Balloon Powered Race Car Lab

Objectives – To create a balloon powered racecar for maximum speed and distance; and use the speed formula. V=d/t

Materials – 9-inch balloon(s) is *mandatory*.

Rules –

- Groups: 2 people design 1 car, 3 people must design 2 different cars (must be completely different in design).
- Detailed outline of car construction, including two drawings of the car (top and side views) and labeling materials on the car. This will include materials to be used and the general design of your car.
- The car must be powered by no more than 2 – 9" balloons.
- You can build the car out of anything, but remember, you cannot exceed $5.00.
- You will bring materials from home to assemble your car in class.
- It must have at least 3 wheels. Wheels are defined as anything that is round and goes around.
- The wheels cannot be wheels from a toy car. They must be made of something that was not originally meant to be used as wheels.
- The car may not leave the ground.
- Cannot cost more than $5.00 to build.

RACE WE MUST!

Hints:

- Think lightweight (it's hard to get a large mass moving)
- Axle and wheel movement should be smooth with little friction
- Make sure wheels are straight so car travels in a straight line
- Traction between wheels and floor is important (need to have some friction)

Race Day Procedure –

1. Using your **RACE DAY SHEET** provided, calculate 5 speed trials of your car. Calculate the distance your car travelled, while one partner records the time. Time will be recorded on GO and end when the car stops.
2. Record all of your results and do an average of the 5 speed trials to find the **average speed** of your balloon-powered car.
3. On race day a track area will be set up (most likely our classroom).
4. Answer your lab questions in full sentences.

5. Cars that follow all of the rules will be eligible for awards.
6. Winning cars will be displayed in the lobby, as well as on our web page!

Awards –

Awards will be given in three categories:

- Best design
- Fastest car (in 5 meters)
- Furthest distance travelled

Lab Questions:

1. Did your car work the first time? If not, what did you do to modify it? Explain how that worked.

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2. If you could make more improvements on your car, what would you do?

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3. Describe how the balloon supplied energy to your car.

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4. Was it difficult to calculate the average speed of your car? Why or why not?

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5. What factors/things influenced the speed of your car?

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6. Give TWO tips or pieces of advice to someone who had to construct a balloon-powered car?

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7. What did you learn from building and testing your balloon car?

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Lab Evaluation Questionnaire:

I. What did you like best about the lab? Be specific and tell why.

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II. Which part did you find to be the most difficult? Be specific and tell why.

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III. If you were able to repeat the lab, what would you do to improve it? Be as specific as you can and remember no experiment it ever perfect! (Remember our potato experiment)

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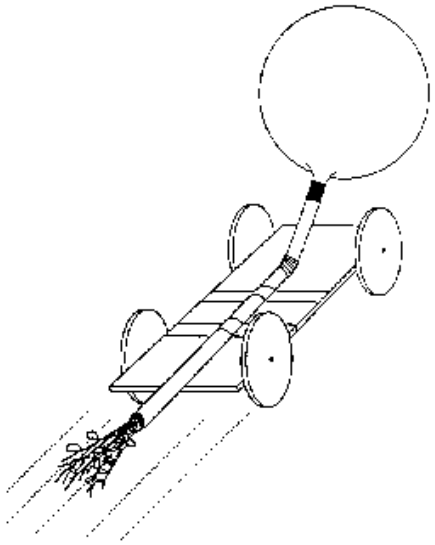
_____

NAMES: _____ _____ _____

RACE DAY WORKSHEET:

TRIAL #	Distance (meters, cm, mm)	Time (Seconds)	Speed (v=d/t)
1			
2			
3			
4			
5			
AVERAGE			

- **Be sure to include all units!**



Grading Rubric:

Lab write-up	Point value	Description	Points earned
Observations and data	15	Completed data table, Correct calculations, thorough thoughtful process, time commitment	
Conclusion	10	What went wrong? How your design changed; what you changed. Relate ideas back to your hypothesis.	
Procedure/Materials	10	Detailed, labeled drawings of car (including two drawings of the car (top and side views)), list of material used.	
Problem/hypothesis	5	Problem/hypothesis clearly stated	
Questions	20	Answered all questions correctly, with supporting evidence and thoughtful responses.	
		Total Points	**/60**

