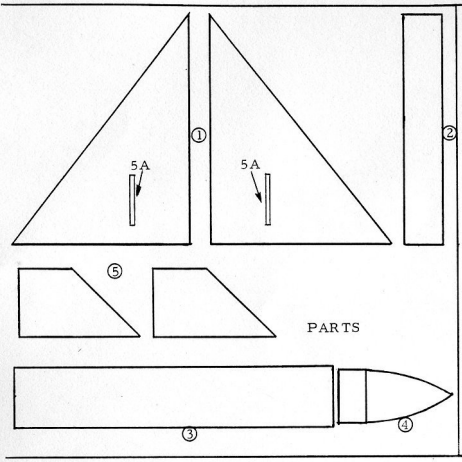
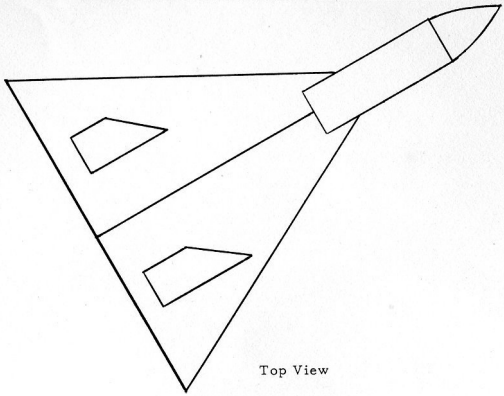
DELTA - WING

Power Glider Rocket Kit





ASSEMBLY INSTRUCTIONS

1. Glue untappered end of nose cone (4). Fit into body tube (3) immediately.
2. Glue along widest side of wing connector (2) and attach wings (1) to form large triangle. Leave set when dry glue on guide fins (5) in position (5A)
3. Attach body (3) to head of wings. Be sure to check for balance with loaded engine and fired engine for best results.
4. To modify see figure 1.

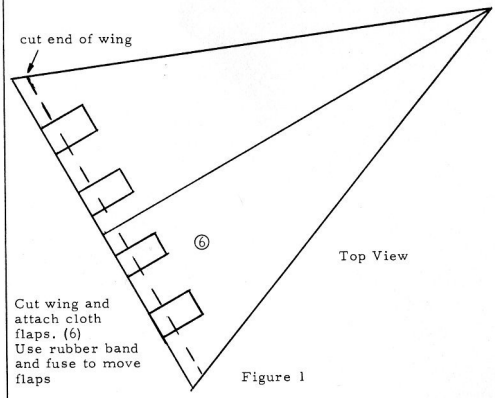
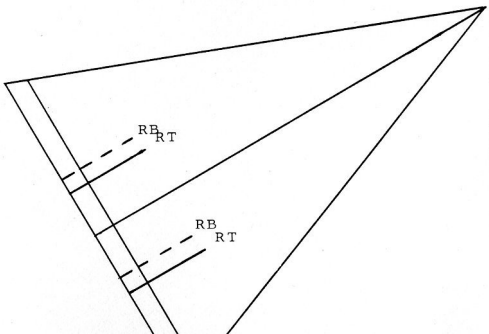
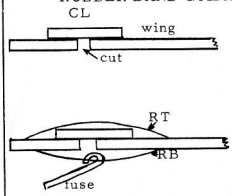


