HOW TO USE THIS GUIDE

Duplicate the student pages on the back of this poster, and distribute them to your students. Read the question posed by the DFTV scientists. Encourage your students to describe how they would investigate the question. Guide them through the steps of developing an inquiry.

If you have a videotape of the episode, play it to see how the DFTV scientists investigated the question, and what their results were. The investigations are also described on the DFTV Web site. Apply the ideas learned in the DFTV example to the classroom activity "Do It, Get To It", or encourage students to do the investigation described in "Take It Outside".

OBSERVATIONAL

1. Write the question: How does A compare to B? Make a hypothesis.
2. Decide what to measure or observe for both A and B, and how to do it.
3. Make multiple observations when possible. Record all results.
4. Organize the data in a table or chart, looking for differences or similarities.
5. Write an answer to the original question. Also write down any new questions that come up during this investigation.

EXPERIMENTAL

1. Write the question: If I change A, what happens to B? Make a hypothesis.
2. Choose the independent variable (the thing you change) and dependent variable (the thing that is affected), and how to measure them.
3. Do multiple trials when possible.
4. Organize the data into a table, and prepare a graph. Look for patterns or trends.
5. Write an answer to the original question. Also write down any new questions that come up during this investigation.

DragonflyTV is a production of Twin Cities Public Television (TPT), St. Paul/Minneapolis, and is made possible by major grants from Best Buy Children's Foundation and the National Science Foundation.

Student Page

303 / WIND:

How does kite shape affect the way a kite does stunts?

What's Up?

We're Danielle and Jasmine. Our kites are colorful and graceful, but they're also fierce competitors. We love to enter kite-flying contests, and we're serious about winning. Our question is: how does our kite's shape affect its performance? Which kite lets us maneuver our way to victory?

Take the DFTV Challenge!

Kites come in all kinds of shapes and designs, including Delta, Diamond, Box, Sled, and single-string or double-string varieties. With your group, decide which kite style you want to make; remember you can make different size kites of that style. Decide what to measure or observe that tells you how easy the kite is to control.
Describe your investigation idea in your notebook.
Go to www.dragonflytv.org to see how Danielle and Jasmine did their kite investigation.

Do It, Get To It

Kites, sails, and parachutes all have to catch the wind. Have a parachute design contest with your friends. Choose a material for your parachute (such as paper, cloth, or plastic), and decide how big it should be. Try different shapes, like a square, circle, or triangle. Attach your parachute to a small toy figurine with thread or fishing line. Find a safe balcony or ledge from which you can drop the parachute. Measure and record the amount of time it takes your parachute to reach the ground. Which design and materials worked best for you? Write to us at www.dragonflytv.org, and tell us what you found out!

Take It Outside!

Ever notice how some kites have tails and some don't? Diamond kites are the most familiar kite shape, and they almost always have tails. What kind of tail gives the best kite flying experience? Build or buy a diamond kite, and make several lengths of tail, using ribbon from a craft store. Attach one tail at a time, and fly the kite, paying attention to how easily it takes off, and how well it flies. What happens with a short tail? How about a long one? Can a tail be too long? What happens if you put a tail on each of the side points of the diamond, instead of just one tail on the bottom? Write to us at **www.dragonflytv.org**, and tell us what you found out!

About the DFTV Investigations

HOCKEY

NATIONAL SCIENCE EDUCATION STANDARD

Physical Science Grades K–4:
Properties of Objects and Materials; Position and Motion of Objects

Science and Technology Grades K–4:
Understandings about Science and Technology

Tess, Alison, and Christina collected wooden hockey sticks with flex numbers of 65, 75, and 95. (These numbers indicate the force in pounds required to put a 3" bow in the shaft of the stick.) The greater the flex number, the more potential energy should be available to add to their shot speed. They each took ten slapshots at the net, using a sports radar gun to measure the puck speed. They found that their own strength was the key factor to getting the "slingshot" effect out of the stick. If they couldn't flex the stick, they couldn't take advantage of its potential energy.

Explore other sports examples where potential energy plays a part, such as tennis racket tension, diving board flex, or basketball inflation. For more details about this investigation, visit **www.dragonflytv.org.**

KITE FLYING

NATIONAL SCIENCE EDUCATION STANDARD

Earth and Space Science Grades K–4:
Objects in the Sky

Physical Science Grades 5–8:
Motions and Forces

Danielle and Jasmine flew three different Delta kites, a two-string variety used in kite ballet and stunt competition. One was wide and short, one was tall and skinny, and the third was in between. The ratio of width to height is referred to as the "aspect ratio". Danielle found that the tall and skinny kite was able to execute maneuvers requiring quick turns, but couldn't "catch air" to do delicate, hovering maneuvers. The wide and short kites couldn't execute sharp turns, but were better for gentle, sweeping movements. The shape of a kite determines how the air pushes on it, and affects its performance in stunts.

Kites are a great tool for exploration of lift and drag forces, and a fantastic way to blend engineering skills with science principles. Observing kite 'behavior' can also be an excellent way to hone students' observation skills. For more details about this investigation, visit **www.dragonflytv.org**.

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