Directions

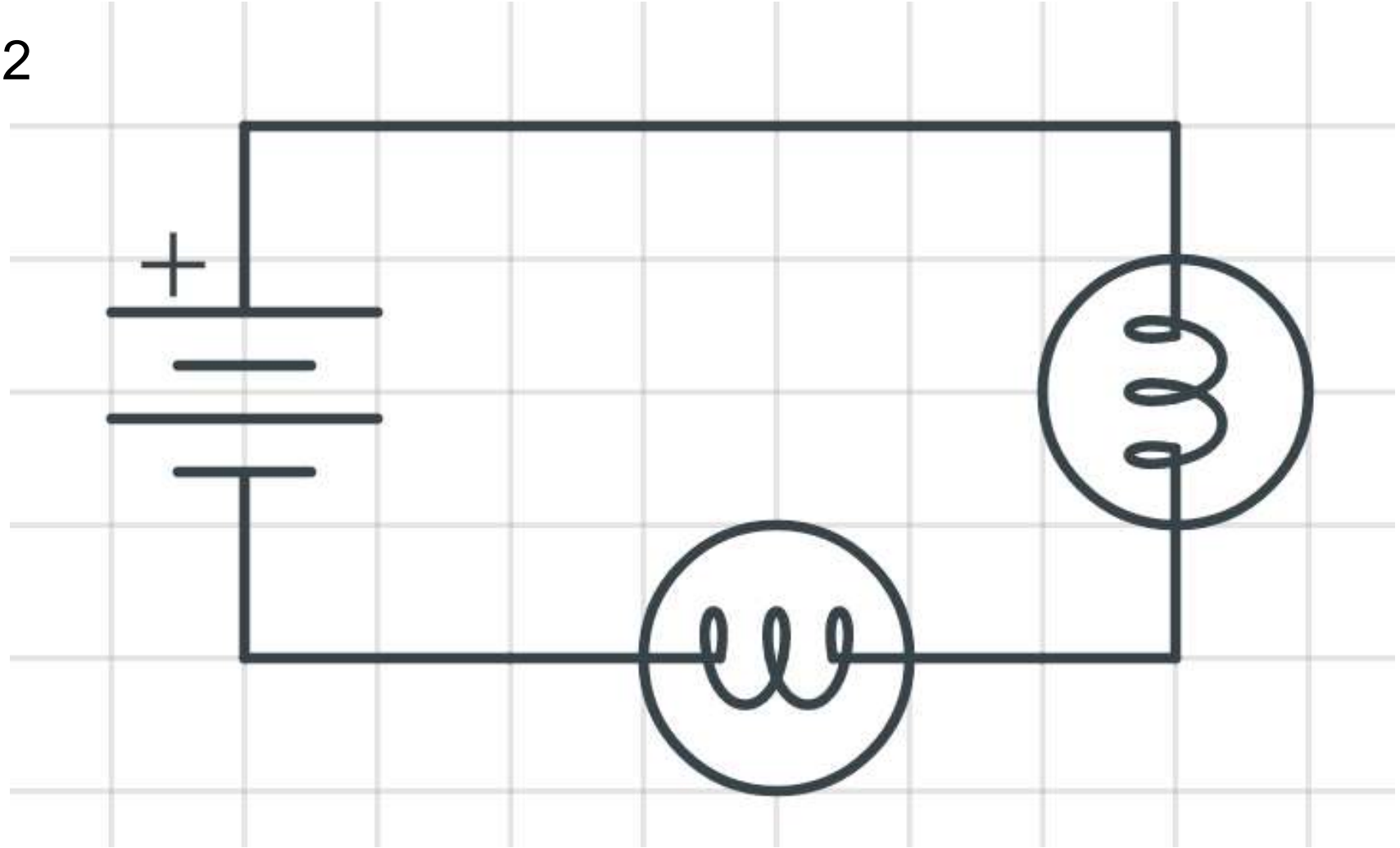
1. Build the circuit
    a. Alternate partners each time
2. Draw the circuit using the circuit diagram
3. Model what you see
    a. You can use words, diagrams, symbols, etc.

If absent use PhET Circuits to Complete Use Lab!

Circuit Exploration Day 1

1

2



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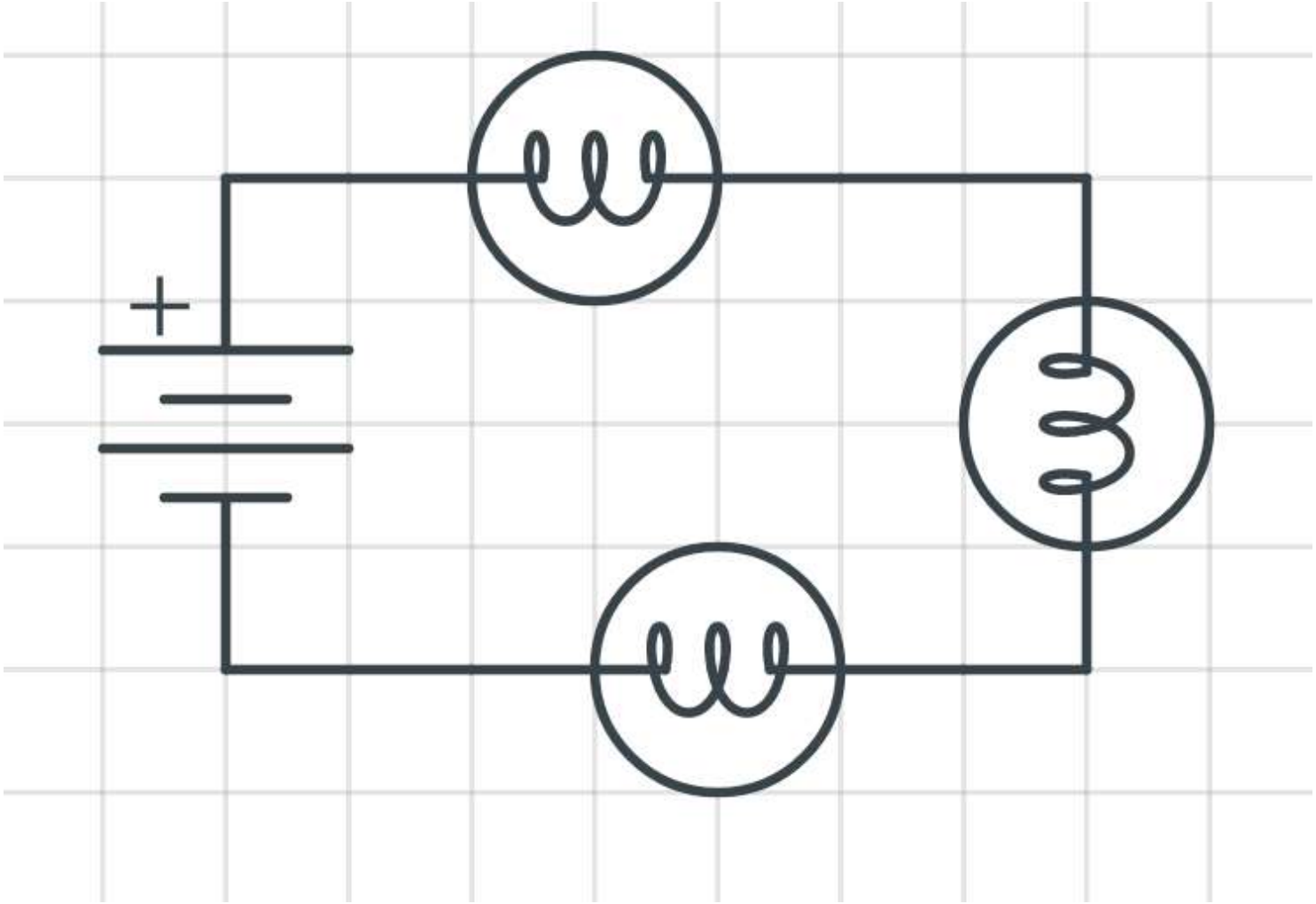

