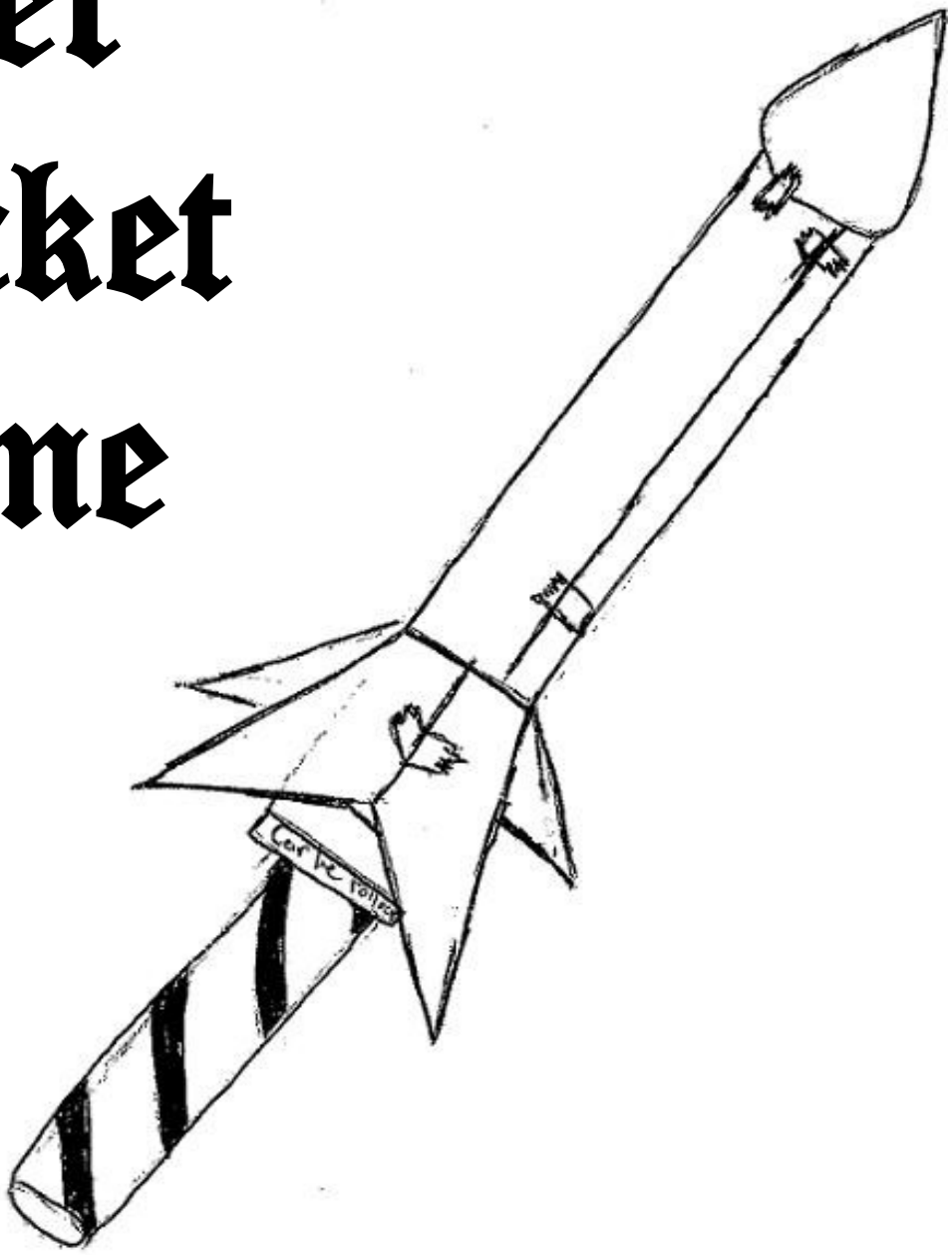
Enrichment Science Lab Report

https://www.jpl.nasa.gov/edu/teach/activity/straw-rocket/

http://www1.nasa.gov/pdf/295786main_Rockets_Adv_High_Power_Paper.pdf

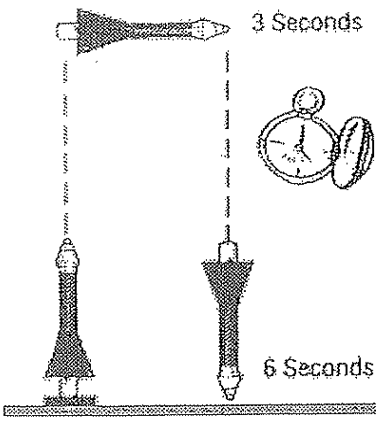
Paper Rocket Time



Directions for Air-powered Projectile Practice

Step 1: Find the initial velocity

Shoot the Projectile straight up into the air and time it until it hits the ground.



then

Divide that time by 2 and multiply by $9.8 m/s^2$

(the rate at which gravity slows an object).

