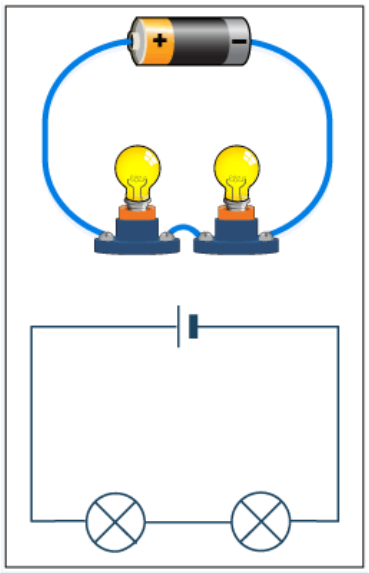
Title:	Painting Circuits
Grade(s):	4
Subject(s):	Physical Science
Author:	ICAC Team
Overview:	The students will use **Paint** on the Computer to create a visual illustration of a series and parallel circuit and review the characteristics of each.
Content Standards:	SC(4) 1. Describe how electrical circuits can be used to produce light, heat, sound, and magnetic fields. Identify characteristics of parallel and series circuits. TC(3-5) 1. Use input and output devices of technology systems. TC(3-5) 2. Use various technology applications, including word processing and multimedia software. TC(3-5) 10. Use digital environments to collaborate and communicate. TC(3-5) 12. Create a product using digital tools.
Local/National Standards:	
Primary Learning Objectives:	The students will: • Use graphics creation software to create a visual illustration of a series circuit. • Use graphic creation software to create a visual illustration of a parallel circuit.
Additional Learning Objectives:	
Approximate Duration of Lesson:	60 min.
Materials and Equipment:	
Technology Resources Needed:	Computer, **Paint**
Background/ Preparation:	Knowledge of the characteristics of series and parallel circuits. Knowledge of the computer and **Paint.**
Procedures/ Activities:	Step 1 Review the characteristics of a **series** and **parallel circuit** with the students by drawing one of each on the board, including the **battery**, **resistors (such as a light bulb)**, and **wire**.

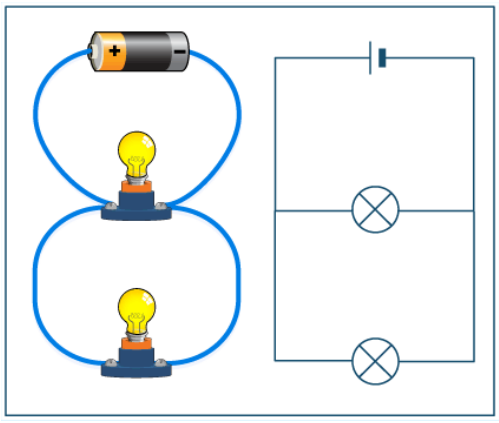
Series circuits form a circle and have only one path for **current** to travel along. If there are two light bulbs in a series circuit and one burns out, the other light bulb will not shine because the path of the current has been broken. Holiday lights are an example of a series circuit.

Series Circuit



Parallel circuits have more than one path for the **current** to travel along. A diagram of a parallel circuit looks like a railroad track with two parallel tracks and crossties for each light bulb or other resistor. If a parallel circuit contains two light bulbs and one of them burns out, the other will continue to shine because there is still a path for the current to travel along. The wiring in a house is an example of a parallel circuit.

