

Let's Stay Alert!

SUMMARY INFORMATION

Keywords

Anti-theft system, LED, circuit break

Topics Covered

Physics

Target Grade(s)

6, 7

Estimated Time Required

1 hour

LESSON

Goals and Pre Requisites

Goals

- Introduce simple circuitry concepts to students.

Instructional Objectives

Students would develop:

- Logical thinking skills
- Research based learning

Instructional Resources

Problem Statement

Theft is one of the most common and oldest criminal behaviours. Though varied number of anti-theft systems are prevalent, it may or may not be economical for all. How can we come up with a simple electric warning system that would alert people in case of theft?

Background

An **anti-theft system** is a device or method used to prevent unauthorized appropriation of items considered valuable. Theft is one of the most common and oldest criminal behaviours. From the invention of the first lock and key to

the introduction of RFID tags and biometric identification, anti-theft systems have evolved to be on par with the introduction of new inventions to society and the resulting theft of them by others.

Procedure for students

1. Introduce the **Problem Statement** to students.
2. Form students into groups of four.
3. Allow them to brainstorm with their groups, on the given **Problem Statement**.
4. Each group must come up with their unique solution(s) to the given problem.
5. Each group can compare their solutions with fellow groups and with their teacher to check on the feasibility of their solution.
 - In order to check on feasibility, instruct students to discuss with their team mates and have a rough sketch of their plan before constructing it. Students must be able to provide justification for their choice of materials.
6. Ask students to build a timeline (within the estimated amount of time provided under summary information) and ensure that all members of each group are involved in planning the project in terms of availability and cost of materials.
7. Students must make sure that the design incorporated in their process would address the existing problem.
8. Each group can present their solution and evaluate feasibility with peer groups and the teacher.

Sample Methodology

Note: The following is an example of how the given **Problem Statement** might be addressed. **For Teacher Reference only.**

Materials Required

Breadboard

LED

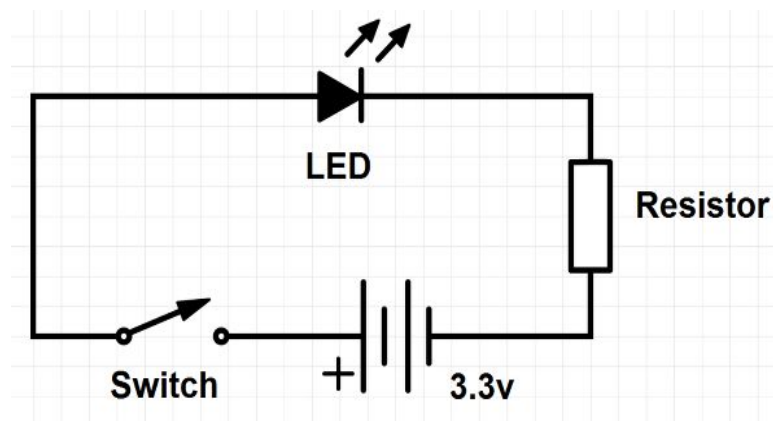
Connecting wires

Battery

Resistor

Procedure

Connections are made by following a simple circuit diagram. When there occurs a break in circuit, the LED bulb glows thus forming the basis of an alert system.



Conclusion

Simple alert systems may be used to protect objects from theft.

Extension

- Replace the LED with a bell and check if you can make it ring when the circuit breaks.
- Design an anti-theft system for your house doors.

Assessment and Rubric

Define the need or problem – Did students identify the need to resolve this problem? Were they able to relate the problem to their own environment?

Come up with ideas - Did students weigh various possibilities brainstorm on various ideas before arriving at a solution? Did each group collaborate effectively to (1) work within the time given (2) give equal opportunity for participation (3) consolidate relevant information (4) provide rationale for their decisions and choices.

Select the most promising idea or design - Were students able to evaluate the feasibility of their solution to the given problem statement? On what basis was the feasibility of the solution determined?

Communicate and plan the project – Were groups able to provide justification for their choice of materials? Were students able to see completion of the activity within the estimated time?

Create/Build and test a design –Were all members of the team participative during the course of the activity?

Evaluate and revise the design – Were student groups able to present their solutions in a clear and distinct manner with other groups? Were they keen on improving their model further?

Credits

- www.ElectroSchematics.com
- <https://www.raspberrypi.org/learning/physical-computing-guide/images/simple-circuit.png>