



## Family Fun Activities and Investigations

Visit the following places to experience hands-on science:

Maryland Science Center

601 Light Street

Baltimore, MD 21230

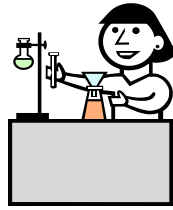
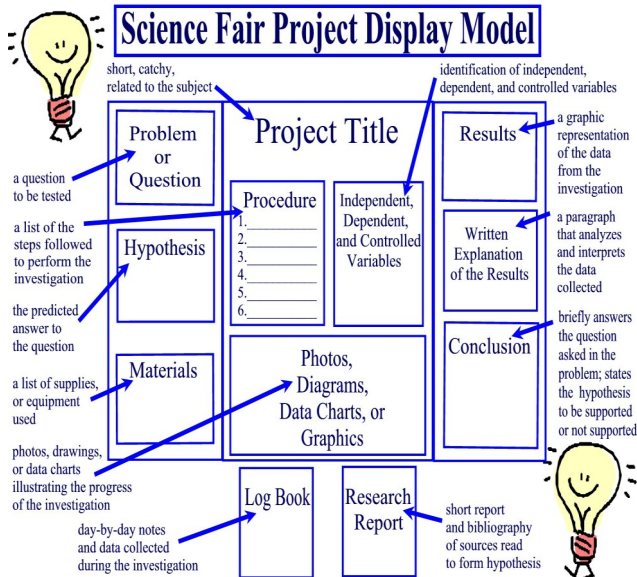
410-685-5225

Baltimore Museum of Industry

1415 Key Highway

Baltimore, MD 21230

410-727-4808



## Career Connections

Take a few minutes to discuss, with your child, these different career opportunities for people interested in designing and performing scientific investigations.

### Biologist

A scientist who deals with the origin, history, characteristics, habits, etc. of plants and animals

### Agriculturalist

A person dedicated to feeding the world and educating people about it

### Physicist

A scientist who studies the science concerned with the interaction of matter and energy

### Chemist

A scientist who studies the makeup, structure, and properties of matter

### Thermodynamics Engineer

A scientist who designs and builds systems based on the relationships between different kinds of energy.

Prepared by

Office Of Science, Pre K–12

## A Parent's Informational Guide to the Science Unit:

# TOO HOT

# TO HANDLE!

## Developing a STEM Fair Project



# Grade 4



# TOO HOT TO HANDLE!

## Developing a STEM Fair Project

This is a fourth grade unit designed to help students learn how to create a STEM Fair project by investigating heat transfer. They will identify a problem, research a topic, form a hypothesis, design and perform an investigation, collect and analyze data, report results, form a conclusion, and create a miniature display backboard. Students will learn about how heat energy is always transferred from a warmer area to a colder area through a process called thermal conduction. Materials that easily absorb heat energy are called thermal conductors. The Maryland Voluntary State Curriculum Indicators addressed in the unit are listed below:

### Constructing Knowledge

Gather and question information from different forms of scientific investigations including observing what things are like or what is happening somewhere, collecting specimens for analysis and doing experiments.

### Apply Evidence and Reasoning

Seek better reasons for believing something other than "Everybody knows that..." or "I just know..."

### Communicate Scientific Information

Recognize that clear communication is an essential part of doing science because it enables scientists to inform others about their work, expose their ideas to criticism by other scientists, and stay informed about scientific discoveries around the world.

### Technology

Recognize and explain that a model can be used to learn something about an object.

### Physics—Thermodynamics

Recognize and explain that heat can be transferred by direct contact between objects at different temperatures.

Observe and compare materials that conduct heat well and materials that do not conduct heat well.

### Math Connection

Collect, record, accurately display, and compare data



## Unit Vocabulary

Encourage your children to use the vocabulary listed below when telling you about what they are learning during this science unit.



**heat energy**– the energy of moving particles

**heat transfer**– the transfer of heat energy from a warmer area to a colder area

**thermal conduction**–heat transfer when objects touch



**question**– leads to an investigation

may be written "How does \_\_\_\_ affect \_\_\_\_?"



**independent variable**–  
manipulated variable

**dependent variable** – responding  
variable

**controlled variables** – variables that

Remain the same or constant throughout  
the investigation



## Books to Read

Take some time to read books about science fair projects with your child. Books on this topic can be found in the non-fiction section of the library with the call numbers 507. You can also find books on this topic in the children's section of your school and public library.

*Guide to More of the Best Science Fair*

*Projects* by Janice VanCleave

*Help! My Science Project Is Due Tomorrow...*

by Janice VanCleave

*Amazing Award Winning Science Fair Projects*

by Glen Vecchione

*Prize Winning Science Fair Projects for*

*Curious Kids* by Joe R. Latigant and

Rain Newcomb

## Internet Sites



<http://hallbar.com/sciencecenter.html>

<http://faculty.washington.edu/chudler/fair.html>

<http://www.explorelearning.com/index.cfm?>

<http://howthingswork.virginia.edu/classes/2001Spring/135>

[http://www.efunda.com/formulae/heat\\_transfer/home/overview.cfm](http://www.efunda.com/formulae/heat_transfer/home/overview.cfm)

<http://www.mansfieldct.org/schools/mms/staff/hand/convcondrad.htm>

<http://www.bartleby.com/64/C004/018.html>

<http://www.mec.edu/gltech/library/htmlaps/mackenzie/conduction.htm>