

Test Your Knowledge Machine

You have been hired by ElectriToys© to design a prototype electronic quiz board. This board will be used in a game for grade 9 students to review their electricity knowledge. As such you will need to come up with multiple choice or true/false questions dealing with the material in the course, and then design a circuit board so students can answer those questions.

The details:

- ★ Up to 3 people per group
- ★ 3 class periods (Jan 3-5) will be given to work (you must do the work in class so that the company knows that you did it, and didn't subcontract the work)
- ★ The questions must fit into one of the following themes:
 - Electrical Safety
 - Renewable vs. Non-renewable energy
 - Static Electricity in Technology
- ★ Questions should be completed first, so that you know how to plan and then build the circuit
 - 1 person group = at least 5 questions, with one being multiple choice
 - 2 person group = at least 6 questions, with one being multiple choice
 - 3 person group = at least 7 questions, with two being multiple choice

Building materials provided:

- | | |
|--------------------|------------------------|
| - wires | - screwdrivers, screws |
| - Christmas Lights | - hammers, nails |
| - board | - buzzers |
| - batteries | |

Procedure:

1. Complete your questions.
2. Draw a rough draft of your circuit diagram (you could use the PhET demo on the computer to try out ideas).
3. Submit your diagram to the ElectriToys© representative (teacher) for approval or further explanation.
4. Once you have received approval, begin building.
5. Present to the company rep:
 - a. A good copy of your circuit drawing
 - b. Your device along with your questions (typed out, with answers)
6. Explain, with a demonstration, how the device works (i.e. go through the questions with me).
7. After this, they will need to be dismantled and recycled, or taken home.

Marking Rubric

	Level 1	Level 2	Level 3	Level 4
Question Quality	The questions have many grammatical mistakes, and do not make sense. There are incorrect answers, and the questions are very basic (too easy).	The questions are done, and have mostly correct answers. The concepts are from the course but are basic.	The questions are well written, with few grammatical mistakes. The answers are correct, and cover concepts in the course.	The questions are well written, and grammatically correct. The answers are correct, and they go above and beyond just basic concepts.
	2.5	3	3.5	4 4.5 5
Circuitry	The circuit has few working components. Most questions are not working.	The circuit has working components and some of the questions are working well.	The circuit is mostly working, and the questions appear to work well.	The circuit works very well, all the questions are hooked up correctly.
	7.5	8	9 10	11 13 15
Circuit Diagram	The circuit diagram is messy, and lacks details. Much improvement needed.	The circuit diagram is done, but could be neater, and use improvements.	The circuit diagram is complete.	The circuit diagram is clear and complete for a final copy.
	2.5	3	3.5	4 4.5 5
Design and Presentation	The game board is not decorated well at all, and labels are missing.	The game board is decorated, but messily, and not properly labeled.	The game board is decorated, and it is clear. The game is labeled properly.	The game board is decorated, and interesting. Each question is labeled well, as well as the "correct" and "incorrect" lights. There is some WOW factor.
	5	6	7 7.5	8 9 10
Teacher Assistance	The students were very dependent on the teacher for assistance at every step.	The students needed a lot of help to understand basic circuitry.	The students needed some help to finish the circuit properly.	The students needed minimal help to complete the task.
	2.5	3	3.5	4 4.5 5