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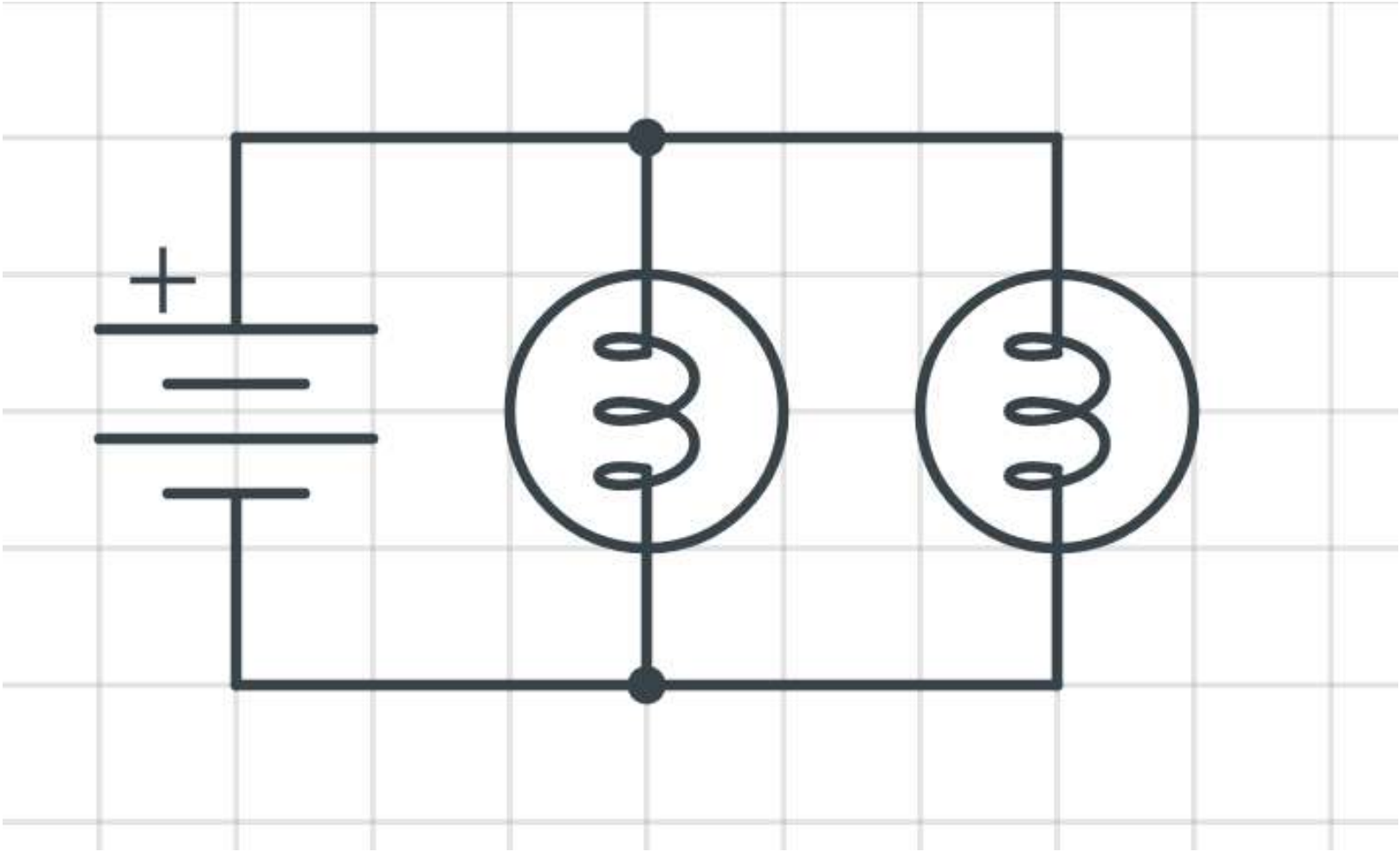

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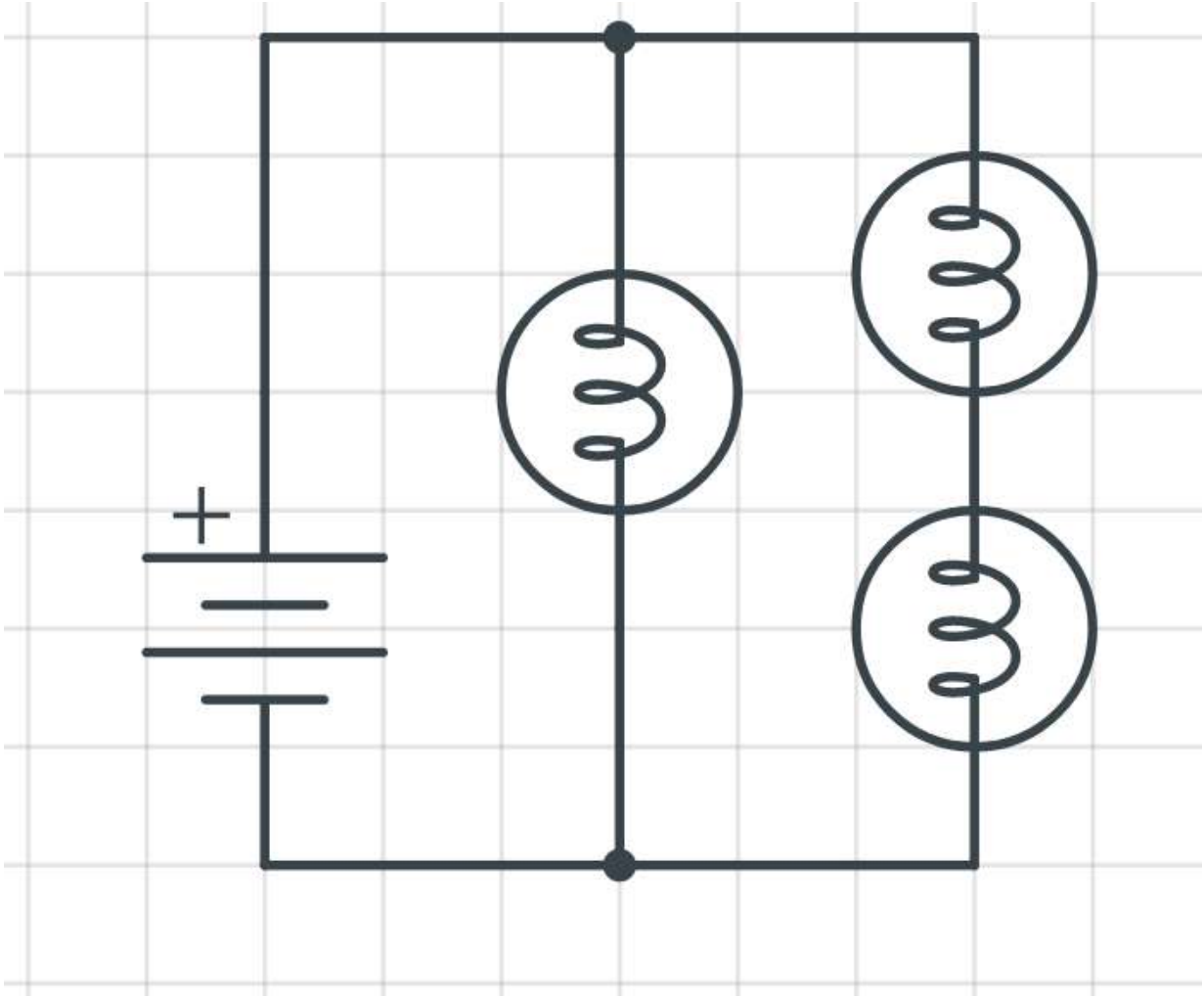

