

How can you make Pi fly?

What Is *IT!*

How does a kite fly?

Understanding gravity, friction, force, and motion is the secret to successful kite flying. The phenomena work together within four factors that cause a kite to launch and soar in the sky. These four factors are lift, weight, drag, and thrust.

Think About *IT!*

Why does a kite dip, turn, and fall?

When a kite takes flight, an upward force occurs lifting the kite. As the kite moves upward, a gravitational force presses downward and is called the weight. To keep the kite in the air, force lifting the kite must equal the gravitational force pushing down on the kite. But wait, there's more! Two other factors must be at play. The motion of a kite is caused by the wind blowing against the surface of the kite—it's the thrust. The tension on the string being held by the flyer is the drag. As the kite flyer moves and pulls on the string attached to the kite, he or she changes how the air moves against the surface of the kite creating different movements or changes in direction. When the thrust is equal to the drag, it helps keep the kite in flight. So to keep a kite soaring like an eagle, the four forces (lift, weight, thrust, and drag) must be in balance.

Extend *IT!*

What questions do you have? Most people think of a kite in the shape of a quadrilateral. But what if a kite was in the shape of a circle? Would it still fly? Think of the possible variables that could be manipulated to get different results.



Materials List:

- Paper Plate
- String
- Crepe Paper or Ribbon
- Craft Stick
- Scissors
- Paperhole Punch

- How does the shape and size of the kite affect its flight?
- What factors influence the lift and drag on the kite?
- What happens when the balance of thrust and drag changes?
- What happens when the balance of lift and weight changes?
- How does the material used to make the kite influence its flight?
- Does the difference between the inner and outer circumference make a difference in the flight of a circular kite?

Dare to Change *IT!*

How can your understanding of kite flying help design a circular kite using recycled materials?

Scenario: Eagle Kite Company wants to add a new kite design to its product line that could be constructed with recycled materials. The company will use this new design to promote environmental protection awareness during its *Keep It Green!* campaign. The kite company wants to release its new design in celebration of “Pi Day” (March 14). It’s looking for a team of engineers to research, design, build, and test a circular kite.

Challenge: Using recycled materials, design, build, and test a circular kite. What criteria would you use to define success? Present your findings to the group.

Suggested Resources and Articles:

American Kitefliers Association

Smithsonian National Air and Space Museum:

- How Kites Fly by Mike Hulslander
- It’s All About You and Kites by Victoria Portway

National Kite Month: Why Kites Fly

The Amazing Circofoil

My Best Kite

Kite Craft: Making a kite with a Paper Plate!

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