



Topic

Light up your home!

Objective

Students will research and design electrical circuits for the lightning systems that best serve a house made up of a living room, bedroom, kitchen and bathroom. Ignoring other electrical appliances such as ACs, TV and Kitchen Appliances. You are not limited to any number of items but you do have a limited budget of 500 JDs.

Keeping in mind the cost of each of the following equipment:

Equipment	Qty	Price (JD)
Wire	1 meter	1
Normal Light Bulb	1 bulb	0.5
CFL Light Bulb	1 bulb	1
LED Light Bulb	1 bulb	1.5
Motion Activated Light Bulb	1 bulb	3.5
Electrical Socket	1	0.5
Ordinary Switch	1	0.5
Fancy Switch	1	0.75
Automatic Switch	1	1



The area of each room is provided in the following table:

Room	Area (m^2)
Living Room	12
Bedroom	10
Kitchen	10
Bathroom	6

To know how much power each lamp needs refer to the table in the physics student book page 201. The cost of one kWh is 0.12 JDs. The subscription to the electrical grid is a fixed rate of 5 JDs per household.

Assessed Subjects

Subject	Subject specific objective
Physics	<p>Design an electric circuit for a house made up of a living room, bedroom, kitchen and bathroom.</p> <p>Calculate the power and energy usage based on the type of light bulbs used.</p> <p>Calculate the electrical bill cost based on the provided kWh costs.</p>



Math	Construct a table of values and plot and interpret the graph. Solve problems involving decimals, percentages. Compare different quantities using ratios. Recognize when two quantities are directly proportional.
ICT	Use Excel to calculate: Total cost, the power output, and electrical bill.

Teams and work

Groups of 3-4 students per group (assigned already by Miss Yasmin and Miss Jumana)

Students will work in the period between May 1st to May 15th.

During this time, students will be given 2 science classes (during chemistry classes), 1 ICT class and 1 Math class to do their work.

All other work will be done at home.

Outcome

Subject	Deliverable / Outcome
Physics	Simulated circuit and circuit diagrams Excel spreadsheet (same as Math and ICT)



Math	Excel spreadsheet (same as Physics and ICT)
ICT	Excel spreadsheet (same as Physics and Math)

Audience

Grade Eight Students

Submission deadline

May 15th, 2023

Submission format / Details

The designated group leader will upload the attached task document on LMS for every subject as shown in the table above.

Resources

Simulation Link (You can use this to build a simulation of each room with how you want to connect it):

<https://phet.colorado.edu/sims/html/circuit-construction-kit-dc/latest/circuit-construction-kit-dc-all.html>

Circuit Diagram Designer (You can use this website to draw the circuit diagrams of your circuits for each room on its own):

<https://www.circuit-diagram.org>

Assessment Criteria

Students' work will be assessed based on the following rubrics.

Sciences

Skill / Measurable outcome	Needs Improvement (1/3)	Acceptable (2/3)	Excellent (3/3)	Grade
Electrical Circuit Diagram	Circuit diagram for one room only	Circuit diagram for two- three rooms only	Circuit diagram for the whole house	
Electrical Circuit Diagram Accuracy	Inaccurate symbol usage	Insufficient symbol usage	Proper and sufficient symbol usage	
Material Cost	Random Calculation	Insufficient Calculation	Proper and detailed calculation	



Material Selection	Random Material were selected	Insufficient materials were selected	Proper and sufficient materials were selected	
Creativity and Originality	Standard Lighting plan	Normal Lighting Plan	Unique Lighting Plan	
Total out of 15				

ICT :

Category	Developing 1 Points	Accomplished 2 Points	Exemplary 3 Points
Data Entry	Some data required is missing.	Most data required is entered with 100% accuracy.	All data required is entered with 100% accuracy.
Computations, & Formulas	Several errors in formula calculations	Most formulas used are correct applicable formulas as required	100% use of correct applicable formulas as required.



Graph	There are graphs present but only most elements were missing.	The graphs required for the project were correct. Most elements were depicted.	The graphs required for the project were correct. All elements were depicted.
Organization / Formatting	Some Information is organized, using standard formatting tools. Some labels or other important formatting tools are missing.	Information is organized by using appropriate formatting, such as shading, alignment tools, borders, fonts, labels, and column/row height/width.	Advanced formatting is used to create well-organized information, such as shading, alignment tools, borders, special fonts, labels, and column/row height/width.
Visual Appearance & Output	Spreadsheets are difficult to read due to omitting important information.	Spreadsheets are visually appealing, easy to read, and printed with all required information.	Spreadsheets are attractive and easy to read, with all required information printed.
Total out of 15			



Mathematics

Skill / Proficiency	Level 1 Needs Improvement	Level 2 Acceptable	Level 3 Excellent	Student Level / Grade
Mathematical knowledge illustrated in the project				
Ability to apply statistical concepts to real life situations in the project				
Understanding of the outcome				



Neatness and organization of the project				
Ability to answer questions related to the project				
Total المجموع				