

# **Backwards Design Unit Planning Template**

*Adapted from Understanding by Design (2005) – Wiggins and McTighe*

**Course:** Grade 9 Science Applied (SNC1P1)

**Strand:** E - Physics

## **Stage 1: Identify Desired Results**

### **Overall Expectations:**

- E1. Assess the major social, economic and environmental costs and benefits of using electrical energy and propose a plan to reduce energy costs
- E2. Investigate, through inquiry, the properties of current electricity and the cost of the consumption of electrical energy
- E3. Demonstrate an understanding of the concepts and principles of current electricity

### **Big Ideas:**

Electricity is a form of energy produced from a variety of non-renewable and renewable sources

Current electricity has distinct properties that determine how they are used

The production and consumption of electrical energy has social, economic and environmental implications

### **Essential Questions:**

Which appliances in the home consume the greatest amount of energy?

What are some options for reducing the amount of energy consumed by household appliances?

How cost-efficient is it to purchase a new energy-efficient appliance when a less efficient appliance is still in good working condition?

What is the role of electrical current, potential difference and resistance in an electrical circuit?

What are the differences between series and parallel circuits?

What would happen by changing the resistance and potential difference on the electrical current in a simple series circuit?

### **Important for Students to Know:**

Electricity moves through electrical circuits and circuits carry electrons that move from an energy source and back to the energy source.

Electrical energy is converted into other types of energy such as, mechanical energy, thermal energy, sound energy, light energy.

### **Important for Students to Do:**

Students should learn how to use and build electrical circuits safely and properly in order to understand the concepts of electricity.

## Stage 2: Determine Acceptable Evidence

<b>Products:</b>	<b>Observations:</b>	<b>Conversations:</b>
Individual Assessment Activities for each lesson	Observe students learning the circuit lab and how effectively the students are working and grasping the material	Questions from the teacher about how circuits work and their components
Circuit Diagram Assignments		Questions from the students about how to set up the circuits and why things are happening
Building circuits laboratories	Observe how the students are able to answer the questions for the activity and understand what is expected of them	Questions from the teacher to the students about how the circuit lights up a light bulb
Unit Test		

## Stage 3: Plan Learning Experiences

### Topic 1: General Introduction to Electrical Circuits

<b>Lesson</b>	<b>Learning Goals, Subtopics and Activities</b>	<b>SEs</b>	<b>Resources</b>
1. Introduction to Electrical Circuits and the Unit in general and how the students will be assessed	<p><b>Learning Goals:</b></p> <ul style="list-style-type: none"> <li>• Students will learn about the components of a circuit</li> <li>• Students will learn to build circuits and understand how the electrons flow through the circuit.</li> <li>• Students will address the implications of having energy friendly household appliances in their home</li> </ul> <p><u>Minds On:</u> After the lecture, students will have the chance to discuss in pairs about what they understand about electron flow in a circuit.</p> <p><u>Action:</u> Adhering to the curriculum expectations and making sure the students understand the expectations and course material</p> <p><u>Consolidation/Debrief:</u> Students will build a series of electrical circuits and assess the quality and strength of the light source based on the energy source they put into the circuit</p>	E1.2 E2.4 E3.4	<p>Will use PowerPoint Slides for lecture portion</p> <p>Activity sheets to fill out during lecture and circuit lab</p> <p>Circuit components to build electrical circuits</p>
2	...		
3	...		
4	...		
5	...		
6	...		
7	...		

**Assessment/Evaluation Opportunities:**

**Assessment for Learning:** Filling in the activity sheet during the lecture portion of the lesson

**Assessment as Learning:** Circuit Laboratory activity sheet with stickers awarded as they finish each circuit assemblage

**Assessment of Learning:** Questions and answers during the lab portion of the lesson to the students from the teacher

**Topic 2: Series and Parallel Circuits**

Lesson	Learning Goals, Subtopics and Activities	SEs	Resources
1. Differences between Series and Parallel Electrical Circuits	<p><b>Learning Goals:</b></p> <ul style="list-style-type: none"> <li>• Students will learn the difference between series and parallel circuitry</li> <li>• Students will understand the different paths that electrons flow in various forms of circuit design</li> <li>• Students will learn to build and measure the voltage, current and resistance of the different types of circuits they design</li> </ul> <p><u>Minds On:</u> During the lecture portion of the lesson plan, students will be asked which circuit diagrams are series and parallel diagrams</p> <p><u>Action:</u> Students will come to the board and draw an example of the circuit design using the correct circuit symbols learned in class</p> <p><u>Consolidation/Debrief:</u> During the laboratory portion of the lesson, students will work in pairs to design series circuits and parallel circuits while recording the current, voltage and resistance of each component of each circuit.</p>	E2.3 E2.4 E2.5 E2.6 E3.5 E3.6	<p>Will use PowerPoint Slides for lecture portion</p> <p>Activity sheets to fill out during lecture and circuit lab</p> <p>Circuit components to build electrical circuits</p> <p>Multimeters to measure current, voltage and resistance</p>
2	...		
3	...		
4	...		
5	...		

**Assessment/Evaluation Opportunities:**

**Assessment for Learning:** Filling in the activity sheet during the lecture portion of the lesson

**Assessment as Learning:** Circuit Lab activity sheet with stickers awarded when finish each circuit assemblage

**Assessment of Learning:** Q and A during the lab portion of the lesson to the students from the teacher