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.

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Student Page

304 / FORENSICS:

How can I figure out who raided my sister's birthday party?

What's Up?

We're Carolyn and Kalia, and we were having a birthday party for my sister Lizzy. Before the party began, we found Lizzy's party set-up trashed; the cake was half-eaten, presents were thrown everywhere, and there was even some bright red stuff dripping off the table. We quickly shifted into detective mode, to try to solve the mystery of who ate the birthday cake. What evidence do you think tipped us off?

Take the DFTV Challenge!

So imagine yourself at a birthday party scene like Lizzy's. What sort of evidence would you collect, and how? What special tools would you need to analyze the clues? How would you identify likely suspects? Think about how to sort out misleading clues form real clues, and match the crime scene evidence to the bandit. Write down your investigation ideas in your notebook. Go to www.dragonflytv.org and see how Carolyn and Kalia analyzed evidence to nab the birthday cake bandit!

Do It, Get To It

Fingerprints have long been an important piece of evidence in solving crimes. You can learn to "lift" fingerprints, too. Get your hands a little greasy with lotion, or by handling a snack, like chips or crackers. Then touch a clean glass, mirror, or countertop. Using an artist's paintbrush, lightly dust the print with graphite powder from a pencil, or even dust from a charcoal briquette. Apply a piece of clear packing tape over the print, lift it off, and stick it onto white paper. Get your friends together and practice identifying each others prints! Write to us at www.dragonflytv.org and tell us what you found out!

Take It Outside!

One kind of forensic analysis involves splashes and splatters. Do your own splatter analysis with water balloons. Fill up some water balloons, then throw them at a dry paved surface, like a driveway or playground, from different heights and angles. Draw the splash patterns each balloon makes. Then have a friend throw a balloon without you watching. Analyze the new pattern, compare it to your reference patterns, and try to figure out how this splatter was made. Write to us at **www.dragonflytv.org** and tell us what you found out!

About the DFTV Investigations

FORENSICS

NATIONAL SCIENCE EDUCATION STANDARD

Science in Personal and Social Perspectives Grades K–4:
Science and Technology in Local Challenges

Physical Science Grades 5-8:
Transfer of Energy (light scattering)

Carolyn and Kalia examined fingerprint and handwriting evidence, even sequenced DNA with the help of their local high school science lab. To characterize the fiber sample, they used a standard laser pen to generate a diffraction pattern for the crime scene fiber and the hair samples from the suspects. They found that the diffraction pattern of the crime sample didn't match the human hair samples they collected, which got them thinking about non-human suspects. In combination with the other evidence and eyewitness testimony, they concluded that Lizzy tampered with her own presents, but the family dog, Sammy, crashed the party and ate the cake!

Laser diffraction is a simple technique to compare the dimensions of small things like hair thickness, or spacing of grooves in the surface of a CD. With a little algebra, you can determine an actual measurement value. For more details about this investigation, visit **www.dragonflytv.org**.

HOVERCRAFT

NATIONAL SCIENCE EDUCATION STANDARD

Science and Technology K–4:
Understanding about Science and Technology

Physical Science Grades 5–8:
Motions and Forces

Rachel and Sara built two hovercrafts to ride, one with a billowy "skirt", the other with a "tight" skirt. They ran each hovercraft through an obstacle course, and evaluated the performance of each. They found the billowy skirt gave them a better performance. To understand why, they set each hovercraft over a pile of glitter, and measured the scatter of the glitter. The billowy skirt allowed air to build up a better film of air between craft and the ground, even allowing the hovercraft to float over rough surfaces.

Work with students to help them grasp the multiple roles that air plays in the function of a hovercraft: air pressure inflates the skirt; air that leaks out of the skirt provides a near frictionless film for the craft to ride on. For more details about this investigation, visit **www.dragonflytv.org**.