



## Classroom Lesson Development

Title of Lesson **Inquiry-Based Learning--Electronics II Design Project**

RET Project Connection Inquiry Learning

RET Teacher Paul Chanley

School Northern Essex Community College

Town/District

Subject(s) taught Electronics II (CTE-202)

Subjects covered in lesson Temperature detection, electronic circuit design

Grades appropriate 2 yr. college

Lesson duration 12 weeks

Goals/Objectives of lesson Objective: Design, build and test an electronic circuit that will detect and provide an indication that my coffee is ready to drink.

Background information Prerequisite courses: Circuits I, Circuits II and Electronics I. Proper use of electronic lab equipment. Construct & troubleshoot electronic circuit prototypes. Electronic circuit simulation software.  
Computer skills: Word, Excel, PowerPoint and Internet research.

Essential questions What must be considered in designing a functional and cost effective electronic circuit?

Links to Frameworks and Standards

National -

State -

Local -

Materials required Electronic components and lab equipment

Lesson development The students will be given the design project on the first day of class. Through out the course, students will be learning different kinds of electronic devices. Some of the topics covered will support the design project. Other information for the design will be obtained by research and from prior knowledge.


Students are required to choose a specific type of transducer to detect temperature: thermometer, thermocouple, thermistor.  
Students must decide placement of the transducer: outside or inside the cup. Students decide on electronic components to use to process temperature information: op-amp, transistors, comparators  
Students decide on an indicator circuit: light, buzzer, DC motor. The following are student report requirements: a one page description of circuits functionally, a plot of temperature vs. time, an electronic circuit parts list, an electronic circuit schematic and cost analysis.  
Also, students are required to keep a daily journal/lab notebook.  
Finally, the students must demonstrate a working circuit and make a classroom presentation

References -




## Inquiry Based Learning-Electronic II Design Project

Paul Chanley (2006)  
Northern Essex Community College



## DESIGN PROJECT

- ✦ Objective: Design, build and test an electronic circuit that will detect and provide an indication that my coffee is ready to drink.
- ✦ Students will receive design project on the first day of class.
- ✦ 12- week duration.
- ✦ Work in groups of two or three.



## DESIGN PROJECT

- ✦ Students are required to choose a specific type of transducer to detect temperature: thermometer, thermocouple, thermistor.
- ✦ Students decide placement of the transducer: outside or inside the cup.
- ✦ Students decide on electronic components to use for processing temperature information: op-amp, transistors, comparators
- ✦ Students decide on an indicator circuit: light, buzzer, DC motor.



## PRIOR KNOWLEDGE

- ✦ Prerequisite courses: Circuits I, Circuits II and Electronics I.
- ✦ Proper use of electronic lab equipment.
- ✦ Construct & troubleshoot electronic circuit prototypes.
- ✦ Electronic circuit simulation software.
- ✦ Computer skills: Word, Excel, PowerPoint and Internet research.



## STUDENT DOCUMENTATION

- ✦ One Page Description of Circuits Functionally
- ✦ Plot of Temperature vs. Time
- ✦ Electronic Circuit Parts List
- ✦ Electronic Circuit Schematic
- ✦ Cost Analysis
- ✦ Daily Journal/Lab Notebook
- ✦ Working Electronic Circuit
- ✦ Classroom Presentation