

Name:

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Design Worksheet

The cost of materials is given below; your team has a budget of \$20.

Material	Unit Amount	Cost per Unit (\$/unit)
Plastic drinking straws	2 straws	2
Popsicle sticks	2 sticks	3
Lifesaver candies	4 candies	1
Index cards	1 card	2
Tape	15 cm	2
Pennies	2 pennies	3

Additionally, you must keep safety considerations in mind. The cost of “building” various safety features into your design is given below. Two features are required and must be purchased.

Safety Feature	Cost (\$)
Seatbelts (<i>required</i>)	1
Airbags (<i>required</i>)	1
Antilock brakes	3
Blind-spot warning	3
Forward-collision warning	3
Lane-departure warning	4
Lane-keep assist system	5
Parking assist system	5

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Ask & Research:

List the criteria that your design must meet and the constraints on your design.

Brainstorm:

Plan what your design might look like.

Are you making any tradeoffs in your design? If so, defend your design decision.

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Plan:

Draw your team's final design.

List the materials and amounts and safety features needed to build your design. List the total cost of your design

Are you making any tradeoffs in your design? If so, defend your design decision.

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Testing:

Run 1:

Observations:

Distance traveled:

Design Modifications, including a list of materials, safety features, and total cost:

Run 2:

Observations:

Distance traveled:

Design Modifications, including a list of materials, safety features, and total cost:

Run 3:

Observations:

Distance traveled:

Design Modifications, including a list of materials, safety features, and total cost:

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Variable Testing:

Independent variable:

Dependent variable:

Control variables:

Run at least three more tests, changing only the independent variable in each test. Record your data in the table below.

Run Number	Mint-mobile Mass	Distance Traveled
1		
2		
3		

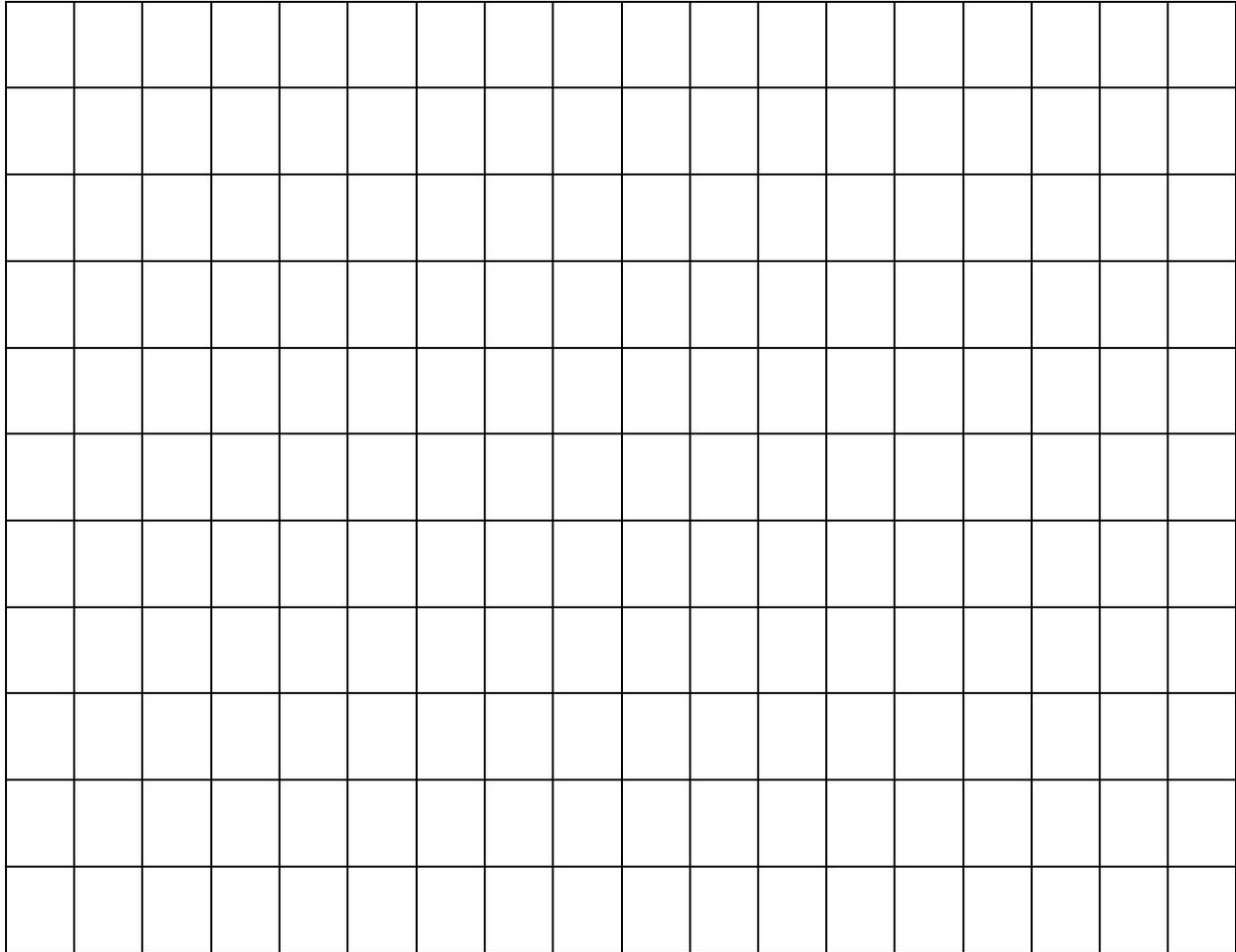
What was the effect of changing the car's mass on the distance your mint-mobile traveled?

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Plot your data on the provided graph. Label the axis appropriately, with units.



How does your graph show the effect of changing your car's mass on your mint-mobile's distance traveled?

Draw a line of best fit onto the graph. Determine the equation for this line.

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Predict:

Select a new mint-mobile mass. This must be a value you did not test earlier. Using your line of best fit equation, determine the distance your mint-mobile would travel if it had that weight.

New mass:

Test your prediction:

Add or remove pennies to/from your mint-mobile to match the mass chosen from your predictions. Use the scale to check your mint-mobile mass.

Test your mint-mobile at this new mass.

Distance traveled:

How did your predicted distance compare to the actual distance traveled? If they are very different, explain why.

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Reflection:

What worked well about your mint-mobile design?

What could you improve in your design to get your mint-mobile to travel even further?

What sorts of things did you do at each step of the engineering design process?

What were some tradeoffs you had to consider while designing your mint-mobile?

What else could you design using the engineering design process?