

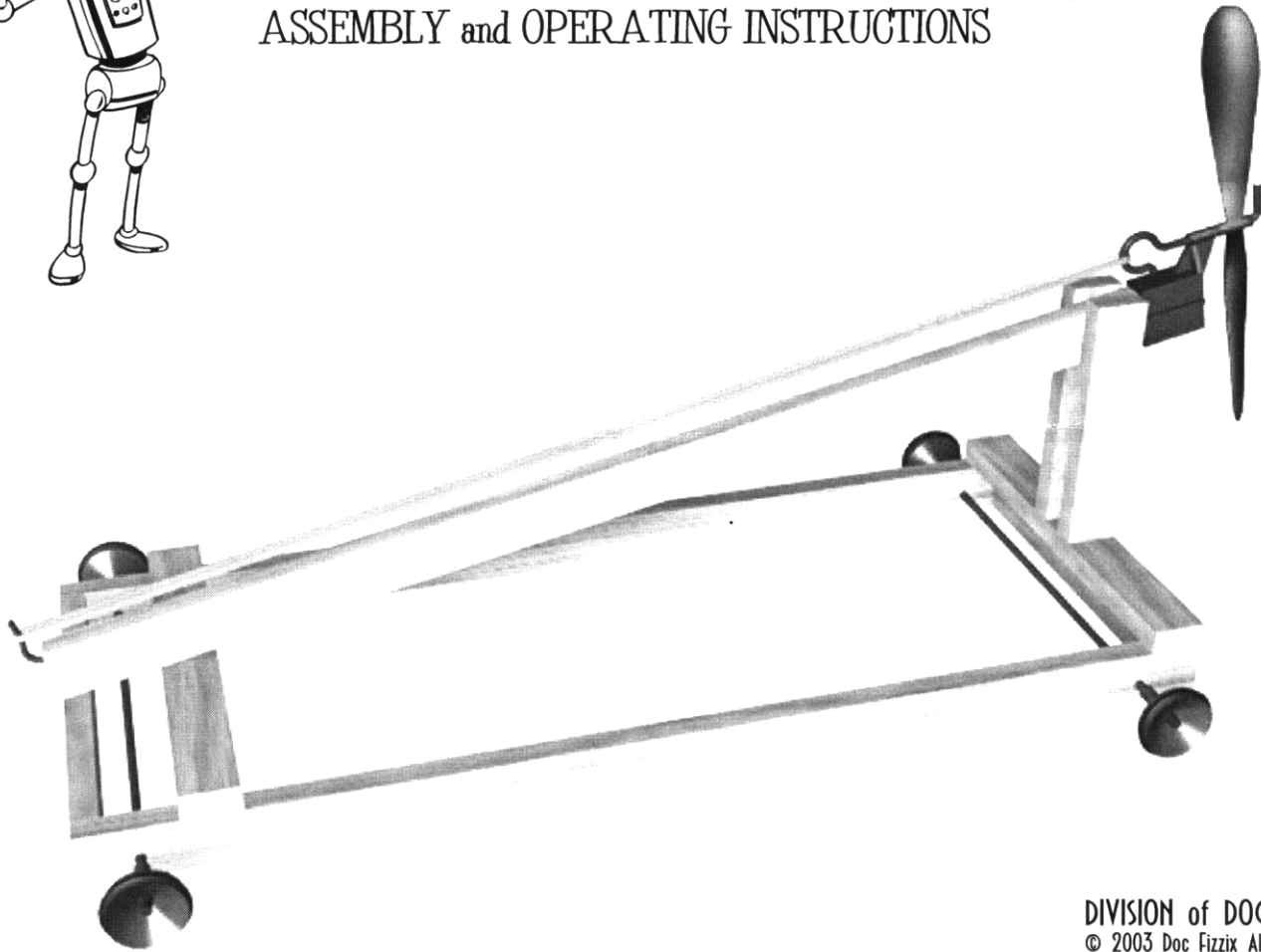
Doc Fizzix Presents

Kit # K-901-DF

# THE ZEPHER - RUBBER BAND POWERED RACER!

ASSEMBLY and OPERATING INSTRUCTIONS

Made in the USA



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## WHAT IS A RUBBER BAND POWERED CAR AND HOW DOES IT WORK?