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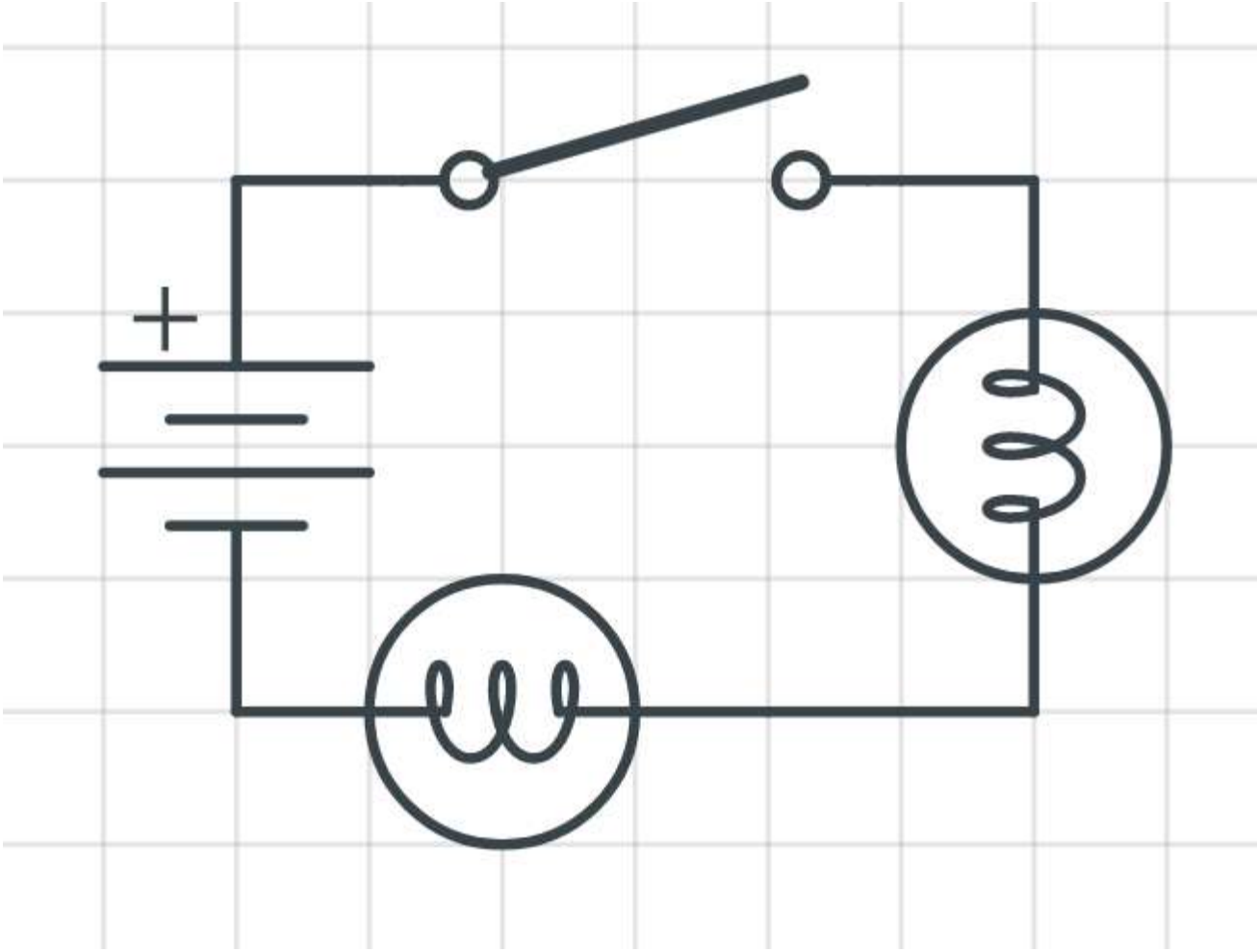

