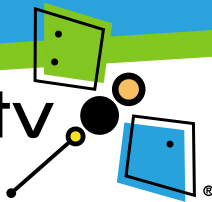


My Science Journal

This journal belongs to:



Do It, Get to it!

Grow a Crystal



What?

It can take centuries for rocks and crystals to form in nature. Demonstrate one way that rock crystals take shape, in just a few days.

Materials: Epsom salt, a tablespoon, a jar lid, a cup of water, a paper circle

How?

1. Cut out a paper circle the same size as the jar lid. Put the circle in the lid.
2. Measure 4 big tablespoons of Epsom salt. Don't worry if you add too much – the more, the better.
3. Dissolve all 4 tablespoons in the water and stir the solution thoroughly.
4. Pour the water mixture into the jar lid. Stick the lid in a place where it won't be disturbed, and check it in a few days. What happened? Why? Turn this page upside down to find out.

The water evaporated from the lid, but the salt was left behind. You can make a miniature rock forest. But don't just sit there; get to it!

Why?

Can you find all 27 DragonflyTV Investigations?



Look vertically, horizontally, and diagonally!

COCONAUTS
HOT AIR BALLOON
TASTE
MOON CRATERS
ROLLERCOASTER
PERCEPTION
SAILING
LEAVES
WEEVILS

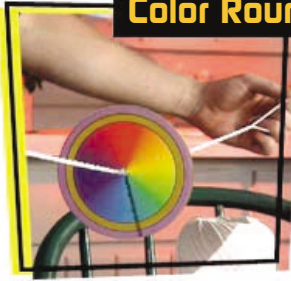
KAYAKING
TAE KWON DO
MOTOCROSS
SKATEBOARD
OTTERS
DOGS
SURFING
DOLPHINS
WATERSLIDES

KELP FOREST
SOLAR CAR
FORECASTING
TORNADOS
FSCALE
GEMS
ROCK CLIMBING
MODEL PLANES
PARAGLIDING

G N I D I L G A R A P T O R Z W E E V I
N W A R T F L I G H T A E E D O S P E T
I K G E M S N I H P L O D T S O R C O S
T S N N A C H O T Y D I D S A V E L L E
S S I L I A B B A N D R P A M C T C O R
A O B A L L O N O R A D P O O O T N C O
C R M O S E E W R O P E D C T C O R O F
E C I R C E K M B E R E G R O O A N T P
R O L E A E D E A C L N I E L N S S A L
O T C S A L T I E P I G H L K A T O S E
F O K T N A L P L K X C A L E U E D T K
X M C A K E T A A S I B S O L T R A E S
A L O S P I N Y E E R T T R P S T N I L
E S R E D E A P T I M E V T J U A R L I
C U R V S K N K A S R E T A R C N O O M
C R E A I O T T R S S O D A N R E T C E
O F M E A L O S C U D W P S W E L O S L
B I L L L H O R E L N O I T P E C R E P
A N A P O E S A I L I N G I A T O Q R O
O G R A C R A L O S W T S S L I V E E W

Do It, Get to it!

Color Roundup



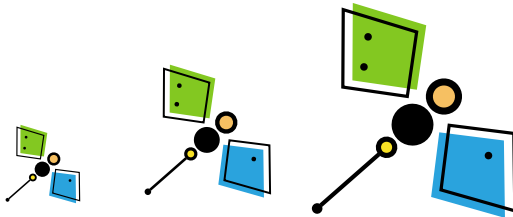
What?

Our eyes can see millions of colors. But what happens when lots of colors reach your eye at the same time?

Materials: a long piece of string, a cardboard circle painted with rainbow colors

How?

1. Thread the string through two holes in the cardboard circle. Tie the string ends into a loop.
2. Hold the ends of the loop and twirl the wheel so the string winds up. Pull the ends of the string, and watch that wheel spin!
3. Look at the wheel... what do you see? Take your best guess, then flip this page to learn the answer.



When the colors of light get blurred together, our brains can't sort them out. Instead, our brain tells us we see white. Now don't just sit there; get

to it!

Why?

DragonflyTV Word Scramble

How many words can you make from the letters in D-R-A-G-O-N-F-L-Y-T-V?

Use each letter only once, and try to make 3-, 4-, 5-, 6-, or 7-letter words.



Investigate This: Measure the Earth!



