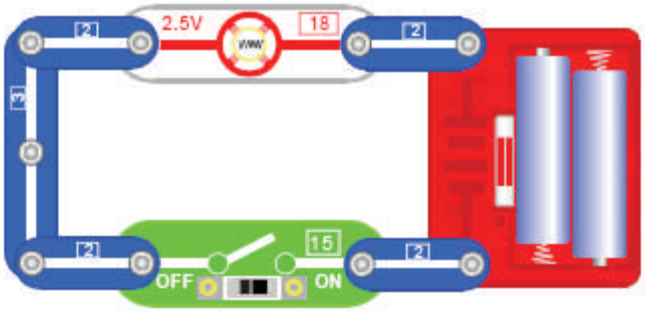
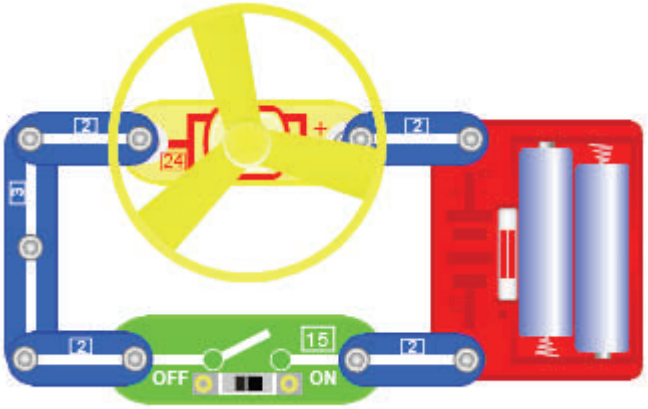


1. Lighting a bulb.
Construct the circuit by clipping all the parts to the base board. Be careful not to use too much force when screwing the bulb into the bulb holder as the glass may break. Slide switch 15 to the on position and the bulb 18 will light up. Switch off and the bulb will go out.

It is easy to follow the flow of electricity around this circuit. The electricity flows out of the positive end of the battery (marked with a + sign), through the bulb, then through the switch and so back into the negative end of the battery. See what happens if you unscrew the bulb and then screw it up again. This happens because the flow of electricity has been temporally stopped.

2. Magnet controlled bulb.
Replace switch 15 with the dry reed switch 13. Bring the magnet close to the dry reed switch and the bulb 18 will light. Remove the magnet and the bulb will go out.

How the Dry Reed Switch works.
Inside a glass tube, two thin steel blades are held apart so that they do not touch each other. When a magnet is brought close, the two blades are forced to touch other so allowing electricity to flow. When the magnet is removed, the blades spring apart again so stopping the flow of electricity. See Worksheet 4F Unit 5.

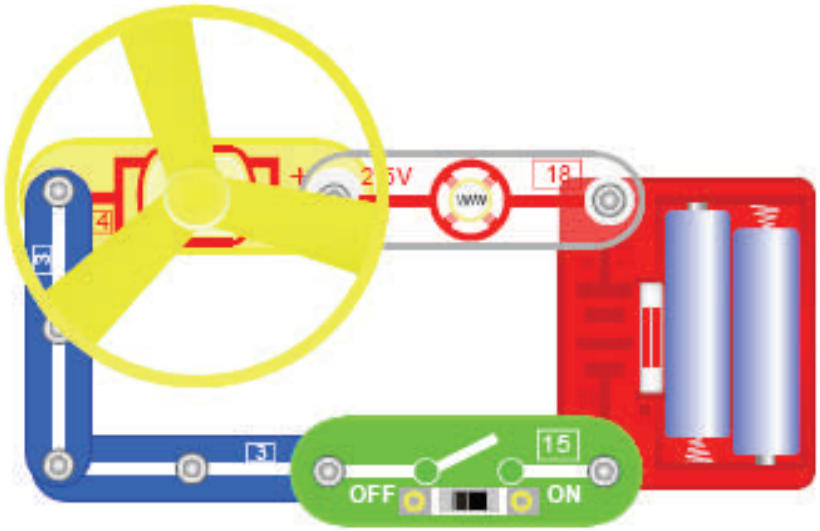


3. Electric Fan.
Assemble as illustrated. The yellow fan should be placed on the motor spigot and not pushed down. Slide switch 15 to the on position and the fan will rotate. Do not lean over the fan as it may fly off! Switch off and the fan will stop rotating.

4. Magnet controlled fan.
Replace the slide switch 15 with the dry reed switch 13. Bring the magnet close to the dry reed switch and the fan will rotate. Remove the magnet and the fan will stop rotating.

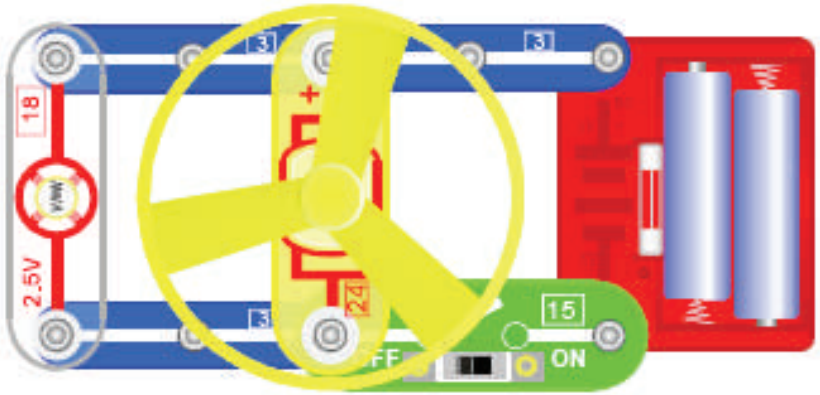
5. A bulb and a motor connected in series.
Slide the switch 15 to the on position, the bulb will light dimly and flicker and the motor will turn slowly. Switch off, the bulb will go out and the motor stop rotating.
In a series circuit, the electricity has to flow through the bulb and then through the motor so they both share the voltage. The battery voltage is 3 volts so they get 1.5 volts each.

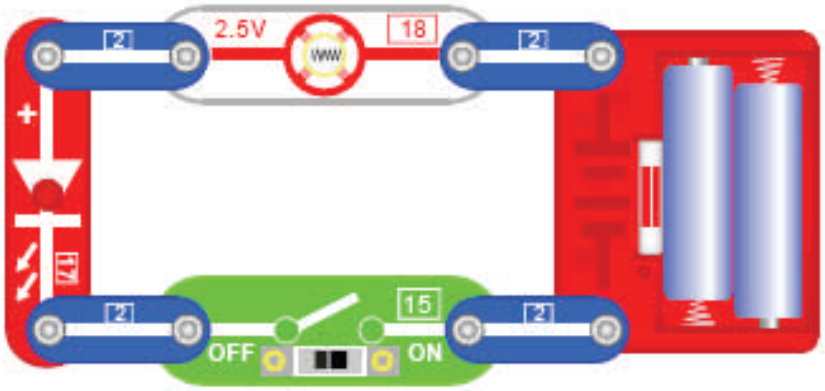
If you remove the bulb, the motor will stop as the electricity can no longer flow. Volts are a measure of electrical pressure rather like the water coming out of a hose pipe. If you put your finger over the end of the pipe the jet of water will travel further but not so much water will flow.



6. A bulb and a motor connected in parallel.
Slide the switch 15 to the on position, the bulb 18 will light brightly and the motor will turn much faster. Switch off, the bulb will go out and the motor stop rotating.

In a parallel circuit, the electricity flows directly to the motor and to the bulb. The battery voltage is 3 volts so they both get the full 3 volts. If you unscrew the bulb, the motor will continue to rotate.

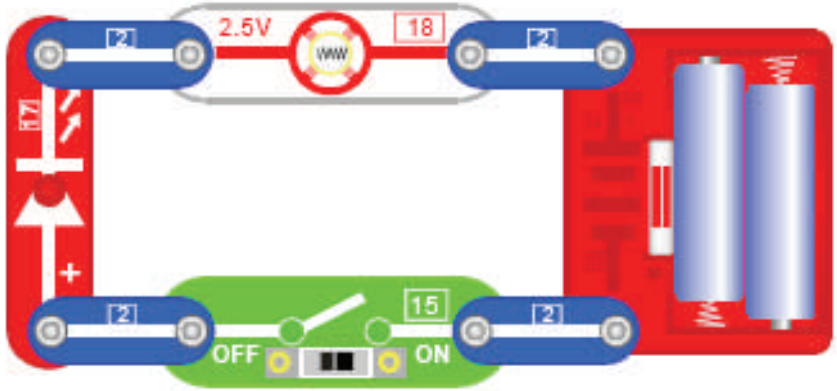




7. A light emitting diode. (LED).

LED's require a resistor wired in series to prevent too much electricity going through the LED and burning it out. You can see this resistor if you look on the underside of the LED.
The LED 17 and the bulb are connected in series. When you switch on, the LED will light but the bulb does not light. This is because the current required to light the LED is much less than is required to light the bulb. Electricity will still flow through the bulb but not enough to make it light.

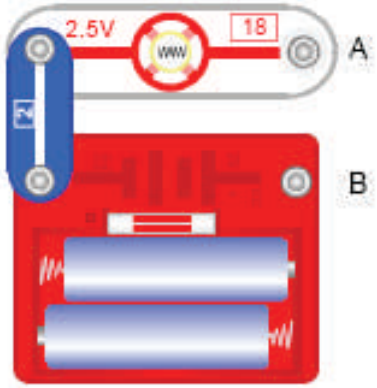
If you unscrew the bulb, the LED will go out.
Current is measured in Amps and it is a measure of the amount of electricity flowing. In the hose pipe idea, it is the amount of water flowing through the pipe. If you are filling a watering can, it will fill much more quickly if you do not put you finger over the end to increase the pressure.



8. One way conductivity of an LED.
This circuit is the same as number 7 but notice that the LED has been reversed.
When this circuit is switched on, neither the bulb or the LED will light, this is because electricity will only flow through an LED from positive to negative. It is said to be a polarized device.

9. Conductivity tester.
With this circuit, you can test out various materials to see if they conduct electricity. Use the material to make contact with points A and B, if the bulb lights then the material conducts electricity.

You could try such things as a metal teaspoon, a plastic ruler, a wooden pencil, a rubber, a piece of paper, a piece of baking foil or silver paper. The more material you test the better. Make a list of them and say if the conduct electricity or not.

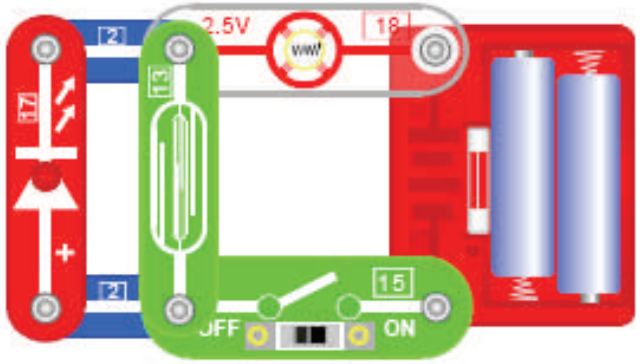


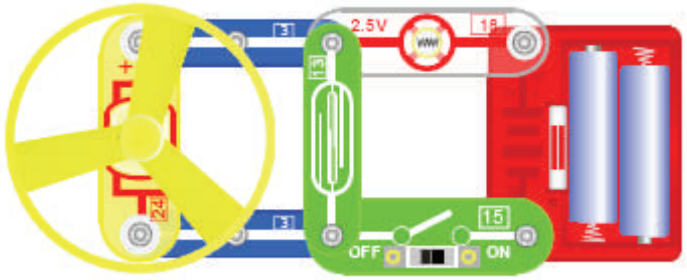
10. Controlling a bulb or an LED with a magnet.
Switch the circuit on. Only the LED will light. Bring a magnet close to the dry reed relay and the bulb will light up and the LED goes out. This is because the dry reed relay gives an easier path for the electricity to get back to the battery and so it does not pass through the LED.

11. Controlling a motor or an LED with a magnet.
Replace the bulb with the motor and then the motor and the LED will be controlled by the magnet.

12. Controlling a bulb or an LED with a press switch.
Replace the motor with the bulb and the dry reed relay with the press switch 14. When you switch on the LED will light but not the bulb. Press the press switch and the LED will go out and the bulb lights up.

13. Controlling a motor or an LED with a press switch.
Replace the bulb with the motor. Now the motor or the LED can be controlled by the press switch.

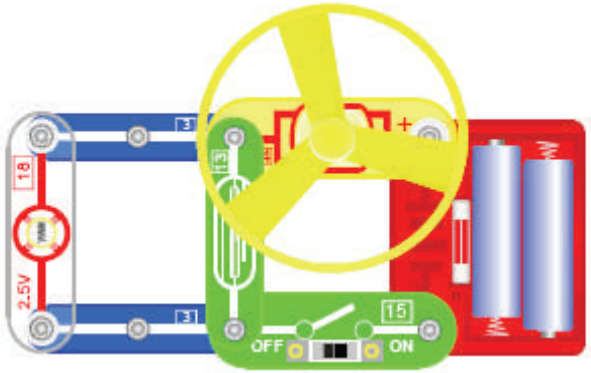




14. Brightness of a bulb in series controlled by a magnet.
Switch on and the motor will rotate slowly and the bulb light dimly. Bring a magnet close to the dry reed relay and the motor will stop rotating while the bulb will light brightly. The electricity now passes through the reed relay and does not go to the motor.

15. Brightness of a bulb in series controlled by a press switch.
Replace the reed relay with a press switch. Now the operation can be controlled by pressing the press switch.

In all these circuits, the reed relay allows the switching to take place remotely. Imagine a room where the ventilation fan needs to be on if the window is closed. If the reed relay is mounted on the window frame and the magnet is fixed on the opening part of the window so that if the window is opened, the magnet will be close to the reed relay, then when the window is shut, the fan will rotate but if the window is opened, the fan will stop and the bulb will get brighter. If the ventilation fan should stop working then the bulb will go out and act as a warning.

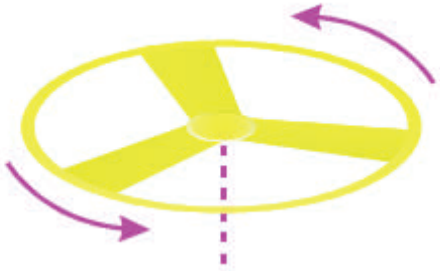


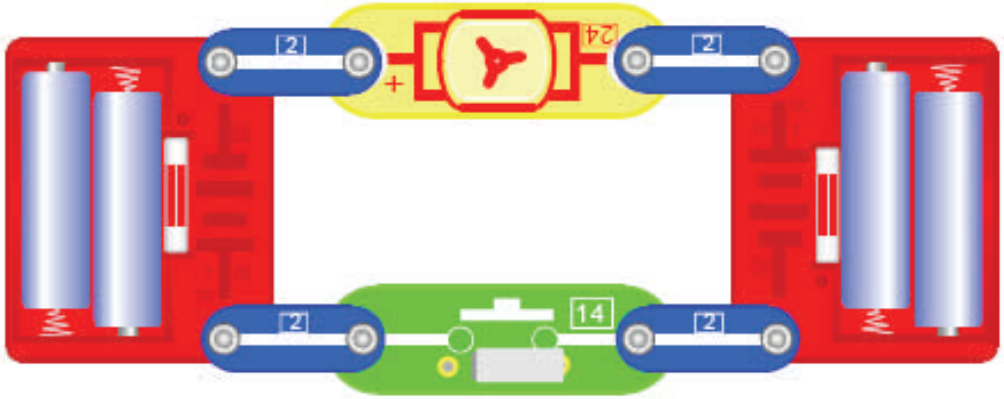
16. Speed of a fan in series controlled by a magnet.
Switch on and the fan will rotate slowly and the bulb light dimly. Bring the magnet close to the reed relay and the bulb will go out and the speed of the fan increase. Do not put you face over the fan as it may fly off!

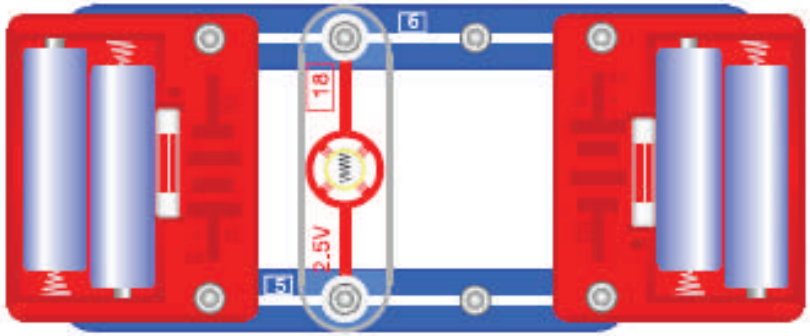
17. Speed of a fan in series controlled by a press switch.
Replace the reed switch with a press switch. Switch on and the fan will rotate slowly and the bulb light dimly. Press the press switch and the bulb will go out and the speed of the fan increase. Do not put you face over the fan as it may fly off!

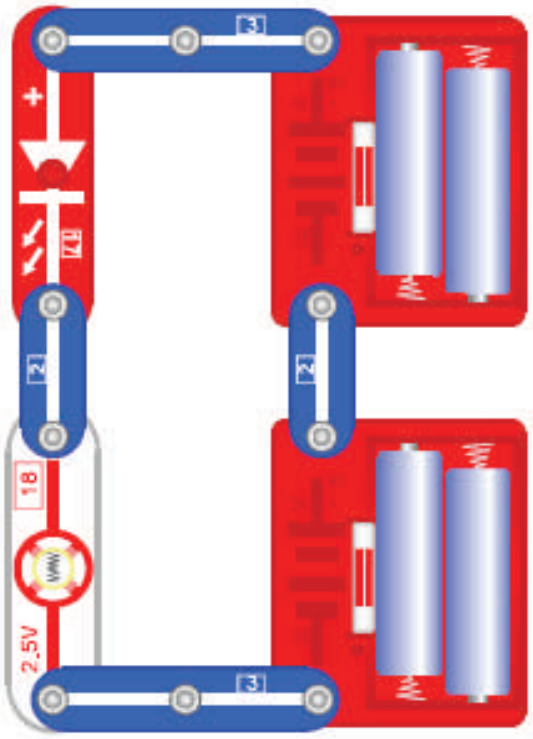
18. Flying Fan
When you make up the circuit, be careful to put the motor in the correct way round with the + sign on the left. The yellow fan should be placed on the motor spigot and not pushed down. **Do not lean over the fan as it will fly off with some force!** Switch on, the fan will rotate and fly up into the air. If the fan does not fly after a few seconds, let go of the switch.
If the spigot gets pushed down on the motor shaft, gently prize it up again using a screwdriver or a key.

