



## HOW TO USE THIS GUIDE

Duplicate the DFTV student pages (pp. 3–6), and distribute them 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).

If you have a videotape of the episodes, play it to see how the DFTV scientists 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!"

If your students develop investigations of their own, encourage them to visit the DragonflyTV Web site, [www.dragonflytv.org](http://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.

# 208 / ECOSYSTEMS: Why do some sand dunes have plants, and some don't?

## What's Up?

We're Victoria and Alejandra. Grab your sunscreen, because we're hitting the Guadalupe-Nipomo Sand Dunes near San Luis Obispo, California! These cool dunes come in all different shapes and sizes. One of the most amazing differences between the sand dunes is the plants that grow on them (or DON'T grow on them, in some cases!). For our DragonflyTV investigation, we asked: *Why are some dunes covered with plants and others aren't?*

### HOW WOULD YOU INVESTIGATE THIS QUESTION?

In addition to counting the dunes' plants, what else would you need to observe about each dune? Make a list of potential features that may give you answers to your question, like the size, shape, or location of the dunes. Note what tools you'll need to collect your measurements. Describe your investigation in your notebook, and discuss it with your teacher, or go to [www.dragonflytv.org](http://www.dragonflytv.org) to find out what the DragonflyTV scientists discovered.



## Do It, Get To It

Study how moisture affects the ability of sand to make a mountain. Get a large bucket of sandbox sand that is completely dry. Take a tall plastic drinking glass (16 oz, say) and fill it to the top with dry sand. Cover the top with a piece of stiff cardboard, then turn it upside down and set it on a table. Lift the cup, and let the sand tumble into a mound. Measure the mound: its height, circumference, and how steep the sides are. Take the dry sand, and add 60 mL of water (about 1/4 cup) and mix it together well. Put it into the 16 oz cup again, and make a new mound. Measure the mound again. Add another 60 mL of water, and repeat. How does the moisture affect the shape of the sand mound?

## Take It Outside!

Different soil types support different kinds of plants. Measure plant diversity in different parts of your schoolyard, or in your own yard or neighboring field. Take an empty picture frame (2 ft. by 3 ft., or 60 cm by 90 cm) and set it on the ground in your yard or field. Count the number of different kinds of plants you find in the frame. Even if you don't know the names of the plants, just look for different kinds. Pay attention to plant height, leaf shape, stalk shape, and flower color. Compare different locations. If you have permission, do some digging to determine what kind of soil is underneath the plants. What do you notice?



# About the DFTV Investigations (for the educator)



## MODEL ROCKET

### NATIONAL SCIENCE EDUCATION STANDARD

#### Earth Science Grades K-4:

*Understanding About Science and Technology*

#### Physical Science Grades 5-8:

*Abilities of Technological Design*

Aren tested two body sizes, wide and skinny. Mary Lynn tested two different nose cones, rounded and pointy. Jessica tested two fin sizes, large and small. Each young scientist flew both versions of his or her rocket, checking the onboard altimeter after each flight. They combined the best characteristics from each test into one final rocket design. They used the skinny body, pointy nose cone, and full sized fins to create... The Chosen One. After a misfire on their first launch, the next attempt proved successful, as their rocket flew to 1586 feet (483 meters)!

There are other factors for your students to consider, such as rocket mass, surface coating, etc. For more details about this investigation, visit [www.dragonflytv.org](http://www.dragonflytv.org).

## EXERCISE AND MEMORY

### NATIONAL SCIENCE EDUCATION STANDARD

#### Earth Science Grades K-4:

*Personal Health*

#### Physical Science Grades 5-8:

*Personal Health*

The girls found 20 household items and set them on a tray. They gave their friends one minute to study the tray. Then each friend had to write down as many items as they could remember. Half the group went off to do exercises for 10 minutes, while the other half played board games. Then everybody came back for a new memory test, with 20 new items. The girls found that on average the exercise group improved its memory score by four points, while the resting group's average score decreased by one. The girls concluded that you can't exercise just once and really improve your memory, but exercising can make you feel alert and improve your focus.

Caution your students about the difficulties in conducting experiments to measure human performance. Discuss ways to guard against false data. For more details visit [www.dragonflytv.org](http://www.dragonflytv.org).

## EXTREME SOUNDS

### NATIONAL SCIENCE EDUCATION STANDARD

#### Earth Science Grades K-4:

*Changes in Environments*

#### Physical Science Grades 5-8:

*Risks and Benefits*

The girls borrowed a decibel meter from Tarissa's dad and took it to different places in the city. They visited everything from a "quiet room" in a sound laboratory to a video arcade, even the top of the Empire State Building! They were surprised to learn that even a quiet library is 40 times louder than the quiet room. They also discovered that the arcade was louder than the subway, dangerously loud at over 85 decibels. They also found that the sound intensity depends on how close you are to the source.

One of the most challenging features of sound intensity is the logarithmic nature of the decibel scale. Work with students to help them understand that 60 dB isn't twice as loud as 30 dB, but more than 30 times louder! For more details, visit [www.dragonflytv.org](http://www.dragonflytv.org).

## SAND DUNES

### NATIONAL SCIENCE EDUCATION STANDARD

#### Earth Science Grades K-4:

*Changes in the Earth and Sky*

#### Physical Science Grades 5-8:

*Populations and Ecosystems*

The kids chose dunes in three locations to study: foredunes (at the ocean front); scrub dunes (slightly inland), and active dunes (further inland). At each location they used a soil moisture meter to determine the moisture content in the first 12 inches (30 cm) of sand. They also laid down a 10 foot (3 m) rope and recorded the number and type of plants it touched, and estimated the dune's size. They found that the active dunes had too little moisture to support plants, and the dry sand allowed them to be eroded easily by winds. Fore dunes had high moisture, but were battered by ocean winds and water, making it hard for plants to grow there. Scrub dunes supported the greatest number of plants, and are less easily eroded by the winds.

Have your students think about what makes the scrub dunes more permanent than the other dunes. Discuss the relationship of soil moisture and plant growth. For more details visit [www.dragonflytv.org](http://www.dragonflytv.org).

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