Figure 1



RUBBER BAND GUIDANCE

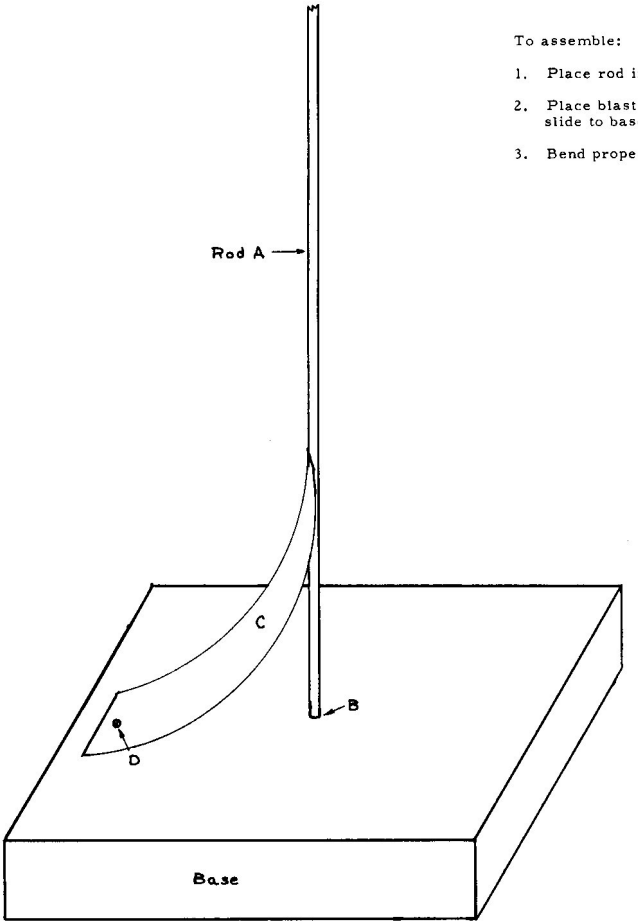


Rubber band holds guidance flaps straight. Fuse when lit breaks band. Rocket curves in opposite direction of break. Above can also be applied to other band.

Side View

RT - rubber band top
RB - rubber band bottom
CL - cloth flaps

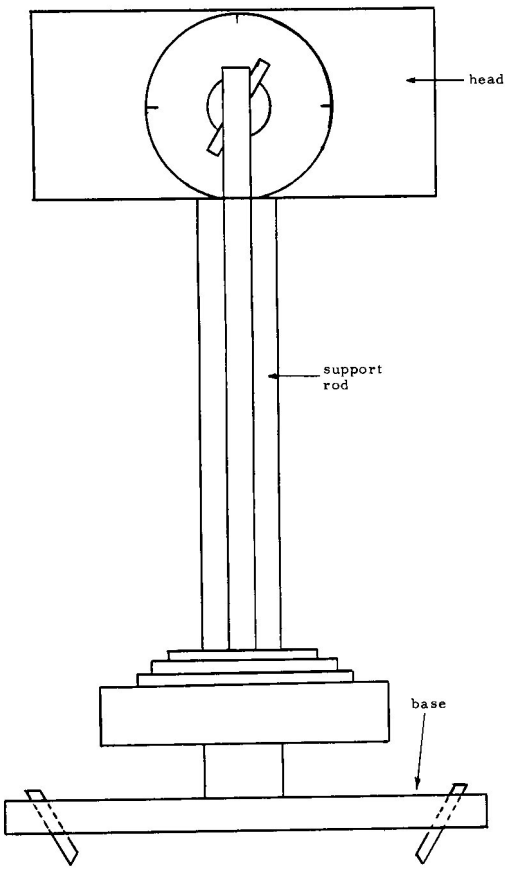
STATIONARY LAUNCHER



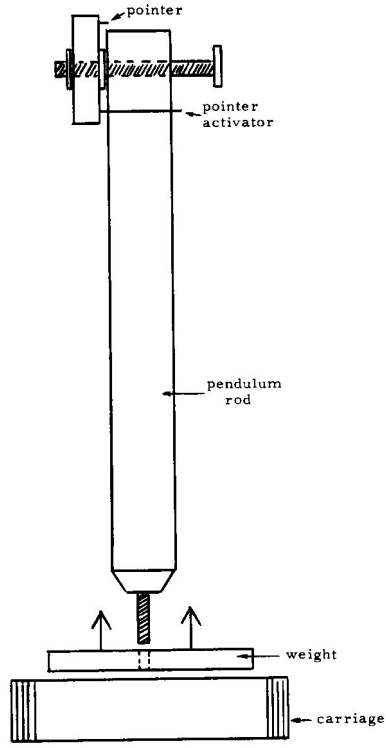
To assemble:

1. Place rod in hole in center of base.
2. Place blast deflector over rod and slide to base.
3. Bend properly and screw to base.