A Greek thinker named Eratosthenes used this method to determine the Earth's circumference more than 2000 years ago, and got a pretty good measurement. You don't have to go to Greece to try this, but you will have to go outside at noon and measure your shadow made by the sun. Here's how.

1. Grab a yardstick and a friend and go outdoors at 12:00 p.m.
2. Standing on a level surface like a sidewalk or playground, measure how long your shadow is, in inches. Have your buddy help you.
3. Make sure you know the zip/postal code where you take the measurement.
4. Send DFTV your data, using the submission form on our Web site, <http://pbskids.org/dragonflytv/Investigate1.pl>

**Try the investigation
on different days,
and see if you
can improve
your results!**



How can you ride a square wheeled bike?

Crack the code to find the answer. Each picture stands for two possible letters. Solve the code, and figure out how to ride a bike with square wheels!



= A or Y



= F or O



= B or I



= G or P



= C or L



= R or S



= D or M



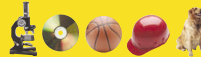
= T or U



= E or N



= H







Log on to
http://pbskids.org/dragonflytv/knowhow/knowhow_wheel.html
 to see for yourself!

Change the shape of the road from flat to bumpy.

DragonflyTV Quiz Kids

1. CATCHIN' AIR!

Chuck and Jake love to go vertical when they ride their skateboards, and they wanted to know how wheel size affects their speed and maneuverability. Which wheels are best?

- a. bigger wheels
- b. smaller wheels
- c. it doesn't make any difference



2. BRAINY 'BOTS!

Claire belongs to a GEMS (Girls in Engineering, Math and Science) team that wanted to answer this techno-question: how do we design a robot that moves quickly and turns in a tight circle?

- a. build a four-wheeled robot
- b. build a three-wheeled robot
- c. build a robot with no wheels



1. C: The boys found that wheel size mattered less than personal preference for both speed and maneuverability; Chuck liked the smaller wheels, and Jake preferred large. Visit pbskids.org/dragonflytv/explore/wheelsb.html to learn more.

2. B: The team found that they got the fastest speed and the tightest turns using a three-wheeled design with programmable brain that received the commands the girls wrote on a computer. They also learned that engineering often involves lots of failures before you succeed. To learn more, go to pbskids.org/dragonflytv/explore/technology.html

Answers

Amazing Air Pressure!

Whether your friend is a lightweight or a real heavy-hitter, you CAN lift him or her using only a standard drinking straw! Here's how:

- Tape together some plastic garbage bags so they create one big bag.
- Poke a hole in one corner.
- Insert a straw in the hole.
- Put a big, thin board on the bag, and tell your friend to have a seat on top of the board.
- Blow in the straw, and watch your friend be lifted by the power of air pressure!

Why does this work? Come up with your own theories, and then check for the answer below. Also, visit pbskids.org/dragonflytv/knowhow/knowhow_truck.html to watch some DragonflyTV kid scientists perform this same scientific feat!



The average person can blow at a top pressure of about 0.5 PSI...that doesn't sound like much! But remember that PSI means pounds per square inch. So, if you want to lift your friend, you need lots of square inches, because each one can lift half a pound. If your friend weighs 90 lbs., then you would need a seat with 180 square inches. That's like a rectangle that's 10 inches on one side, 18 inches on the other. The bigger the seat, the less hard you have to blow into the straw.

Answer

8

My Invention

Show off your super science ideas by drawing a cool new invention!



Send your drawings to:

DragonflyTV

Twin Cities Public Television

172 East 4th Street, St. Paul, MN 55101

The most creative inventions will be featured on our Web site!

Do It, Get to it!



Free Fall

What?

Gravity: it's the law. See if a falling quarter can bend the law of gravity by shooting sideways.

Materials: two rulers, two quarters, the edge of a table

How?

1. Slide a quarter to the edge of the table.
2. Lay one ruler so it lines up diagonally to the table edge, one end hanging over, the other end touching the first quarter.
3. Put the second quarter on the end of the ruler hanging over the table.
4. Put your thumb on the first ruler, then use the other ruler to give it a good whack, hitting it near the end that hangs over. Watch those quarters go! Why? Check the bottom of this page for the answer.

The quarter sitting on the ruler falls straight down, while the other quarter goes flying sideways. Will they hit the floor at the same time? The law of gravity says they will. No matter how fast the quarter shoots sideways, it will hit the floor at the same time as the other one. Now don't just sit there, get to it!

Why?

DOGGONE SMART!



