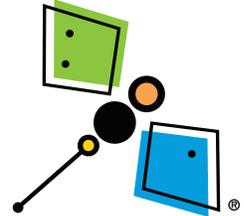


# DragonflyTV: GPS Activity 12 In the Doghouse



**Arizona Science Center**  
Phoenix, AZ  
azscience.org



## Doghouse Design

We're Anna and Alex, and our dog, Rupert, needs a cool place to hang out when it's hot. We live in Arizona, so it gets really hot in summer. We can't buy an air conditioner for Rupert's doghouse, so we wondered what else we could do to keep it cool. We found some answers at the Arizona Science Center. Our question: How can we build a doghouse to keep Rupert cool?

The Arizona Science Center showed us how to select a good color of paint for our doghouse. We put a dark colored model house and a light colored one under some sun lamps, and compared the temperature of each after 20 minutes. We also learned how to use evaporating water as a way to keep the air temperature comfortable. In Arizona, we call a device like this a "swamp cooler."





## Icebreaker

Demonstrate thermal conductivity with this Conduction Countdown!



30-45 minutes

### DragonflyTV Skill: Predicting

#### Instructions

- 1) Poke each knife into a piece of butter.
- 2) Put the handles of the knives into the glass of warm water with the butter slices sticking up in the air, and wait. Predict which butter slice will melt and fall first. Watch carefully to see which butter slice melts off first!

#### You'll need:

- two slices of cold butter
- a metal knife
- a plastic knife
- a glass of warm water

### DFTV Science Helper

This is a very simple activity to introduce the concept of thermal conductivity. Use it to introduce the concepts of heat and temperature to your kids.



For more information about this activity, or to send DragonflyTV a message about your results, visit [http://pbskidsgo.org/dragonflytv/superdoit/conduction\\_countdown.html](http://pbskidsgo.org/dragonflytv/superdoit/conduction_countdown.html)



## Investigation Doghouse Design



1-2 hours

Explore how colors of paint affect the way a structure absorbs light energy with this bright activity.

### Guide your kids as they

- 1) Paint the shoeboxes with different colors. Make one entirely a light color, and the other entirely dark. Allow the paint to dry thoroughly.
- 2) Set a thermometer inside each box, wait for a few minutes, and take the temperature reading inside each box. Write down those readings.
- 3) Set up the heat lamps, turn them on, and shine them onto the boxes. The lights should be about 24 inches away from the boxes. Allow the boxes to sit under the heat lamps for 20 minutes. Keep the thermometers inside the boxes during this time. [CAUTION: Leave at least 12 inches between the heat lamp and the boxes, and DO NOT LEAVE THE BOXES UNATTENDED while the lamps are on.]
- 4) After 20 minutes, take a reading from the thermometers again, and write the new readings down. The temperature in each box is likely to be warmer than before.
- 5) Compare the readings from the two boxes. Did one box warm up significantly more than the other?

### ▶ You'll need:

- two or three shoe boxes
- two colors of paint, one light (like pale yellow), one dark (like navy blue, or black)
- two heat lamps (use 250-watt infrared bulbs sold in most home hardware stores) and an adjustable light source (gooseneck desk lamps work great)
- two thermometers

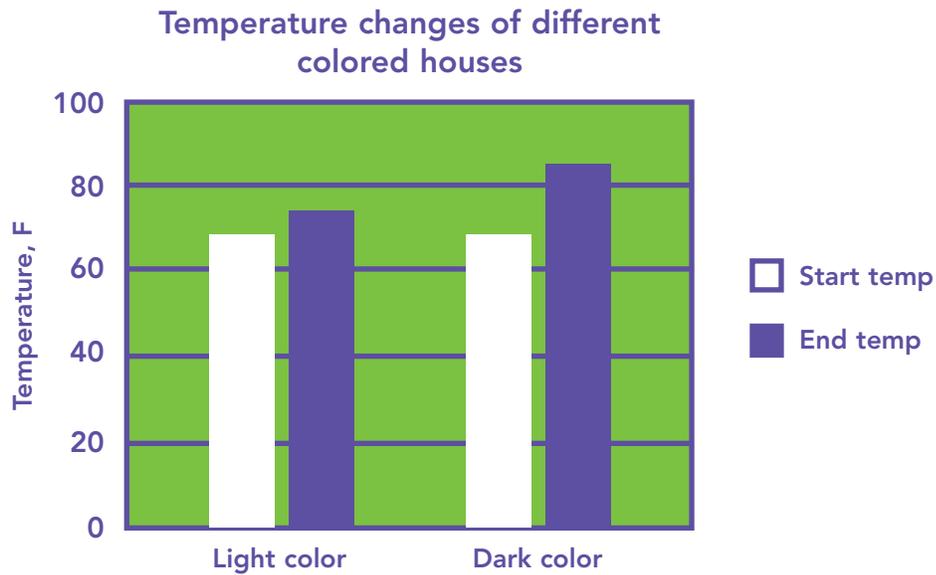
### DFTV Science Helper

In this activity, heat energy is transferred to the boxes by a process called radiation. The two boxes, depending on their colors, absorb or reflect the radiant energy in different ways. The box that shows the greater temperature increase is one that absorbed more energy.



## DFTV Kids Synthesize Data and Analysis

Here's a simple bar graph that shows how you can compare the temperature changes of the two boxes.



## Keep Exploring!

If you live in a hot dry climate, you might want kids to try the experiment that Alex and Anna tried, using an evaporative cooling device to "air condition" the shoebox houses. To learn about these devices, and how to make them, visit <http://pbskidsgo.org/dragonflytv/show/doghouse.html>