MAXIMUM THRUST TESTER



ASSEMBLY (A)



This thrust tester is accurate within an error of 3% to 0% when used properly.

To assemble properly, use the following steps:

1. Place support rod in base and tighten screws.
2. Place head over support rod, adjust, and tighten screw.
3. Screw assembly (A) into hole in center of protractor with pointer in up position.
4. Place weight over pendulum rod, screw on carriage and let weight rest on it.

To use:

1. Set the thrust tester on the ground and secure pegs into ground.
2. Let pendulum rod come to rest.
3. Put pointer activator against pendulum and take reading (R_1) on protractor.
4. Place engine in carriage and fire.
5. After pendulum rod has stopped swinging take reading (R_2) on protractor.

To calculate thrust:

1. Use following formulas: thrust = weight $\times \frac{(R_2 - R_1)^2 \times 1.5}{90^2}$ for angles $R_2 - R_1$ less than 90°

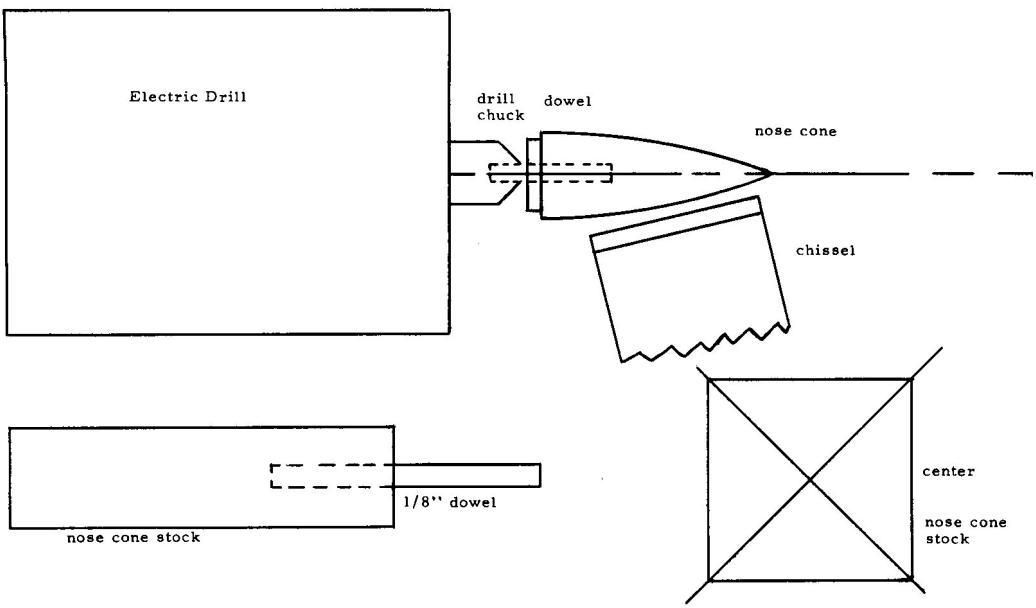
   for angles $(R_2 - R_1)$ 90° to 180° use formula
   thrust = $3 - \frac{(180 - (R_2 - R_1)^2 \times 1.5}{90^2}$ x weight

2. Simply substitute the proper readings and weights in formula.

To calculate the proper weight, add to the weight of carriage, which is _____ to the weight of the weight used.

With this formula, you will not obtain perfectly accurate results, but you will obtain a thrust reading of 0% to 3% less than the actual maximum thrust.

Make Your Own Nose Cones



TO MAKE PERFECT NOSE CONES: Procure some nose cone stock. The length you pick will be approximately the size of the finished nose cone. Drill a 1/8" hole in the center of the end of the block. To find the center draw line from corner to corner as shown. Cut a 1" piece of dowel rod and glue it in hole. For best results use [redacted] cement which we supply [redacted]. Let glue set for 24 hours. Then place assembled nose cone stock in drill chuck & tighten. Place drill in a vise for easier handling. Turn the drill on and get a nail like instrument with a handle. Shave block until it is round. Then take sandpaper and smooth it down.

