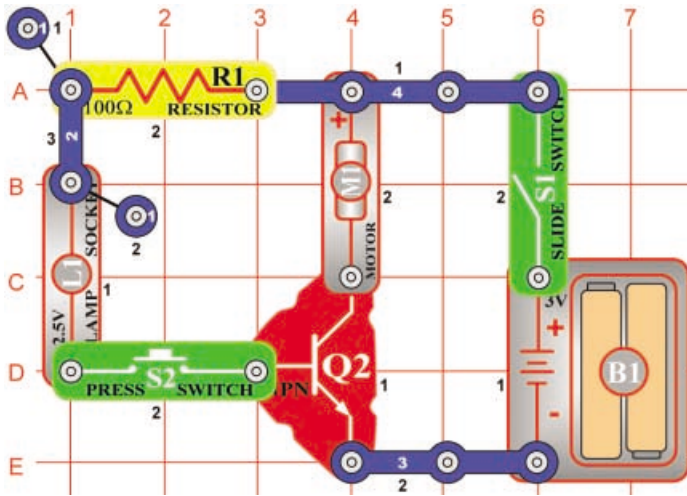


Project #A14

The Transistor (V)

OBJECTIVE: To compare transistor circuits.



Place the fan on the motor (M1) and turn on the slide switch (S1), then compare this circuit to project #A4. Push the press switch (S2), the lamp doesn't light now but the motor still spins.

The lamp is dark because the 100Ω resistor (R1) limits the current through it. The NPN transistor (Q2) uses the small lamp current to create a large current that spins the motor.

Now replace the 100Ω resistor (R1) with the larger 1KΩ resistor (R2). The motor spins more slowly now, because the transistor cannot create as large of a motor current from such a small controlling current.

Requires SC-300 or larger parts set.

Project #A15

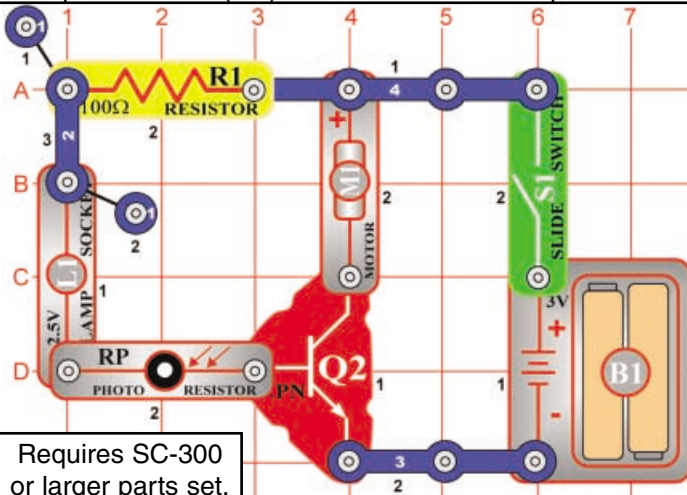
The Transistor (VI)

OBJECTIVE: To compare transistor circuits.

Compare this circuit to project #A14. It uses the photoresistor (RP) to control the current to the NPN transistor (Q2), instead of the press switch (S2). You can adjust the speed of the motor by changing how much light shines on the photoresistor.

The lamp is dark because the photoresistor limits the current through it. The NPN transistor uses the small lamp current to create a large current that spins the motor.

If you tried to control the motor speed by placing the photoresistor in series with the motor, the motor would not spin because the photoresistor would limit the current. But the photoresistor can control the motor speed with help from the transistor. You may need to shine a light on the photoresistor (RP) if the motor does not spin.



Requires SC-300 or larger parts set.

Project #A16

The Transistor (VII)

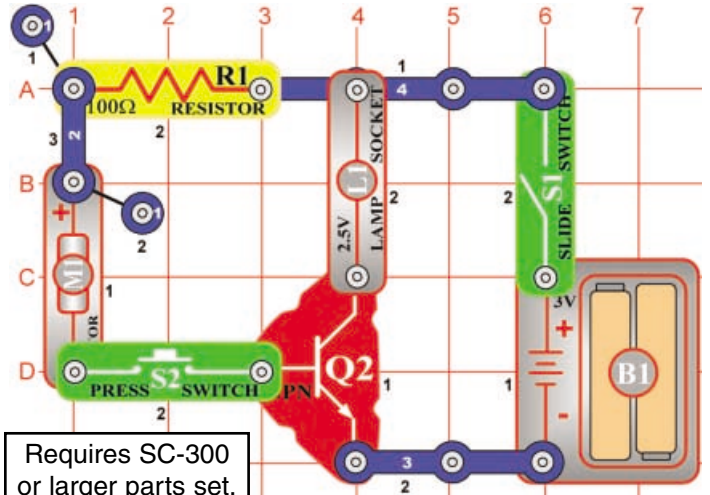
OBJECTIVE: To compare transistor circuits.

Compare this circuit to project #A15. Push the press switch (S2), the motor doesn't spin now but the lamp still lights.

The motor doesn't spin because the 100Ω resistor (R1) limits the current through it. The NPN transistor uses the small motor current to create a large current that lights the lamp.

Now replace the 100Ω resistor (R1) with the larger 1KΩ resistor (R2). The lamp is only slightly less bright even though the motor current is much lower.

Now place the 100Ω resistor back in the circuit and replace the press switch (S2) with the photoresistor (RP). A bright light on the photoresistor will turn the lamp on. But if the light is dim then the photoresistor has high resistance, so little current flows through the transistor and the lamp is off.



Requires SC-300 or larger parts set.