19. What happens if the motor is reversed?
Turn the motor round so that the + sign is on the right. Put the fan on the motor and switch on. This time the fan will not fly but will give a powerful current of air in an upwards direction.





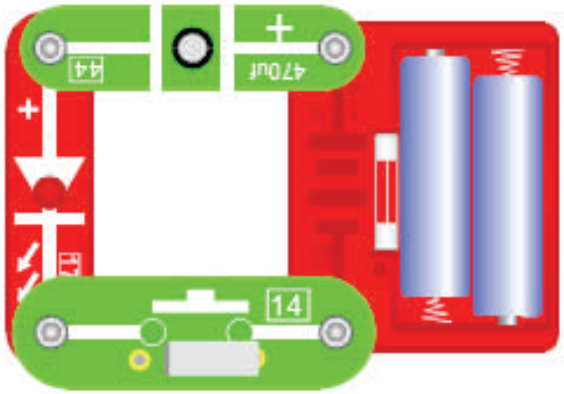


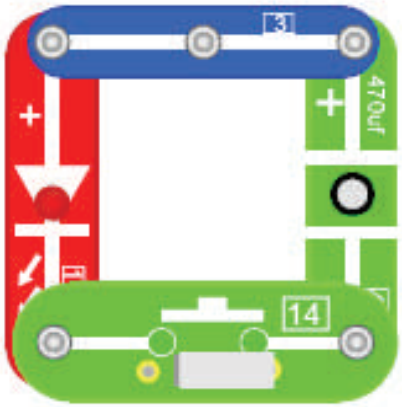


20. Batteries connected in parallel.
The circuit at the top of the page shows how batteries can be connected in parallel.
The + terminal of one battery is connected to the + terminal of the other battery and the two – terminals are also connected together. The voltage remains the same but the capacity of the batteries is doubled so they will last twice as long. This arrangement is not used much these days and it is a throwback to the days when batteries were less powerful.

21. Batteries connected in series.
The circuit on the left shows the batteries connected in series. It is a folded out version of circuits 18 and 19. When batteries are arranged in this way, the total voltage is the combined voltage of both batteries added together. In this case as both batteries are 3volts, the output to the bulb and the LED is 6volts.

22. Batteries connected in series but the wrong way round.
This arrangement is not to be recommended as the voltage is zero and the batteries way well be damaged.

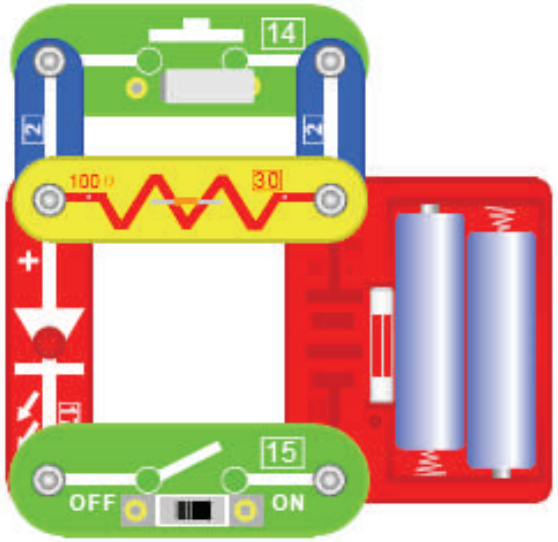




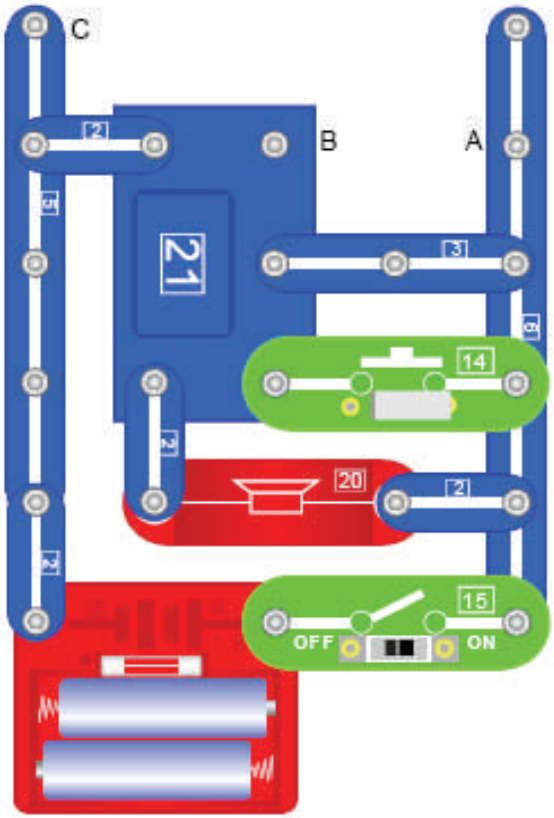
23. Charging a capacitor.
A capacitor is a short term storage device for electricity. A capacitor is used to supply a short pulse of electricity just when it is required so it can be charged up quickly and the electricity used before it can run out.
The circuit at the top left of the page shows how a capacitor can be charged. Press the switch and the LED will flash once to show that the capacitor has been charged.

24. Discharging a capacitor.
Charge the capacitor as in circuit 23. Very quickly change the circuit as shown on the top right. Press the switch and the LED will flash once as the capacitor discharges.

25. The working of a capacitor.
Think of a capacitor as being a bit like a bucket with a hole in it. If you fill the bucket with water, the water will slowly run out of the hole. When a capacitor is charged the electricity will not remain in it for long so it will not hold it's charge for a long time.



26. The working of a resistor.
A resistor slows the flow of electricity. Try the circuit on the left. When you switch on the LED will light dimly. This is because the resistor 30 is slowing the electricity down. Now press the other switch and notice that the LED gets brighter. The electricity now flows through the switch and not through the resistor so the electricity speeds up and the LED glows brighter.



The next section of experiments all feature module 21. This is a sound module using a multi vibrator integrated circuit to produce a musical tune. All the experiments start with the circuit shown.

27. Doorbell controlled by a press switch.
Switch on and music will be played. When the music stops it will restart if you press the press switch.

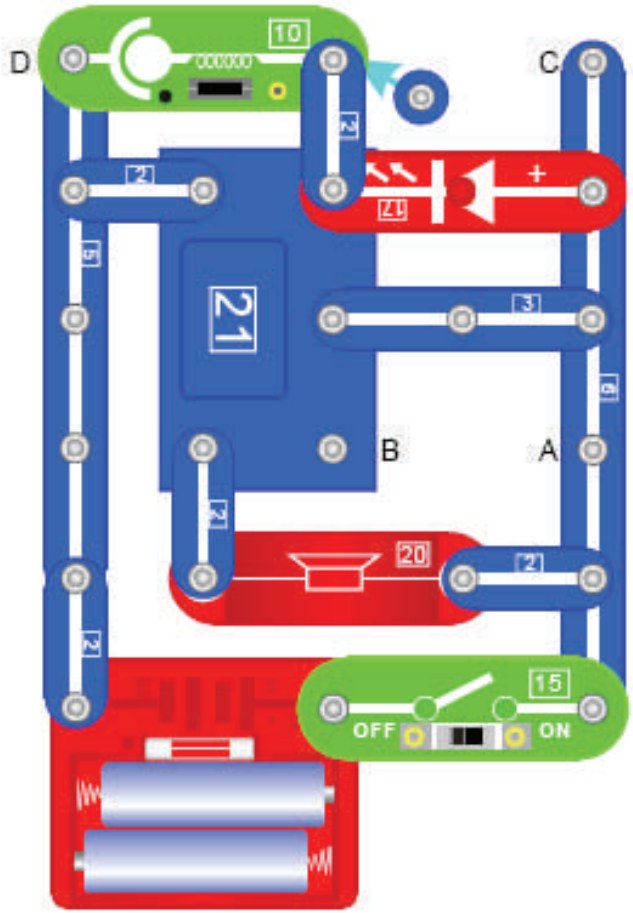
28. Doorbell controlled by a magnet.
Replace the press switch with the dry reed switch, the magnet can be used to control the music.

29. Doorbell controlled by light.
Replace the press switch with the photo sensor 16. When the photo sensor is covered, the music will stop and will start again when the photo sensor is uncovered. The photo sensor contains a light sensitive resistor. In the dark the resistance is high and so electricity does not flow but in the light, the resistance is low so electricity flows and the music sounds.

30. Doorbell controlled by a touch switch.
Replace the press switch with the touch plate 12. Put your finger on the touch plate and the music will sound. Remove you finger and the music will stop. The touch switch conducts electricity when the two parts of the plate are connected together. The slight dampness on your finger is enough for this to happen!

31. Doorbell controlled by sound.
Connect the buzzer 11 to terminals A and B. Switch on and when the music stops, clap you hands and the music will start again.

32. Doorbell controlled by a motor.
Connect the motor 24 to A and B. When the music stops, gently turn the motor shaft and the music will start again.



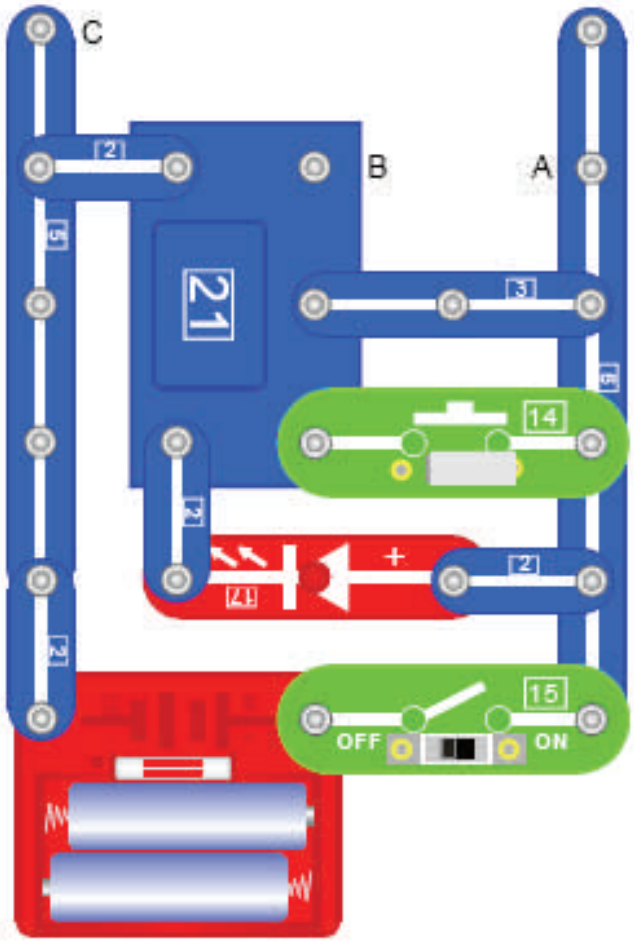
33. Doorbell controlled by vibration (1).
When you have made up the circuit, switch on. When the music stops, gently tap the base board and the music will start again.

34. Doorbell controlled by a press switch (1).
Replace vibrating switch 10 with the press switch 14, when the music stops, press the press switch once and the music will start again.

35. Doorbell controlled by vibration (2).
Replace the LED with the vibrating switch 10, when the music stops, gently tap the base board and the music will start again.

36. Doorbell controlled by a press switch (2).
Replace the LED with the press switch 14, when the music stops, press the press switch once and the music will start again.

37. Doorbell controlled by a press switch (3).
Remove the vibrating switch 10 and replace the LED. Connect the press switch to terminals A and B, when the music stops, press the press switch once and the music will start again.



38. LED controlled by a press switch.
Switch on, when the LED goes out, press the press switch and the LED will light up again.

39. LED controlled by a magnet.
Replace the press switch with the dry reed switch. Switch on, when the LED goes out, bring the magnet close to the dry reed switch and the LED will light up again.

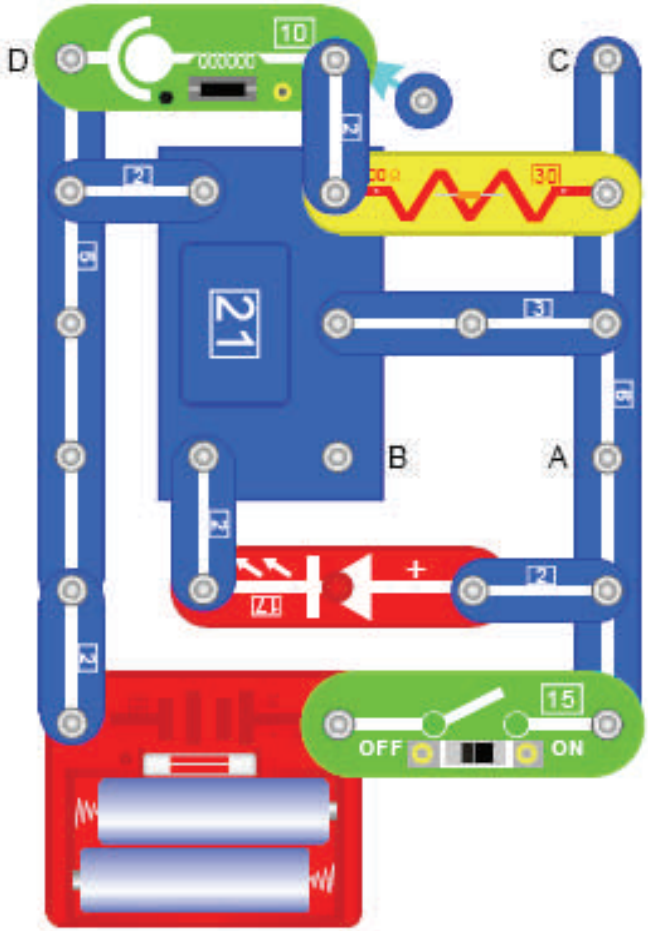
40. LED controlled by light.
Replace the press switch with the photosensor 16. Switch on and cover up the photosensor, when the LED goes out, uncover the photosensor and the LED will light up again.

41. LED controlled by the touch switch.
Replace the press switch with the touch plate 12. Switch on and when the LED goes out, put you finger on the touch plate and the LED will light up again.

42. LED controlled by sound (1).
Connect the buzzer 11 to terminals A and B. Switch on and when the LED goes out, clap your hands and the LED will light up again.

43. LED controlled by sound (2).
Connect the speaker 20 to terminals A and B. Switch on and when the LED goes out, clap your hands close to the speaker and the LED will light up again.

44. LED controlled by a motor.
Connect the motor to terminals A and B. Switch on and when the LED goes out, turn the motor shaft and the LED will light up again.



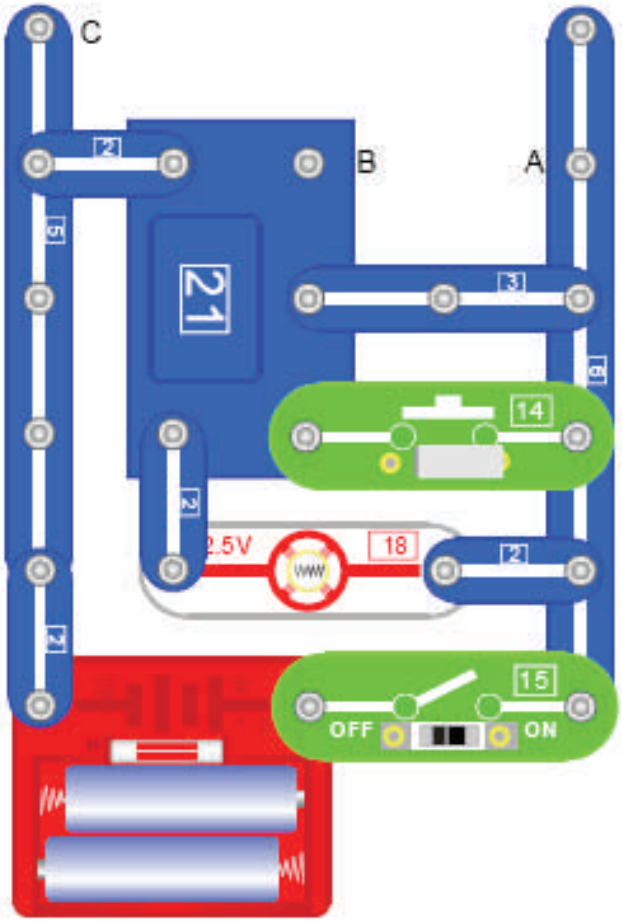
45. LED controlled by a vibration switch (1).
Switch on and when the LED goes out, gently tap the base board. The LED will light up again and go out after a period of time.

46. LED controlled by a press switch (1).
Replace the vibration switch with the press switch. Switch on and when the LED goes out, press the press switch and the LED will light up again and go out after a period of time.

47. LED controlled by a vibration switch (2).
Replace the resistor 30 with the vibration switch. Switch on and when the LED goes out, gently tap the base board. The LED will light up again and go out after a period of time.

48. LED controlled by a press switch (2).
Replace the resistor with the press switch. Switch on and when the LED goes out, press the press switch and the LED will light up again and go out after a period of time.

49. LED controlled by a press switch (3).
Remove the vibrating switch. Connect the press switch to terminals A and B. Switch on and when the LED goes out, press the press switch and the LED will light up again and go out after a period of time.



50. Flashing bulb controlled by a press switch.
Switch on and when the bulb goes out, press the press switch and the bulb will light up again and go out after a period of time.

51. Flashing bulb controlled by a magnet.
Replace the press switch with the dry reed switch. Switch on, when the bulb goes out, bring the magnet close to the dry reed switch and the bulb will light up again.