The next step is to use a chissel to make the nose cone to any contour you want. Finally after nose cone is as you wish, sand it with very fine sandpaper. If you have followed instructions correctly, you should now have a perfect nose cone. If you have any questions, please write.

KRUEGER ROCKET CO.

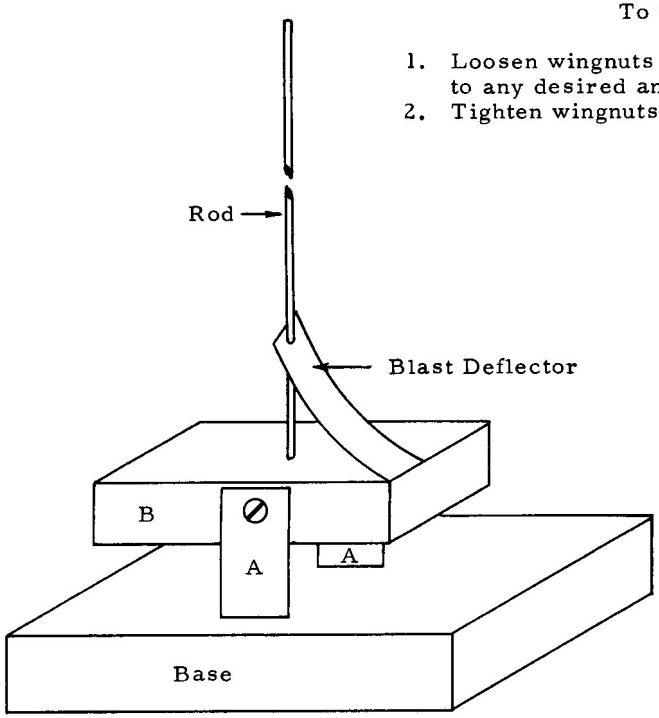
TILTA - LAUNCH

To assemble:

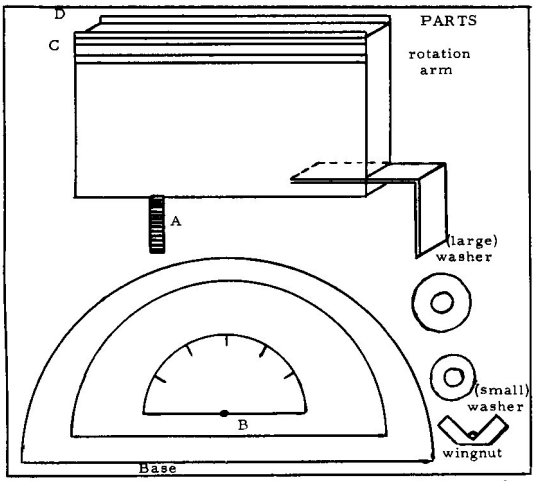
1. Screw sides A to base with wood screws provided.
2. Place platform B between blocks A and line up the holes in platform B with holes in blocks A.
3. Place washer over each hole and screw in the supplied screw with wingnut.
4. Tighten wingnuts.
5. Place rod in hole in center of platform B.
6. Put Blast deflector over rod, bend to proper shape, and screw down with small wood screw.

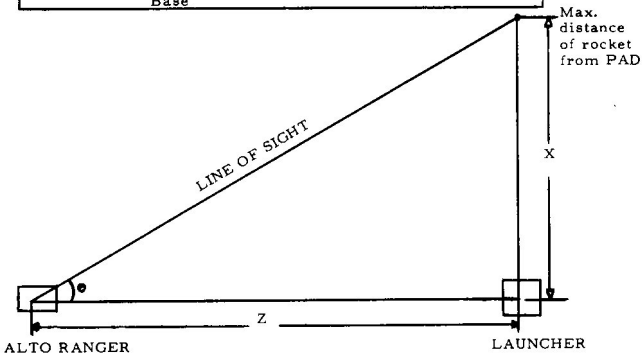
To use:

1. Loosen wingnuts and set platform B to any desired angle.
2. Tighten wingnuts and fire your rocket.



ALTO - RANGER





EASY TO ASSEMBLE!

