

DIY Making a Kite...

Key Physics Concepts Used in Flying a Kite...

- Forces of Flight: Lift, Weight, Drag, and Thrust
- Kinetic Energy

Background:

The four forces of flight affect kites in the same way they affect airplanes, and anything else that flies.

- **Weight** is the force of gravity. It acts in a downward direction—toward the center of the Earth.
- **Lift** is the force that acts at a right angle to the direction of motion through the air. It pushes the kite up in the air. Lift is created by differences in air pressure. Kites are shaped and angled so that the air moving over the top moves faster than the air moving over the bottom.
- **Thrust** is the force that propels a flying machine in the direction of motion. Engines produce thrust. With no engines, a kite can appear to remain in the same position in the air. For thrust, a kite must rely on tension from the string and moving air created by the wind.
- **Drag** is the force that acts opposite to the direction of motion. Drag is caused by friction and differences in air pressure.

What kind of energy is flying a kite? It is using the kinetic energy in the wind (which has itself been generated by the heat energy warming the earth and causing air to rise and expand) to increase and then maintain the potential energy of a heavier than air object (the kite). Now explore the world of flight by making your own kite. Keep in mind that the forces and the wind energy must be in balance to keep the kite in the air.

Tip: Kites fly better on a breezy day but never fly a kite on 'super' windy day, near power lines, trees, or during a storm! Find a 'wide...open...space to fly your kite!'

Materials Needed:

- (2) 1/4" dowel rods (cut to 24" and 20") and one sq. yard of lite plastic, fabric, or paper
- A spool of lightweight string (about 200'), boxing tape, and glue
- An adult to cut notches in the ends of the dowels with a sharp knife

Using the two pre-cut dowel rods and make a lower case 't' placing the center of the short rod about 4" higher from the center of the larger rod. Using string, tie the pieces together in a crossing pattern then gluing the string to secure it.

Have an adult cut notches on each end of the rods. Using string, wrap and tie it to the notch at the top of the 't'. Take this string and continue to the next notch and then the next, wrapping the string tightly at each notch and tying it off at the top notch again. This is your kite frame. Lay the kite frame out on the piece of plastic, fabric or paper. With a marker, mark an outline of the frame 2" out from the frame. Cut along the line. Fold the 2" extra material over the string frame and secure it with glue or tape. Reinforce the frame with an extra layer of tape at the ends of the rods.

To create the flight tension string, tie a length of string from end to end on the short rod and also one on the larger rod. Then tie these two strings together where they cross at the center of the 't' with what remains of your string. Use the scraps of the plastic or fabric to create a tail for the bottom and wings of your kite. As your kite takes flight, let the string out slowly. Hold on...this string will enable you to bring your kite back to earth when you are done.

Kite Making Video for Reference

https://www.youtube.com/watch?time_continue=48&v=lBukRxTt_uA&feature=emb_title

Launching Your Kite: <https://www.youtube.com/watch?v=QjxJYTEQn6Q>