

Name: _____

Cart Building Design Challenge

PLAN: Draw a picture of the design of your cart. You must get teacher approval before building.

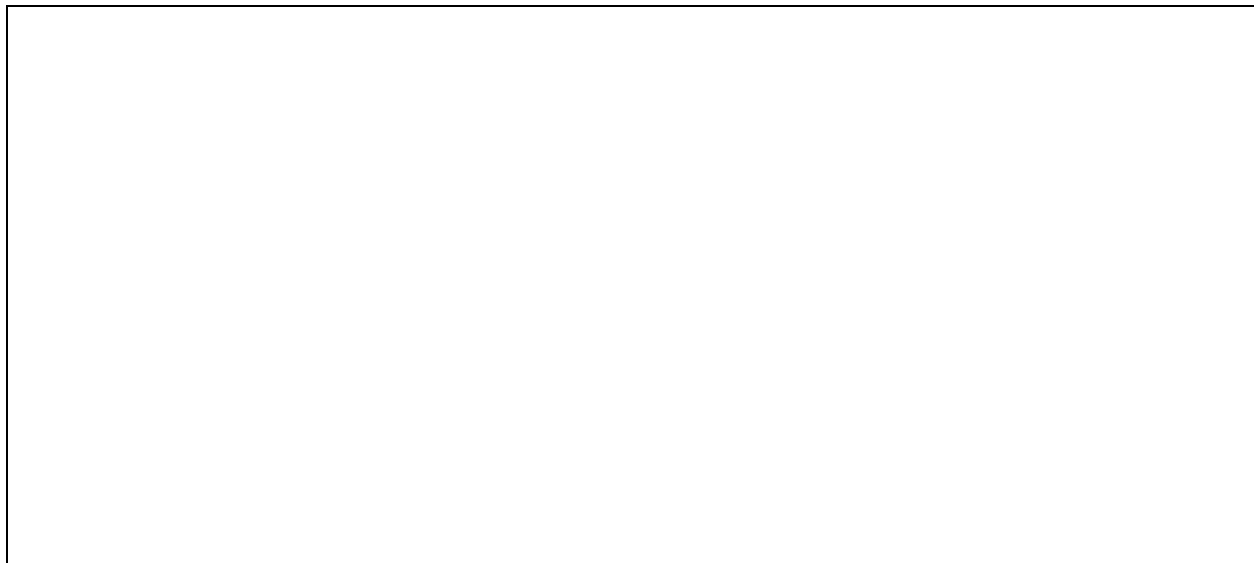
A large, empty rectangular box with a thin black border, intended for the student to draw their cart design. The box is centered on the page and occupies most of the middle section.

Once your teacher has approved your labeled design, complete the order form on the next page and go to the materials station to collect the materials you will use.

Cart Building Order Form

Item	Quantity Needed
Large Plastic Disk - Red	
Small Plastic Disk - Yellow	
Assorted Color Wheels	
Small Black Wheels	
Green Shafts (For red & yellow disks)	
Wooden Dowel for Colored Wheels	
Wooden Dowel for Black Wheels	
Tongue Depressors	
Craft Sticks	
Binder Clips	
Clear Straws	
Index Cards - White	
Index Cards - Color	
Transparent Tape	

CREATE: After you have built your cart, draw a new labeled color diagram of your cart



Cart Building Invoice

Item	Cost	Quantity Used	Total (Cost x Quantity)
Large Plastic Disk - Red	\$500 each		
Small Plastic Disk - Yellow	\$400 each		
Assorted Color Wheels	\$300 each		
Small Black Wheels	\$350 each		
Green Shafts (For red & yellow disks)	\$100		
Wooden Dowel for Colored Wheels	\$100		
Wooden Dowel for Black Wheels	\$100		
Tongue Depressors	\$200		
Craft Sticks	\$150		
Binder Clips	\$200		
Clear Straws	\$200		
Index Cards - White	\$100		
Index Cards - Color	\$150		
Flag	\$200		
Total Cart Cost Sum of all items			

--

Cart Building Order Form

Go back to the materials station and return items that you don't need and gather your new items.

Item	Quantity Needed
Large Plastic Disk - Red	
Small Plastic Disk - Yellow	
Assorted Color Wheels	
Small Black Wheels	
Green Shafts (For red & yellow disks)	
Wooden Dowel for Colored Wheels	
Wooden Dowel for Black Wheels	
Tongue Depressors	
Craft Sticks	
Binder Clips	
Clear Straws	
Index Cards - White	
Index Cards - Color	
Transparent Tape	

Cart Building Invoice

Item	Cost	Quantity Used	Total (Cost x Quantity)
Large Plastic Disk - Red	\$500 each		
Small Plastic Disk - Yellow	\$400 each		
Assorted Color Wheels	\$300 each		
Small Black Wheels	\$350 each		
Green Shafts (For red & yellow disks)	\$100		
Wooden Dowel for Colored Wheels	\$100		
Wooden Dowel for Black Wheels	\$100		
Tongue Depressors	\$200		
Craft Sticks	\$150		
Binder Clips	\$200		
Clear Straws	\$200		
Index Cards - White	\$100		
Index Cards - Color	\$150		
Flag	\$200		
Total Cart Cost (Sum of all items)			

Cart Distance Test Recording Sheet

Procedure: Assemble the ramp and meter tapes. Line up the front wheels of the cart on the 30cm line. Release the cart and then once the cart has stopped, record the distance travelled by recording the measurement from the front wheels. Place a sticky note on the ground by the meter tape with the distance recorded. Repeat the process 5 times.

