



# CERT Educational Series

## 3<sup>rd</sup> Grade Heat Transfer

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### Educator Introduction

Thank you for using the CERT **3<sup>rd</sup> Grade Heat Transfer** module in your classroom. This module links directly with the science curriculum “Essential Standards and Clarifying Objectives” for 3<sup>rd</sup> grade. Specifically it aligns with the Energy: Conservation and Transfer standards, 3.P.3. Details of the standards addressed in this module are listed at the end of this document.

### Module Contents

The module you have (will) received(receive) contains the items necessary to teach the Heat Transfer concept in 3<sup>rd</sup> Grade.

The Module Kit is Numbered (#) and contains:  
A Notebook and Experimental Materials

The Notebook contains:

A Memory Stick with all videos, presentations, guides, and documents (you should copy all to your hard drive); and

Paper copies of all presentations, guides, and documents (and a laminated Step-by-Step Set-up guide)

*Details of the memory stick contents are shown below:*

#### Basic Module:

- *CERT Educational Series, 3<sup>rd</sup> Grade Heat Transfer, Educator Introduction.docx*: This document that you are presently reading.
- *CERT Educational Series, 3<sup>rd</sup> Grade Heat Transfer, Educator Preparation.m4v*: 10 min. instructional video for teacher (explains set-up and classroom preparation)
- *CERT Educational Series, 3<sup>rd</sup> Grade Heat Transfer, Step-by-Step Set-up.pdf*: notes to guide you during class delivery
- Classroom video for the CERT 3<sup>rd</sup> Grade Heat Transfer module:
  - *CERT Educational Series, 3<sup>rd</sup> Grade Heat Transfer, Basics.mp4*
- *CERT Educational Series, 3<sup>rd</sup> Grade Heat Transfer, Student Lab Sheet.pdf* (and .docx)
- A kit containing the components for 8 individual experimental set-ups for the classroom (kit contents listed below):

### Supplementary Materials:

- *CERT Educational Series, 3<sup>rd</sup> Grade Heat Transfer, Student Lab Sheet Answer Key.pdf*
- Kit contents (all in a big storage box):
  - 16 insulated cups (8 each labeled A or B) and 16 cup liners
  - 1 cup for cooling thermometers
  - 16 foam lids
  - 8 Aluminum bars
    - 1 extra aluminum bar to be used before experiments
  - 16 digital thermometers (**leave plastic sheath on at all times**)
  - One hot water pot
  - A portable mouse
  - A memory stick containing all files listed above
  - A notebook with all documents listed above and below
- The classroom video above in .ppt format. This is provided to allow the educator to make variations if desired.
  - *CERT Educational Series, 3<sup>rd</sup> Heat Transfer, Basics.pptx*

Before classroom module delivery, you should have already

1. visited the website of Module materials (<http://www.ncat.edu/research/dored-research-centers/cert/3rd-grade-heat-transfer.html>)
2. read this Educator Introduction document, and
3. viewed the “Educator Preparation video” that will introduce you to the 3<sup>rd</sup> Grade Heat Transfer module and the kit contents. TOTAL PREP TIME FOR TEACHER IS ~20min.

Next you should determine which specific day(s) you will need the Kit in the classroom.


Then you should contact CERT to arrange for delivery of the Kit one day before your class(es), and for pick-up of the Kit the day after your class(es).

Once you have done these preparations, you should be ready to follow the Classroom Module Delivery instructions below. Have fun! And if you need any advice or have questions, please call CERT at 336-256-2406, or send an email to us at [CERT@ncat.edu](mailto:CERT@ncat.edu); [vafoust@ncat.edu](mailto:vafoust@ncat.edu) (Vicki Foust); [ghmonty@ncat.edu](mailto:ghmonty@ncat.edu) (Greg Monty); or [emixsonkeele@twc.com](mailto:emixsonkeele@twc.com) (Elizabeth Keele).

### **Classroom Module Delivery**

You simply need to view the instructional video and then spend a few minutes familiarizing yourself with the kit contents. You can then use the laminated “Step-by-Step Set-up Instructions” to assist you the first couple of times you use the kit. Print enough copies of the student lab sheet (3 pages) for your class (or have them complete

online if you have that capability). When you are ready to begin, you start the classroom video: "*CERT Educational Series, 3<sup>rd</sup> Grade Heat Transfer, Basics.mp4*"

There are places in the video where you will want to pause the video and have discussions. These places are marked with a "sun icon,"  along with a laser sound. When you see the sun icon, and hear the laser sound, use the portable mouse to pause the video, and have a discussion with your class (to verify understanding). Then resume the video.

Students will be prompted to complete sections of the Student Lab Sheet throughout the module. This Student Lab Sheet can be used as a study guide for the students, or can be used as a graded assignment.

### **Module Feedback**

When you have finished using the module we ask you to provide feedback using this link:

<https://docs.google.com/forms/d/e/1FAIpQLSe9LQTaS6O4VMD2EKVRy0IXnqtIpODUnE8ehNWhUojgM0BEQ/viewform?c=0&w=1>

Students will be asked for feedback on the module at the end of the Student Lab Sheet. We ask that you tally the responses to this simple three question survey. There will be a place on your survey to include this information.

Thank you for using the CERT Educational Series. Visit our website <http://www.ncat.edu/research/dored-research-centers/cert/> to discover our other energy education module offerings.

If you have questions please contact us at [CERT@ncat.edu](mailto:CERT@ncat.edu) or 336-256-2406. We appreciate the opportunity to provide you with our energy education content, and we also look forward to working with you to define other modules for your use.

Sincerely,

Dr. Gregory Monty  
Director  
Center for Energy Research and Technology (CERT)

Dr. Vicki Foust  
Research Associate  
Center for Energy Research and Technology (CERT)

Elizabeth Keele, M.Ed  
Education Consultant  
Center for Energy Research and Technology (CERT)

## **Guilford County School Curriculum Standards**

### **3<sup>rd</sup> Grade and 5<sup>th</sup> Grade – Science as Inquiry**

As students progress through the grade levels, their strategies for finding solutions to questions improve as they gain experience conducting simple investigations and working in small groups. They are capable of asking questions and make predictions that can be tested. Students must be encouraged to make more careful observations and measure things with increasing accuracy. During investigations, students must have opportunity to use more advance tools such as calculators, computers, graduated cylinders, scales and meter sticks to gather data and extend their senses. They must keep accurate records and run enough trials to be confident of their results to test a prediction. They must have experiences that allow them to recognize patterns in data and use data to create reasonable explanations of results of an experiment or investigation. They should be encouraged to employ more sophisticated language, drawings, models, charts, and graphs to communicate results and explanations. Students must always use appropriate safety procedures, including listening skins, when conducting simple investigations.

#### **Essential Standard (3<sup>rd</sup> Grade):**

**3.P.3** Recognize how energy can be transferred from one object to another.

#### **Clarifying Objective:**

- 3.P.3.2 Recognize that energy can be transferred from a warmer object to a cooler one by contact or at a distance and the cooler object gets warmer.