

CLASSROOM EXERCISES

CLASSROOM EXERCISE #1: LIGHTING SCENARIOS

PAGE 1/5: LIGHTING OPTIONS

INSTRUCTIONS:

Use the lamps, ballasts, controls, and sensors shown below to make appropriate selections for the following lighting scenarios.

LAMPS



Incandescent



Halogen



CFL



Tubular
Fluorescent
T-5/T-8/T-12



Metal
Halide



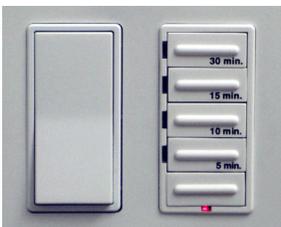
Sodium Vapor
(LPS/HPS)



LED

BALLASTS

- None
- Magnetic
- Electronic
- Multi-Level
- Dimming



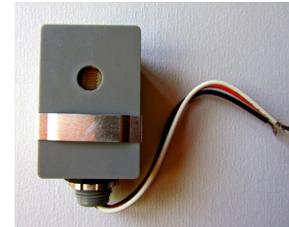
SWITCHING/ CONTROLS

- On/Off
- Timed
- Dimming
- Multi-Level



SENSORS

- Occupancy: Passive Infrared (PIR)
- Occupancy: Ultrasonic
- Vacancy
- Daylight



CLASSROOM EXERCISE: LIGHTING SCENARIOS

PAGE 2/5: SCENARIOS 1-4

1



At an airport rental car outdoor parking lot customers need to be able to find their car by model and color.

ANSWER:
HP sodium or metal halide with CRI of 70 or better and daylight sensor.

2



Elementary school hall retrofit: lighting flickers, and they would like to reuse the existing fixtures.

ANSWER:
Retrofit T12s with T8s or T5s. Discuss ballast issues and possibility of PCBs in old magnetic ballasts.

3



Boiler room of a 15-story apartment building.

ANSWER:
Fluorescent lamps need a CRI above 80°F (might distinguish color, e.g. color coded wires) or metal halide. No occupancy sensors (dangerous for lights to go out while someone is servicing the boiler).

4



Library stacks retrofit: needs a separate lighting scheme from the rest of library since more people are now interested in e-books.

ANSWER:
Occupancy sensors in stacks placed so they shut off only when empty. Check line of sight from stacks to sensors.

CLASSROOM EXERCISE: LIGHTING SCENARIOS

PAGE 3/5: SCENARIOS 5-8

5



Public stairwells in a 20-story office building.

ANSWER:

Use bi-level lighting for stairs rarely occupied (five stairs). Fluorescent lamps, or LEDs for hard to reach areas. Timer for night setback for a stair not occupied during the day but not at night.

6



Cove lighting at ceiling of a 30' atrium food court.

ANSWER:

LEDs because re-lamping is difficult, use high CRI to render food as more appetizing.

7

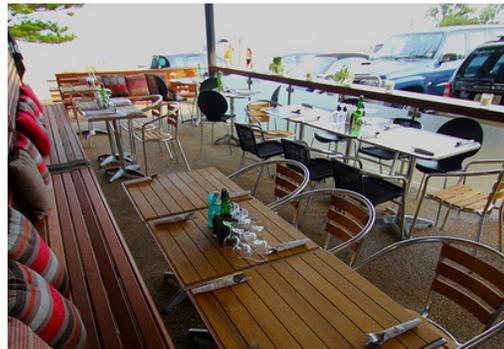


Barbershop retrofit: the lights hum, and customers are concerned about the yellow cast seen in grey hair.

ANSWER:

Use high CRI lamp such as halogen MR-16. Some fluorescents have a high CRI and are more efficient than halogens.

8



Family restaurant with all glass south facade in Florida.

ANSWER:

Use daylighting sensors and high efficiency lamps to avoid introducing more heat into the space. Higher CRI will render food more appetizing.

CLASSROOM EXERCISE: LIGHTING SCENARIOS

PAGE 4/5: SCENARIOS 9-12



Floral retrofit: existing store has hot flood lights. The store heats up in the afternoon, and the flowers look drab.

ANSWER:
High efficiency lighting with high CRI.



Ground level lighting at construction site in busy downtown area.

ANSWER:
Use reverse-threaded CFLs.



Large daycare space needs flexible lighting scheme for many activities including play, naptime, quiet time, etc.

ANSWER:
Use fixtures with dimmable lamps, dimmable lamps, dimmable ballasts and dimmer switches. For added flexibility use large number of circuits with fewer fixtures per circuit.



Hotel lobby at continually operating casino with a large skylight.

ANSWER:
Use daylight sensors carefully placed to affect only the fixtures adjacent to the skylight. If ceiling is high, use LEDs.

CLASSROOM EXERCISE: LIGHTING SCENARIOS

PAGE 5/5: SCENARIOS 13-16

13

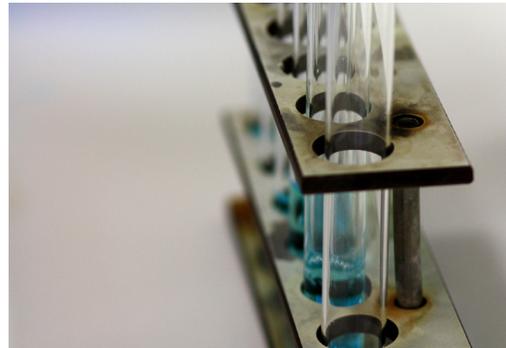


Metal shop retrofit: accidents have occurred due to existing poor lighting. People work on a flexible schedule and the lights are never turned off.

ANSWER:

Use even, bright lighting with CRI>80. Vacancy sensors will be dangerous; use manual switching.

14



Research laboratory needs constantly controlled temperature and even lighting to monitor changing colors of the experiments.

ANSWER:

Use lamps with excellent CRI. Can use fluorescents or LEDs to manage heat gain.

15



Community room at a senior center needs flexible lighting schedule for various activities including movies, bingo, concerts, exercise, etc.

ANSWER:

Use multi-level lighting with dimmable fixtures. Make sure dimmable fixtures have dimmable ballasts, dimmable lamps, and dimming switches.

16



Outdoor restroom and changing pavilion (open to the elements) at public beach.

ANSWER:

Use lamps rated for outdoor conditions. Use combined daylight/occupancy sensor.