Trial Number	Distance Travelled (cm)
1	
2	
3	
4	
5	

Make a claim about the distance that the cart can travel: (Cause and Effect)

I claim that _____

What patterns do you notice when you did your test?

OPTIMAL DESIGN

Draw a final prototype of your cart, using color and labels

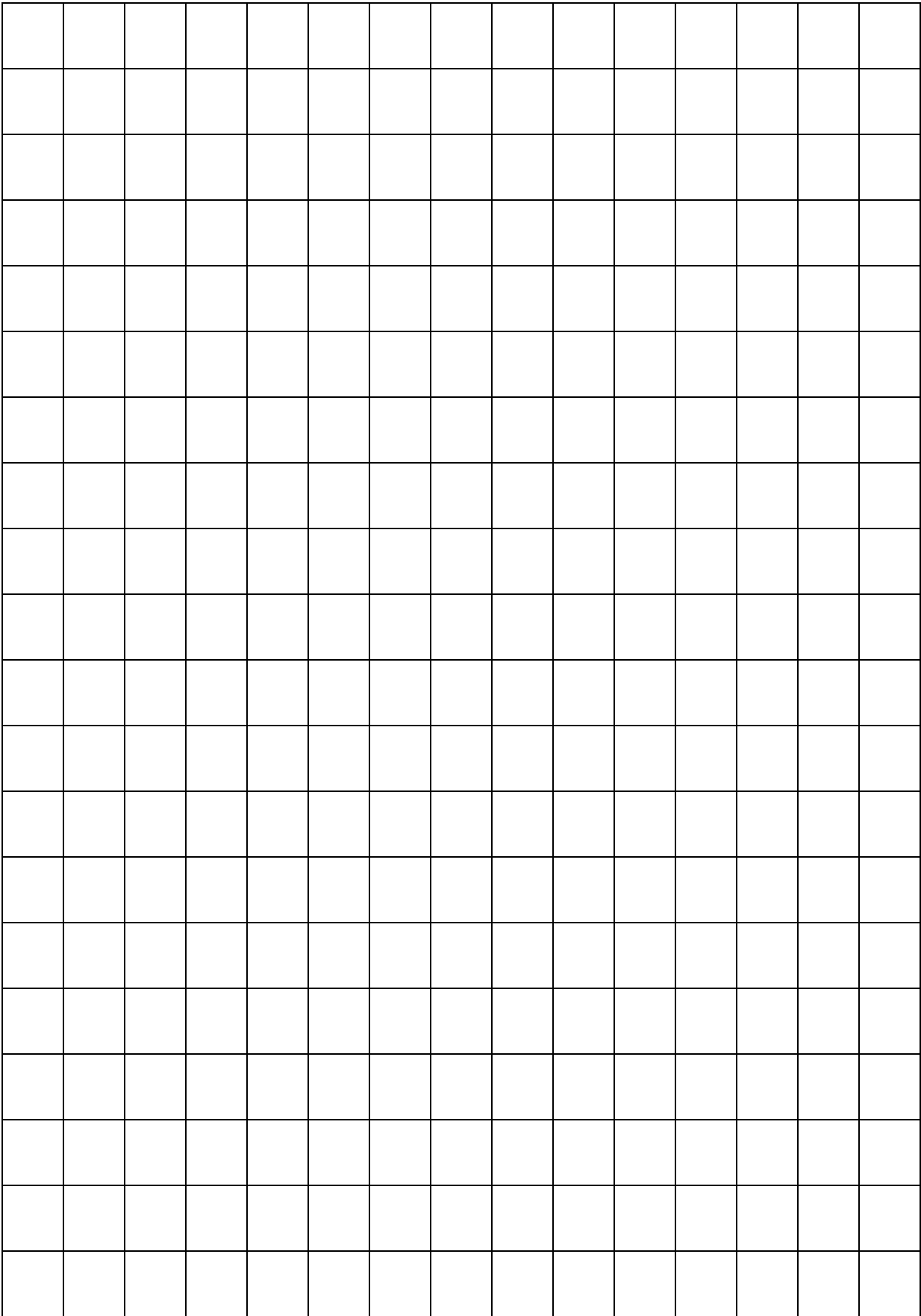
Class Cost/Distance Table

Record the distance travelled and the cost of each cart as your teacher completes the final test runs. You will use this data to complete the bar graph.

Cart Number	Distance Travelled (cm)	Cost (\$)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

On the next page, use the data that you collected from each group's distance test to create a bar graph. Be sure to label your X and Y Axis. You will work with your classmates to decide on an appropriate scale for your Y-Axis based on the results of the distance challenge. Your bar graph will include data from all of the carts.

Cart Design Graph



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Cart Number

Reflection

Write a reflection on what you learned about the engineering design process.
What did you learn about how the process works?

Which cart do you feel was the optimal design based on the criteria and constraints? Why?

What did your group do well? _____

What were some things that you could do better?