Name: _____

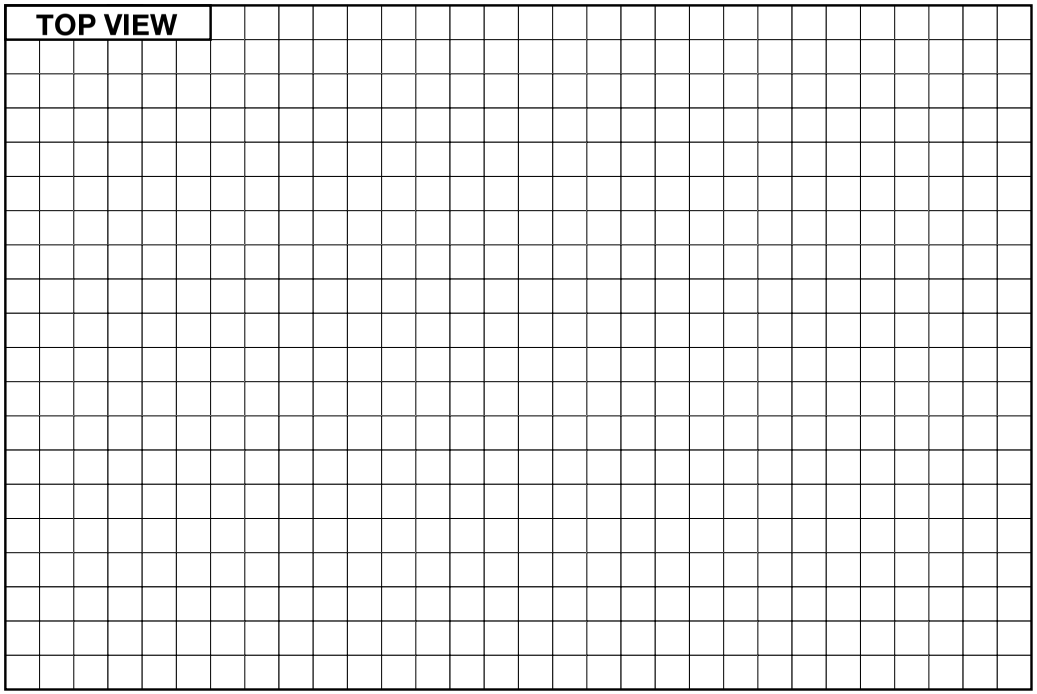
Rocket Racer Design Sheet

Draw a diagram showing your best design for a rocket racer.

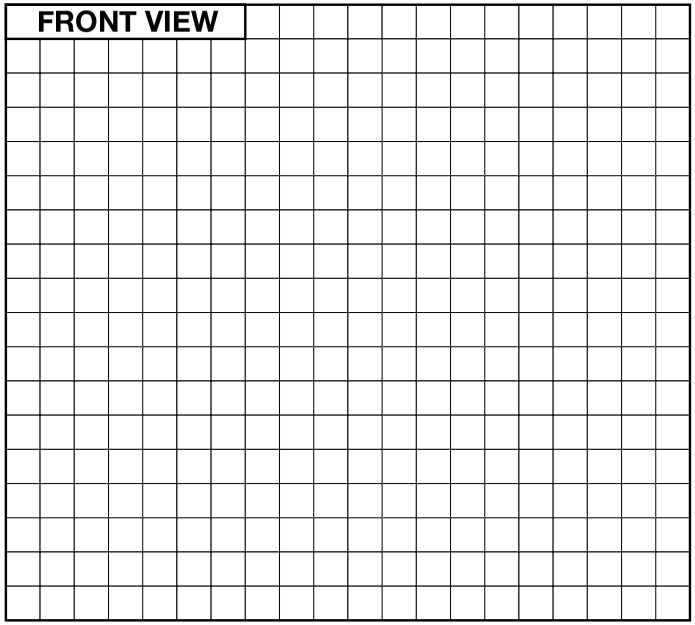
Show your racer as seen from the front, top, and side.

Each square on the graphs = 1cm.

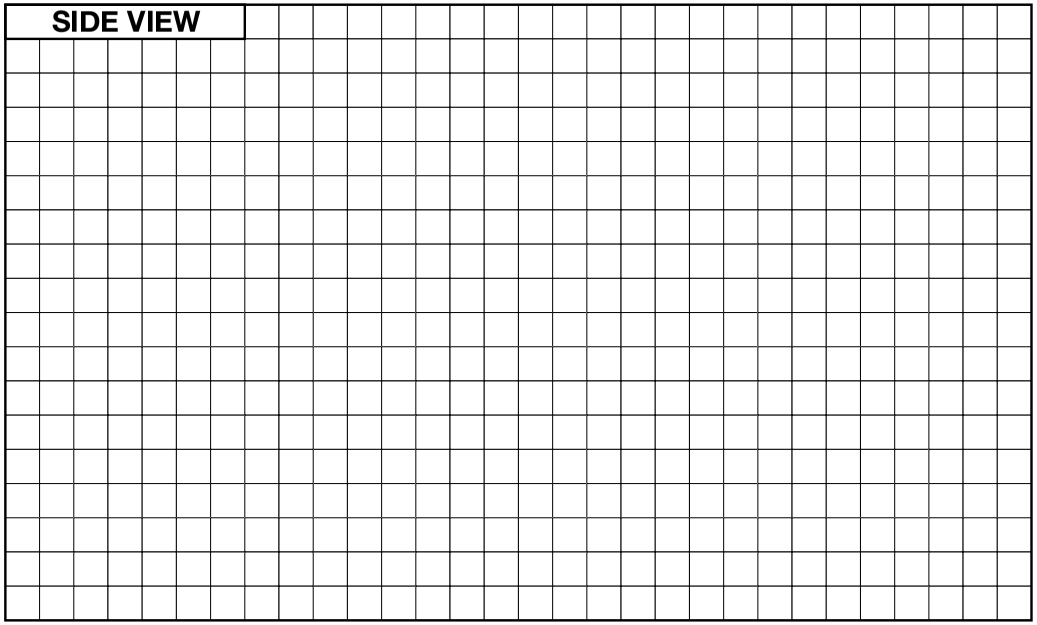
TOP VIEW



FRONT VIEW



SIDE VIEW



Name: _____ Date: _____

The Scientific Method II

Problem Or Objective 	What is the problem or objective…
Form Hypothesis 	Make a prediction
Make a Plan and Follow it 	Experiment Procedure Materials needed
Observe and Record 	Draw or write what you observed… Use a chart
Draw a Conclusion 	See if your hypothesis is accepted or rejected…