

Outdoor Lighting

Street lamps, deck lights, path lighting, and other outdoor lighting make neighborhoods and residences more inviting and useful. But using outdoor lighting when it isn't necessary is expensive and wasteful. ABC Home Resources makes a variety of home technologies, from outdoor light fixtures to bird feeders to gazebos. ABC is considering making more automated technologies as interest in “smart homes” grows.

As ABC's newest electrical engineer, your job is to prototype an automated outdoor lighting system. The system should be automated in the sense that the lighting is triggered by actions defined by the user. For instance, the light system might trigger when a certain amount of time has elapsed or when it gets dark outside. You will need to do some research and put some thought into what you feel is the best trigger for the light system.

At your disposal are a variety of Vernier sensors, which you may use as the trigger for the light system, a generic light source (LED, light bulb) to represent the outdoor lighting, and some additional construction materials. Using *Logger Pro* (or a stand-alone LabQuest 2), you will connect the trigger sensor and the light source to form your prototype light system. Of course, you will need to show that your light system works as intended and be able to justify the why you chose the particular trigger.

MATERIALS

Vernier LabQuest 2 or
LabQuest interface with computer running
Logger Pro software
LabQuest power supply

Digital Control Unit (DCU)
Vernier sensors (light, motion, etc.)

DCU-compatible AC power switch
(optional)

Light (one of the following)
light bulb/socket (with power supply switch)
DC/120 mA lamp
green LED (with resistor)
red LED (with resistor)

Construction Materials
duct tape
cardboard
felt sheets
colored markers

DESIGN AND CONSTRUCTION TIPS

- Following the Engineering Process will save you time and energy! First, consider the design requirements and constraints, and then start brainstorming ideas. Using an Engineering Design Sheet can guide you through the process.
- Some questions to consider
 - What are your experiences with outdoor lighting?
 - When has it been helpful?
 - What are some ways it could be improved?