

# MODIFIED UBD LESSON PLAN

**COURSE:** Introduction to Engineering

**UNIT:** Basic Electricity 2.0

**EXERCISE:** Series Circuits

**TIME FRAME:** 1 - 2 Hours



**PREPARATION:** *Summary of “to do’s” that the teacher should understand and prepare before bringing this lesson to the classroom.*

## Information:

Before starting this exercise, students should have an understanding of material covered in:

- ✓ Presentation: Ohm's Law
- ✓ Video: Electricity – Series – Parallel Circuits
- ✓ Video: Simple Circuits
- ✓ Presentation: Series Circuits

Teachers will need to ensure that the proper supplies are available for students to build their solutions.

## Materials:

- NASCO electrical supply kit
- Batteries

## Tools:

- Internet



**SAFETY:** *Summary of safety strategies in the lesson.*

Shock: Students will be working with electricity. Extra care should be observed when working with electricity.

**S1**

## DESIRED RESULTS:

### ESTABLISHED GOALS:

*Problem Solving Techniques and Applications Standards:*

Teachers should use the STEM Academy Standards Correlation System available in the STEM Connections area of a unit to extract specific standards and insert these standards [here](#).

### TRANSFER:

*Students will be able to independently use their learning to...*

- Identify the basic characteristics of series circuits;
- Verify the characteristics of a series circuit.

### MEANING:

#### UNDERSTANDINGS

*Students will understand that...*

- There is only one path for electricity to pass through in a series circuit;
- The more components to the circuit, the less current is available to each component.

#### ESSENTIAL QUESTIONS

*Students will keep considering...*

- What other types of circuits exist;
- What other characteristics a series circuit has.

### ACQUISITION OF KNOWLEDGE AND SKILL:



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*Students will know...*

- The characteristics of series circuits;
- How to handle electrical circuits in a safe manner.

*Students will be skilled at...*

- Constructing series circuits;
- Handling electricity safely.

## S2 EVIDENCE:

### EVALUATIVE CRITERIA:

- Circuit constructed correctly
- Correct answers

### ASSESSMENT EVIDENCE:

*Performance Task(s):*

Series Circuits Assignment:

In this exercise, students will construct a series circuit and learn the characteristics of series circuits.

*Other Evidence:*

- Outcome
- Correct questions
- Activity
- Online Quiz

## S3 LEARNING PLAN: *Summary of Key Learning Events and Instruction*

### Outline:

1. Set Introduction  
In a series circuit, there is only one path for current to flow. There is no limit on the number of components that make up the circuit, however, based upon Ohm's law, the more components the circuit has, the less current the series circuit will have.
2. Activity  
This sections discussion is very short and can be used at your set induction. When you're done with the discussion direct your students attention to the procedures section. Have the student's read the entire procedures section before starting. While they are reviewing this section, pass out the necessary materials for the activity. Students will be assembling a simple circuit using the materials provided. Using the provided adjustable wire strippers. Be sure to remove enough wire in order to "clip" the wire into the connection.
3. Student Questions  
Make yourself available for any questions any of your students may have.
4. Quiz  
At the conclusion of the activity have your students complete the corresponding online quiz

### Progress Monitoring:

- The instructor will need to monitor the classroom, checking student's work and ensuring students are on task and following directions.
- Ensure students store their projects at the end of class and leave all materials in the room.
- At the end of the activity, post student projects in the room and provide appropriate feedback.

## DIFFERENTIATION: *Summary of Key Differentiation Techniques*

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Please use this space to insert your differentiation techniques. Depending on the needs of students, various techniques might be needed in a classroom, therefore use the information below and experts in the area needed to design your plan for differentiation.

The ASCD Study Guide for Integrating Differentiated Instruction and Understanding by Design: Connecting Content and Kids.  
by Carol Ann Tomlinson, Jay McTighe

Integrating Differentiated Instruction and Understanding by Design: Connecting Content and Kids.  
by Carol Ann Tomlinson, Jay McTighe  
ISBN-13: 978-1416602842  
ISBN-10: 1416602844

Differentiating Reading Instruction  
by Laura Robb.  
ISBN13: 9780545022989

A Teacher's Guide to Differentiating Instruction  
The Center for Comprehensive School Reform and Improvement



#### CAREER CONNECTIONS: *Summary of Career Opportunities Associated with this Lesson*

##### Electrical Engineer

Electrical engineers design and develop electrical systems.

##### Utilities Worker

Utilities workers handle electricity and other utilities in a safe manner.

##### Electrician

Electricians wire buildings and implement electrical systems.

Good sources for career connections:

Occupational Outlook Handbook  
<http://www.bls.gov/ooh>

The National Career Clusters® Framework  
<http://www.careertech.org/career-clusters>



#### KEYWORDS: *Please Insert Keywords from this Lesson with their Definitions*

**SERIES CIRCUIT**—a closed circuit in which the current flows one path.

**ELECTRICITY**—a form of energy resulting from the existence of charged particles.

**CIRCUIT**—a complete and closed path around which a circulating electric current can flow.

Use resources like [dictionary.com](http://dictionary.com) to find definitions to your keywords