Physical Science KJHS

Rockets

Date Period

Name

OBJECTIVES: to work as a team and create a rocket (one for each team member) that is testing a different independent variable.

Team Name:	Member Names:		

TIMELINE:

April_____- Introduce project, groups, start getting materials
May 5+6- Materials Due, Start Building
May 7+8- Finish building rocket, Set-up Google slides 1,2,3
May 11 +12- Rocket Launch 1
May 13 +14- Modify rockets in class, work on Google slides 1-5
May 15 +18- Rocket Launch 2 (take video of 1 launch per group)
May 19-20- Work on Google slides, finish for HW (Slides -)
This might extend a period, we will see how it goes.
May 21+22-Present findings to class.

TOTAL POINTS:

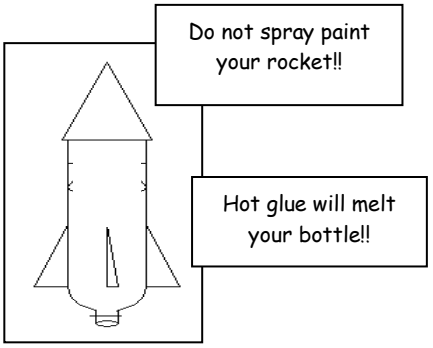
- Materials in on due date _____ (points will be deducted if materials not in class)
  - Empty, rinsed out bottle with cap
  - material for fins, nosecone and mass inside nosecone
  - duct tape to attach parts
- Rockets built correctly for Launch 1 _____ 15pts
- Rockets built correctly for Launch 2 with modified independent variable to improve dependent variable (distance, time, or speed)_____ 15pts
- Google Slides _____50pts

Total_____80pts

CONSTRUCTION REQUIREMENTS:

1. Your rocket's body will be made out of a **2-Liter** plastic bottle provided by YOU. **Keep the cap.** Cheap soda bottles don't work (fit/pressure problems). The materials you use for the fins and nose cone will be provided by YOU.
2. Your control rocket MUST have at least 3 **fins** for stability. BE CREATIVE! (SPIRAL?)
3. Your rocket MUST have a **nose** cone. You might have to redo this for 2nd launch.
4. **Mass** in nose cone not too heavy, not too light – must maintain **MOMENTUM**.

Building a Water Rocket: Quality plastic, not too much duct tape!
1. Cut out fins of any shape secure them to the tube. You choose the number, shape, and material. Do not puncture plastic bottle!
2. Form a nosecone and hold it together with duct tape.
3. Add mass into the top of the nosecone. (modeling clay, paperclips, beans, etc.) Find mass of rocket when completely done without water.
4. Tape nosecone to upper end of bottle (not on end with nozzle). You do NOT want it to fall off. (NOSECONE LIMIT < 20 cm)



A. Experimental Design Review:

Independent Variable: the ONE variable that you change on a rocket. Ex: _____

Dependent Variable: the variable that is MEASURED based on the independent variable ex: _____

Constants: everything else that must stay the same on the rocket, ex: _____

Control: the #1 rocket that is not changed – all other rockets are based off of this one.

- if you are in a group of 3, you will have 3 rockets. 1 control rocket, and 2 other identical rockets, with only 1 independent variable changed on each rocket. The control will be launched first.
- if you are in a group of 4, you will have 4 rockets. #1 is the control (which will be launched first) and then other 3 identical rockets with only **one independent variable changed for each other rocket**.

B. Now it's time to think and create very carefully!

Variables: possible choices to be your **1 independent variable** on the rockets in your group that are not the control. Note: all of your rockets will be identical to each other except for that ONE I.V.

What are some possible i*ndependent variables* that you could change (manipulate)?

Ex:_____

_____

Control Rocket #1:
Draw the control

PREDICTED Materials

Height:_____
Number of fins:_____
Fin material:_____
Draw fin design:

Nose cone material:_____
Nose cone length:_____
Mass inside nose cone:_____

Amount of water: 1 liter(1/2 full)
(draw line on your rocket)
Air Pressure: 90 PSI
Launch Angle: 45°
You must put name and rocket number!!!

DRAW Rocket #2:
Independent Variable:
_____

DRAW Rocket #3:
Independent Variable:
_____

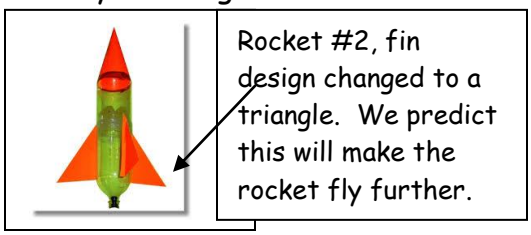
DRAW Rocket #4 (if needed):
Independent Variable:
_____

GOOGLE SLIDES: In this order:

Intro: Group members, Team Name, Period, Group picture of your rockets (before launch 1). **_____(2pts)**

Control: Rocket #1 Picture of control rocket #1-Label the height (cm), number of fins and material used, nosecone material, material inside nosecone, mass of rocket. **_____(5pts)**
Include constants: air pressure___, angle of launch ___, amount of water _____

IV Rockets: Picture of Rocket #2, #3, #4(?) before Launch 1. *Individual slide for each rocket*
A. Label the IV you changed for each. B. Write a prediction of what DV will change. **_____(6pts)**



Data Table **_____ (15pts)**

ROCKET	IV	DV: Distance m	DV: Time s	DV: Speed m/s
Launch 1 Rocket #1	CONTROL			
Launch 2 Rocket #1	CONTROL			
Launch 1 Rocket #2				
Launch 2 Rocket #2				
Launch 1 Rocket #3				
Launch 2 Rocket #3				
Launch 1 Rocket #4				
Launch 2 Rocket #4				

Conclusion 1: A. Compare control to rocket #2 **_____(4pts)**
B. Compare control to rocket #3.
C. (#4?)
Ex. A. Our control's distance was 33 m, Rocket #2 went 5 m farther due to its fin design change.

Final Conclusion: For each Rocket answer these questions: **_____ (8pts)**
a. What change did you make to improve your IV?
b. Why?
c. Which DV had a positive change?
d. Why do you think this change occurred?

Video of 1 rocket during second launch **_____ (5pts)**

****Overall appearance**: Presentation is professional and easy to follow **_____(5pts)**