612-1255 (15-085) Leslie's Cube: A Demonstration in Heat Absorption

Parts List Needed but Not Included:

Additional materials that are needed but not included are a thermometer (such as our **#3001 – B25 partial immersion thermometer) and a heat source such as an infrared lamp.*

Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

Description:

In 1804, Sir John Leslie developed Leslie's cube, which was designed to demonstrate heat absorption and radiation, surface reflectance and the emission of light.

One of the principles of this cube is to discover the varying properties of surface finishes by rate of heat absorption through each different side. This cube's 4 sides are designated with a different type of surface finish.

How to Use:

1.) Remove cork and pour tap water into the cube. *Make sure to fill the cube with enough water so the thermometer will be immersed, less water makes for a faster demonstration.
2.) Place a thermometer through the center of the hole of the cork and replace the cork into the hole of the cube. *Again, make sure the thermometer is fully immersed in the water.
3.) Take the temperature of the tap water in its current state and record.
4.) Replace the thermometer back in the hole of the cube so that it is immersed in the water (if needed).
5.) Place and focus a heat source, such as a lamp on only one of the sides of the cube. After a designated number of minutes, (ie. 5 minutes), take the temperature of the water and record. Replace the thermometer again in the cube and take the temperature after another 5 minutes and so on until you have accumulated a data set of at least 3 trials.
6.) Remove the heat source and pour out the water from the cube.
7.) Pour in new tap water making sure that it is as close to the first amount as possible.
8.) Take the temperature of the water in the cube and record.
9.) Next, place the heat source on a different side of the cube. After the designated time (ie. 5 minutes) take the temperature of the water. Continue on until you have at least 3 trials and/or as many as the first set of data.
10.) Remove the heat source and pour out tap water.
11.) Repeat steps 1 – 6 until all of the sides have been tested, making sure to record your data.

Example table for data setup

Side (Color)	Time in min.	0	5	10	15	Gain in temp.*

** To calculate gain in temperature, subtract the original temp (0 min) from the final temperature recorded.*

12.) Graph the data. Place all 4 curves on the same graph, using different colors to represent each side of the cube.

Extend the Learning:

1.) Which side of the cube did you predict would warm up the fastest? Were you correct?
2.) How many degrees did the temperature rise each minute for each side?
3.) What do the gains in temperature mean? What if the gain was the same for each side?
4.) Does the color and/or the surface texture of each side make a difference?
5.) In conclusion, should you wear lighter or darker colored clothing in the summer? Why?

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Related Products:

612-1055 Investigating Energy Transfer Kit
Study heat and light with the simplest materials – a black can, 2 silver (or white) cans and a connecting copper bar. Measure the temperature inside dark and shiny bright cans to determine the different ways light and heat are absorbed and radiated.

612-1265 Radiation Cans
Investigate how color can influence the rate of absorbing and radiating energy. Fill these two cans with cold water for absorption, hot water for emission.

612-1050 Conductometer
Heat transfers by conduction and materials differ in conductivity. This device demonstrates the diverse thermal conductivity of five distinct metals. Place small strips of the included wax over each metal spoke. Heat the central hub over a Bunsen burner flame and watch the differing rates at which the wax melts.

Other Products:

615-4620 Copper Voltameter
Our Copper Voltameter is used to measure electric current by weighing the negative electrode before and after electricity is provided. The change in weight is proportional to the amount of electricity provided. Experiment with electrolysis. Three thick copper plates with brass terminals are suspended from a bakelite cover in an inert plastic jar.

615-4040 Contact Key
This handy accessory opens an electric circuit with a light touch of the key. The circuit remains closed only as long as the key is depressed. As such it illustrates the action of a switch and can be used with absolute safety. You can use it also to test and operate electronic devices in your lab.

615-4695 Energy Transformation Apparatus
Use this motor with spool and thread to lift differing numbers of 1 gram weights. Students will be amazed by how electrical energy is converted to mechanical energy. Electrical input is measured with an ammeter-voltmeter. Work is calculated from the mass of the 1 gram weights and the distance they are raised.

615-3165 Lightning Leaper
The path of least resistance can often lead to complications and unexpected outcomes. This is certainly true of our creatively named "Lightning Leaper". We provide an insulating plate with two binding clips on either end for connecting to a Van de Graaff generator. On the plate's surface, an incomplete metallic path-with eight small gaps-is drawn in a zig zag pattern. Anyone can see that the shortest path between the binding clips is definitely *not* the metallic path. Yet, the discharge from the Van de Graaff follows just this path-watch as the electricity leaps over each gap! This plate can be suspended from an insulating stand and connected at either end to a Van de Graaff generator. For hardier souls, it can be held in the hand close to the active Van de Graaff.

612-1310 Fire Syringe
Our 15-110 **Science First Fire Syringe** is a classic example of the Ideal Gas Law (PV=nRT). By compressing air into a smaller volume, we are also increasing the temperature. Looking at the formula, a large increase in P, a small decrease in V, with n and R being constant, leads to a large increase in T.

612-1335 Electric Calorimeter
Our simple electric calorimeter helps you to determine the electrical equivalent of heat. It features a removable spring heating element that operates on 0 to 6 V DC. The unit consists of an aluminum outer can, a 1.7 cm thick styrofoam lining, plastic insulator ring and aluminum heat reservoir designed to control heat loss. The lid accepts heating element, stirrer and thermometer. Cover cap included.

Neodymium Magnets
These little magnets are powerful enough to attract through your arm! Use for a variety of science labs and kits. Value priced. Item cannot ship by air.

615-0270 2D Magnetic Field Demonstrator
Wow your students with this handy magnetic field demonstration! Shake the unit so that the iron filings are distributed throughout the unit. The transparent acrylic case holds iron filings in such a way as to maximize the visible lines of force from a magnet placed either on top of or underneath the case. Note: Magnets not included.