Activity Sheet 1
Introduce the Experiment

Let’s see how the ball’s landing position depends on its release position on the ramp. There are positions marked on the ramp (in cm): 30, 50, 70, 90, 110. There are also distances ruled on the landing mat (in cm): 0-125.

1. Which release position will cause the ball to land the furthest away from the base of the ramp? Why do you think that?

2. Now release a ball from the top of the ramp and release one from the bottom. Which one landed further away? Were you right?
Activity Sheet 2
Develop Testing Procedure

3. Release a ball from a ramp position = 70cm and measure where the ball lands to the nearest cm.

   Landing Distance (cm) = ________

4. Describe how you measured its distance. Did you measure the front of the ball? Did you stand right over the ball?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

5. Release a ball from a ramp position = 70cm and measure where the ball lands to the nearest cm.

   Landing Distance (cm) = ________
   How reproducible is the landing distance? Does it land in the same place every time?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

6. What should you do if the ball rolls before stopping?

   __________________________________________________________
   __________________________________________________________
Activity Sheet 3
Collect Data – 70cm

7. Using the procedure you just made, release the ball from a ramp position = 70cm five times and record the results in the table below:

<table>
<thead>
<tr>
<th>Ramp Position</th>
<th>Landing Distance [cm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

8. Find the average landing distance:

First, find the total distance:

\[
\text{Total Distance} = \text{Landing Distance #1} + \text{Landing Distance #2} + \text{Landing Distance #3} + \text{Landing Distance #4} + \text{Landing Distance #5}
\]

Then, divide by the number of drops:

\[
\frac{\text{Total Distance}}{\text{Number of Drops}} = \text{Average Landing Distance}
\]

Do you think the Average Landing Distance value is a better or worse predictor of the landing distance than a single measurement? Why?

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
Activity Sheet 4
Collect Data

9. Practice releasing the ball from ramp position = 70cm until you can get a similar landing distance a few times in a row. Make notes on the procedure you use to release and measure the ball:

How did you place the ball on the ramp position?
_______________________________________________________
_______________________________________________________

How did you measure the ball on the landing mat?
_______________________________________________________
_______________________________________________________

10. Now you are ready to measure the other ramp positions.

<table>
<thead>
<tr>
<th>Ramp Position</th>
<th>Landing Distance [cm]</th>
<th>Total Distance [cm]</th>
<th>Average Landing Distance [cm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
11. Define the X-Axis:
The horizontal x-axis represents the variable you are changing. What variable are we changing in the Launch Tube experiment? 

What is the smallest value of the variable we are changing? __________
What is the largest value of the variable we are changing? __________

12. Define the Y-Axis:
The vertical y-axis represents the response variable. What variable are we measuring in the Launch Tube experiment? 

What is the smallest value of the response variable? __________
What is the largest value of the response variable? __________

13. Plot the average data in your table on the graph provided on the following page.

14. Draw a “best fit line” that connects the points on your graph.
Activity Sheet 6
Hit the Target!

15. Using your graph, predict the landing distance of the ball released from the yellow line.

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

16. How did you make this prediction?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

17. Do the experiment. How many times did you hit the target out of 5? Why?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________