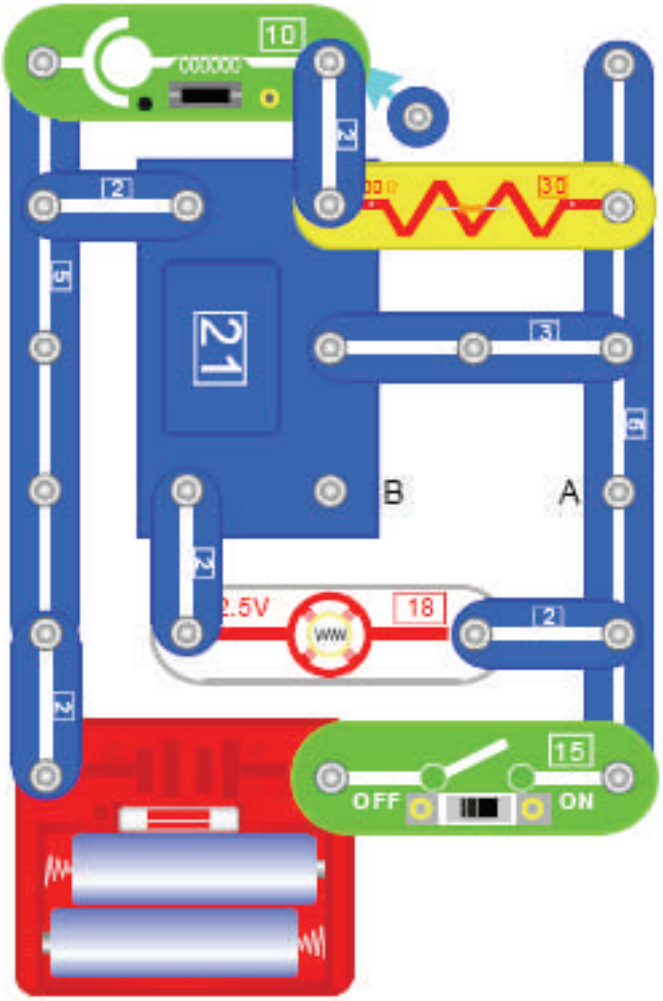
52. Flashing bulb controlled by light.
Replace the press switch with the photosensor 16. Switch on and cover up the photosensor, when the bulb goes out, uncover the photosensor and the bulb will light up again.

53. Flashing bulb controlled by the touch switch.
Replace the press switch with the touch plate 12. Switch on and when the bulb goes out, put you finger on the touch plate and the bulb will light up again.

54. Flashing bulb controlled by sound (1).
Connect the buzzer 11 to terminals A and B. Switch on and when the bulb goes out, clap your hands and the bulb will light up again.

55. Flashing bulb controlled by sound (2).
Connect the speaker 20 to terminals A and B. Switch on and when the bulb goes out, clap your hands and the bulb will light up again.

56. Flashing bulb controlled by a motor.
Connect the motor 24 to terminals A and B. Switch on and when the bulb goes out, turn the motor shaft gently and the bulb will light up again.



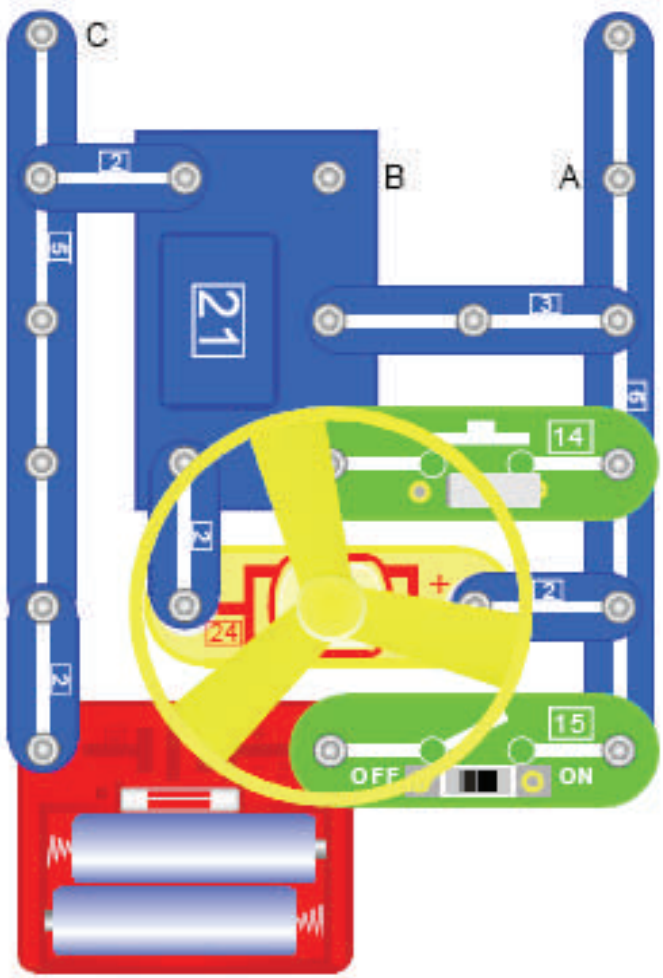
57. Flashing bulb controlled by vibration (1).
Switch on and when the bulb goes out, gently tap the base board, the bulb will light up again and go out after a period of time.

58. Flashing bulb controlled by a press switch (1).
Replace the vibration switch with the press switch. Switch on and when the bulb goes out, press the press switch, the bulb will light up again and go out after a period of time.

59. Flashing bulb controlled by vibration (2).
Replace the resistor 30 with the vibration switch 10. Switch on and when the bulb goes out, gently tap the base board, the bulb will light up again and go out after a period of time.

60. Flashing bulb controlled by a press switch (2).
Replace the resistor 30 with the press switch. Switch on and when the bulb goes out, press the press switch, the bulb will light up again and go out after a period of time.

61. Flashing bulb controlled by a press switch (3).
Remove the vibration switch 10 and replace the resistor 30. Connect the press switch to terminals A and B. Switch on and when the bulb goes out, press the press switch, the bulb will light up again and go out after a period of time.



62. Singing motor controlled by a press switch.
Switch on, when the music stops, press the press switch and the music will start again.

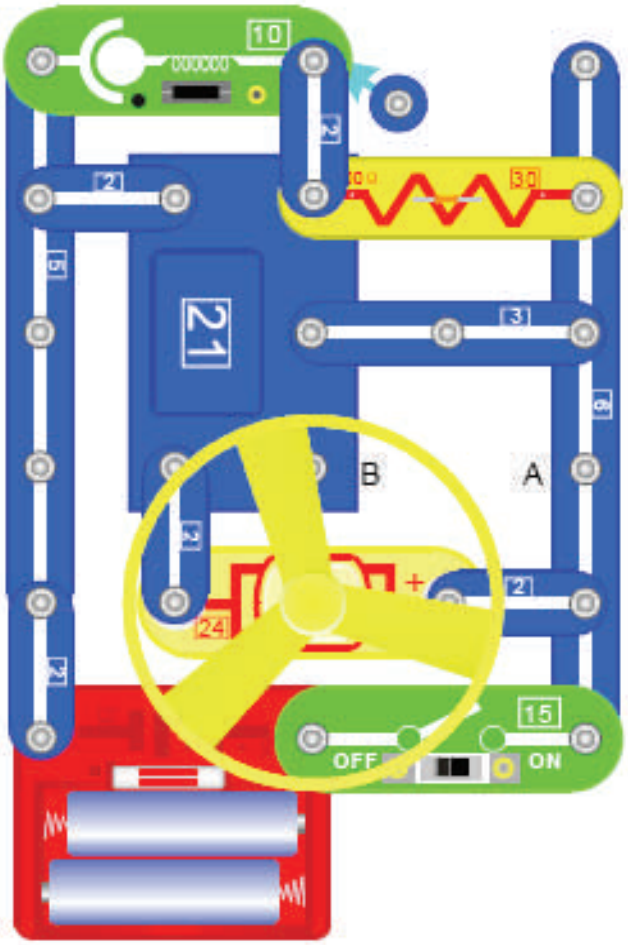
63. Singing motor controlled by a magnet.
Replace the press switch with the dry reed relay. Switch on, when the music stops, bring a magnet close to the dry reed relay and the music will start again.

64. Singing motor controlled by light.
Replace the press switch with the photosensor. Cover the photosensor and switch on. When the music stops, uncover the photosensor and the music will start again.

65. Singing motor control by a touch switch.
Replace the press switch with the touch plate 12. Switch on, when the music stops, place a finger on the touch plate and the music will start again.

66. Singing motor control by sound (1).
Connect the buzzer 11 to terminals A and B. Switch on, when the music stops, clap your hands close to the buzzer and the music will start again.

67. Singing motor control by sound (2).
Connect the speaker 20 to terminals A and B. Switch on, when the music stops, clap your hands close to the speaker and the music will start again.



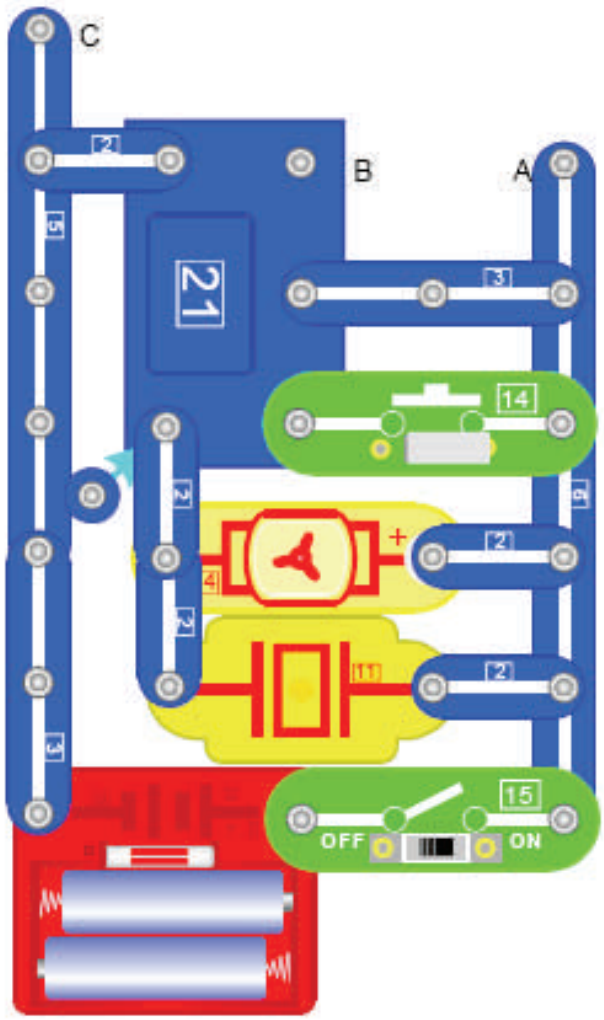
68. Singing motor controlled by vibration (1).
Switch on and when the music stops, gently tap the base board, the motor will play the music again.

69. Singing motor controlled by the press switch (1).
Replace the vibration switch with the press switch. Switch on and when the music stops, press the press switch, the motor will play the music again.

70. Singing motor controlled by vibration (2).
Replace the resistor with the vibration switch 10. Switch on and when the music stops, gently tap the base board, the motor will play the music again.

71. Singing motor controlled by the press switch (2).
Replace the resistor with the press switch. Switch on and when the music stops, press the press switch, the motor will play the music again.

72. Singing motor controlled by the press switch (3).
Remove the vibration switch and replace the resistor. Connect the press switch to terminals A and B. Switch on and when the music stops, press the press switch, the motor will play the music again.



73. Buzzer music controlled by the press switch.
Switch on and when the music stops, press the press switch, the buzzer 11 will play the music again.

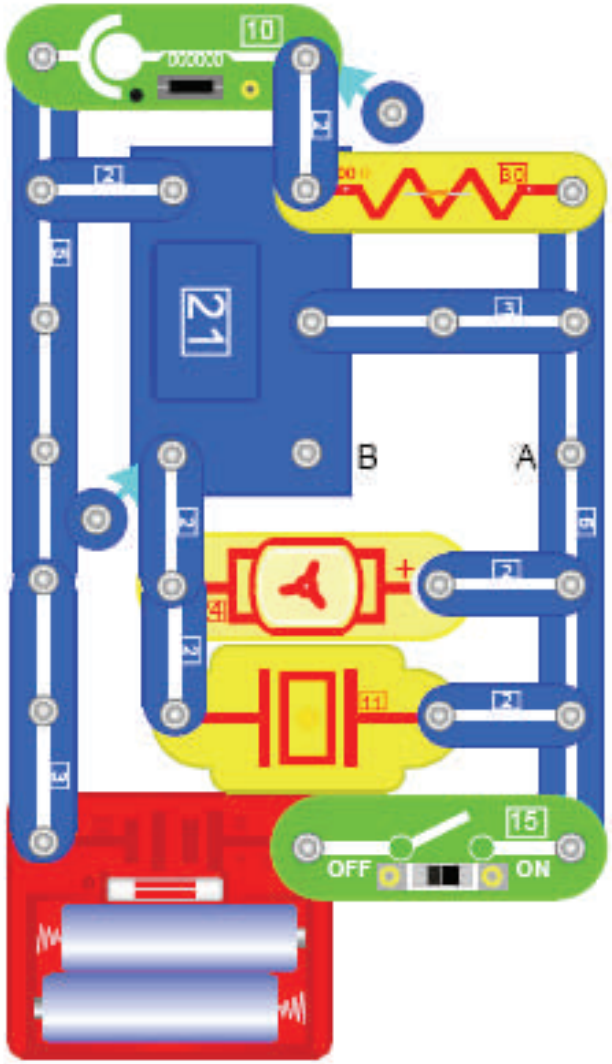
74. Buzzer music controlled by a magnet.
Replace the press switch with the dry reed relay. Switch on and when the music stops, bring a magnet close to the dry reed relay, the buzzer 11 will play the music again. If the music keeps repeating, stop the motor from rotating.

75. Buzzer music controlled by light.
Replace the press switch with the photosensor. Put your finger over the photo-sensor and switch on. When the music stops, take your finger off the photosensor, the buzzer 11 will play the music again. If the music keeps repeating, stop the motor from rotating.

76. Buzzer music controlled by touch.
Replace the press switch with the touch plate. Switch on and when the music stops, put your finger on the touch plate, the buzzer 11 will play the music again. If the music keeps repeating, stop the motor from rotating.

77. Buzzer music controlled by sound.
Connect the speaker 20 to terminals A and B. Switch on and when the music stops, clap your hands close to the speaker, the buzzer 11 will play the music again. If the music keeps repeating, stop the motor from rotating.

78. Buzzer music controlled by a motor.
Replace the motor with the bulb, then connect the motor to terminals A and B. Switch on and when the music stops, turn the motor shaft, the buzzer 11 will play the music again.



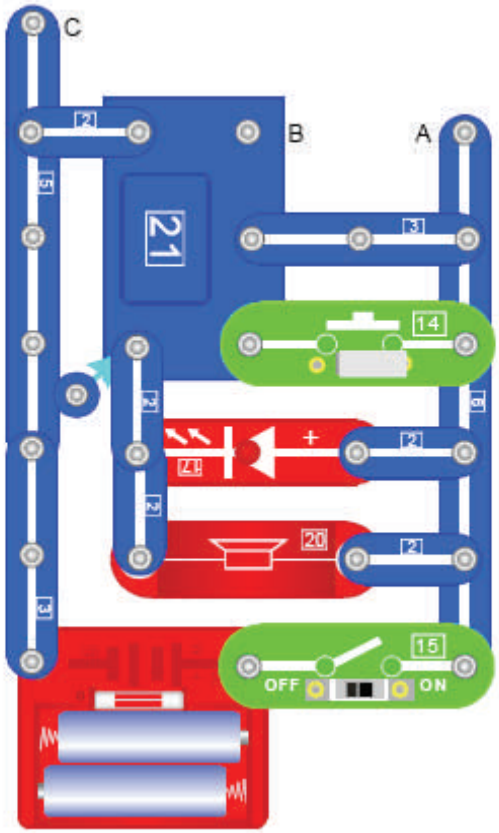
79. Buzzer music controlled by vibration (1).
Switch on and when the music stops, tap the base board, the buzzer 11 will play the music again.

80. Buzzer music controlled by a press switch (1).
Replace the vibration switch with press switch 14. Switch on and when the music stops, press the press switch and the buzzer will play the music again.

81. Buzzer music controlled by vibration switch (2).
Replace the resistor with the vibration switch. Switch on and when the music stops, tap the base board, the buzzer 11 will play the music again.

82. Buzzer music controlled by a press switch (2).
Replace the resistor with the press switch. Switch on and when the music stops, press the press switch, the buzzer 11 will play the music again.

83. Buzzer music controlled by a press switch (3).
Remove the vibration switch and replace the resistor. Connect the press switch to terminals A and B. Switch on and when the music stops, press the press switch, the buzzer 11 will play the music again.



In the following experiments 84 to 94, an LED is included in the circuit to give a visual indication that the doorbell is sounding. This would be useful for the hard of hearing.

84. Acoustic- optic doorbell controlled by a press switch.
Switch on and music will be played. When the music stops it will restart if you press the press switch.

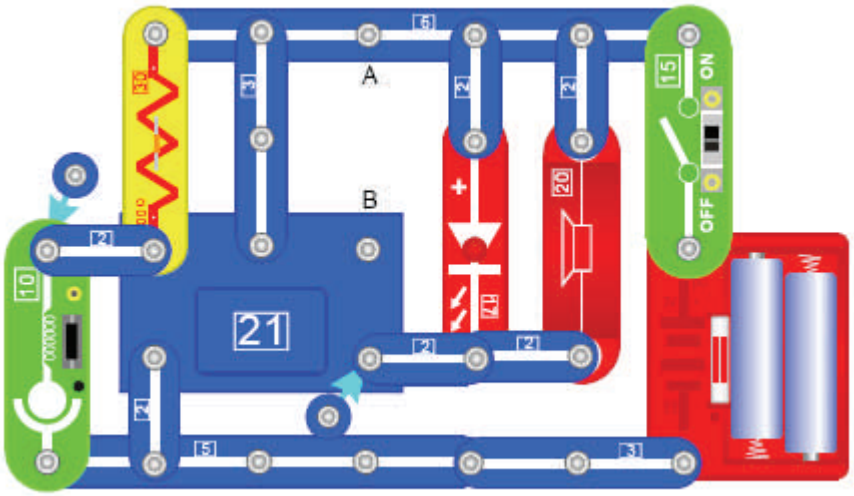
85. Acoustic- optic doorbell controlled by a magnet.
Replace the press switch with the dry reed switch, the magnet can be used to control the music.