What did the DragonflyTV scientists ask?

DragonflyTV scientists Anna and Laura created some tests to answer the question: Which of their dogs is better at solving problems?



What did they do?

Meet terrier Fischer and golden retriever Lucy. Both like to run, bark, wag their tail and slobber all over your face. Anna and Laura set up four tests for Fischer and Lucy. They timed each test. Test one: get out from under a blanket. Test two: find a treat under a cup. Test three: find a treat under a blanket. Test four: find a treat under a shelf.

What did they find out?

Anna and Laura were both correct: Fischer was better suited for some tests, and Lucy was better suited for other tests. But overall Fischer had the lowest time. Anna and Laura say they're going to try again, with some new tests for their dogs.

Problem	Lucy	Fischer
Blanket over dog	10 sec	5 sec
Cup over treat	4 sec	6 sec
Blanket over treat	70 sec	11 sec
Board over treat	8 sec	43 sec
Total Time	92 sec	65 sec

What can you do?

- Problem Solving Pooches: Try creating other tests for your dog. Can your dog find a treat up on a shelf? Or try "dog tests" at different times of day. Is your dog "smarter" in the morning or the afternoon?
- Feline Einstein: Create problem-solving tests for your cat. What kinds of tests would work? What obstacles might you face?



Journal Page

Now that you have some background on animal investigations, sink your teeth into some real science. Use this page to collect data for any of the investigation suggested on the previous page, or "go wild" and create your own! And remember to send your best ideas to pbskids.org/dragonfly-tv/beon.html. Your investigation could be featured on DFTV!



My Question:



What I did?



My data:



My conclusion:

What a Scream!

What did the DragonflyTV scientists ask?

Christopher and Zahabiya love the perilous climbs and shocking descents of "wild" amusement park rides, and wondered if they could measure a ride's "thrill factor." Their question: How does your pulse rate correspond to the scariness of a thrill ride?



What did they do?

Christopher, Zahabiya and their friends tested three rides: Supreme Scream, Ghost rider and Boomerang.

Everybody took a pulse rate before they got on a ride and again right after the ride was over. Each person wrote down his or her pulse rate. They subtracted the two readings to find the increase in each person's pulse rate. They also recorded

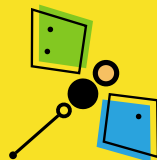
how scary they thought each ride was, on a scale of 1 to 5. At the end, Christopher and Zahabiya averaged the numbers for each ride and looked for any patterns.

What did they find out?

Christopher and Zahabiya learned that there was a relationship between heart rate change and a ride's "scariness." Their friends felt that the Ghost rider was the least scary ride, with an average rating of 2.4. The average increase in heart rate was 33.5 beats per minute. Their friends gave Boomerang a higher scariness rating of 2.6, and the average increase of pulse rate was 46.8 beats per minute. The scariest rating went to the Supreme Scream at 3.7, with the average pulse rate increase totaling 54.0 beats per minute

What can you do?

- Summertime Scream: What is your favorite amusement park ride? Measure your pulse rate before and after the ride and see how much it increases. How does your pulse rate compare to a friend's?



Journal Page

Now that you have some background on human perception, it's time to get your brain revved for more real science! Use this page to collect data for any of the investigations suggested on the previous page, or use your noodle to create your own! And don't forget to send your best investigations to pbskids.org/dragonflytv/beon.html. You could star on DFTV!



My Question:



What I did?



My data:



My conclusion:



DragonflyTV Themes

DragonflyTV is all about real kids, just like you, doing REAL SCIENCE! Check your local PBS listings to tune into episodes on these great topics:

- 101: Investigate!**
- 102: Wheels**
- 103: Animal Behavior**
- 104: Water**
- 105: Rocks**
- 106: Flight**
- 107: Weather**
- 108: Technology**
- 109: Plants**
- 110: Air**
- 111: Human Behavior**
- 112: Space**
- 113: Human Body**

If you have great investigations, DragonflyTV wants to know about them! Visit our Web site at pbskids.org/dragonflytv, or write to us at:

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Twin Cities Public Television
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on DragonflyTV!**



DragonflyTV is a production of Twin Cities Public Television (TPT), St. Paul/Minneapolis and is made possible by major grants from the National Science Foundation and Best Buy Co., Inc. Educational materials developed in association with Miami University of Ohio and with the National Science Teachers Association. Visit pbskids.org/dragonflytv for more information.