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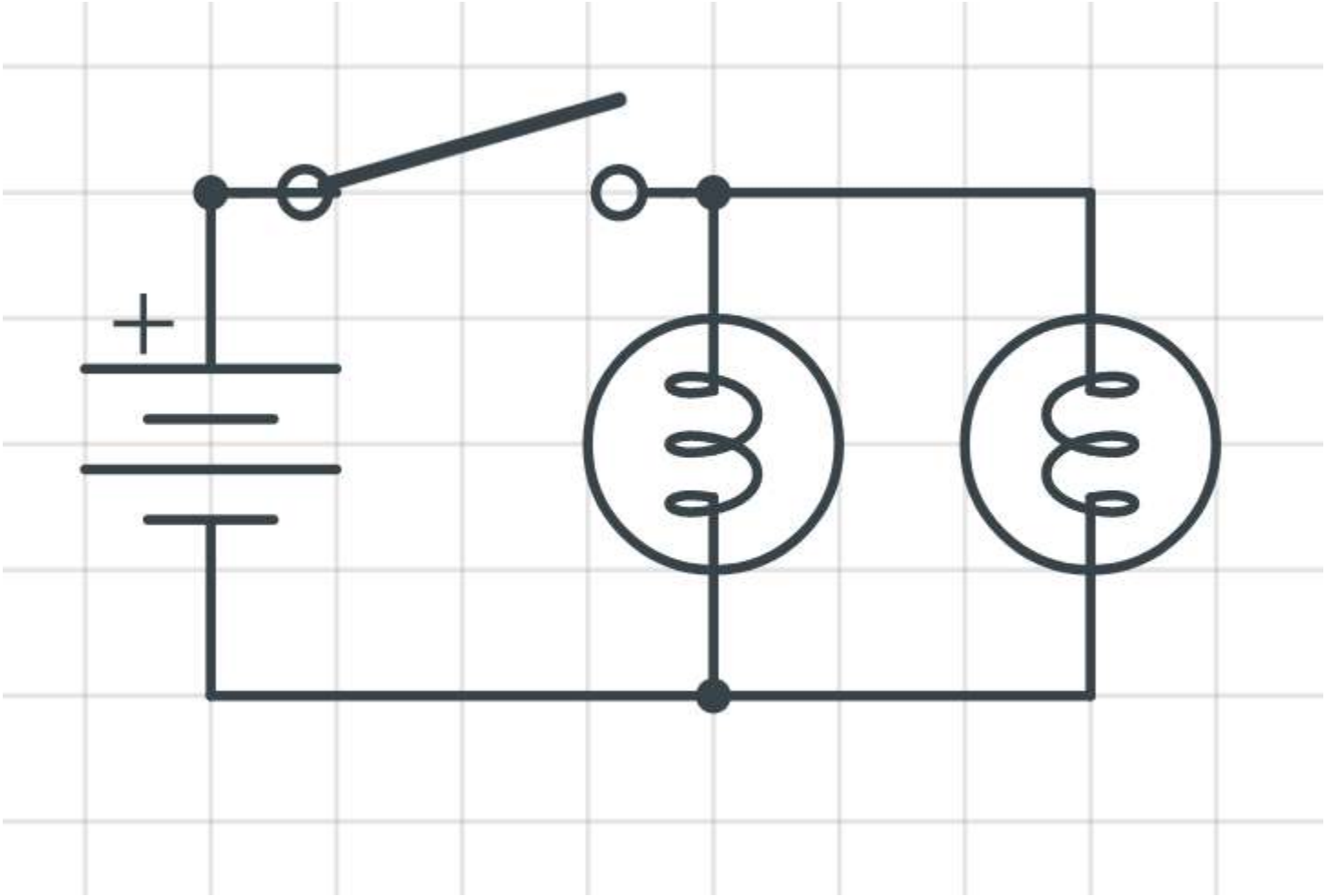


Compare and Contrast Day 1

1. #2 and #4
2. #1, #2 and #3
3. #4 and #5
4. #3 and #5
5. #6 and #7

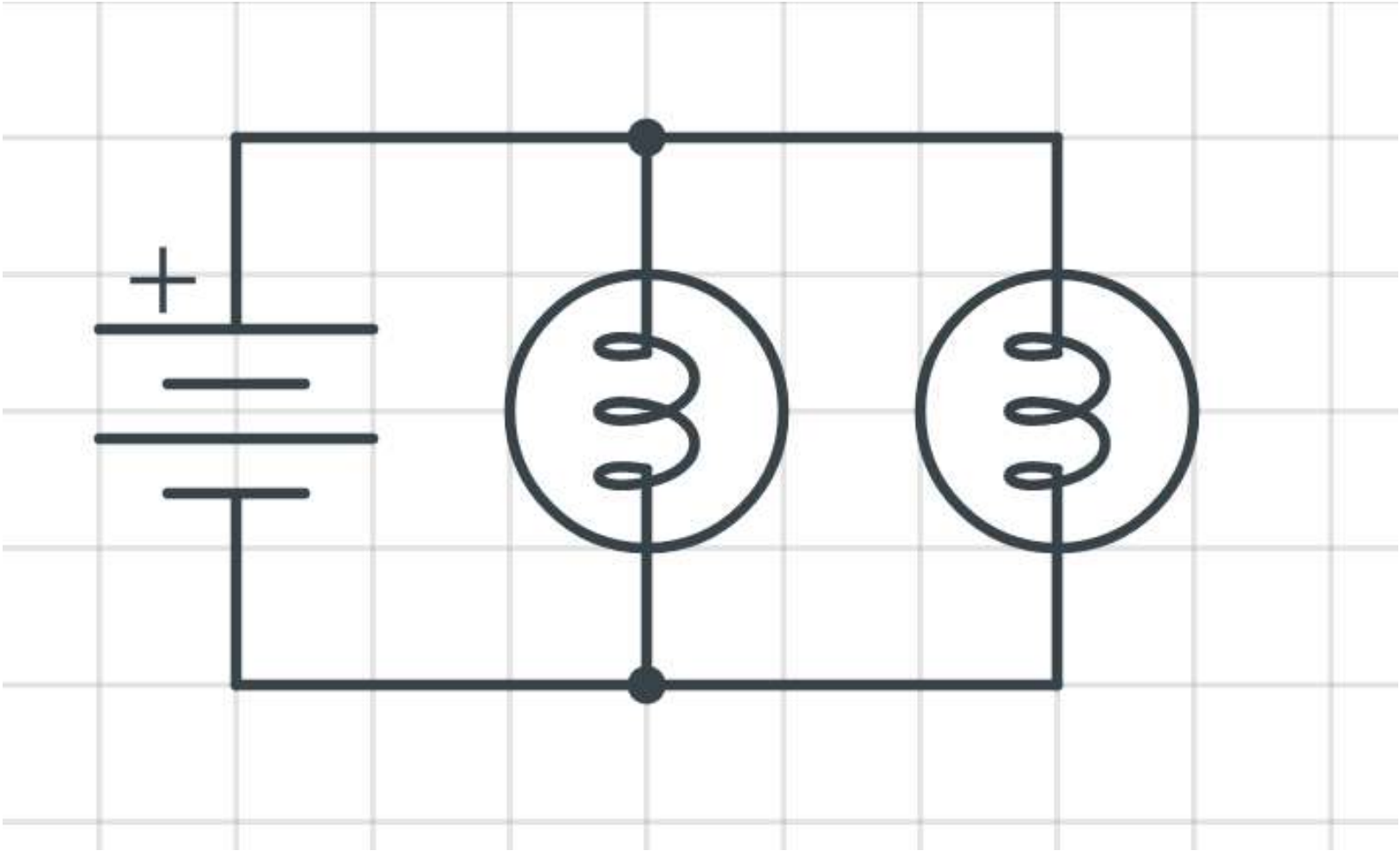
Compare and Contrast Day 1

1. #2 and #4
    a. Lights from Circuit #2 were dimmer than #4, #4 branch off (parallel), 2 lights
2. #1, #2 and #3
    a. All in series (in a line), amount of lightbulbs, #1 was brightest
3. #4 and #5
    a. #5 more complex, 3 bulbs, #4 had 2 bulbs, type of circuit was similar, branch off, in #5 single bulb was brighter than the two bulbs
4. #3 and #5
    a. Both had the same number of lights, #3 was a series, #5 combination, #3 all had the same brightness, #5 single bulb was brighter
5. #6 and #7
    a. Switches turn off both, one was in series and the other in parallel