86. Acoustic- optic doorbell controlled by light.
Replace the press switch with the photo sensor 16. When the photo sensor is covered, the music will stop and will start again when the photo sensor is uncovered. The photo sensor contains a light sensitive resistor. In the dark the resistance is high and so electricity does not flow but in the light, the resistance is low so electricity flows and the music sounds.

87. Acoustic- optic doorbell controlled by a touch switch.
Replace the press switch with the touch plate 12. Put your finger on the touch plate and the music will sound. Remove you finger and the music will stop. The touch switch conducts electricity when the two parts of the plate are connected together. The slight dampness on your finger is enough for this to happen!

88. Acoustic- optic doorbell controlled by sound.
Connect the buzzer 11 to terminals A and B. Switch on and when the music stops, clap you hands and the music will start again.

89. Acoustic- optic Doorbell controlled by a motor.
Connect the motor 24 to A and B. When the music stops, gently turn the motor shaft and the music will start again.



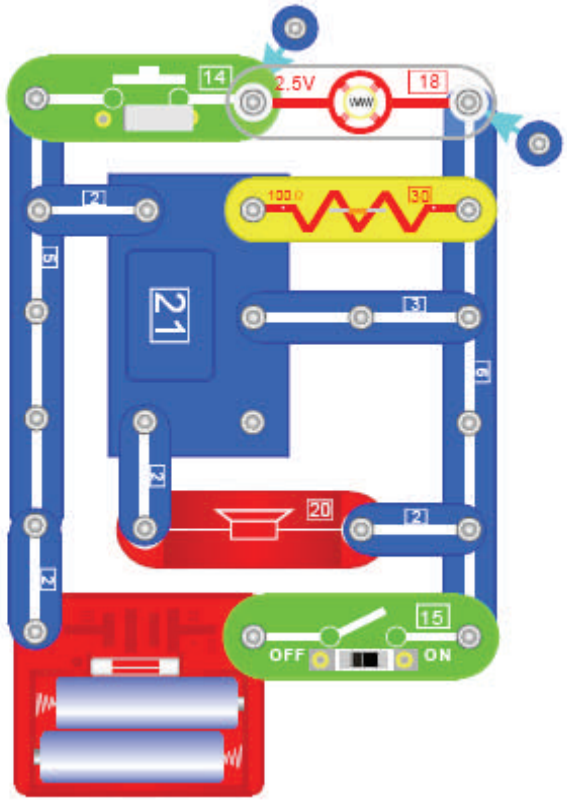
90. Doorbell controlled by vibration (1).
When you have made up the circuit switch on. When the music stops, gently knock the base board and the music will start again.

91. Doorbell controlled by a press switch (1).
Replace vibrating switch 10 with the press switch 14, when the music stops, press the press switch once and the music will start again.

92. Doorbell controlled by vibration (2).
Replace the LED with the vibrating switch 10, when the music stops, gently tap the base board and the music will start again.

93. Doorbell controlled by a press switch (2).
Replace the LED with the press switch 14, when the music stops, press the press switch once and the music will start again.

94. Doorbell controlled by a press switch (3).
Remove the vibrating switch 10 and replace the LED. Connect the press switch to terminals A and B, when the music stops, press the press switch once and the music will start again.



95. Music and light.
Switch on, and when the music stops, press the press switch once, the bulb will flash and the music will start again.

96. LED and light.
Replace the speaker with the LED. Switch on, and when the LED stops flashing press the press switch once, the bulb will flash and the LED will start flashing again.

97. Motor music and light.
Replace the speaker with the motor. Switch on, and the motor will play the music. When the music stops, press the press switch once, the bulb will flash and the music will start again. You may have to stop the motor rotating to get to the end of the tune.

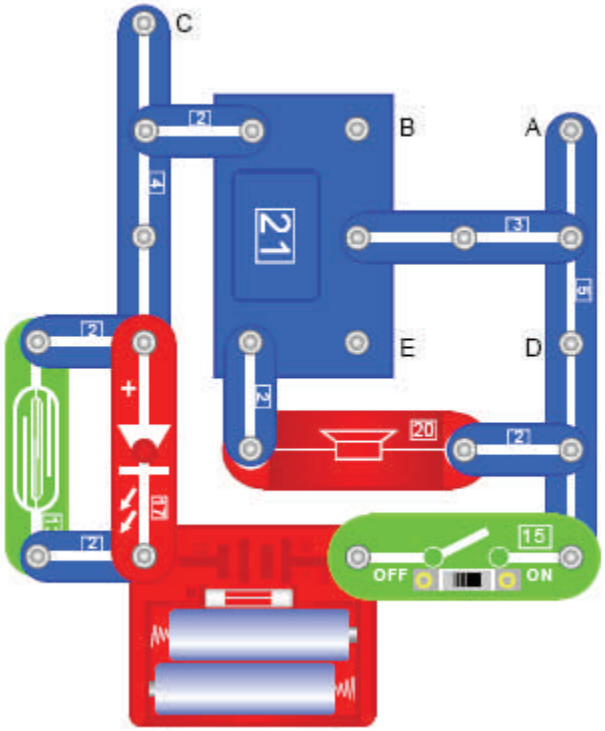
98. Motor and buzzer music with light.
Replace the speaker with the buzzer 11 and mount the motor directly on top of the buzzer. Switch on, and the motor will play the music. When the music stops, press the press switch once, the bulb will flash and the music will start again.

99. Music without the motor running.
Replace the bulb with the motor and the buzzer with the speaker. Switch on and when the music stops, press the press switch once, the motor will rotate and the music will start again.

100. Flashing LED without the motor running.
Use the same circuit as for 99, but replace the speaker with the LED. Switch on and when the music stops, press the press switch once, the motor will rotate and the LED will start flashing again.

101. Flashing bulb without the motor running.
Use the same circuit as for 100, but replace the speaker with the bulb. Switch on and when the bulb stops flashing, press the press switch once, the motor will rotate and the bulb will start flashing again.

102. Buzzer music without the motor running.
Use the same circuit as for 101, but replace the bulb with the buzzer and then mount the bulb directly over the buzzer. Switch on and when the bulb stops flashing and the music stops, press the press switch once, the motor will rotate and the bulb will start flashing and the music will start again.



103. Vibration controlled slow rhythm music.
Connect the vibration switch to terminals A and B. Switch on and when the music stops, knock the vibration switch and the music will start again.

104. Sound controlled slow rhythm music.
Connect the buzzer to terminals A and B. Switch on and when the music stops, clap your hands and the music will start again.

105. Press switch controlled slow rhythm music (1).
Connect the press switch to terminals A and B. Switch on and when the music stops, press the press switch and the music will start again.

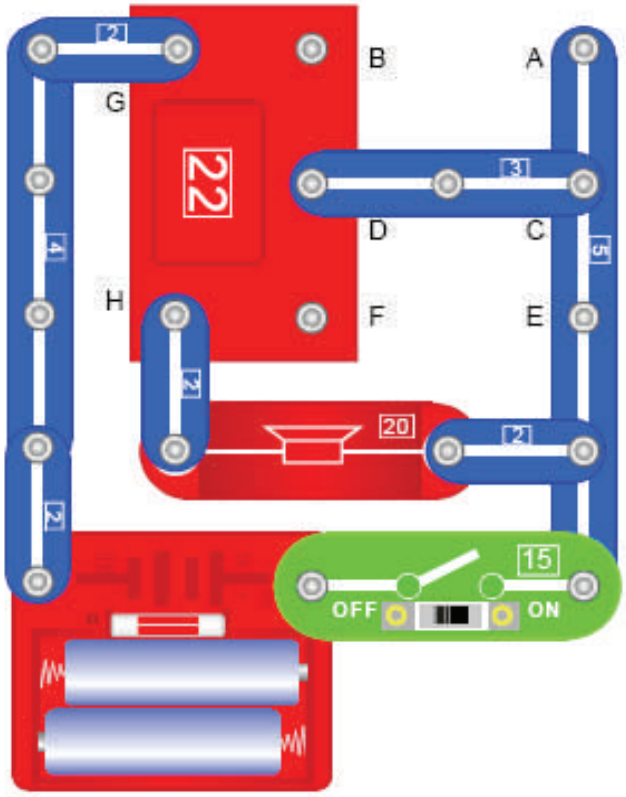
106. Press switch controlled slow rhythm music (2).
Connect the press switch to terminals D and E. Switch on and when the music stops, press the press switch and the music will start again.

107. Vibration controlled slow rhythm music.
Connect the vibration switch to terminals A and B. Switch on and when the music stops, knock the vibration switch and the music will start again. To speed up the music, bring a magnet close to the reed relay.

108. Sound controlled slow rhythm music.
Connect the buzzer to terminals A and B. Switch on and when the music stops, clap your hands and the music will start again. To speed up the music, bring a magnet close to the reed relay.

109. Press switch controlled slow rhythm music (1).
Connect the press switch to terminals A and B. Switch on and when the music stops, press the press switch and the music will start again. To speed up the music, bring a magnet close to the reed relay.

110. Press switch controlled slow rhythm music (2).
Connect the press switch to terminals D and E. Switch on and when the music stops, press the press switch and the music will start again. To speed up the music, bring a magnet close to the reed relay.



111. Sound of a police car.
Switch on and the speaker will make the sound of a police car.

112. Sound of a machine gun.
Connect terminals E and F together. Switch on and the speaker will make the sound of a machine gun.

113. Sound of a fire engine.
Connect terminals A and B together. Switch on and the speaker will make the sound of a fire engine.

114. Sound of an ambulance.
Connect terminals B and G together. Switch on and the speaker will make the sound of an ambulance.

115. Sound of a gaming machine.
Remove the connector from terminals C and D. Connect terminals A and B together. Switch on and the speaker will make the sound of a gaming machine.

116. Sound of intruder alarm.
Connect terminals B and G together also connect F and H. Switch on and the speaker will make the sound of an intruder alarm.

117. Sound of vibration (1).
Connect terminals B and F together. Switch on and the speaker will make the sound of vibration.

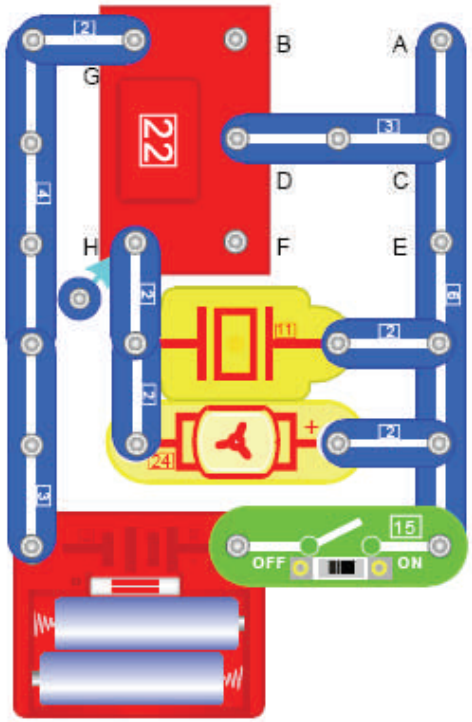
118. Sound of vibration (2).
Remove the connector from C and D. Connect terminals A and B together. Switch on and the speaker will make the sound of vibration.

119. High speed flashing LED.
Replace the speaker with the LED. Remove the connecter from C and D. Connect terminals B and G together also connect F and H. Switch on and the LED will flash at high speed.

120. Low speed flashing LED.
Replace the speaker with the LED. Connect terminals F and E together. Switch on and the LED will flash slowly.

121. High speed flashing lamp.
Replace the speaker with the bulb. Remove the connecter from C and D. Connect terminals B and G together also connect F and H. Switch on and the bulb will flash at high speed.

122. Low speed flashing lamp.
Replace the speaker with the bulb. Connect terminals F and E together. Switch on and the bulb will flash slowly.



123. Bleeping sound of a police car.
Switch on and the buzzer will make the bleeping sound of a police car.

124. Bleeping sound of a machine gun.
Connect terminals E and F together. Switch on and the buzzer will make the bleeping sound of a machine gun.

125. Bleeping sound of a fire engine.
Connect terminals A and B together. Switch on and the buzzer will make the bleeping sound of a fire engine.

126. Bleeping sound of an ambulance.
Connect terminals B and G together. Switch on and the buzzer will make the bleeping sound of an ambulance.

127. Bleeping sound of a gaming machine.
Remove the connector from terminals C and D. Connect terminals A and B together. Switch on and the buzzer will make the bleeping sound of a gaming machine.

128. Bleeping sound of intruder alarm.
Connect terminals B and G together also connect F and H. Switch on and the buzzer will make the bleeping sound of an intruder alarm.

129. Bleeping sound of vibration (1).
Connect terminals B and F together. Switch on and the buzzer will make the bleeping sound of vibration.

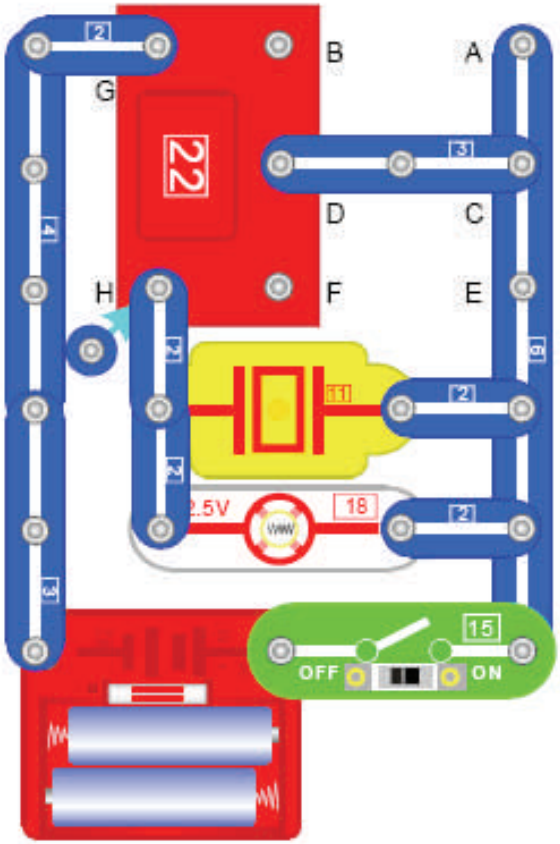
130. Bleeping sound of vibration (2).
Remove the connector from C and D. Connect terminals A and B together. Switch on and the buzzer will make the bleeping sound of vibration.

131. Sound of a police car produced by a motor.
Remove the buzzer and replace it with the motor. Switch on and the motor will make the sound of a police car.

132. Sound of a machine gun produced by a motor.
Remove the buzzer and replace it with the motor. Connect terminals E and F together. Switch on and the speaker will make the sound of a machine gun.

133. Sound of a fire engine produced by a motor.
Remove the buzzer and replace it with the motor. Connect terminals A and B together. Switch on and the speaker will make the sound of a fire engine.

134. Sound of an ambulance produced by a motor.
Remove the buzzer and replace it with the motor. Connect terminals B and G together. Switch on and the speaker will make the sound of an ambulance.



135. Sound of a police car with light.
Switch on and the buzzer will make the sound of a police car and the bulb will light up.

136. Sound of a machine gun with light.
Connect terminals E and F. Switch on and the buzzer will make the sound of a machine gun and the bulb will flash in time with the sound.

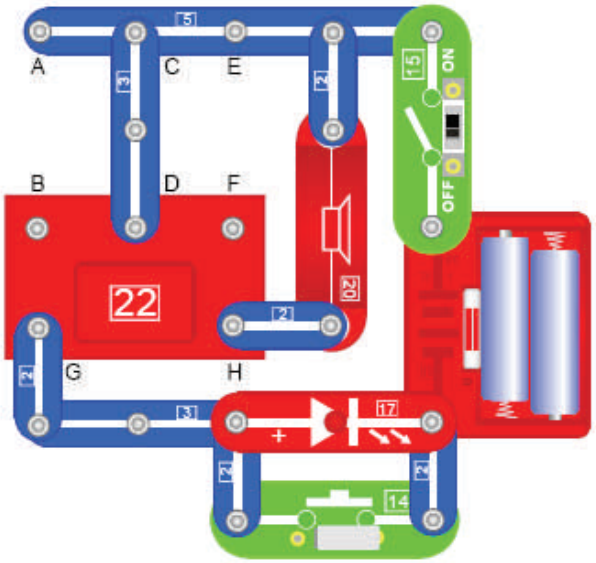
137. Sound of a fire engine with light.
Connect terminals A and B. Switch on and the buzzer will make the sound of a fire engine and the bulb will light up.

138. Sound of an ambulance with light.
Connect terminals B and G. Switch on and the buzzer will make the sound of an ambulance and the bulb will light up.

139. Sound of vibration with light.
Connect terminals B and F. Switch on and the buzzer will make the sound of vibration and the bulb will light up.

140. Light controlled sound of a police car.
Replace the bulb with the photosensor 16. Switch on and the buzzer will make the sound of a police car. Cover the light sensor and the sound will get softer or stop.

145. Light controlled sound of music.
Replace the module 22 with the music module 21. Replace the bulb with the Photosensor 16. Switch on and the buzzer will play the sound of music. Cover the light sensor and the sound will get softer or stop.



146. Sound of slow speed police car siren.
Connect a resistor in parallel with the LED (in place of switch 14). Switch on and the speaker will make the sound of a slow speed police car siren.

147. Sound of slow speed machine gun.
Connect terminals E and F also connect a resistor in parallel with the LED (in place of switch 14). Switch on and the speaker will make the sound of a slow speed machine gun. To improve the sound, connect a resistor in parallel with the LED.

148. Sound of slow speed fire engine siren.
Connect terminals A and B also connect a resistor in parallel with the LED (in place of switch 14). Switch on and the speaker will make the sound of a slow speed fire engine siren.