Parallel Circuit

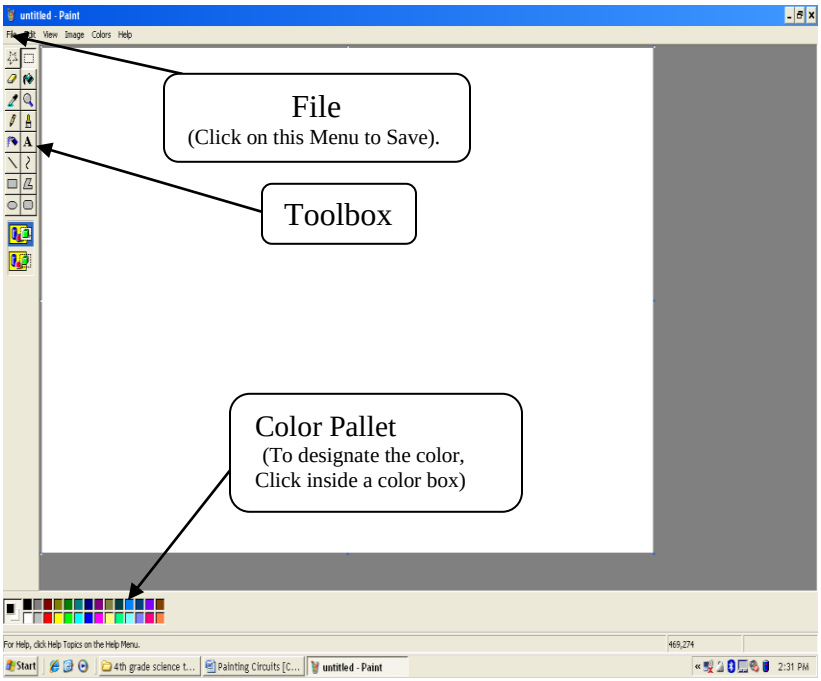


Step 2 The students will use Paint to create a visual illustration of a series and a parallel circuit. Tell students that their circuits must contain a **battery**, **wires**, and **3 resistors**.

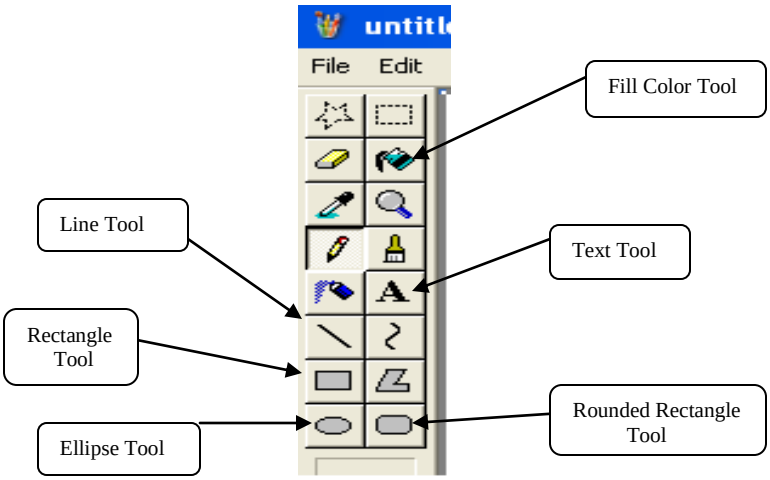
To Launch **Paint** :

- Click on “Start”.
- From the “Start” Menu, click on “All Programs”.
- From the “All Programs” Menu, click on “Accessories.”
- From the “Accessories” Menu, Click on “Paint.”

The **Paint** Screen looks like this:



Step 3 Have the students illustrate series and parallel circuits in **Paint** using the various Shape Tools found in the Toolbox. (Ellipse, Rectangle, Line, etc.)



The pictures of each circuit should include the circuit elements of a battery, resistors (light bulbs), and wire. You can change the color of the circle by using the Fill Color tool (you will have to select the desired color *before* you draw your shapes).

The students should also use the Text Tool in the Toolbox to label each circuit.

To change the Font, Color, or Size of the Text:

- Right Click inside the Textbox.
- Click on Text Toolbox.
- The Text Toolbox will appear.

To Save the Illustrations to the Desktop:

- Click on “File.”
- Click on “Save As.”
- Select “Desktop.”
- Enter a “File name” and Click Save.

To Save the Illustrations to a Flash Drive:

- Click on “File.”
- Click on “Save As.”
- Select “My Computer.”
- Select the Flash Drive and enter a name for the file, then click “save.”

Step 4 The students will share their illustrations with the class discussing the characteristics of a series and parallel circuit. This will allow the students to have their work checked by their peers.

Attachments: Rubric

Assessment Strategies: See rubric.

Extension: Have students use **Paint** to create a diagram of a house wiring circuit (parallel) including some ceiling lights, lamps, wall plugs, and appliances.

Remediation: Provide diagrams of series and parallel circuits and have a student proficient in using **Paint** work with students having difficulties to create circuit diagrams.

Assessment Rubric for Painting Circuits

Score:	1	2	3	4
Participation (if students worked in groups)	No participation in the activity.	Some participation, but did not work well with the group.	Participated throughout activity, contributed to successful outcome.	Worked well with everyone in group, offered ideas, contributed to successful outcome.
Scientific Comprehension	Accurately drew one circuit and/or did not include circuit elements.	Accurately drew series circuit and correctly included one circuit element.	Accurately drew series and parallel circuits and correctly included two of the three circuit elements.	Accurately drew series and parallel circuits and correctly included battery, resistor, and wire.
Technology	Did not use Paint to draw a series and parallel circuit.	Did not use the appropriate Shapes, Line, or Text tools to draw a series and parallel circuits including battery, resistor, and wire.	Correctly used the two of the three tools in Paint to draw series and parallel circuits including battery, resistor, and wire.	Correctly used the Shapes, Line, and Text tools in Paint to draw series and parallel circuits including battery, resistor, and wire.