

Light Bulbs



Rachel's math club meets in a classroom at the end of a long hallway in her school. This long hallway is lit by a row of 100 light bulbs, each with a chain attached to it that toggles the light bulb on or off when pulled.

One day, Rachel arrives much earlier than everyone else, and she sees that the hallway is still dim: no one has turned on the hallway bulbs yet. So on her way to the classroom, she pulls the chain for each light bulb she passes, turning them all on.

But Rachel knows that no one else will arrive for several more minutes. She looks back down the long hallway. "It's a waste of electricity," she says to herself. "Really, the hallway would be lit up fine with just every other bulb on." So she goes back to the beginning of the hallway and pulls the chain for the second bulb, fourth bulb, sixth bulb, and so on for every other bulb down the row.

This gives Rachel an idea. "What if I went down the hallway again, pulling the chain for every third bulb? Then again for every fourth bulb, and again for every fifth bulb, and so on through every 100th bulb?" she wonders. She decides to try it while she waits for the others.

When Rachel finishes her experiment, which light bulbs will be on?