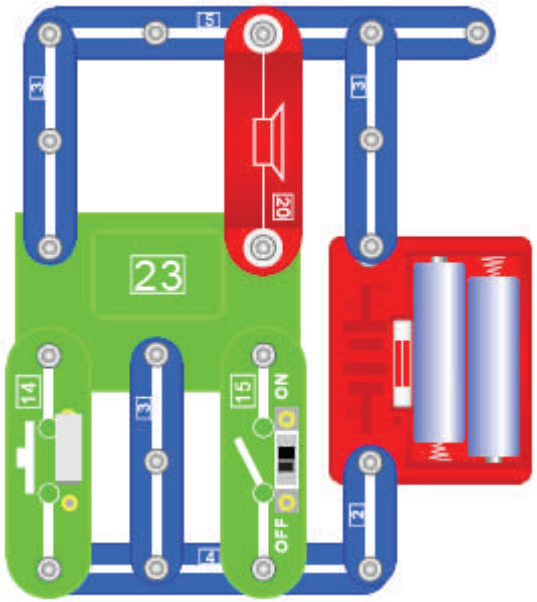
149. Sound of slow speed ambulance siren.
Connect terminals B and G also connect a resistor in parallel with the LED (in place of switch 14). Switch on and the speaker will make the sound of a slow speed ambulance siren.

150. Sound of slow speed gaming machine.
Remove the connector from C and D. Connect terminals B and G also E and F. Switch on and the speaker will make the sound of a slow speed gaming machine.

151. Sound of slow speed vibration (1).
Remove the connector from C and D. Connect terminals E and F, also connect a resistor in parallel with the LED (in place of switch 14). Switch on and the speaker will make the sound of a slow speed vibration.

152. Sound of slow speed vibration (2).
Connect terminals B and F, also connect a resistor in parallel with the LED (in place of switch 14). Switch on and the speaker will make the sound of a slow speed vibration.

153 – 159 Series of variable speed sounds.
For each of the above experiment, press the press switch and the sound will grow in intensity and speed.



160. Hand controlled sounds of space war.
Operate the two switches separately or together to produce different sounds of space wars.

161. Magnet controlled sounds of space war.
Replace switch 15 with the reed relay 13. Operate the two switches separately or together to produce different sounds of space wars controlled by a magnet.

162. Light controlled sounds of space war.
Replace switch 15 with the photo sensor 16. Operate the two switches separately or together to produce different sounds of space wars controlled by light.

163. Touch controlled sounds of space war.
Replace press switch 14 with the touch plate 12. Touch the plate repeatedly to produce different sounds of space wars.

164. Knock controlled sounds of space war.
Replace press switch 14 with the vibration switch 10. Knock the switch repeatedly to produce different sounds of space wars.

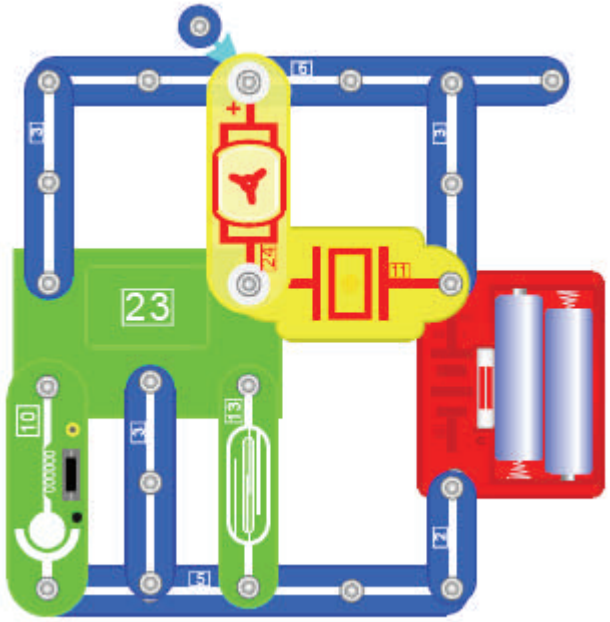
165. Knock controlled LED.
Replace press switch 14 with the vibration switch 10 and replace the speaker with the LED. Knock the switch to light the LED.

166. Knock controlled Bulb.
Replace press switch 14 with the vibration switch 10 and replace the speaker with the bulb. Knock the switch to light the bulb.

167. Light controlled LED.
Replace the slide switch 15 with the photo sensor and replace the speaker with the LED. If light falls on the photo sensor, the LED will light up.

168. Light controlled Bulb.
Replace the slide switch 15 with the photo sensor and replace the speaker with the bulb. If light falls on the photo sensor, the bulb will light up.

169. Touch controlled LED.
Replace the press switch 14 with the touch plate 12 and replace the speaker with the LED. Touch the touch plate and the LED will light up.



170. Magnet controlled soft sounds of space war.
Bring a magnet near the dry reed relay and the buzzer will make the soft sounds of a space war.

171. Light controlled soft sounds of space war.
Replace the dry reed relay with the photo sensor. When light falls on the sensor, the buzzer will make the soft sounds of a space war.

172. Hand controlled soft sounds of space war.
Replace the dry reed relay with the press switch. Press the switch and the buzzer will make the soft sounds of a space war.

173. Knock controlled soft sounds of space war.
Knock the base board and the buzzer will make the soft sounds of a space war.

174. Touch controlled soft sounds of space war.
Replace the vibration switch with the touch plate. Touch the touch plate and the buzzer will make the soft sounds of a space war.

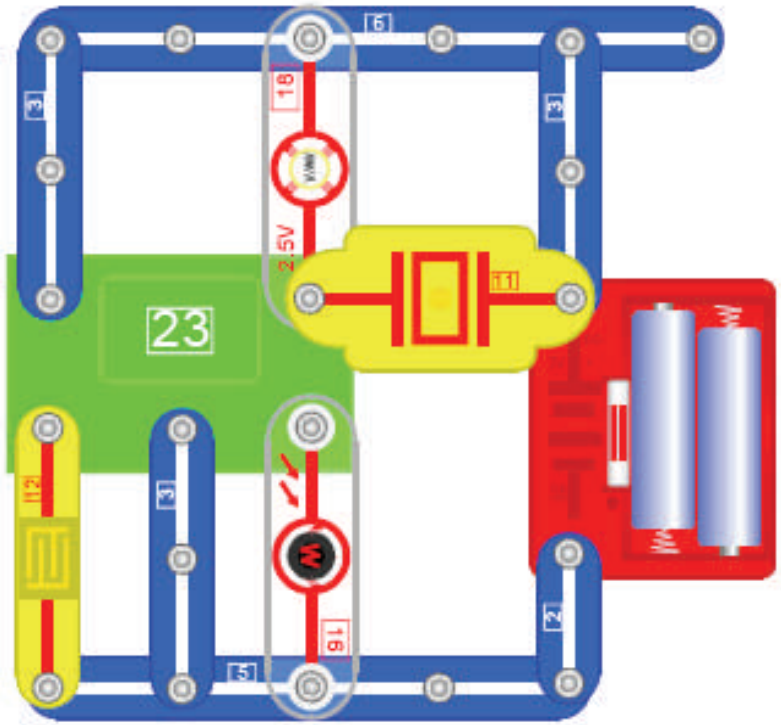
175. Magnet controlled motor soft sounds of space war.
Remove the buzzer. Bring a magnet near the dry reed relay and the motor will make the soft sounds of a space war.

176. Light controlled motor soft sounds of space war.
Remove the buzzer. Replace the dry reed relay with the photosensor. When light falls on the sensor, the motor will make the soft sounds of a space war.

177. Hand controlled motor soft sounds of space war.
Remove the buzzer. Replace the dry reed relay with the press switch. Press the switch and the motor will make the soft sounds of a space war.

178. Knock controlled motor soft sounds of space war.
Remove the buzzer. Replace the dry reed relay with the vibration switch. Knock the base board and the motor will make the soft sounds of a space war.

179. Touch controlled motor soft sounds of space war.
Remove the buzzer. Replace the vibration switch with the touch plate. Touch the touch plate and the motor will make the soft sounds of a space war.



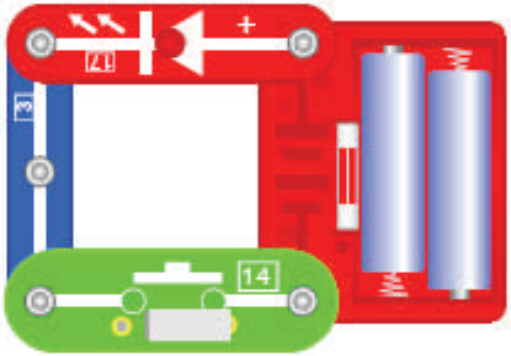
180. Light controlled acousto-optic sound of space war.
When light falls on the photo sensor, the buzzer will make the sound of a space war and the bulb will light up.

181. Magnet controlled acousto-optic sound of space war.
Replace the photo sensor with the dry reed relay. Bring a magnet near the dry reed relay and the buzzer will make the sound of a space war and the bulb will light up.

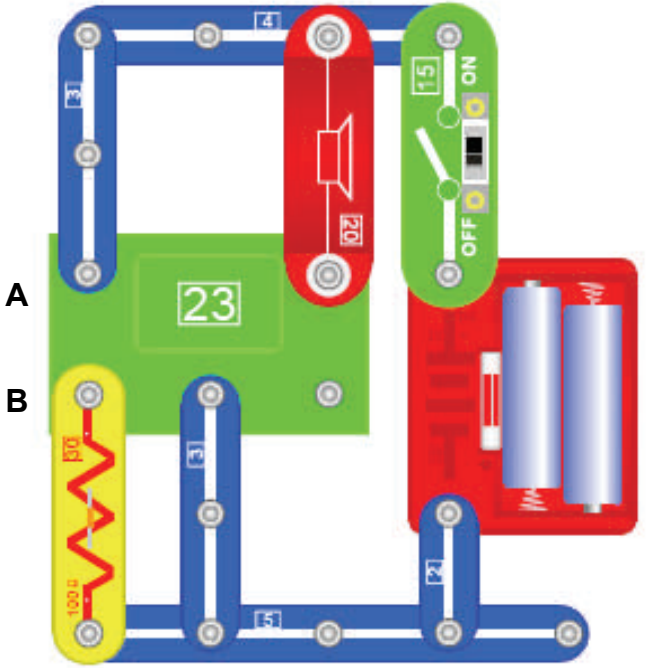
182. Hand controlled acousto-optic sound of space war.
Replace the photosensor with the press switch. Press the press switch and the buzzer will make the sound of a space war and the bulb will light up.

183. Touch controlled acousto-optic sound of space war.
Touch the touch switch and the buzzer will make the sound of a space war and the bulb will light up.

184. Knock controlled acousto-optic sound of space war.
Replace the touch plate with the vibration switch. Knock the base board and the buzzer will make the sound of a space war and the bulb will light up.

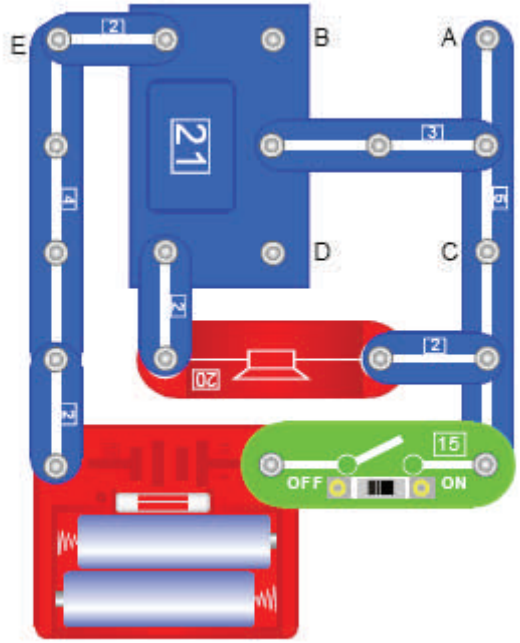


185. Morse code machine.
Press the switch to make the LED flash. Use this to send messages in Morse code or even make up your own code!



186. Theft alarm (1).
Connect a long wire to terminal A. Pass the other end of the wire through the object you wish to protect and then connect the other end of the wire to terminal B. Switch on and if the object is removed, the wire will break and the alarm will sound.

187. Rain warning alarm.
Replace the resister 30 with the touch plate. Connect the touch plate with long wires and hang them out of the window. If it starts to rain, the touch plate will get wet and complete the circuit, this will sound the alarm.



188. Theft alarm (2).
Connect a long wire to terminal A. Pass the other end of the wire through the object you wish to protect and then connect the other end of the wire to terminal B. Switch on and if the object is removed, the wire will break and the alarm will sound.

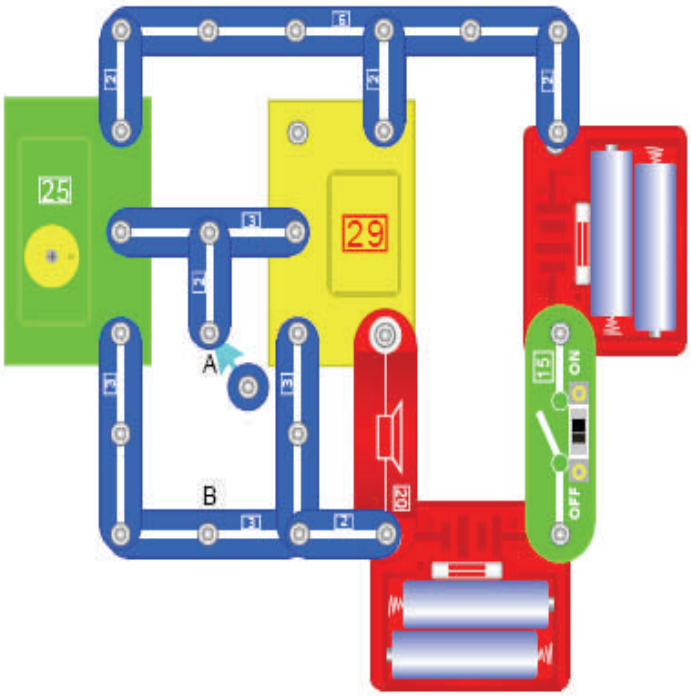
189. Noise warning.
Connect the buzzer to terminals A and B. If the noise level gets too high, the music will play.

190. Musical doorbell.
Fix the buzzer to a door and connect it to terminals A and B with thin wire. If there is a knock at the door, the music will play.

191. Theft alarm using the vibration switch.
Fix the vibration switch to an object you wish to protect. Connect the vibration switch to terminals A and B with thin wire. If the object is removed, the music will play.

192. Daybreak alarm.
Connect the photo sensor to terminals C and D. When it is dark, switch on and when light falls on the sensor, the music will play.

193. Bath level indicator.
Connect the touch plate with thin wires to terminals C and D. hang the touch plate over the side of the bath and when the water reaches the touch plate, the music will play.



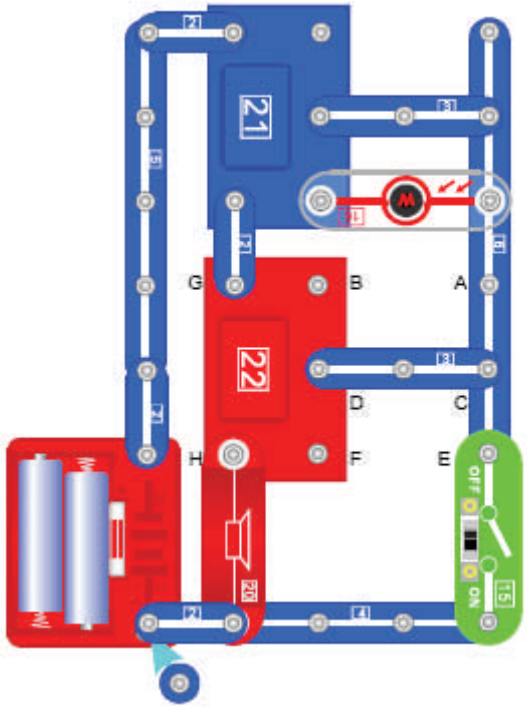
194. Medium wave radio.
Switch on and tune the stations in using the yellow knob. Try rotating the base board for the best reception.

195. Reduced volume radio (1).
Replace the speaker with the buzzer, this will reduce the volume level of the sound.

196. Reduced volume radio (2).
Return the speaker to its original place. Connect a resistor to terminals A and B, the resistor will reduce the volume level of the sound.

197. Remote speaker.
Connect the buzzer to terminals A and B. Remove the speaker and connect it with long wires. Speak into the buzzer and the sound will come out of the speaker.

The next series of experiments are designed to show how two sound modules can be connected together and used to produce a mixture of sounds.
The sounds are controlled by module 21 which plays the tune called Happy Birthday. The sound of the police siren etc. will not stop until the tune finishes.



198. Light controlled loud sound of a police car.
Switch on and put a finger over the photo sensor. When the sound stops it can be controlled using the photo sensor. If you listen carefully, you will be able to hear the music of happy birthday mixed with the police siren!

199. Light controlled loud sound of a machine gun.
Connect terminals E and F, you can control the sound of the machine gun using the photo sensor.

200. Light controlled loud sound of a fire engine.
Connect terminals A and B, you can control the sound of the fire engine using the photo sensor.

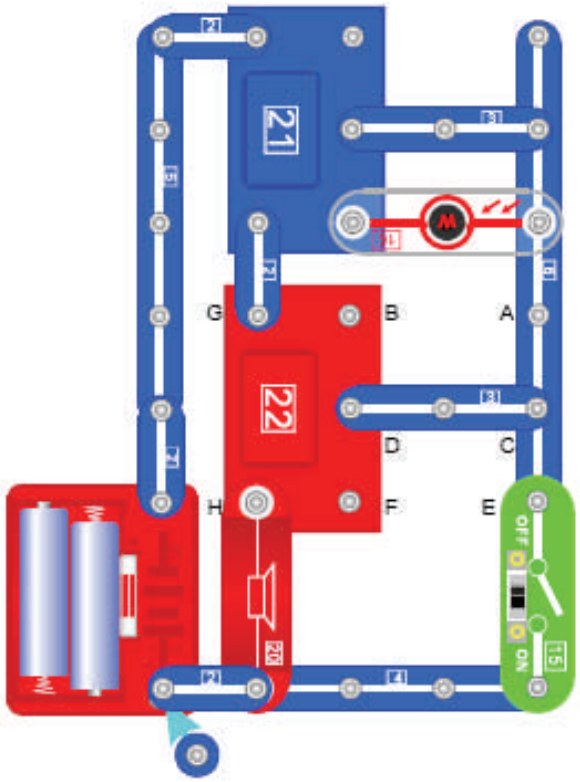
201. Light controlled loud sound of an ambulance.
Connect terminals B and G, you can control the sound of the ambulance using the photo sensor.