Circuit Exploration Day 2

1

2



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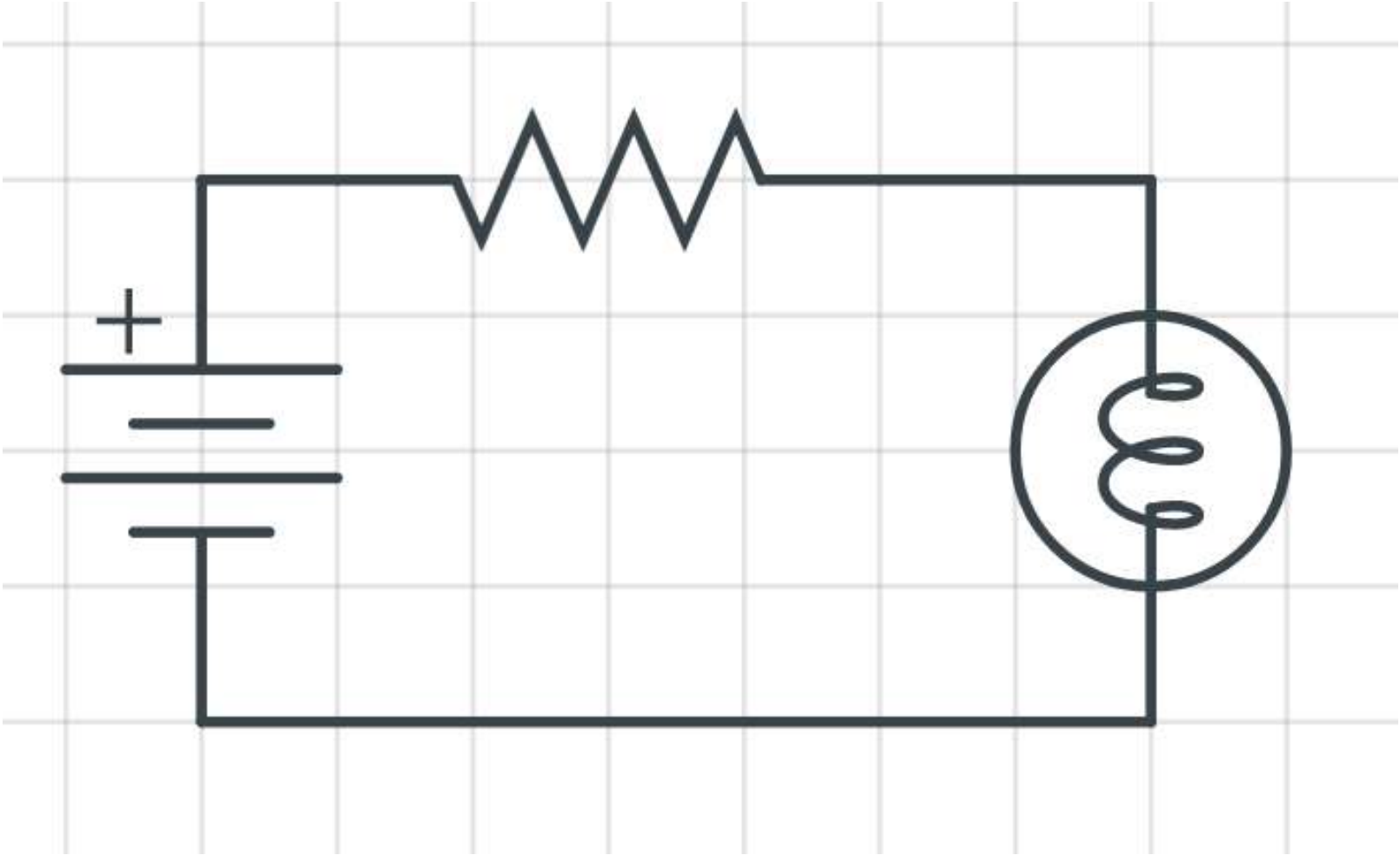

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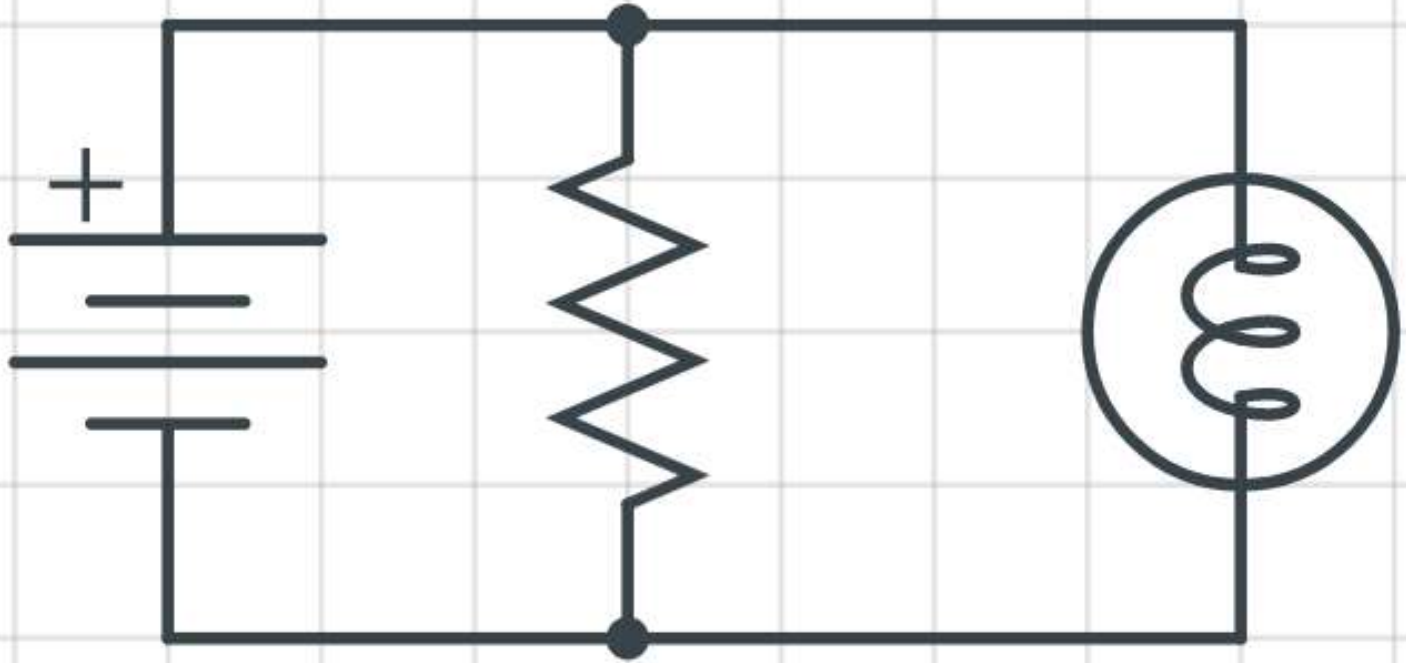

