Lesson Plan (Offline)

Coding Tool	Ozobot
Cross-curricular	Language

Big Ideas

Electrical Energy can be transformed into other forms of energy

Overall Expectation:

2. Investigate the characteristic of static and current electricity and construct simple circuits

From Curriculum Overview: Building of Circuits should further strengthen students' understanding of how electrical systems work

Specific Expectations

Science:

2.2 Design and build series and parallel circuits, draw labelled diagrams identifying the components uses in each, and describe the role of each component in the circuit.

2.6 Use appropriate science and technology vocabulary, including current, battery, circuit, transform, static, electrostatic, and energy in oral and written communication

3.6 Explain the functions of the components of a simple electrical circuit (eg the battery is the power source, a length of wire is the conductor that carries the electrical current to the load, a light bulb or motor is the load)

3.7 Describe series circuits and parallel circuits

Language:

2.3 communicate orally in a clear, coherent manner, using appropriate organizing strategies and formats to link and sequence ideas and information (e.g., present an argument in favour of one point of view on an issue, with an opening statement, sequence of points with supporting evidence, and summary/conclusion)

Description

In this science coding lesson, students will have the opportunity to explore the Ozobot and use it to demonstrate their understanding of Electricity and circuits.

Materials

- Ozobots, as available. (Each student will need to use the Ozobots to test and retest their circuit designs a few times.)
- Markers (Black, Green, Red and Blue)
- White paper (or Good On One Side paper)

Computational Thinking Skills

Algorithm Design

Introduction

Before completing this activity, students should already have an understanding of

- Basic understanding of electricity
- Circuit design, including series and parallel
- How to draw and build circuits

Students will be introduced to the Ozobot by watching the How to video by Ozobot found here: https://www.youtube.com/watch?v=m5d4iXGbIGs

Students will be given time to explore the Ozobot freely with markers and about 20 minutes of time (or however long the teacher prefers) to try out different codes to get the feel of how it works.

Action

Students will be challenged to use the Ozobot to demonstrate their understanding of Electricity

Task One: Students will be challenged to create a representation of a series circuit, and/or a parallel circuit using the Ozobot tool

- The teacher can choose, based on time, whether to have all students create both types, or have half the class create a series, and half create a parallel, and then share.

Both circuits must contain an Ozobot feature to represent:

- Wire/Conductor
- Battery/Power source
- Load
- Switch

Each part of the circuit will be represented with a different Ozobot code: Examples of codes that students can use are presented below but encourage them to be creative:

- The batter can be represented by a Spin command – the spinning motion represents movement to generate energy (kinetic energy)

- The load can be represented by a change in colour – use of energy to create light (different coloured lines)
- The switch can be represented by a zigzag to show the opening and closing of the switch
- The conductor (wires) are represented by the black lines drawn in marker.

Task Two: Students will be challenged to create a representation of a series circuit, and/or a parallel circuit with an open switch using the Ozobot tool

- the Ozobot won't be able to complete this loop, demonstrating that electricity needs a path to follow
- The Ozobot is an effective representation of electrons, which need to complete a circuit for the load to work

Learning Moment/Goal: Have a discussion with the class to compare the two circuit scenarios, both open and closed, focusing on the facts that:

- a circuit with an open switch will not continue
- a circuit is continuous and repeats for ever

Consolidation/Extension

Possible Bonus/ Extensions:
Students can be challenged to build a series circuit with more than one load and compare the different types of circuits created. The different loads can be represented by a different Ozobot action.

Assessment

Students will use appropriate science and technology vocabulary (Science 2.6) to communicate orally in a clear, coherent manner (Language 2.3) about how their Ozobot represents their understanding of circuits and electricity.

Possible Questions to assess learning and understanding:

- Tell me how your circuit works.
- What type of circuit is this?
- What elements of a circuit are demonstrated here? (Look for Science Vocabulary: Switch, Load, Conductor, Battery, Series, Parallel)

Additional Resources

- Ozobot Website: https://ozobot.com/
- Ozobot How To Video: https://www.youtube.com/watch?v=m5d4iXGbIGs
- Introduction to Electricity- video for kids https://www.youtube.com/watch?v=Uf76pThNXZc

Sample circuits for the Ozobot are provided on the ***Sample Circuit*** handout.