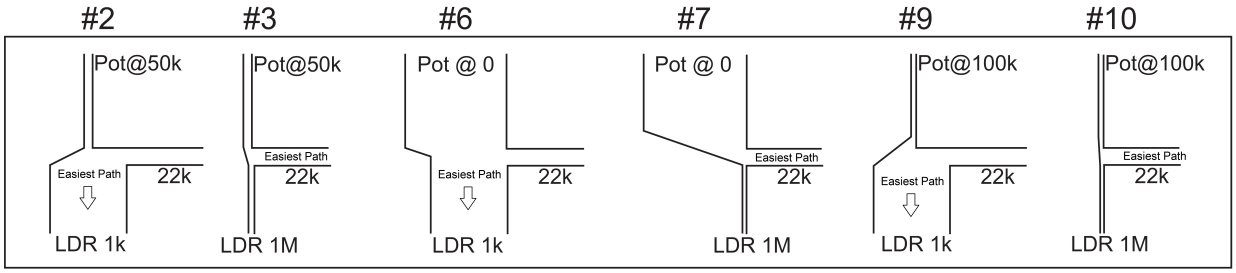
Answer Key: Lesson 12 The Night Light

1. Think of water in a small creek. A flow of electrons is like the current of water. Water follows the easiest path downhill, the path of least resistance. Electrons do the same.
2. The voltage the test point would be very close to 0 volts because under good light, the LDR has very little resistance. So the current flows directly to ground.



These graphics relate to the following questions

3. The TP voltage would be close to V+. In good darkness, the LDR will have over 1 M ohms. It's easier for the current to move through 22,000 ohms rather than 1,000,000 ohms. They move to the transistor.
4. explanations
5. Instructions
6. The voltage at the test point will be very high. Done properly, it would be the same as measuring right at V+. Most of the current will move through the LDR, because it only has 1000 ohms or less, compared to R1 at 22,000 ohms. The LEDs might even turn on a bit because (using the water analogy) some of the current is splashing through R1, and turning on Q1 a bit.
7. The voltage at the test point will be V+. The LEDs will turn on fully even in dim light. You will find it difficult to adjust them to an off setting even in dim light.
8. Instructions
9. Your measurement at TP will be close to zero volts, because under good light, the LDR has very little resistance. It is so much easier for the current (electrons) to flow through 1000 ohms than it is to move through 22,000 ohms. So most of the current flows directly to ground.
10. Your night light responds less quickly. The measurement at the test point will be less than your readings from #3, but still will be fairly close to V+. See Figure 12-7