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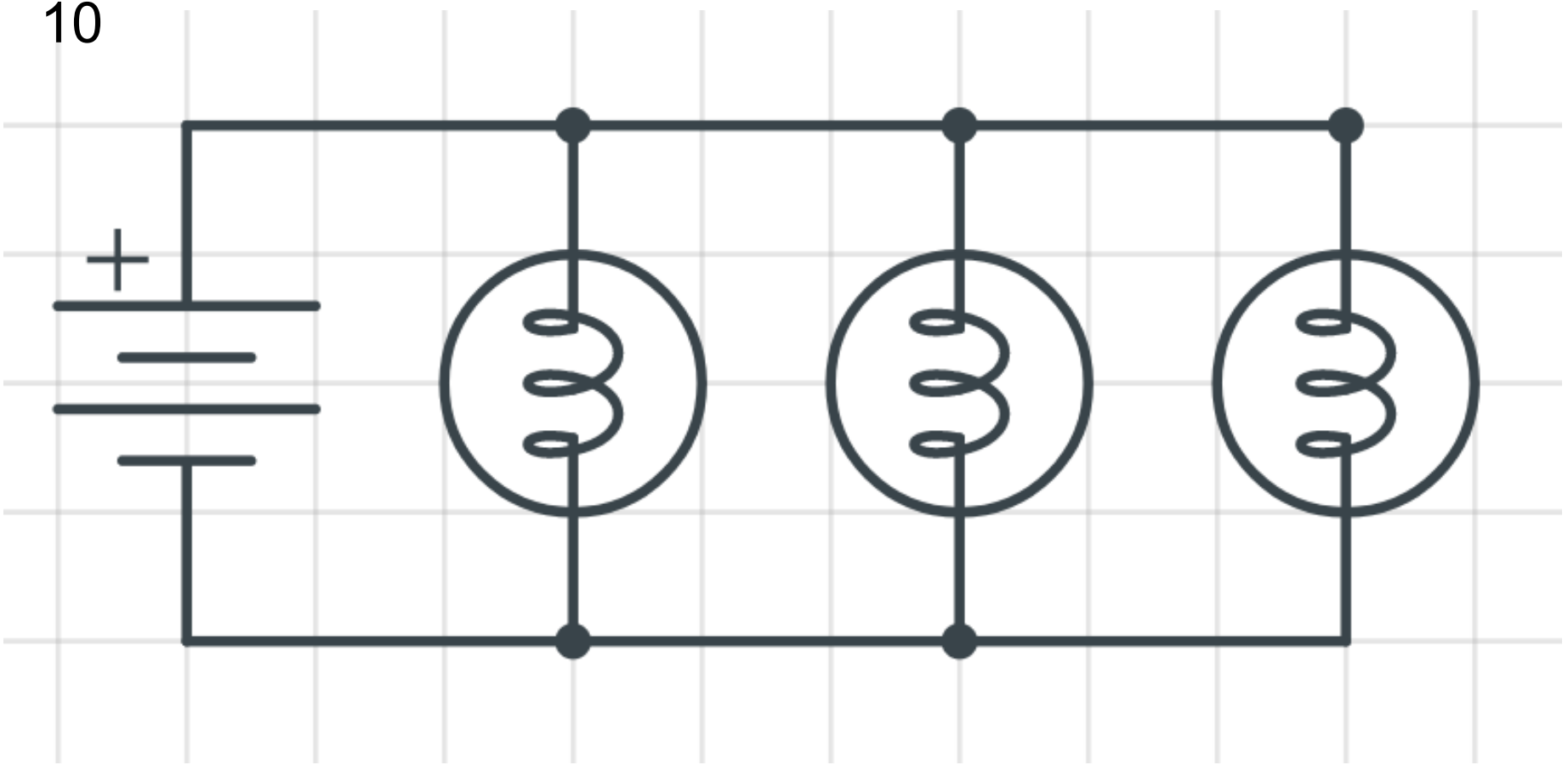

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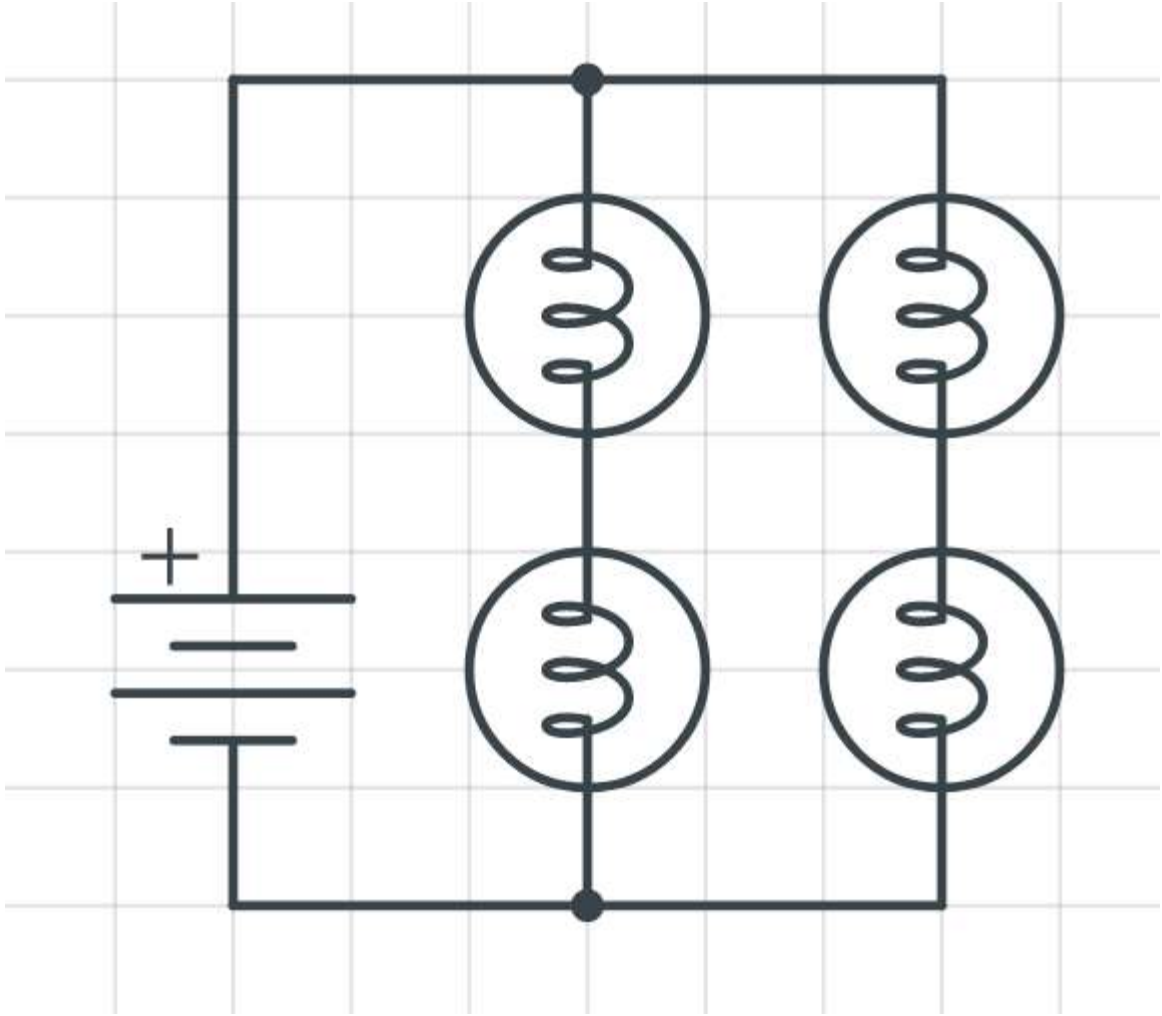