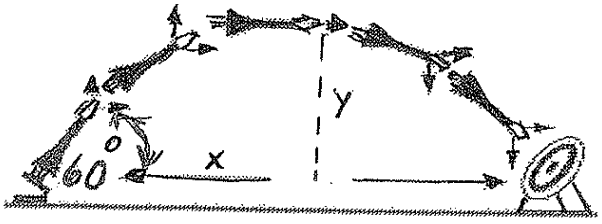
Step 2: Assign an angle, Z°, and shoot the projectile again.

Z angle is = 60°

Step 3: Calculate the vertical (y), and horizontal (x), velocities.

a) V_y = (initial velocity · sinZ)m/s
b) V_x = (initial velocity · cosZ)m/s

Step 4: Calculate total air time



$2(V_y \div 9.8 m/s^2)$

Must complete inside the brackets first

Step 5: Calculate total distance

V_x(total air time)

DIRECTIONS FOR THE NEXT PAGE:

Complete the data table for each rocket (minimum 3 times) and record your results. Then take the average of your flights on the last page and complete the calculations ONLY on the AVERAGE of each rocket.

Flight #	Total Time of Flight (seconds)	Distance Traveled (feet)	Distance Traveled (inches)	Flight #	Total Time of Flight (seconds)	Distance Traveled (feet)	Distance Traveled (inches)
1) NO wings				4) NO wings			
2) NO wings				5) NO wings			
3) NO wings				6) NO wings			
7) Straight Fins				10) Straight Fins			
8) Straight Fins				11) Straight Fins			
9) Straight Fins				12) Straight Fins			
13) 90 degree Fins				16) 90 degree Fins			
14) 90 degree Fins				17) 90 degree Fins			
15) 90 degree Fins				18) 90 degree Fins			
19) Twisted Fins				22) Twisted Fins			
20) Twisted Fins				23) Twisted Fins			
21) Twisted Fins				24) Twisted Fins			
25) your design				28) your design			
26) your design				29) your design			
27) your design				30) your design			

HIGHLIGHT your BEST (Longest) flight from each rocket

NAME: _____ **DATE:** **PD:** ***Paper Rocket Activity***

Record your Flight #	**Total Time of Flight (sec)**	**Converted Feet & inches to meters**	**flight Velocity (m/sec) = (Distance ÷ time)**	**TIME UP (seconds) = (Total Time ÷2)**	**(V_i) Velocity (initial) = (TIME UP)(9.8)**	**(V_y) Velocity vertical = Sin60° *V_i**	**(V_x) Velocity horizontal = Cos60° * V_i**	**Total Air time = $2[(V_y) / g]$**	**Total distance = (Total air time) * (V_x)**	**(V_f) Final Velocity (m/sec) = (Total Distance ÷ Time)**	**Final Velocity (mph) $=V_f * 2.23$**	**GRADE / 44**
+4 pts for ea column	Column 1 +4	Column 2 +8	Column 3 +12	Column 4 +16	Column 5 +20	Column 6 +24	Column 7 +28	Column 8 +32	Column 9 +36	Column 10 +40	Column 11 +44	
no Fins Paper Rocket #												
Straight Fins Paper Rocket #												
90 degrees Fins Paper Rocket #												
Twisted Fins Paper Rocket #												
Your rocket Design?												
Doesn't count												

Example of how to convert feet and inches to meters.

$$\frac{\#\,feet}{1} x \frac{12 inches}{1 foot} = \#inches + (extra\_inches) = \frac{Total\_inches}{1} X \frac{1 meter}{40 inches} = Total\_distance\_in\_meters$$

Activity description courtesy: John Ca/Jas, NASA/JPL