**Lesson Plan**

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| Name: Peter Ziemins | Module: Basic Electronics |
| **Lesson Plan Title** | |
| Introduction to Atomic Structure and Electricity | |
| **Discipline and Topic** | |
| Students have learned in fifth grade briefly about the basics of electricity. I will reintroduce what they have learned and build on to their knowledge. Students will have a better understanding of how electricity runs through a circuit by revisiting the Atomic Structure and breaking down the different parts of an atom. Students will have understanding of atomic structure, protons, neutrons, electrons, and how electricity flows by the end of this lesson. | |
| **Target Population** | |
| This lesson will be presented to 16 8th Grade Technology Students within a forty minute period. These students are very visual learners and learn best with being able to see a finish product. They will use their communication and construction skills to complete the circuits with a partner, and get it checked off by the teacher. A few of my students have IEPs and to help not just them but the entire class I have presented them with a sheet giving them clues on each of the different circuits since this is all brand new material to them. | |
| **Curriculum Alignment and Standards** | |
| This lesson is toward the beginning of our unit on Basic Electronics. Leading up to this lesson students have learned about atoms, elements and what makes up electricity. This lesson is in connection with the guidelines stated from Standards for Technology Literacy (SfTL)  **Standards for Technological Literacy**  **Standard 1 (BM: F) Standard 2 (BM: N &CC) Standard 3 (BM:G,H,J &K)**  Standard 1: Students will develop an understanding of the characteristics and scope of technology.  Standard 2: Students will develop an understanding of the core concepts of technology.  Standard 3: Students will develop an understanding of the relationships among technologies and their connections between technology and other fields of study | |
| **Goals** | |
| Students will create the different types of circuits and be able to explain how each one works. They will also become more familiar with SNAP circuits, which will be using in our Digital Electronics Unit, which we expand on later in the course. | |
| **Objectives** | |
| **Students will be able to:**    - Summarize how and why electricity flows through a circuit.  - Create circuit diagrams using standardized schematic symbols  - Build series, parallel, and combination electrical circuits correctly using different schematics.  - Differentiate the types of circuits and how each particular one works.  - Integrate DC sources, lamps, switches, diodes, light emitting diodes, resistors, and capacitors into electrical circuits to achieve specific functions. | |
| **Underlying Educational Theory** | |
| Constructivism Learning Theory – learning is active, constructive process where students will create their own representations of objective reality (SNAP Circuits) New information is linked to prior knowledge in their Science classes. | |
| **Materials Description and Timing** | |
| SNAP Circuit Kits which are kits that have different components of a circuit such as switches, lights, wires, motors, LEDs, and so on. They are easy for students to use if they have never built a circuit before because they snap together kind of like Legos in a way. They can make any different assortment of circuits using a variety of length pieces and connecting them together.  <http://www.snapcircuits.net/> Picture and information about SNAP Circuits  **Circuit Design** Power Point viewed with Microsoft Power Point Software  Hardware Used:   * Smart Board/LCD Project and Laptop * SNAP Circuit Kits   I have selected a combination of SNAP Circuits and Power Point Presentation so students don’t have to listen to me lecture the entire class period. In 8th grade I find it very beneficial to them if I break up a lesson and have short bursts of information for them to learn. I also created a worksheet that goes along with the Basic Electronics Unit so they have a note sheet to write down important information. | |
| **Supplemental Materials/Links** | |
| Students will be provided with SNAP Circuit Kits to build their circuits in class, Smart Board, Circuit Design Power Point, Additional Worksheet which they will complete once we go over basics for practice. | |
| **Lesson** | |
| I start each class with my Daily Questions which the students love when they come in and give them a minute to sit down and take a look. I have a particular method I use, and use flashcards to pick who gets to answer the Daily Question. I tell my students anyone who thinks they know the answer to number one raise your hand. Whoever has their hand raise and if when I shuffle the index cards their name comes up first I call on them. I give my class up to 5 chances before I give them answer and move to the second one to repeat the process. This usually takes a minute or two and once we are done I take attendance. While I am taking attendance I will have my students get their worksheets and pencils from their technology lockers.  I will start off each of my lessons with an attention getter and will have a circuit board in front of me with a bunch of different components in a circuit. I always let my students know what topics we will be covering and what my expectations are by the end of the class. With clear expectations students know what needs to be completed before the end of the period.  I like to have a lot of volunteers help during lessons and after my introduction I will start talking about circuits and work my way into schematics. I usually have a student come up and we run through their day using all the different modes of transportation and housing, school, etc. shown with different symbols. I try and relate all of my information to my students and show them the importance’s and how it can relate to their every day lives. If they see that importance I feel they are more prone to remembering the information since they can relate to it better and from that retain the information I have covered in class.  We will then do the following steps for each of the circuits provided there is enough time in class. Students will work with a partner at their table to construct Series, Parallel, and Combination Circuits. I will go around and check for understanding by verbally asking my students different questions about the circuit they just built. For example some questions might be, Why do all the light bulbs go out on a Series Circuit if you were to unscrew only one? Also how many paths of flow does a Series Circuit have? Before I move onto the next circuit I make sure I have stopped by at least once to each group to check for understanding.  If there is time we will cover Combination Circuits but found that in a class that is 40 minutes long with a little time taken off at the beginning and a couple minutes used at the end for cleanup I don’t want to rush the material because one the students wont remember any of it and two they won’t take it seriously or just assume it must not be as important as I say it is if I am flying through it.  Once we are nearing the end of class I always like to, one take a couple minutes to recap and review with the class what we just learned, and answer any last minute questions they might have before we clean up. Before I have the students cleanup I mention where we are going in the unit and how tomorrow will relate with what we learned today in class.  I like having my students seated when the bell rings and then once I see everyone all cleaned up I dismiss them if the bell has rung.  Note: If students finish with what I have covered in class early I have created a sheet for practice where students can build additional circuits as a review. | |
| **Assessment of Students** | |
| Formative Assessment: I will assess student’s circuits visually and check to see if they build them correctly. I will also question them once they have the correct circuit for additional understanding. I will also ask students during recap particular questions dealing with information we have covered in class that day. I feel that the way I have structured my lesson all students will stay together since I will be going around and making sure each group understands that particular circuit before moving on eliminating anyone from falling behind.  Summative Assessment: At the end of our Basic Electricity Unit students will take a Unit Test which will have fill in the blank questions. It will be on everything that we have covered during the Basic Electricity Unit. There will also be a performance based assessment as a “pop quiz” which I will ask the students a day or two later to build a particular circuit and explain to me verbally what is going on for a grade as well. I also have the students fill out a definition sheet where they will take notes and also additional notes they feel are important and have this sheet as a study guide for the Unit Test at the end of the Unit. | |
| **Evaluation of Students and Lesson** | |
| I actually taught this lesson in my class and realized after teaching this lesson that it might be more information that I would like to cover in one period. Working between the Power Point and SNAP Circuits we were able to cover the material but certain periods were different and if we took a little longer I didn’t want to rush the material and we can cover the Combination Circuits the next class period. It works out better talking about just Series and Parallel in one class then the Combination Circuits in the following class so they see the difference between each and have enough time to practice constructing each and understanding why one is different. | |
| **Low Tech Modification** | |
| If I were stripped of my use of the different technology equipment I have a printed copy of my Power Point and would present this information on a white board or chalk board. While going through the lesson I can have circuits built ready to show students so they know what their goal is. It is nice because any lesson can be taught a different variety of ways so I don’t always have to rely on technology because I have experienced faulty technology and made changes on the fly! | |
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