A rubber band-powered racer is a vehicle that is powered by the energy of a wound up rubber band. The Zepher is designed as follows: A rubber band is stretched from one support post and then to a propeller hook mounted on the opposite end of the vehicle. A propeller is turned causing the rubber band to wind up or become stretched and this stretching stores potential energy. When the tension in the rubber band is released, the propeller will begin to rotate at a high rate of speed transferring potential energy into kinetic energy of motion. The propeller is shaped and designed in such a way to pull the vehicle through the air. The more winds that can be stored in the rubber band will translate into a greater top speed and a greater travel distance, but the rubber band can not be stretched beyond its elastic limits without breaking the rubber band and ending the fun. Like any design, the Zepher must be tested and experimented with it in order to find its optimum performance. The Zepher was designed as a sprint racer over a short 5m distance but it will also work well for any maximum distance contest.

## IDENTIFY AND CHECK OFF THE FOLLOWING PARTS FROM THE LIST BELOW

- |  |  |
|--|--|
| <input type="checkbox"/> 2 - Pre-Drilled Balsa wood Side Rails (8" x 1/4" x 3/8")  | <input type="checkbox"/> 2 - steel 4" axles            |
| <input type="checkbox"/> 2 - Balsa bumpers (2 5/8" x 1/4" x 3/8")                  | <input type="checkbox"/> 1 - propeller assembly        |
| <input type="checkbox"/> 2 - Balsa cross-members (3" x 1/4" x 3/8")                | <input type="checkbox"/> 1 - rubber band               |
| <input type="checkbox"/> 2 - Balsa propeller shaft supports (1 3/4" x 1/4" x 3/8") | <input type="checkbox"/> 4 - Low inertia wheels        |
| <input type="checkbox"/> 1 - Propeller shaft (8 3/4" x 1/4" x 3/8")                | <input type="checkbox"/> 1 - Brass rubber band support |

## 1. MAKING the FRAME

- A.  **GLUE** the two side rails to the 2" 5/8 front and rear bumpers.
- B.  **GLUE** one of the top 3" cross-members to the rear of the frame. Position 3/4" from the rear of the frame.
- C.  **GLUE** the other 3" cross-member to the front of the frame. Position flush with the front of the frame.
- D.  Optional: Lightly sand the frame with 400 to 600 grit sandpaper.

## 2. THE PROPELLER SHAFT

- A.  Mark the center of the front cross-member and then position the ends of the two 1 7/8" propeller shaft supports straight up on top of the front cross-member, on either side of the center mark. **DO NOT GLUE YET**
- B.  Test fit the 8 3/4" propeller shaft between the two supports, make sure the center of the propeller shaft is lined up above the center mark on the front cross-member.
- C.  Once everything is lined up and centered **GLUE** the supports **ONLY** to the cross-member.
- D.  Position the propeller shaft between the supports and even with the tops. The propeller shaft is angle so that it will rest on the rear cross-member. **DO NOT GLUE**
- E.  Adjust the position of the propeller shaft so that the rear end of the shaft is even with the rear bumper then **GLUE** in place. Apply several applications of glue in order to properly secure the propeller shaft to the cross-member.

## 3. ATTACHING the WHEELS

- A.  Press the two 4" axles into the front and rear set of the pre-cut axle slots in the frame. **GLUE IN PLACE**
- B.  Place the a red wheel on each end of each axle. **DO NOT GLUE**
- C.  Using a needle-nosed pliers, carefully bend the end of the axles so that the wheels do not fall off the ends of the axles.

NOTE: Wheels should spin freely without binding on the frame or the ends of the axles. There should be a small amount of side-to-side play between the axle and the frame.

## 3. ATTACHING the PROPELLER

- A.  Using the small brass rubber band post, bend into an "L" shape and then press into the rear of the propeller shaft. Make sure it is bent in such a way that the rubber band will not slip off when stretched attached, **GLUE** in place.
- B.  Place the propeller assembly on the front end of the propeller shaft. **DO NOT GLUE**
- C.  Attach the rubber band to the rear rubber band post and then stretching it to the front propeller hook.

The angle of the front propeller is adjustable. By wedging small bits of paper under the propeller assembly's case on the top of the propeller shaft, you can adjust the angle of the propeller and thereby change the performance.