202. Light controlled loud sound of a gaming machine.
Remove the connector from terminals C and D, and connect terminals H and F. You can control the sound of the gaming machine using the photo sensor.

203. Light controlled loud sound of vibration.
Connect terminals B and F. You can control the sound of vibration using the photo sensor.

204. Touch controlled sound of a police car.
Replace the photo sensor with the touch plate. When the sound stops it can be controlled using the touch plate.

205. Touch controlled sound of a machine gun.
Replace the photo sensor with the touch plate. Connect terminals E and F, you can control the sound of the machine gun using the touch plate.



206. Touch controlled sound of a fire engine.
Replace the photo sensor with the touch plate. Connect terminals A and B, you can control the sound of the fire engine using the touch plate.

207. Touch controlled sound of an ambulance.
Replace the photo sensor with the touch plate. Connect terminals B and G, you can control the sound of the ambulance using the touch plate.

208. Touch controlled sound of a gaming machine.
Replace the photo sensor with the touch plate. Remove the connector from terminals C and D, and connect terminals H and F. You can control the sound of the gaming machine using the touch plate.

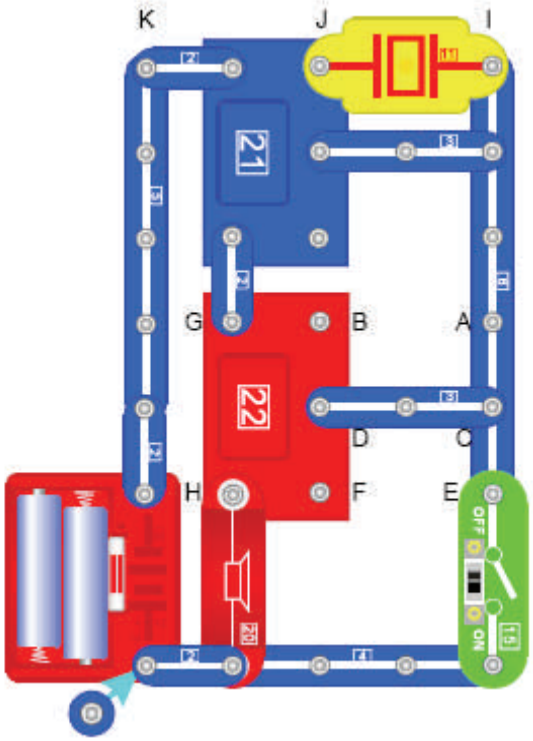
209. Touch controlled sound of vibration.
Replace the photo sensor with the touch plate. Connect terminals B and F. You can control the sound of vibration using the touch plate.

210. Touch controlled LED.
Replace the photo sensor with the touch plate. Replace the speaker with the LED. You can control the LED using the touch plate.

211. Touch controlled Bulb.
Replace the photo sensor with the touch plate. Replace the speaker with the bulb. You can control the bulb using the touch plate.

212. Light controlled Bulb.
Replace the speaker with the bulb. You can control the bulb using the photo sensor.

213. Light controlled LED.
Replace the speaker with the LED. You can control the LED using the photo sensor.



214. Sound controlled sound of a police car (1).
Switch on and when the sound stops, clap your hands and the sound will start again.

215. Sound controlled sound of a machine gun (1).
Connect terminals E and F, you can control the sound of the machine gun by clapping your hands.

216. Sound controlled sound of a fire engine (1).
Connect terminals A and B, you can control the sound of the fire engine by clapping your hands.
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217. Sound controlled sound of an ambulance (1).
Connect terminals B and G, you can control the sound of the ambulance by clapping your hands.
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218. Sound controlled sound of a gaming machine (1).
Remove the connector from terminals C and D, and connect terminals H and F. You can control the sound of the gaming machine by clapping your hands.

219. Sound controlled sound of vibration (1).
Connect terminals B and F. You can control the sound of vibration by clapping your hands.

220. Sound controlled sound of a police car (2).
Connect the buzzer to terminals J and K. Switch on and when the sound stops, clap your hands and the sound will start again.

221. Sound controlled sound of a machine gun (2).
Connect the buzzer to terminals J and K. Connect terminals E and F, you can control the sound of the machine gun by clapping your hands.

222. Sound controlled sound of a fire engine (2).
Connect the buzzer to terminals J and K. Connect terminals A and B, you can control the sound of the fire engine by clapping your hands.
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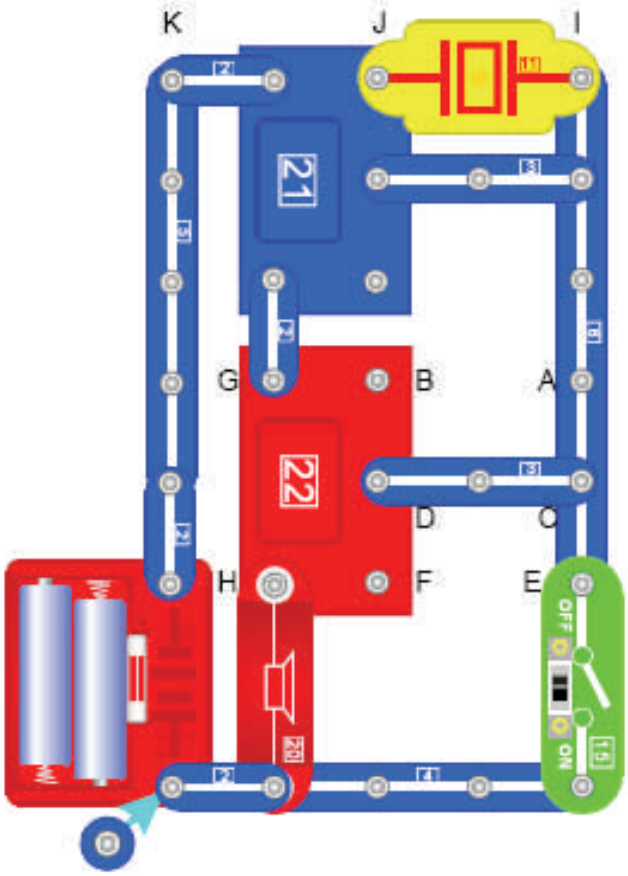


223. Sound controlled sound of an ambulance (2).
Connect the buzzer to terminals J and K. Connect terminals B and G, you can control the sound of the fire ambulance by clapping your hands.

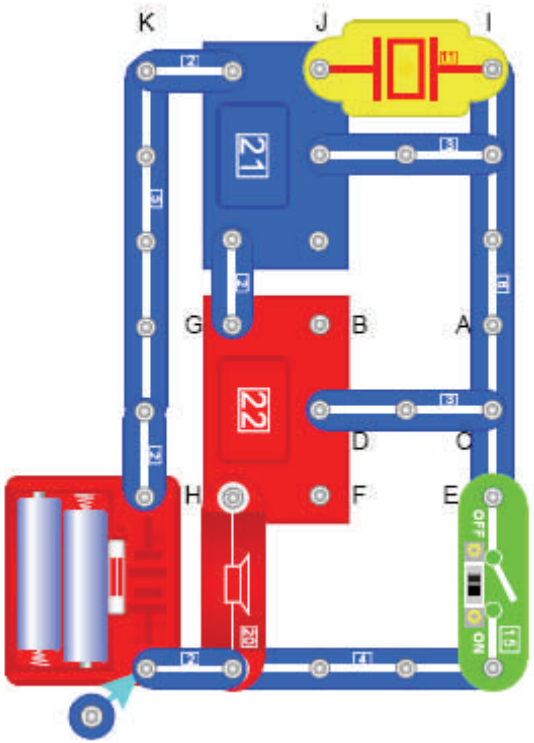
224. Sound controlled sound of a gaming machine (2).
Connect the buzzer to terminals J and K. Remove the connector from terminals C and D, and connect terminals H and F. You can control the sound of the gaming machine by clapping your hands.

225. Sound controlled sound of vibration (2).
Connect the buzzer to terminals J and K. Connect terminals B and F. You can control the sound of vibration by clapping your hands.

226. Motor controlled sound of a police car (1).
Replace the buzzer with the motor and connect terminals I and J. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

227. Motor controlled sound of a machine gun (1).
Replace the buzzer with the motor and connect terminals I and J. Connect terminals E and F, Switch on and when the sound stops, turn the motor shaft and the sound will start again.

228. Motor controlled sound of a fire engine (1).
Replace the buzzer with the motor and connect terminals I and J. Connect terminals A and B, Switch on and when the sound stops, turn the motor shaft and the sound will start again.



229. Motor controlled sound of an ambulance (1).
Replace the buzzer with the motor and connect terminals I and J. Connect terminals B and G, Switch on and when the sound stops, turn the motor shaft and the sound will start again.

230. Motor controlled sound of a gaming machine (1).
Replace the buzzer with the motor and connect terminals I and J. Remove the connector from terminals C and D, and connect terminals H and F. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

231. Motor controlled sound of vibration (1).
Replace the buzzer with the motor and connect terminals I and J. Connect terminals B and F. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

232. Motor controlled sound of a police car (2).
Connect the motor to terminals J and K. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

233. Motor controlled sound of a machine gun (2).
Connect the motor to terminals J and K. Connect terminals E and F. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

234. Motor controlled sound of a fire engine (2).
Connect the motor to terminals J and K. Connect terminals A and B. Switch on and when the sound stops, turn the motor shaft and the sound will start again.
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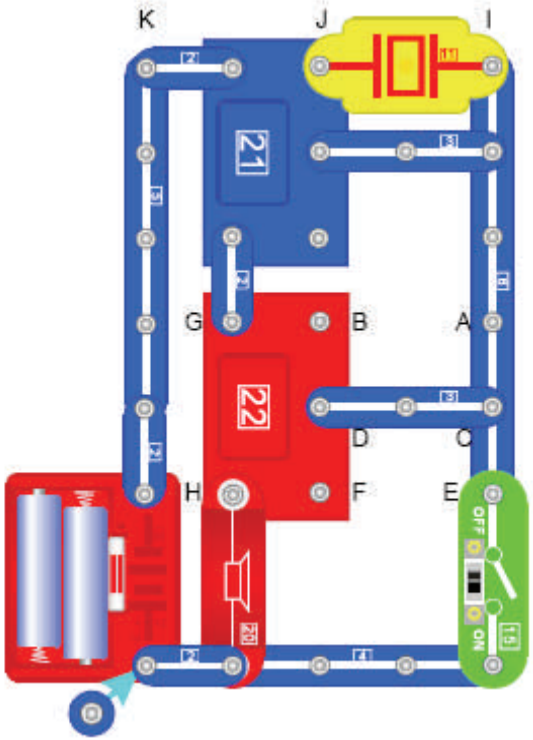
235. Motor controlled sound of an ambulance (2).
Connect the motor to terminals J and K. Connect terminals B and G. Switch on and when the sound stops, turn the motor shaft and the sound will start again.



236. Motor controlled sound of a gaming machine (2).
Connect the motor to terminals J and K. Remove the connector from terminals C and D, and connect terminals H and F. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

237. Motor controlled sound of vibration (2).
Connect the motor to terminals J and K. Connect terminals B and F. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

238. Vibration controlled sound of a police car (1).
Replace the buzzer with the vibration switch. Switch on and when the sound stops, tap the vibration switch and the sound will start again.

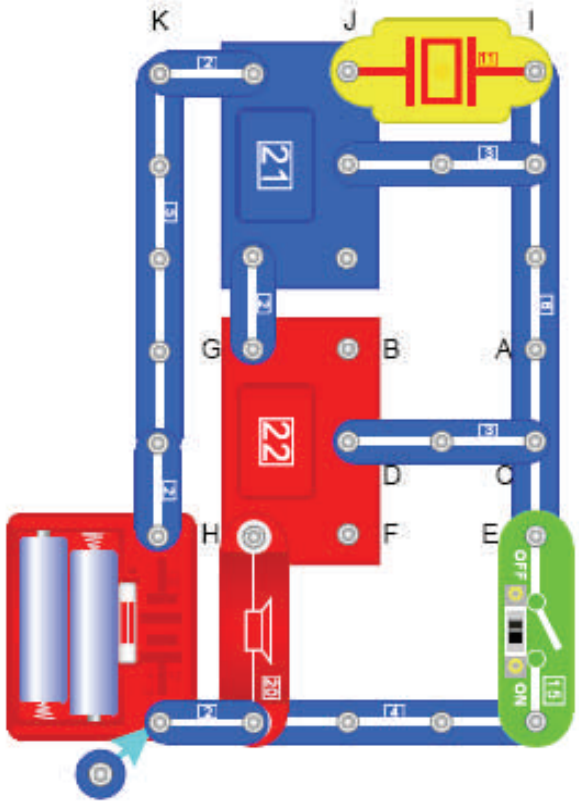
239. Vibration controlled sound of a machine gun (1).
Replace the buzzer with the vibration switch. Connect terminals E and F, Switch on and when the sound stops, tap the vibration switch and the sound will start again.

240. Vibration controlled sound of a fire engine (1).
Replace the buzzer with the vibration switch. Connect terminals A and B, Switch on and when the sound stops, tap the vibration switch and the sound will start again.

241. Vibration controlled sound of an ambulance (1).
Replace the buzzer with the vibration switch. Connect terminals B and G, Switch on and when the sound stops, tap the vibration switch and the sound will start again.

242. Vibration controlled sound of a gaming machine (1).
Replace the buzzer with the vibration switch. Remove the connector from terminals C and D, and connect terminals H and F. Switch on and when the sound stops, tap the vibration switch and the sound will start again.

243. Vibration controlled sound of vibration (1).
Replace the buzzer with the vibration switch. Connect terminals B and F. Switch on and when the sound stops, tap the vibration switch and the sound will start again.



244. Vibration controlled sound of a police car (2).
Connect the vibration switch to terminals J and K. Connect the resistor 30 to terminals I and J. Switch on and when the sound stops, tap the vibration switch and the sound will start again.

245. Vibration controlled sound of a machine gun (2).
Connect the vibration switch to terminals J and K. Connect the resistor 30 to terminals I and J. Connect terminals E and F. Switch on and when the sound stops, tap the vibration switch and the sound will start again.

246. Vibration controlled sound of a fire engine (2).
Connect the vibration switch to terminals J and K. Connect the resistor 30 to terminals I and J. Connect terminals A and B, Switch on and when the sound stops, tap the vibration switch and the sound will start again.

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247. Vibration controlled sound of an ambulance (2).
Connect the vibration switch to terminals J and K. Connect the resistor 30 to terminals I and J. Connect terminals B and G, Switch on and when the sound stops, tap the vibration switch and the sound will start again.

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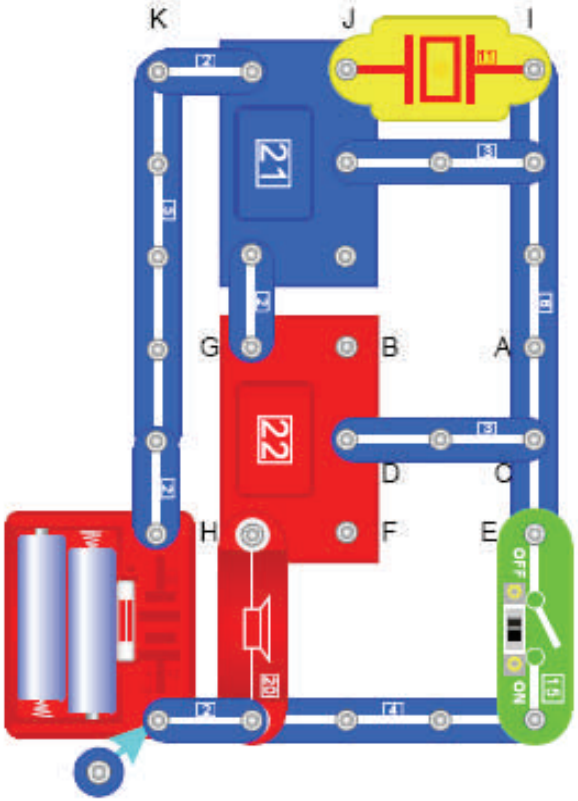
248. Vibration controlled sound of a gaming machine (2).
Connect the vibration switch to terminals J and K. Connect the resistor 30 to terminals I and J. Remove the connector from terminals C and D, and connect terminals H and F. Switch on and when the sound stops, tap the vibration switch and the sound will start again.

249. Vibration controlled sound of vibration (2).
Connect the vibration switch to terminals J and K. Connect the resistor 30 to terminals I and J. Connect terminals B and F. Switch on and when the sound stops, tap the vibration switch and the sound will start again.



250. Hand controlled sound of a police car (1).
Connect the press switch to terminals I and J. Switch on and when the sound stops, press the switch and the sound will start again.

251. Hand controlled sound of a machine gun (1).
Connect the press switch to terminals I and J. Connect terminals E and F, Switch on and when the sound stops, press the switch and the sound will start again.

252. Hand controlled sound of a fire engine (1).
Connect the press switch to terminals I and J. Connect terminals A and B, Switch on and when the sound stops, press the switch and the sound will start again.

