**Teacher’s Name:** Ms. Singh  **04/17/2019**

**Unit:** Fundamentals of Electronics **Topic:** Schematic Diagrams

**NYS STANDARDS:**

1. **RST4:** Determine the meaning of symbols, key terms, and other content-specific words and phrases as they are used in scientific or technical sources; describe how the inclusion of charts, graphs, diagrams, data influence conclusion(s).

**NYS Learning Standards for Career and Technical Education:**

1. **CDOS S3a:**Students will demonstrate mastery of the foundation skills and competencies essential for success in the workplace.

**Common Core Learning Standards:**

1. **RST.9-10.4:** Determine the meaning of symbols, key terms,and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
2. **RST.9-10.7:** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

**Materials:**

Snap On Trainers

Notebooks

Rulers/ID Cards

**Opening Task:**

Answer one of the questions in complete sentences:

1. Why do people use waze or google maps?
2. How is waze or google maps helpful in everyday life?
3. What does waze and google maps have in common?

**Motivation/Answer to Do Now:**

Now that you’ve had a moment to answer one of the Do Now questions, let’s have a conversation. First, raise your hand if you use google maps or waze. Why do you use it? How does it help you? (It tells me directions, where I need to go, how to get there, how long it takes to get there, if there is traffic). There are many reasons why we use a virtual map, but one of the core reasons that I want you guys to acknowledge is that a map allows you to identify your surrounds and it also tells you the location of you surroundings. In electronics we have something similar to a map and that’s we will be talking about today, schematics.

**Aim:** How can we draw and identify the symbols in a schematic diagram?

**Instructional Objectives:**

*S.W.B.A.T.:*

* Define a schematic diagram
* Identify basic schematic symbols and their equivalent component
* Draw and interpret schematic diagrams

**Vocabulary:**

Schematic

Component

**Presentation:**

1. Question: Based on what we talked about in the do now, what do you think a schematic circuit is?
	1. Answers include: A map for electronics, A blueprint for electronics etc.
2. What is a schematic Diagram?
	1. Schematic Diagram: A schematic diagram is a technical drawing of a circuit that shows how electronic components are connected to one another in a circuit. Each component has its own unique universal schematic symbol used to identify it in the diagram.
3. Schematic diagrams are similar to maps or blueprints that lay out everything.
4. Question: What is the difference between the two images?
	1. Answers include: one has pictures, the other has symbols. For this class we will be only working with symbols not pictures.
	2. 
	3. Question: Do you think that the picture option or the symbol option is more practical for the real world?
	4. Answer: The symbols are more practical because they are easy to draw and they are also universal.
5. Question: In our schematic definition we mentioned the term “electronic component” what does that mean?
	1. Answers include: the actual item inside of the circuit (light, sound etc.)
6. What is an electronic component?
	1. Electronic components are devices that are connected in a circuit to impact or be affected by electricity. They are basically everything except for the wire inside of a circuit.
7. Question: There was another term, schematic symbols. Based on what we talked about so far what do you think a schematic symbol is?
	1. Answers include: the symbol version of the electronic component.
8. What is a schematic symbol?
	1. Each electronic component has an easily drawn, & easily recognizable symbol called a schematic symbol.
9. Question: With our conversation of how maps help us in mind, how can schematic diagrams be helpful?
	1. Answers include: Troubleshooting (knowing where you want to be and where you are currently), identification etc.
10. Why are schematic diagrams helpful?
	1. Identification: To identify the components used in a circuit.
	2. Troubleshooting: to determine what point in a circuit a problem exists
	3. Guide: As a map to help build or fix a circuit.
	4. Consistency:Schematic diagrams and symbols are universal, so anyone around the world are able to interpret them, even if they don’t speak the same language.
11. Real World Application:
	1. The schematics that I showed you are very simple but in the real world these schematics get really advanced really fast.
	2. For example, something like your cell phone or laptop has multiple circuits within circuits.
	3. These are some of the projects that I worked on when I was in the industry at littleBits and Teknikio.
	4. With these complex circuits it is not possible to just look at the physical circuit, or trace all of the wires because there is too much going on.
	5. Having a schematic really helps with organization, troubleshooting and figuring out if the circuit actually works the way it was designed or if something needs to be changed. Some circuits that I worked on took months to develop to the point where we could put it in the actual product.
12. We’ve been talking about what schematics are but we haven't drawn any yet! These are three basic symbols that we use in schematics. Using these symbols we are going to make our own schematic diagram. With these components I can make a circuit that when you flip the switch the light turns off. When drawing a schematic circuits for this class we are always going to start with the battery. The battery is going to be on the left side. Then we will add our lamp and switch. There is a component here that we don’t have however.
13. Question: What do you think that is?
	1. Answers: Wires! Wires can be drawn using a straight line.
14. Since you guys are just starting out, I am going to require you to label all of the components. Make sure that when you draw your schematic diagram that you are using a ruler.
15. So now that we did it together, I want you to try to do it yourselfs. Using the symbols try to turn this pictorial diagram into a schematic diagram.
16. Question: Can someone come up to the board to show us what they did and how they got that diagram?

**Summary:**

1. What is a schematic diagram? Define in your own words.
	1. Answer: A schematic diagram is a technical drawing of a circuit that shows how electronic components are connected to one another in a circuit. Each component has its own unique universal schematic symbol used to identify it in the diagram.
2. What are electronic components? Define in your own words.
	1. Electronic components are devices that are connected in a circuit to impact or be affected by electricity. They are basically everything except for the wire inside of a circuit.
3. What are two benefits of using a schematic diagram?
	1. Identification, Troubleshooting, etc.

**Immediate Application:**

* Using the schematic reference sheet, complete the schematic worksheet.
* You will need your trainers to complete the schematic worksheet.
* If you didn’t finish the schematic worksheet it is homework. (Complete all of the trainer portions first).
* When finished with the worksheet, start completing Job #1 (I’ve attached the documents for Job #1, so that you can see. The job requires students to build, make a schematic, write about and then present their job sheet with the build circuit during a job check. During the job check content questions are also asked to the student.)

**Extension Activity OR Homework:**

Complete the schematic worksheet if you did not finish it in class.

**Accommodations:**

Students are exposed to schematic diagrams in multiple forms written (text-based), hands-on (drawing) and practical (building in the trainers). Since there are multiple forms of exposure to schematic diagrams all students should be able to understand what a schematic diagram is and how to draw one. If a student needs more help I will assist during the time that students are working on their worksheets individually.