



HOW TO USE THIS GUIDE

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

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 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."

If your students develop investigations of their own, encourage them to visit the DragonflyTV Web site, www.dragonflytv.org. On the link titled "Be on DFTV" they can describe their investigation and they'll be considered for the next season of DragonflyTV!

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.

201 / INVESTIGATE: Which animals grow the fastest?



What's Up?

We're Matt and Kyndal. Whether they have fur or feathers, we love animals. When we went to the zoo in the springtime with our friend Danny, we noticed a lot of newborn animals. We knew they wouldn't stay small for long and were curious about which animal grows the fastest. For our DragonflyTV investigation, we tracked the growth of a chicken, a pig, and a cow. Which do you think grew the fastest?

HOW WOULD YOU INVESTIGATE THIS QUESTION?

Decide what you're going to measure and how often you'll measure it. What does it mean to "grow faster?" How would you display your results? Describe your investigation in your notebook, and discuss it with your teacher, or go to www.dragonflytv.org to learn what Matt, Kyndal, and Danny discovered.



Do It, Get To It

GO AHEAD, OPEN A CAN OF WORMS!

Investigate how mealworms respond to different stimuli, such as touch, sound, light, or scents. (Ask your teacher for help getting a supply of mealworms.) How do they react to light? Put a worm on a table, shine a light on it, and see if it turns to or away from the light. Or place a smelly piece of food next to a worm and see if it moves toward the food or away from it. Devise similar tests, and track the worms' responses. After the testing is completed, watch the mealworm metamorphose into a beetle. What differences do you notice about how the mealworm and the beetle respond to those stimuli? Can you explain why they would be different?

Take It Outside!

BIRD BRAINS

Set up three birdfeeders near a window, and fill them each with a different type of feed, such as sunflower seeds, cracked corn, and millet. Track what kinds of birds (and other creatures!) visit which feeders. Does weather make a difference? What other factors affect how many birds come to your feeders? If you want to participate in a national study of birds, visit the Cornell Lab of Ornithology, at <http://birds.cornell.edu/publications/birdscope/Spring2001/urbanbirds.html>

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About the DFTV Investigations (for the educator)



SNOW SHELTER

NATIONAL SCIENCE EDUCATION STANDARD

Earth Science Grades K-4:

Properties of Earth Materials

Physical Science Grades 5-8:

Transfer of Energy

The DFTV scientists built a snow shelter (quinzhee), and used an electronic thermometer to record the temperatures inside and outside all night long. They found that even though the outside air temperature dipped to a chilly 20° Fahrenheit (-6° C), the temperature inside stayed a comfortable 32° Fahrenheit (0° C). Their body heat kept the inside air temperature warm, and the quinzhee wall kept the heat in!

Get your students thinking about why the temperature inside didn't climb above 33° Fahrenheit (1° C) degrees, or what result you might get if nobody stayed inside during the night. For more details about this investigation, visit www.dragonflytv.org.

BABY ANIMALS

NATIONAL SCIENCE EDUCATION STANDARD

Earth Science Grades K-4:

Life Cycles of Organisms

Physical Science Grades 5-8:

Reproduction and Heredity

The DFTV scientists measured the weights of a chick, a pig, and a cow from birth until four weeks of age. The cow gained the most weight, but it didn't even double its birth weight. The pig increased its weight by seven times, and the chick beat them all by increasing its body weight 14 times! It appears that small animals grow at faster rates than large ones.

Work with your students to clarify the difference between absolute growth rate (pounds per month) and relative growth rate. For more details about this investigation, visit www.dragonflytv.org.

YO-YOS

NATIONAL SCIENCE EDUCATION STANDARD

Earth Science Grades K-4:

Position and Motion of Objects

Physical Science Grades 5-8:

Motions and Forces

The DFTV scientists tried three different lengths of string (24", 36", 48" or 60 cm, 90 cm, 120 cm) on their yo-yos, and measured the sleep time in each case, doing several trials to get an average. They found that the 48" strings gave a longer sleep time than the other two. Strings longer than 48" were too hard to control to be useful. The longer string allows more rotational energy to develop, giving the yo-yo a longer sleep time.

There are other yo-yo properties to consider, too, like mass, axle bearing, and shape, all of which can influence the yo-yo's rotational inertia. For more details about this investigation, visit www.dragonflytv.org.

SOCCER KICK

NATIONAL SCIENCE EDUCATION STANDARD

Earth Science Grades K-4:

The Characteristics of Organisms

Physical Science Grades 5-8:

Structure and Function in Living Systems

The girls built a spring-loaded soccer ball kicking machine out of 2x4's, and used springs to simulate leg muscles. The girls learned that the distance of the kick depends on the mass of the leg, *and* how quickly it swings.

This investigation illustrated not only the concept of transfer of momentum, but inertia as well. The girls didn't anticipate that the heavier leg's inertia required more "spring" muscle to make it swing fast. Use this investigation to discuss inertia, momentum and kinetic energy. For more details about this investigation, visit www.dragonflytv.org.

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