253. Hand controlled sound of an ambulance (1).
Connect the press switch to terminals I and J. Connect terminals B and G, Switch on and when the sound stops, press the switch and the sound will start again.
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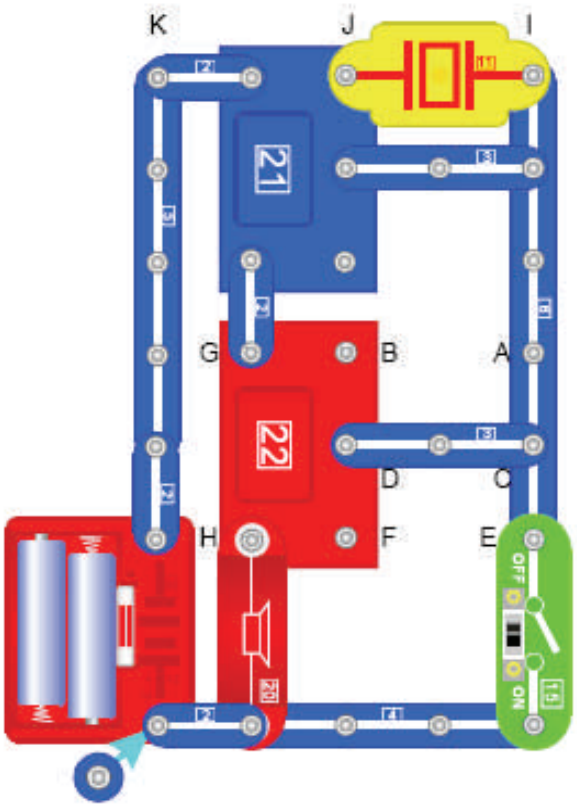
254. Hand controlled sound of a gaming machine (1).
Connect the press switch to terminals I and J. Remove the connector from terminals C and D, and connect terminals H and F. Switch on and when the sound stops, press the switch and the sound will start again.

255. Hand controlled sound of vibration (1).
Connect the press switch to terminals I and J. Connect terminals B and F. Switch on and when the sound stops, press the switch and the sound will start again.

256. Hand controlled sound of a police car (2).
Connect the press switch to terminals I and J. Switch on and when the sound stops, press the switch and the sound will start again.



257. Hand controlled sound of a machine gun (2).
Connect the press switch to terminals I and J Connect terminals E and F. Switch on and when the sound stops, press the switch and the sound will start again.

258. Hand controlled sound of a fire engine (2).
Connect the press switch to terminals I and J Connect terminals A and B, Switch on and when the sound stops, press the switch and the sound will start again.

259. Hand controlled sound of an ambulance (2).
Connect the press switch to terminals I and J Connect terminals B and G, Switch on and when the sound stops, press the switch and the sound will start again.

260. Hand controlled sound of a gaming machine (2).
Connect the press switch to terminals I and J Remove the connector from terminals C and D, and connect terminals H and F. Switch on and when the sound stops, press the switch and the sound will start again.

261. Hand controlled sound of vibration (2).
Connect the press switch to terminals I and J Connect terminals B and F. Switch on and when the sound stops, press the switch and the sound will start again.

262. Sound controlled flashing LED (1).
Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

263. Sound controlled flashing LED (2).
Connect the buzzer to terminals J and K. Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

264. Sound controlled flashing LED (3).
Remove the buzzer and connect the speaker to terminals I and J. Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

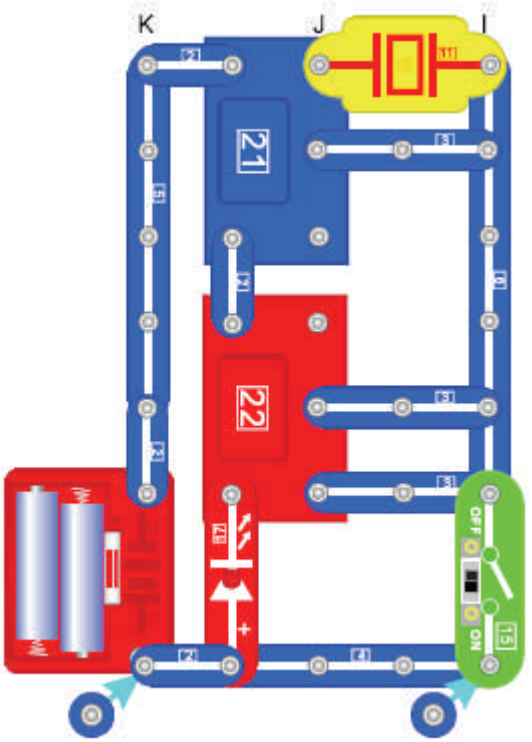
265. Sound controlled flashing LED (4).
Connect the speaker to terminals J and K. Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

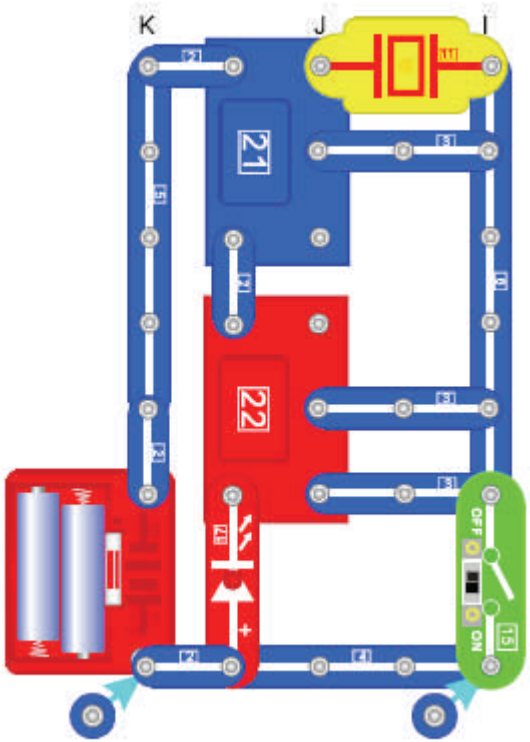
266. Motor controlled flashing LED (1).
Remove the buzzer and connect the motor to terminals I and J. Switch on and when the LED goes out, turn the motor shaft and the LED will flash for a period of time.

267. Motor controlled flashing LED (2).
Remove the buzzer and connect the motor to terminals J and K. Switch on and when the LED goes out, turn the motor shaft and the LED will flash for a period of time.

268. Hand controlled flashing LED (1).
Replace the buzzer with the press switch. Switch on and when the LED goes out, press the press switch and the LED will flash for a period of time.

269. Hand controlled flashing LED (2).
Remove the buzzer and connect the press switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the LED goes out, press the press switch and the LED will flash for a period of time.





270. Sound controlled flashing bulb (1).
Replace the LED with the bulb. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.

271. Sound controlled flashing bulb (2).
Replace the LED with the bulb. Connect the buzzer to terminals J and K. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.

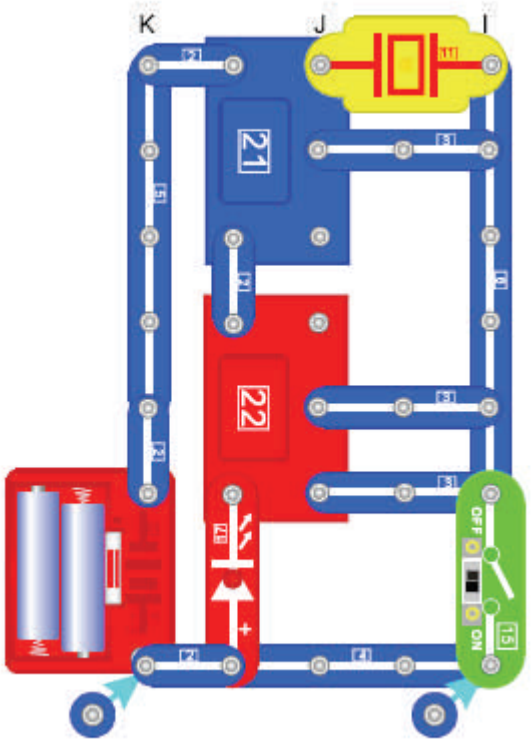
272. Sound controlled flashing bulb (3).
Replace the LED with the bulb. Remove the buzzer and connect the speaker to terminals I and J. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.

273. Sound controlled flashing bulb (4).
Replace the LED with the bulb. Connect the speaker to terminals J and K. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.

274. Motor controlled flashing bulb (1).
Replace the LED with the bulb. Remove the buzzer and connect the motor to terminals I and J. Switch on and when the bulb goes out, turn the motor shaft and the bulb will flash for a period of time.

275. Motor controlled flashing bulb (2).
Replace the LED with the bulb. Remove the buzzer and connect the motor to terminals J and K. Switch on and when the bulb goes out, turn the motor shaft and the bulb will flash for a period of time.

276. Hand controlled flashing bulb (1).
Replace the LED with the bulb. Replace the buzzer with the press switch. Switch on and when the bulb goes out, press the press switch and the bulb will flash for a period of time.



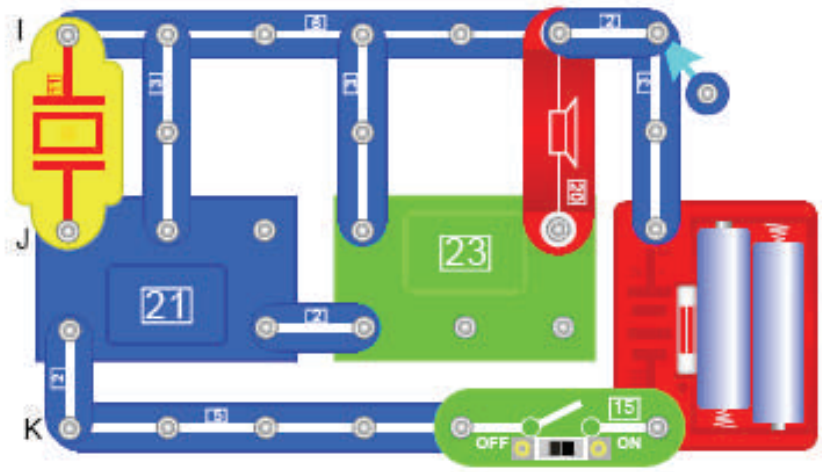
277. Hand controlled flashing bulb (2).
Replace the LED with the bulb. Remove the buzzer and connect the press switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the bulb goes out, press the press switch and the bulb will flash for a period of time.

278. Vibration controlled flashing LED (1).
Replace the buzzer with the vibration switch. Switch on and when the LED goes out, knock the vibration switch and the LED will flash for a period of time.

279. Vibration controlled flashing LED (2).
Remove the buzzer and connect the vibration switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the LED goes out, knock the vibration switch and the LED will flash for a period of time.

280. Vibration controlled flashing bulb (1).
Replace the LED with the bulb. Replace the buzzer with the vibration switch. Switch on and when the bulb goes out, knock the vibration switch and the bulb will flash for a period of time.

281. Vibration controlled flashing bulb (2).
Replace the LED with the bulb. Remove the buzzer and connect the vibration switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the bulb goes out, knock the vibration switch and the bulb will flash for a period of time.



282. Sound controlled space war sounds (1).
Switch on and when the sound stops, clap your hands and the sound will start again.

283. Sound controlled space war sounds (2).
Connect the buzzer to terminals J and K. Switch on and when the sound stops, clap your hands and the sound will start again.

284. Vibration controlled sound of space war (1).
Replace the buzzer with the vibration switch. Switch on and when the sound stops, knock the vibration switch and the sound will start again.

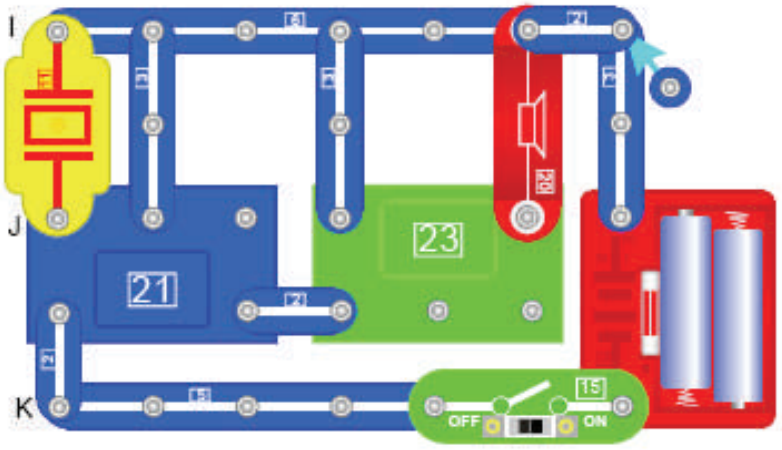
285. Vibration controlled sound of space war (2).
Replace the buzzer with the resistor 30. Connect the vibration switch to terminals J and K. Switch on and when the sound stops, knock the vibration switch and the sound will start again.

286. Hand controlled space war sounds (1).
Replace the buzzer with the press switch. Switch on and when the sound stops, press the switch and the sound will start again.

287. Hand controlled space war sounds (2).
Replace the buzzer with the resistor 30. Connect the press switch to terminals J and K. Switch on and when the sound stops, press the switch and the sound will start again.

288. Motor controlled space war sounds (1).
Replace the buzzer with the motor. Switch on and when the sound stops, turn the motor shaft and the sound will start again.

289. Motor controlled space war sounds (2).
Connect the motor to terminals J and K. Switch on and when the sound stops, turn the motor shaft and the sound will start again.



290. Sound controlled flashing LED (1).
Replace the speaker with the LED with the + end connected to the 6 connector. Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

291. Sound controlled flashing LED (2).
Connect the buzzer to terminals J and K. Replace the speaker with the LED with the + end connected to the 6 connector. Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

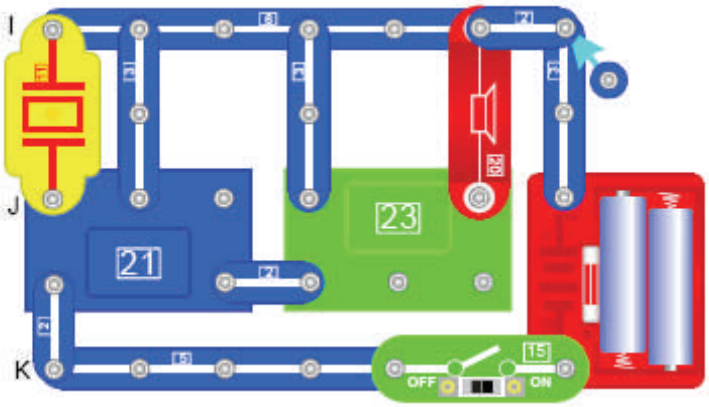
292. Sound controlled flashing LED (3).
Remove the buzzer and connect the speaker to terminals I and J. Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

293. Sound controlled flashing LED (4).
Connect the speaker to terminals J and K. Switch on and when the LED goes out, clap your hands and the LED will flash for a period of time.

294. Vibration controlled flashing LED (1).
Replace the buzzer with the vibration switch. Switch on and when the LED goes out, knock the vibration switch and the LED will flash for a period of time.

295. Vibration controlled flashing LED (2).
Remove the buzzer and connect the vibration switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the LED goes out, knock the vibration switch and the LED will flash for a period of time.

296. Hand controlled flashing LED (1).
Replace the buzzer with the press switch. Switch on and when the LED goes out, press the press switch and the LED will flash for a period of time.



297. Hand controlled flashing LED (2).
Remove the buzzer and connect the press switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the LED goes out, press the press switch and the LED will flash for a period of time.

298. Motor controlled flashing LED (1).
Remove the buzzer and connect the motor to terminals I and J. Switch on and when the LED goes out, turn the motor shaft and the LED will flash for a period of time.

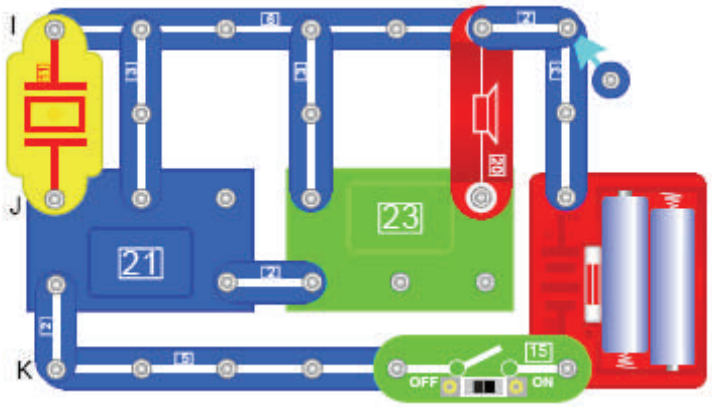
299. Motor controlled flashing LED (2).
Remove the buzzer and connect the motor to terminals J and K. Switch on and when the LED goes out, turn the motor shaft and the LED will flash for a period of time.

300. Sound controlled flashing bulb (1).
Replace the speaker with the bulb. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.

301. Sound controlled flashing bulb (2).
Connect the buzzer to terminals J and K. Replace the speaker with the bulb. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.

302. Sound controlled flashing bulb (3).
Remove the buzzer and connect the speaker to terminals I and J. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.

303. Sound controlled flashing bulb (4).
Connect the speaker to terminals J and K. Switch on and when the bulb goes out, clap your hands and the bulb will flash for a period of time.



304. Vibration controlled flashing bulb (1).
Replace the buzzer with the vibration switch. Switch on and when the bulb goes out, knock the vibration switch and the bulb will flash for a period of time.

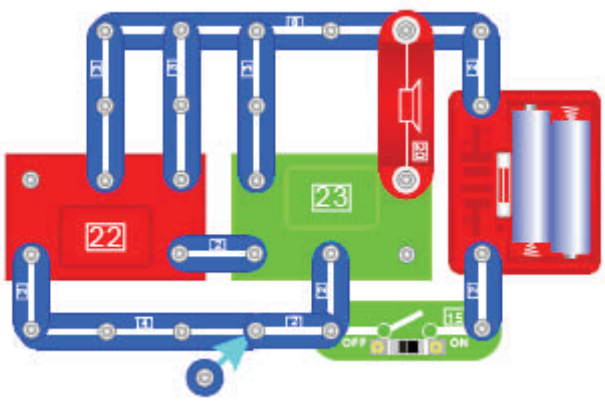
305. Vibration controlled flashing bulb (2).
Remove the buzzer and connect the vibration switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the bulb goes out, knock the vibration switch and the bulb will flash for a period of time.

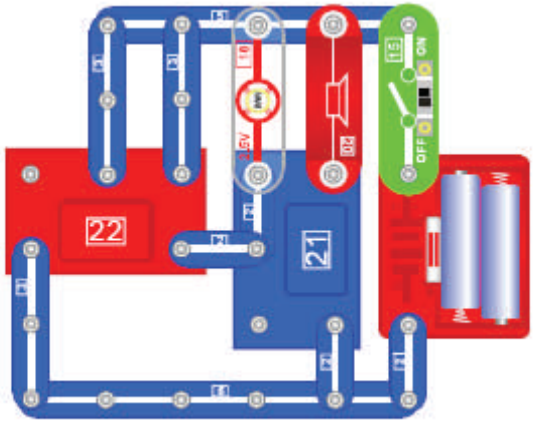
306. Hand controlled flashing bulb (1).
Replace the buzzer with the press switch. Switch on and when the bulb goes out, press the press switch and the bulb will flash for a period of time.

