

Lesson Plan

Description

Students will learn about the difference between series and parallel circuits using the online platform TinkerCad. They'll code lights in the circuits to compare the two, then use what they learn to identify a mystery circuit.

Learning Outcomes

- Students learn about different types of electrical connections
- Students will learn the difference between parallel and series circuits
- Students will learn how to create program code with multiple branches.

Specific Expectations

Strand A: STEM Skills and Connections

A2.1 write and execute code in investigations and when modelling concepts, with a focus on obtaining input in different ways for a variety of purposes

Strand C: Matter and Energy

C2.6 explain the functions of the components of a simple electrical circuit

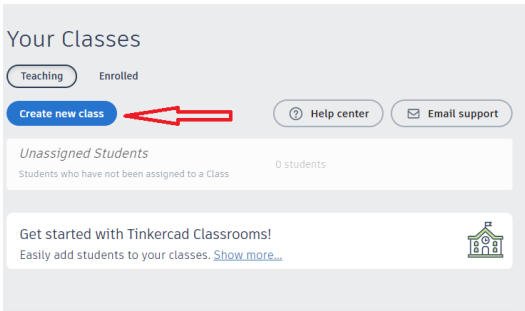
C2.7 distinguish between series and parallel circuits, and identify common uses of each type of circuit

Introduction

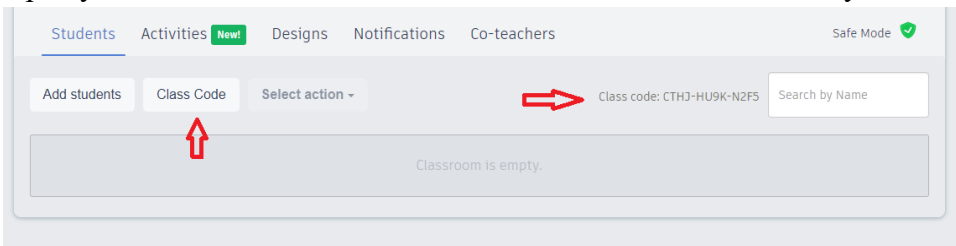
Circuits can be set-up both in series and in parallel. Both types of circuits have unique uses and benefits, as well as potential detractors. In a series circuit, all components are connected end-to-end to form a single path for current flow. The advantage of a series circuit is that all components are reliant on each other, meaning removing one component turns off the others. These types of circuits are often used with light switches. In a parallel circuit, all components are connected across each other with two common nodes. This allows for multiple paths and therefore each component is independent of the others. Outlets in a house are all parallel meaning that turning off your TV in one room won't turn off a light in the other. They both have their uses and, in this lesson, students will compare the two.

Action

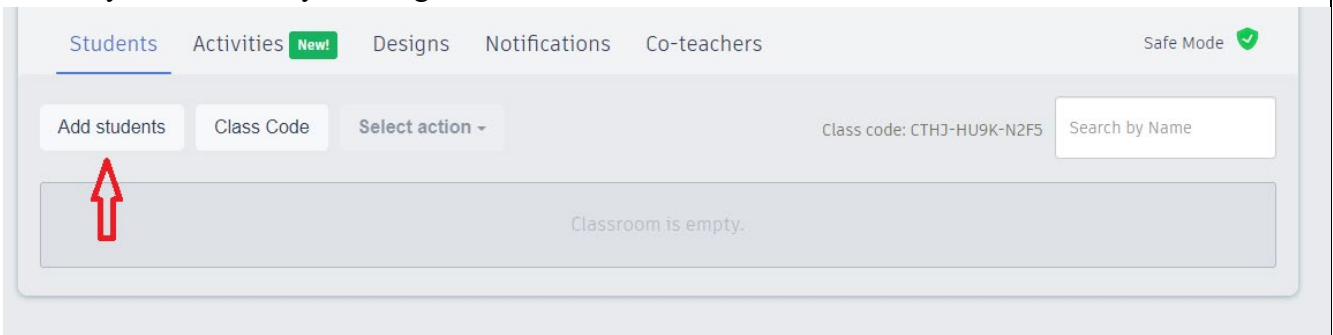
1. Sign Up for an Educator account on <https://www.tinkercad.com/>
2. Create a new class, give a name to the class, choose a grade and choose a subject:



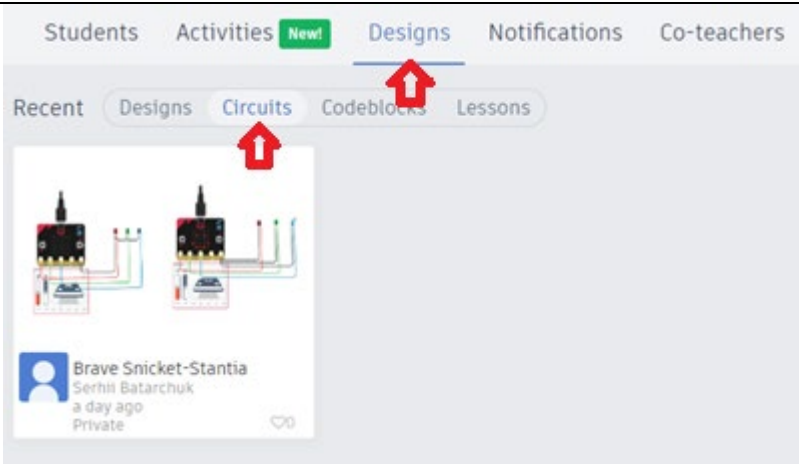
3. Open your class, and write the class code to be able to share with your students



4. Add all your students by entering their names



5. Save a list of nicknames on the computer or print them out.
6. Share the class code with your students and distribute the nicknames
7. When the students complete their tasks you can view them here:



8. Distribute the handout to the students for them to built and test the different circuits.
9. The solution guide will help you and there is a coding guide for the two coding challenges in the worksheet.

Consolidation/Extension

- You can ask students to do the same tasks but in a different way.
- Encourage students to use more light elements in their schematics.
- Put the students into pairs, ask one of the students to change the property in the program, and the other to try to guess the changes before starting.

Accommodations/Modifications

- Reduce the tasks to only have two LEDs
- Have students orally answer the questions
- Provide students with the completed code or circuits to get them started

Assessment

The student handouts can be used as Assessment *for* Learning or Assessment *of* Learning. Gather information from the students throughout the activity to gauge their level of understanding or collect the handout to provide a summative evaluation.