HOW TO USE THIS GUIDE

1. Duplicate the DFTV student page of your choice (pp. 3–6) and distribute it to your students. Read the questions posed by the young scientists. Encourage your students to describe how they would investigate the questions. Guide them through the steps of developing an inquiry (see below).

2. If you have videotapes of the episodes featured in this guide, play the video segment to see how the DFTV kids investigated the questions and what their results were. The investigations are also described on page 7 of this guide and on the DragonflyTV 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!"

3. If your students develop investigations of their own, encourage them to visit the DragonflyTV Web site, pbskids.org/dragonflytv, and click on DFTV Boards. Kids can describe their investigations and share their ideas with others.

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.

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407 / Science at Play: Double Dutch

Student Page

What's Up?

We're Francesca, Precious, and Marnicka, and we jump for joy whenever anyone mentions Double Dutch. Double Dutch jump roping dates back to the 1600s, and uses two ropes instead of one. Special moves like the "washing machine," the "mamba," and "pop-ups" make Double Dutch cool, and competitions keep things interesting! One of the most important things in Double Dutch is to sense the rope's beat. Although you can both hear and see the ropes, it's easy to get distracted by the music, lights, or other kids at a competition. This got us thinking: **Does hearing or seeing the ropes have a bigger effect on our performance, or are both senses equally important?**

How Would You Investigate This Question?

To answer the girls' question, do a little digging on Double Dutch. What kind of ropes do jumpers use? How do they turn them, and how fast do they go? Once you're familiar with the mechanics of Double Dutch, think about sight and sound. Which sense seems more important to keeping the beat, and why? Which sense provides a better filter for distractions? Write your ideas in your notebook and discuss them with your classmates and your teacher. Then watch the video segment, or go to pbskids.org/dragonflytv to check out how the girls sorted out their senses.

Do It, Get To It

Try an investigation of the jump rope itself. Get a long piece of rope, say about 16 feet (almost 5 meters), and stand 12 feet away from a friend. Twirl the rope between you, as slowly as possible without letting the rope droop. Count the number of times the rope slaps the floor in a minute. Now step closer, about 10 feet apart, and twirl again, as slowly as possible. Count the slaps, then move still closer. Does the distance between the twirlers affect the rhythm of the rope?

Take It Outside!

Instead of jumping rope, do an investigation into another kind of jump – the standing broad jump. Make a "start line" on the playground with chalk. Gather a bunch of friends, and one at a time have them stand with their toes at the chalk line and jump as far as they can. Make a mark where their toes land. Measure the distance from the start line to the jump mark. Do taller jumpers jump farther than shorter ones? What other characteristics might explain why some people jump farther than others?

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About the DFTV Investigations
(for the educator)

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Educator Page

WOLVES

NATIONAL SCIENCE EDUCATION STANDARD

Life Science Grades K–4:
Organisms and their Environments
Life Science Grades 5–8:
Regulation and Behavior

The boys received permission to throw chunks of meat into the wolf pen, then observed how the wolves competed for the meat. The pen contained three females and three males, including a young female and male. The boys threw out several pieces of meat, one at a time, looking for behaviors or gestures such as fighting, growling, chasing, or tail position. They concluded that the leader, or "alpha" in this pack was actually an older female wolf. It's not always the largest or oldest wolf, nor always a male who is the top wolf.

Discuss with students how animals compete in their social groups for their status. Also point out how pets, especially dogs, live in a kind of pack… with their human owners. A dog's ear position can tell a lot about its status in the family.

DOUBLE DUTCH

NATIONAL SCIENCE EDUCATION STANDARD

Life Science Grades K–4:
The Characteristics of Organisms
History and Nature of Science Grades 5–8:
Nature of Science

The girls used a popular technology 'a personal mp3 player' to provide a musical distraction for the jumpers. They played a highly rhythmic piece of music in the jumpers headphones, which played at a beat which did not match the rhythm of the jump rope. They conducted a similar test using a strobe light as a visual distraction. They found that for some jumpers, auditory distractions were harder to ignore than visual ones. Still, their results showed that they couldn't make a general conclusion. They learned that each jumper on their team handles distractions differently.

Discuss with students the difficulties in controlling variables when conducting human performance investigations. In this case, how can you be sure the jumpers are trying equally hard in each circumstance?

RIVERS

NATIONAL SCIENCE EDUCATION STANDARD

Earth and Space Science Grades K–4:
Changes in Earth and Sky
Physical Science Grades 5–8:
Structure of the Earth System

The girls spent time at the museum exhibit on rivers and found three things there that made them want to learn more. They left the museum and headed for a local river to learn about a) how rivers meander; b) how sediment layers develop in water; c) how humans change river flow with dams. For example, they canoed down a meandering river, noticing how the water deposits rocks and pebbles on the inside of each curve.

On your next field trip to a science museum or nature center, ask your students to consider the exhibits more carefully. Look for some exhibits that encourage them to go into the field and investigate things for themselves.

TIGERS AND OTTERS

NATIONAL SCIENCE EDUCATION STANDARD

Life Science Grades K–4:
Organisms and Environments
Life Science Grades 5–8:
Regulations and Behavior

The girls received permission from their local zoo to develop play objects for two animals: river otters and tigers. For the otters, they make a six-sided hoop out of bamboo and inserted food into holes drilled in the hexagon. For the tigers, the made a papier-mache warthog and again put meat inside to make it attractive to the animals. The zookeepers put each plaything into the appropriate exhibit, while the girls observed the animals' responses. Each object seemed to occupy the animal's attention for several minutes, bringing out natural behaviors and keeping the animals active.

Discuss with students the challenges of keeping zoo animals physically active and mentally challenged.

For more details on these investigations, visit pbskids.org/dragonflytv.
Use the search option to quickly find the specific segment.

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