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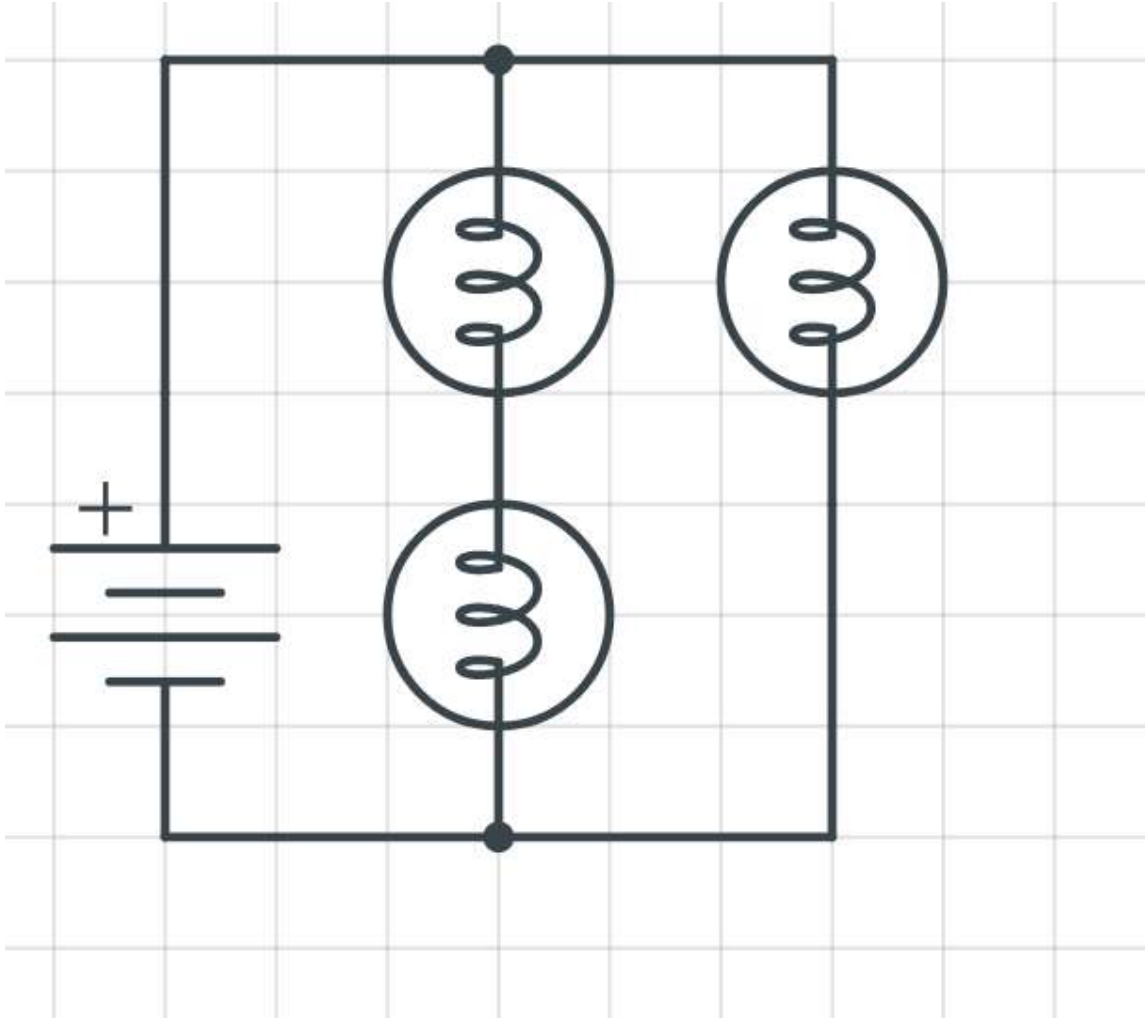


Compare/Contrast Day 2

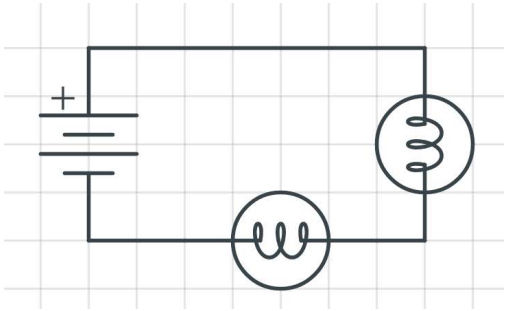
1. #1 and #8
2. #2 and #9
3. #8 and #9
4. #10 and #11
5. #11 and #12

Compare/Contrast Day 2

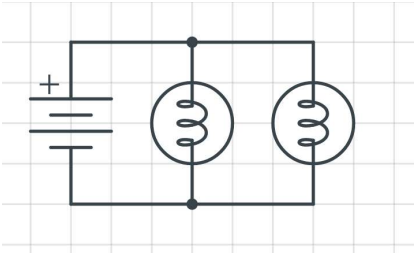
1. #1 and #8
    a. Same construction of the circuit, #8 had a resistor, didn't turn on
2. #2 and #9
    a. Both branched off, #9 had a resistor, #2 had a lightbulb, #9 light bulb turned on
3. #8 and #9
    a. #8 was in the flow of electricity it didn't work, #9 parallel light bulb worked
4. #10 and #11
    a.
5. #11 and #12
    a.

Series vs. Parallel vs. Combination

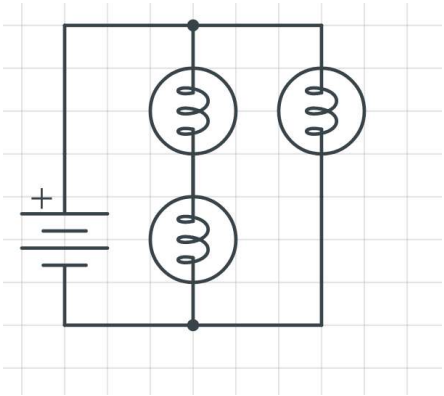
Series



Combination



Parallel



Go through each circuit #1 - #12 and determine if it is series, parallel or combination.

