowledge Questions** (Do these BEFORE using the Gizmo.)

- How tall is your classroom? Guess its height in feet (without measuring it): \_\_\_\_\_
- How many paperclips do you think you would need to make a paperclip chain that stretched from the floor of your classroom to the ceiling? Explain your thinking below.

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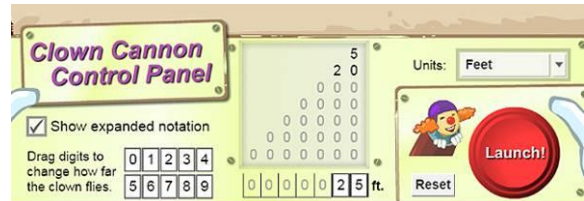


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### Gizmo Warm-up

You've just been hired by the *Cannonball Clowns* circus. Your job is to make sure the clowns hit their target.

- The center of the control panel shows the launch distance, currently set to 25 feet. Press the **Launch!** button.



Did the clown hit the target? \_\_\_\_\_

- The left of the control panel has a set of digit cards. Drag the **9** card on top of the **2** card in 25 feet. This makes the launch distance 95 feet.


Click **Launch!** Where did the clown land? \_\_\_\_\_

- Experiment with launch distances until you land the clown in the target zone.

What launch distance did you use? \_\_\_\_\_

- Create a new target zone by clicking **New**.

Find a launch distance that lands the clown inside the target zone. What is it? \_\_\_\_\_

<b>Activity A:</b> <b>Cannon practice</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click the <b>Reset</b> button.</li> <li>• Be sure the <b>Target</b> checkbox is selected.</li> </ul>	
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As a new circus member, you need to practice your cannon skills before your first show.


1. Select **Number Line (0 – 100)** from the top left menu.
  - A. Try different numbers until you find one that hits the target. What is it? \_\_\_\_\_
  - B. Find the start and end of the target zone. Start: \_\_\_\_\_ End: \_\_\_\_\_
  - C. How wide is this target zone? \_\_\_\_\_
  
2. Select **Number Line (0 – 1,000)** from the top left menu.
  - A. Try different numbers until you find one that hits the target? What is it? \_\_\_\_\_
  - B. Is this target the same width as the target in Step 1? Why or why not? \_\_\_\_\_  
 \_\_\_\_\_
  - C. Find the start and end of the target zone. Start: \_\_\_\_\_ End: \_\_\_\_\_
  - D. How wide is this target zone? \_\_\_\_\_
  
3. Click **New**. Find a number that lands the clown in the new target. What is it? \_\_\_\_\_
  
4. Repeat Step 3 three more times. Record the number you used to hit each target below.
 

Target 1: \_\_\_\_\_ Target 2: \_\_\_\_\_ Target 3: \_\_\_\_\_
  
5. Look at the target zone shown below.



- A. **Estimate** the start and end of the target zone. Start: \_\_\_\_\_ End: \_\_\_\_\_
- B. Explain how you made your estimates. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_




<b>Activity B:</b> <b>Halftime show</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click the <b>Reset</b> button.</li> <li>• Be sure the <b>Target</b> checkbox is selected.</li> </ul>	
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The Cannonball Clowns have been hired to perform during the halftime show at a football game.

1. Select **Football Field** from the top left menu. Set the **Units** to **Yards**.
  - A. Find a number that lands the clown in the target zone. What is it? \_\_\_\_\_
  - B. Find the start and end of the target zone. Start: \_\_\_\_\_ End: \_\_\_\_\_
  - C. Use the **New** button to create three new, random target zones. Land the clown in each of the zones. Write the numbers you used below.  
 Target 1: \_\_\_\_\_ Target 2: \_\_\_\_\_ Target 3: \_\_\_\_\_
2. You want to impress the circus boss by working with different units. Turn the **Target** off. Make sure that **Markers** are turned on and click **Clear**. Launch the clown 100 yards.
  - A. Change the **Units** to **Feet**. There are 3 feet in one yard.  
 How many feet do you think there are in 100 yards? \_\_\_\_\_
  - B. Check your answer using the Gizmo. How many feet equal 100 yards? \_\_\_\_\_
  - C. How many feet are in 50 yards? \_\_\_\_\_ Use the Gizmo to check your answer.
3. **Clear** the markers. Launch the clown 100 feet.
  - A. Change the **Units** to **Inches**. There are 12 inches in one foot.  
 How many inches do you think there are in 100 feet? \_\_\_\_\_
  - B. Check your answer using the Gizmo. How many inches equal 100 feet? \_\_\_\_\_
  - C. How many inches are in 50 feet? \_\_\_\_\_ Use the Gizmo to check your answer.
4. Turn **Target** on. Use the **New** button to create a new random target zone.
  - A. Land the clown in the target using inches. What distance did you use? \_\_\_\_\_
  - B. Now land the clown in the target using feet. What distance did you use? \_\_\_\_\_



<b>Activity C:</b> <b>National tour</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>Click the <b>Reset</b> button.</li> </ul>	
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The Cannonball Clowns are going on a national tour. Can you help them hit their targets across the United States?

- Use the top left menu to visit the five locations. At each location, you need to score two hits in the target zone using two different units. Record the distances and units for each hit in the table below.

Location	Hit 1	Hit 2
8 School Buses		
Golden Gate Bridge		
New York City – Washington D.C.		
New York City – Paris		
To International Space Station		

- Look at the last two locations in the table.
  - What two units of measurement did you use to measure the distance from New York City to Paris? Why did you choose those units?  


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  - Which would be the shorter trip: from New York City to Paris or from Earth's surface to the International Space Station? Is this what you expected?  


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- An **approximate** measurement is close but not exact. Do you think that the distances in your table are exactly or approximately equal to the real-life distances? Explain.  


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