1. Detach wingnut and washers.
2. Place large washer over hole B and put screw A of rotation arm through washer and into hole B of base.
3. Put small washer over end of screw and screw on wingnut and tighten so that rotation arm moves freely.

EASY TO USE!

FOR RANGE MEASUREMENT

1. Set tilta-launch at desired angle.
2. Pace off any convenient distance (Z) from launcher (be sure to keep at right angle to launch path). (See figure at left)
3. Fire rocket and sight along D slit just before it hits the ground by moving rotation arm properly.
4. Read angle and find tangent of that angle in table.
5. To find the flight distance (X) use formula which follows:
   Dz Tan Θ = Dx, (Distance Z) times tangent of measured angle = distance X.

FOR ALTITUDE MEASUREMENT

1. Use same procedure used to find range except for following:
   (a) Launch rocket vertically and sight it at peak altitude along slit C.
   (b) Hold alto-ranger sideways and read scale as follows: $90^{o} = 0^{o}$, $80^{o} = 10^{o}$, $70^{o} = 20^{o}$, so on and so forth.
   (c) Pace off distance (Z) at any angle to the launcher and assume distance (X) to be the altitude.

[redacted]

angle	tangent	angle	tangent				
0	.0000	23	.4245	46	1.036	69	2.605
1	.0175	24	.4452	47	1.072	70	2.747
2	.0349	25	.4463	48	1.111	71	2.904
3	.0524	26	.4877	49	1.150	72	3.078
4	.0699	27	.5095	50	1.192	73	3.271
5	.0875	28	.5317	51	1.235	74	3.487
6	.1051	29	.5543	52	1.280	75	3.732
7	.1228	30	.5774	53	1.327	76	4.011
8	.1405	31	.6009	54	1.376	77	4.331
9	.1584	32	.6249	55	1.428	78	4.705
10	.1763	33	.6494	56	1.483	79	5.145
11	.1944	34	.6745	57	1.540	80	5.671
12	.2126	35	.7002	58	1.600	81	6.314
13	.2309	36	.7265	59	1.664	82	7.115
14	.2493	37	.7536	60	1.732	83	8.144
15	.2679	38	.7813	61	1.804	84	9.514
16	.2867	39	.8098	62	1.881	85	11.43
17	.3057	40	.8391	63	1.963	86	14.30
18	.3249	41	.8693	64	2.050	87	19.08
19	.3443	42	.9004	65	2.145	88	28.64
20	.3640	43	.9325	66	2.246	89	57.20
21	.3839	44	.9657	67	2.356		
22	.4040	45	1.000	68	2.475		

FLIGHT DATA SHEET

Primary Information

Date: Time: Rocket Style:

Finish on Rocket: (1) Rocket Weight:

Engine type: (2) Engine Duration:

Maximum Thrust: (3) Impulse:

(4) Engine Weight before Flight:

(5) Engine Weight after Flight:

(6) Wind Velocity: Wind Direction:

Barometer Reading: Temperature:

General Weather Conditions:

Technical Information, (Flight Characteristics)

Take Off (describe):

Powered Flight (Note attitude, direction, spin, wobble, etc.):

Unpowered Flight (Note rate of deceleration and unusual causes for rapid speed loss):

Parachute Flight (Note spin, wobble, etc.):

Calculations

(7) Time of Flight to Peak:

(8) Time of Flight to Engine Cut-off (E.C.O.) = (2)

(9) Parachute Duration Time:

(10) Distance Rocket Landed Down-range from Pad:

(11) Maximum Altitude to Peak:

(12) Parachute rate of fall = (11)/(9) :

(13) Wind Speed = (10)/(9) = (6):

(14) Altitude at E.C.O. :

(15) Predicted Altitude:

(16) Preformance Ratio = (11)/(15) :

(17) Average Velocity to Peak = (11)/(7) :

(18) Average Velocity to E.C.O. = (14)/(8) :

(19) Maximum Velocity at E.C.O. = (2) x (18) :

(20) Acceleration = (19)/(8) :

(21) Max. G Force = (20)/16ft.per sec.per sec. :

put additional comments on back K.R.C.