SNC1D1
Electricity

Wiring a Model House Project

Throughout the **Electricity unit** we have learned about circuits, different types of circuits and how to build and draw them. For this project, you will be **building a model house, designing and wiring the circuits for your house**. The purpose of this assignment is to allow you the opportunity to connect your classroom learning to technology in the real world. You are allowed to work in groups of 4. Creativity and enjoyment is encouraged!

Phase 1 - DESIGNING & PLANNING

✓ Create a detailed plan of what you plan to build using properly labelled circuit diagrams
✓ Each house must contain:

- minimum 4 rooms (can be 2 stories or bungalow) 27000cm^3 (30cm x 30cm x 30cm)
- 1 Master (or control) switch
- at least 5 lights or LEDs (Light emitting dials)
- at least 1 series and 2 parallel circuits
    - parallel circuits must have a switch to turn one light bulb on and off
    - series circuit must have at least 2 bulbs

Bonus! (In order to receive a Higher Level 4) you must have one of the following...

- Motor, 2-way switch, door alarms, anything else that is fun (teacher approved)

Phase 2 - TEACHER MEETING

✓ Meet with your teacher to show design plan and get approval

Phase 3 - BUILDING

✓ Build your house!

Phase 4 - EVALUATION

✓ Present your house for evaluation at a lunch time party!

Equipment & Materials - <u>You should not be spending more than $20-30 MAX per group</u>

Any of the equipment can be found at a Home Hardware or the equivalent – but it can be REALLY EXPENSIVE! Our advice is to go to a store called "Active Surplus" at 347 Queen Street West or 5601 Steeles Ave. west. (www.activesurplus.com).
You will need at least:

- 2m length of **insulated copper wire** (non-insulated wire can cause a fire). Get the smallest diameter offered
- 30cm max of **uninsulated** (bare) wire to be used around circuits
- at least **5 light bulbs** (1.5V is the largest you should use)
    - Hint: You may want to get more bulbs (at least 10 because you often overload several in the trial and error aspect of making your circuits)
    - Hint: LED's are cheaper, smaller and colourful
- At least **4 switches** (1 master, 2 for the parallel circuit, 1 for the series)
- A **cell** that is capable of between 6-9 V (depending on the resistance of your circuit). Most likely you will need to buy several D cell (1.5V) alkaline batteries and place them in series. You may need 5-7 of them
- Use cardboard (i.e. shoeboxes) for the walls of your house. You can cut it easily and fit wires into holes and in the corrugated sections

Success Criteria

Please hand in rubric with your house!

Criterion	Level 1	Level 2	Level 3	Level 4	Level 4+	Mark
Functionality Test	Circuit very limited. Does not meet basic Level 3 requirements	Circuit has some limitations in terms of reaching the level 3 expectations		1) Switch on/off series circuit(s) 2) Switch on/off parallel circuit 1 3) Switch on/off parallel circuit 2 4) Additional features added 5) Master switch turns everything off	Circuits are very sharp No flickering of lights	**/50**
Use of lights	Many Lights do not light up	Some lights are very dim/ do not all work	Lights not to the same brightness Drop in brightness when another parallel added	Lights are not "dim" Consistent brightness between series and parallel	Extra bulbs used to asthetically add to the appearance Variety of types of lamps used	**/5**
Organization (of circuits)	Lack of organization	Minimal effort in organization ("rats nest of wires")	Circuits are logical and mostly consistent Wiring is relatively efficient but visible	Efforts made to hide wires Some wires visible	Efforts made to hide, remove wires No wires visible	**/5**
Asthetics	No effort made into beautifying house	Minimal effort made in beautifying house	Some effort put into beautifying house	Significant effort put into making house beautiful	Extreme amount of effort put into making building beautiful	**/10**
Creativity	No creativity expressed in a theme	Minimal theme expressed	Some creativity placed in overall theme and design of house	Significant amount of creativity placed in overall theme and design of house	Very High amount of creativity placed in house	**/10**
Bonus features included	N/A	N/A	N/A	N/A	Motor, other features, buzzer, 2-way switch are included	**/10**
Overall Impression (understands purpose of project)	Lack of effort and understanding expressed	Minimal comprehension of the purpose of the project	Some evidence students understand purpose of project	Students above grade level	Student(s) significantly above grade level	/10

Comments -

Success Criteria
Please hand in with your project.

NAMES: _____

AC	Criteria	Expectations	Weight	A&E
COMMUNICATION	Circuit Diagrams	❑ Accurate circuit diagrams for components ❑ Correct use of circuit diagram symbols ❑ Use of straight lines, neatness, titles/labels	10%	#1
	Presentation	❑ Evidence of organization & preparation by all students ❑ All members have a vocal role ❑ Not longer than 3 minutes	10%	Final
	Assessments	❑ Met all components of assessment deadline #1: building and electrical materials, circuit diagrams ❑ Met all components of assessment deadline #2: completed exterior/ frame, interior materials, floor plan ❑ Evidence of periodic progression in design and build (not procrastinating) ❑ Evidence of division of labour amongst all group members	10%	Final
THINKING	Safety	❑ No exposed wires ❑ Wires are secured with tape or glue or other means to the house (e.g. behind walls, under carpet etc.) ❑ Switches are secured so that wires are not accidentally accessed ❑ Source is a battery (not a wall outlet) ❑ Source is secured at a permanent location that is accessible if the battery needs to be changed	15%	Final
	Functionality	❑ Properly wired series circuit ❑ Working series circuit ❑ Properly wired parallel circuit ❑ Working parallel circuit ❑ Properly wired option A/B circuit ❑ Working option A/B circuit	35%	Final
APPLY	Design	❑ Realistic placement of loads ❑ At least one load is different from the other loads ❑ Proper placement of switches- it should make sense. You don't ring the doorbell from the 2nd floor. ❑ Switches are easily accessible for observer to manipulate ❑ Interior of project are visible either from above or from the side ❑ Function of space is obvious	20%	Final
BONUS		❑ Creative and innovative ❑ Use of fun parts (buzzer, motor, fan) ❑ Best overall	+5%	Final