Assessment Standards

1.2 Circuits and Charges: I can determine, create and predict different outcomes from charges and circuit configurations.

S.3.1: Modeling Details: All relevant details are present in the model to explain unobservable mechanisms and show input/output with no extraneous details.

S.3.3 Modeling Student Thinking: Students clearly communicate all aspects of their thinking to others through the model that contains fully developed connections.

S.4.1 Argumentation Claim: The claim is clear and specific while relating to the question presented in class **(Reassessment)**

S.4.2 Argumentation Evidence: The evidence is detailed and persuasive. Includes: all necessary qualitative data and/or quantitative data that supports the claim **(Reassessment)**

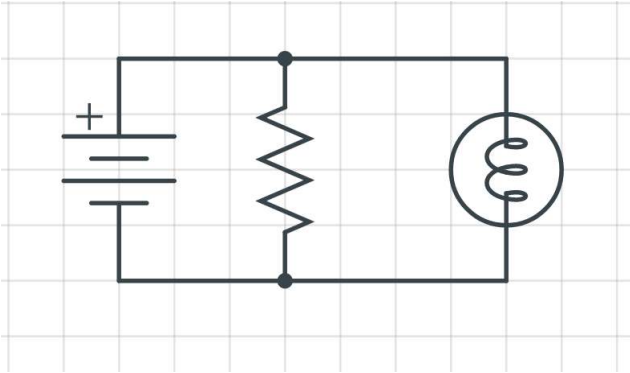
S.4.3 Argumentation Reasoning: Explanations and organization of reasoning strongly enhance the communication of evidence. The reasoning is based on clear and sound scientific principles. Fully explains *why or how* the data supports the claim The reasoning is from a reputable source if sources were used **(Reassessment)**

Practice Modeling & CER #1

A well charged balloon is brought near a stack of lined paper.

1) Model the before and after of the situation. Use images, descriptions, keys, etc.
2) Create a CER of what is going to happen
    a) Claim: Do not use “I think”. Make a statement about what will happen.
    b) Evidence: Use 2-3 pieces of evidence from the PhET Simulations, Charges Balloons Labs and/or Circuit Exploration
    c) Reasoning: Tie your evidence to your claim. Statement for each piece of evidence.

Practice Modeling & CER #2



You remove the resistor in the circuit to the right.

What will happen to the light bulb?

1) Model the before and after of the situation. Use images, descriptions, keys, etc.
2) Create a CER of what is going to happen
    a) Claim: Do not use “I think”. Make a statement about what will happen.
    b) Evidence: Use 2-3 pieces of evidence from the PhET Simulations, Charges Balloons Labs and/or Circuit Exploration
    c) Reasoning: Tie your evidence to your claim. Statement for each piece of evidence.

Practice Modeling & CER #3

Draw a circuit that will shut off if one light bulb is removed.

1) Model the circuit. Use images, descriptions, keys, etc.
2) Create a CER of what is going to happen
    a) Claim: Do not use “I think”. Make a statement about what will happen.
    b) Evidence: Use 2-3 pieces of evidence from the PhET Simulations, Charges Balloons Labs and/or Circuit Exploration
    c) Reasoning: Tie your evidence to your claim. Statement for each piece of evidence.

CER/Modeling Assessment

Turn in to your teacher on paper when done!

Assessment CER/Modeling #1

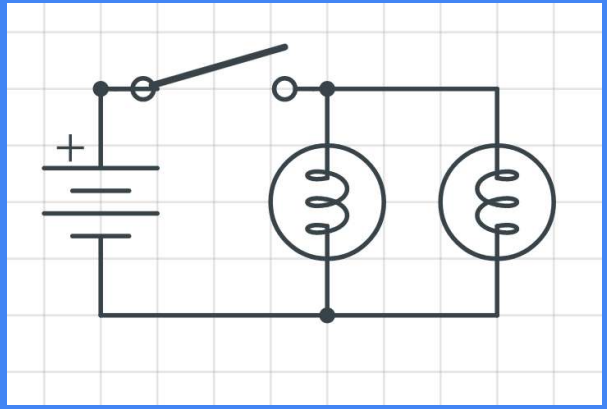
A well charged balloon is brought near a piece of scrap of paper, a scrap of aluminum foil and a tiny droplet of water. What will happen?

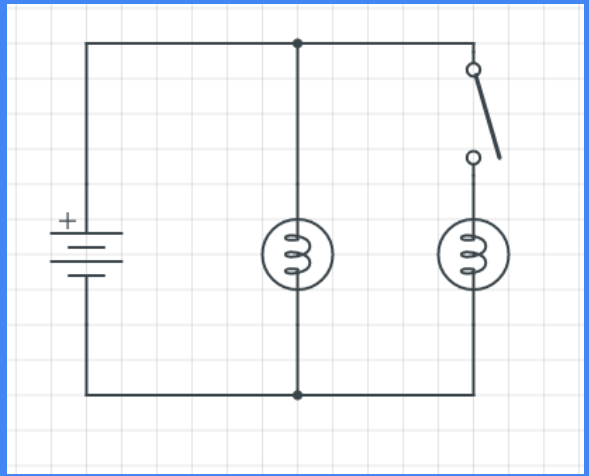
1) Model the before and after of the situation. Use images, descriptions, keys, etc.
2) Create a CER of what is going to happen
    a) Claim: Do not use “I think”. Make a statement about what will happen.
    b) Evidence: Use at least 3 pieces of evidence from the Charges and Electricity Choice Boards (PhET), Charges Balloons Labs and/or Circuit Exploration
    c) Reasoning: Tie your evidence to your claim. Statement for each piece of evidence.

Assessment CER/Modeling #2

Look at the two circuits on the right. What will happen in both situations when you open and close the switch?

1) Model the before and after of the situation. Use images, descriptions, keys, etc.
2) Create a CER of what is going to happen
    a) Claim: Do not use “I think”. Make a statement about what will happen.
    b) Evidence: Use 2-3 pieces of evidence from the Charges and Electricity Choice Boards (PhET), Charges Balloons Labs and/or Circuit Exploration
    c) Reasoning: Tie your evidence to your claim. Statement for each piece of evidence.





Circuit/E&M Exploration Day 3

Put your computer on the center console of your lab bench!

Electricity and Magnetism Investigation

1. How do the magnets interact? Describe in detail.
2. How do the magnets interact with the bottle of iron filings, paperclips, nails and compass?
3. What do you notice happens when you interact the **wire coil along** with the bottle of iron filings, paperclips, nails and compass?
4. What do you notice happens when you interact the **wire coil attached to a series circuit (into the wall)** with the bottle of iron filings, paperclips, nails and compass?
5. What happens when you turn the generator (hand crank) at different speeds? What are the mechanics of the generator?
6. Attach the motor to the series circuit (into the wall)- what happens? What do you think would happen if there was less voltage from the power source? Now try it connected to the generator.