307. Hand controlled flashing bulb (2).
Remove the buzzer and connect the press switch to terminals J and K. Connect the resistor to terminals I and J. Switch on and when the bulb goes out, press the press switch and the bulb will flash for a period of time.

308. Motor controlled flashing bulb (1).
Remove the buzzer and connect the motor to terminals I and J. Switch on and when the bulb goes out, turn the motor shaft and the bulb will flash for a period of time.

309. Motor controlled flashing bulb (2).
Remove the buzzer and connect the motor to terminals J and K. Switch on and when the bulb goes out, turn the motor shaft and the bulb will flash for a period of time.





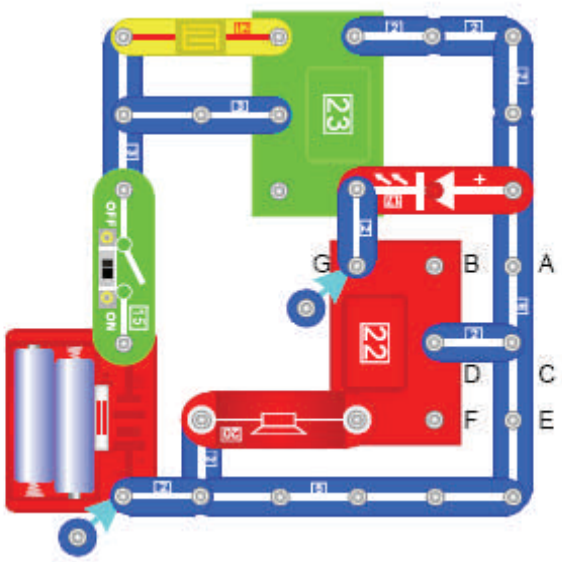
310. Sound of space warfare.
Switch on and the speaker will make the sound of space warfare.

311. Flashing LED.
Replace the speaker with the LED. Switch on and the LED will flash.

312. Flashing bulb.
Replace the speaker with the bulb. Switch on and the bulb will flash.

313. Intermittent bleep.
Switch on and the bulb will flash and the speaker will give out a bleep sound. This is the result of using the sound of a machine gun from the music IC to control the alarm IC.

314. Flashing bulb and LED.
Replace the speaker with the LED. Switch on and the bulb and the LED will flash.



315. Touch controlled sound of an acousto-optic police car.
Switch on and touch the touch plate, the speaker will give out the sound of a police car and the LED will flash.

316. Touch controlled sound of an acousto-optic machine gun.
Connect the terminals E and F. Switch on and touch the touch plate, the speaker will give out the sound of a machine gun and the LED will flash.

317. Touch controlled sound of an acousto-optic fire engine.
Connect terminals A and B, Switch on and touch the touch plate, the speaker will give out the sound of a fire engine and the LED will flash.

318. Touch controlled sound of an acousto-optic ambulance.
Connect terminals B and G, Switch on and touch the touch plate, the speaker will give out the sound of an ambulance and the LED will flash.
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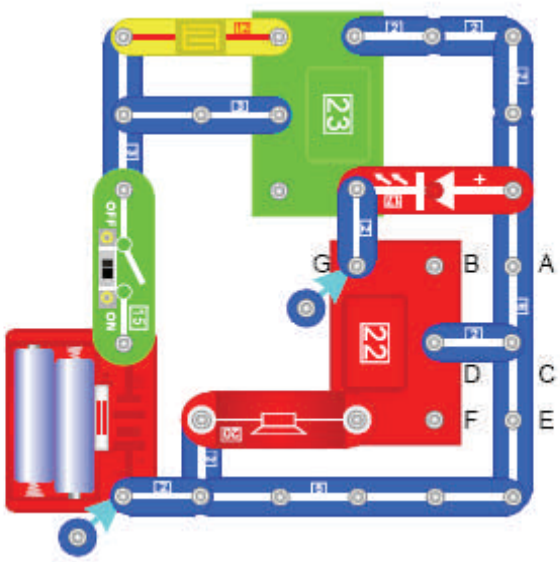
319. Touch controlled sound of an acousto-optic gaming machine.
Remove the connector from terminals C and D. Switch on and touch the touch plate, the speaker will give out the sound of a gaming machine and the LED will flash.

320. Touch controlled sound of acousto-optic vibration.
Connect terminals B and F. Switch on and touch the touch plate, the speaker will give out the sound of vibration and the LED will flash.

321. Vibration controlled sound of an acousto-optic police car.
Replace the touch plate with the vibration switch. Switch on and tap the vibration switch, the speaker will give out the sound of a police car and the LED will flash.

322. Vibration controlled sound of an acousto-optic machine gun.
Replace the touch plate with the vibration switch. Connect the terminals E and F. Switch on and tap the vibration switch, the speaker will give out the sound of a machine gun and the LED will flash.



323. Vibration controlled sound of an acousto-optic fire engine.
Replace the touch plate with the vibration switch. Connect terminals A and B, Switch on and tap the vibration switch, the speaker will give out the sound of a fire engine and the LED will flash.

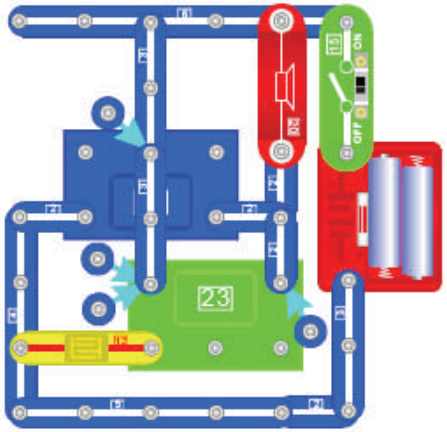
324. Vibration controlled sound of an acousto-optic ambulance.
Replace the touch plate with the vibration switch. Connect terminals B and G, Switch on and tap the vibration switch, the speaker will give out the sound of an ambulance and the LED will flash.

325. Vibration controlled sound of an acousto-optic gaming machine.
Replace the touch plate with the vibration switch. Remove the connector from terminals C and D. Switch on and tap the vibration switch,, the speaker will give out the sound of a gaming machine and the LED will flash.

326. Touch controlled sound of acousto-optic vibration.
Replace the touch plate with the vibration switch. Connect terminals B and F. Switch on and touch the touch plate, the speaker will give out the sound of vibration and the LED will flash.

327. Vibration controlled sound of acousto-optic noise.
Replace the alarm IC with the music IC. Switch on and tap the vibration switch, the speaker will give out noise and the LED will flash.

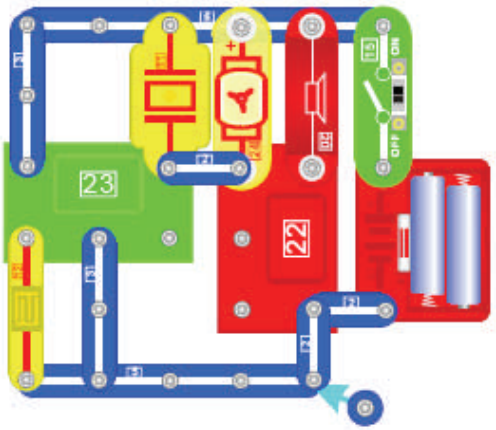
328. Touch controlled sound of acousto-optic noise.
Replace the alarm IC with the music IC and the vibration switch with the touch plate. Switch on and touch the touch switch, the speaker will give out noise and the LED will flash.



The next three experiments refer to the diagram on the left.

329. Touch controlled sound of space music.
Switch on and only music plays, touch the touch switch, the speaker will give out the music mixed with the sound of space wars.

330. Hand controlled sound of space music.
Replace the touch plate with the press switch. Switch on and only music plays, press the press switch, the speaker will give out the music mixed with the sound of space wars.



These next experiments refer to the diagram on the right.

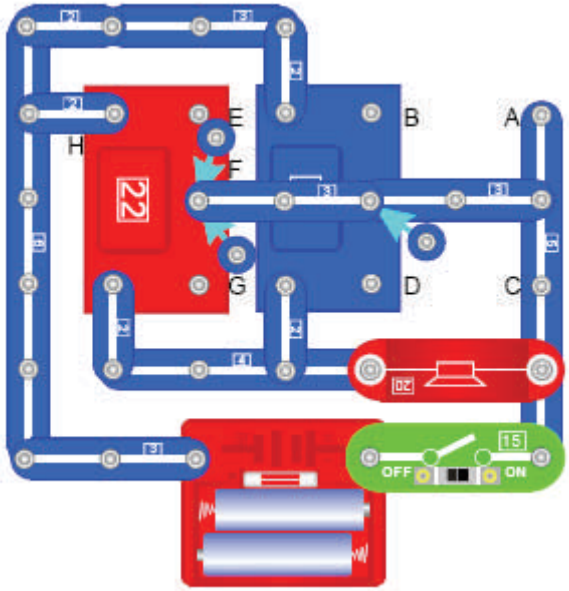
331. Vibration controlled sound of space music.
Replace the touch plate with the vibration switch. Switch on and only music plays tap the vibration switch, the speaker will give out the music mixed with the sound of space wars.

332. Touch controlled sound of space machine gun.
Switch on and the machine gun sounds. Touch the touch plate, the speaker will make the sound of the machine gun mixed with the sound of space wars.

333. Vibration controlled sound of space machine gun.
Replace the touch plate with the vibration switch. Switch on and the machine gun sounds. Tap the vibration switch, the speaker will make the sound of the machine gun mixed with the sound of space wars.

334. Vibration controlled sound of space machine gun.
Replace the buzzer with the LED, + end to the 6 connector. Switch on and tap the vibration switch, the speaker will make the sound of the machine gun mixed with the sound of space wars and the LED will flash.

335. Touch controlled sound of space machine gun.
Replace the buzzer with the LED, + end to the 6 connector. Switch on and touch the touch switch, the speaker will make the sound of the machine gun mixed with the sound of space wars and the LED will flash.



336. Hand controlled musical sound of a police car.
Connect the press switch to terminals C and D. Switch on and when the music stops, press the press switch and the music and sound will start again.

337. Light controlled musical sound of a police car.
Connect the photosensor to terminals C and D. Put your finger over the photosensor, switch on and when the music stops, take you finger off the photosensor, the music and sound will start again.

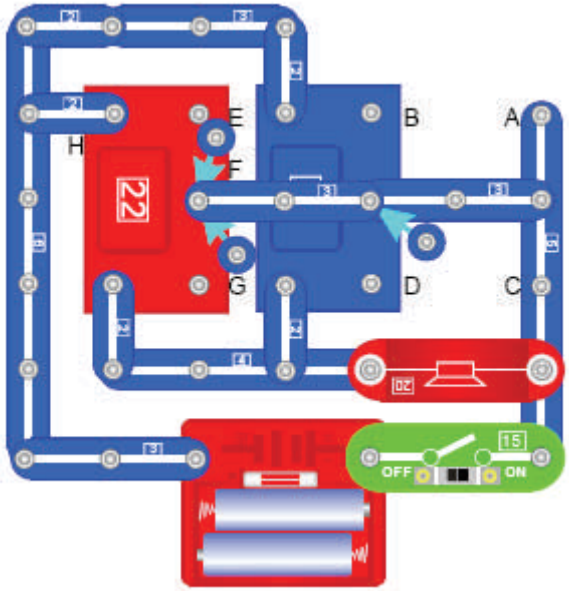
338. Touch controlled musical sound of a police car.
Connect the touch plate to terminals C and D. Switch on and when the music stops, touch the touch switch, the music and sound will start again.

339. Hand controlled musical sound of a police car.
Connect the press switch to terminals A and B. Switch on and when the music stops, press the press switch, the music and sound will start again.

340. Vibration controlled musical sound of a police car.
Connect the vibration switch to terminals A and B. Switch on and when the music stops, tap the vibration switch, the music and sound will start again.

341. Motor controlled musical sound of a police car.
Connect the motor to terminals A and B. Switch on and when the music stops, turn the motor shaft, the music and sound will start again.

342. Hand controlled musical sound of a machine gun.
Connect the press switch to terminals A and B and connect terminals F and G. Switch on and when the music stops, press the press switch, the music and sound will start again.



343. Light controlled musical sound of a machine gun.
Connect the photosensor to terminals C and D and connect terminals F and G.. Put your finger over the photosensor, switch on and when the music stops, take you finger off the photosensor, the music and sound will start again.

344. Touch controlled musical sound of a machine gun.
Connect the touch plate to terminals C and D and connect terminals F and G. Switch on and when the music stops, touch the touch switch, the music and sound will start again.

345. Hand controlled musical sound of a machine gun.
Connect the press switch to terminals A and B and connect terminals F and G. Switch on and when the music stops, press the press switch, the music and sound will start again.

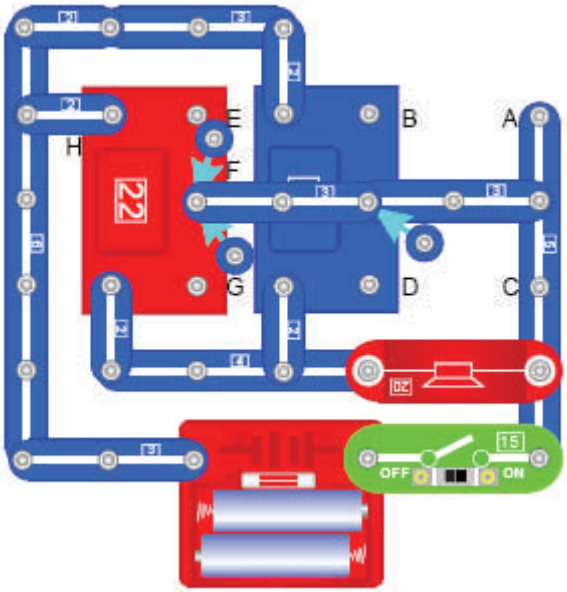
346. Vibration controlled musical sound of a machine gun.
Connect the vibration switch to terminals A and B and connect terminals F and G. Switch on and when the music stops, tap the vibration switch, the music and sound will start again.

347. Motor controlled musical sound of a machine gun.
Connect the motor to terminals A and B and connect terminals F and G. Switch on and when the music stops, turn the motor shaft, the music and sound will start again.

348. Hand controlled musical sound of a fire engine.
Connect the press switch to terminals A and B and connect terminals E and F. Switch on and when the music stops, press the press switch, the music and sound will start again.

349. Light controlled musical sound of a fire engine.
Connect the photosensor to terminals C and D and connect terminals E and F.. Put your finger over the photosensor, switch on and when the music stops, take you finger off the photosensor, the music and sound will start again.

350. Touch controlled musical sound of a fire engine.
Connect the touch plate to terminals C and D and connect terminals E and F. Switch on and when the music stops, touch the touch switch, the music and sound will start again.



351. Hand controlled musical sound of a fire engine.
Connect the press switch to terminals A and B and connect terminals E and F. Switch on and when the music stops, press the press switch, the music and sound will start again.

352. Vibration controlled musical sound of a fire engine.
Connect the vibration switch to terminals A and B and connect terminals E and F. Switch on and when the music stops, tap the vibration switch, the music and sound will start again.

353. Motor controlled musical sound of a fire engine.
Connect the motor to terminals A and B and connect terminals E and F. Switch on and when the music stops, turn the motor shaft, the music and sound will start again.

354. Hand controlled musical sound of an ambulance.
Connect the press switch to terminals A and B and connect terminals E and H. Switch on and when the music stops, press the press switch, the music and sound will start again.

355. Light controlled musical sound of a fire engine.
Connect the photosensor to terminals C and D and connect terminals E and H. Put your finger over the photosensor, switch on and when the music stops, take you finger off the photosensor, the music and sound will start again.

356. Touch controlled musical sound of a fire engine.
Connect the touch plate to terminals C and D and connect terminals E and H. Switch on and when the music stops, touch the touch switch, the music and sound will start again.

357. Hand controlled musical sound of a fire engine.
Connect the press switch to terminals A and B and connect terminals E and H. Switch on and when the music stops, press the press switch, the music and sound will start again.

358. Vibration controlled musical sound of a fire engine.
Connect the vibration switch to terminals A and B and connect terminals E and H. Switch on and when the music stops, tap the vibration switch, the music and sound will start again.

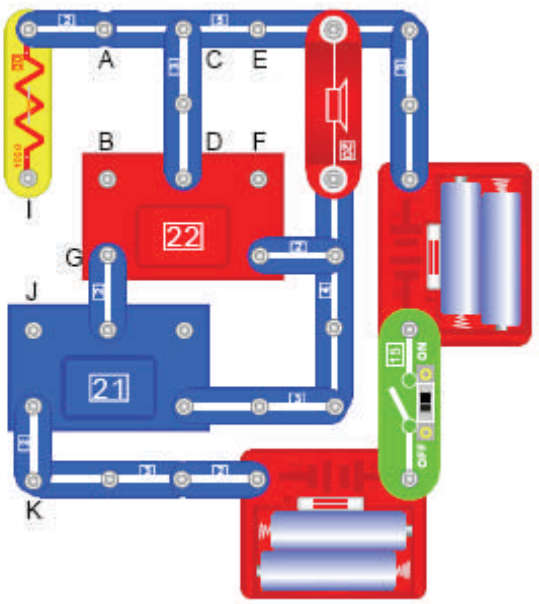
359. Motor controlled musical sound of a fire engine.
Connect the motor to terminals A and B and connect terminals E and H. Switch on and when the music stops, turn the motor shaft, the music and sound will start again.

360. Hand controlled musical sound of a police car (1).
Connect the press switch to terminals I and J. Switch on and when the music stops, press the press switch and the music and sound will start again.

361. Hand controlled musical sound of a police car (2).
Connect the press switch to terminals K and J, connect the motor to terminals I and K. Switch on and when the music stops, press the press switch and the music and sound will start again.

362. Sound controlled musical sound of a police car (1).
Connect the buzzer to terminals I and J. Switch on and when the music stops, clap you hands and the music and sound will start again.

363. Sound controlled musical sound of a police car (2).
Connect the buzzer to terminals K and J. Switch on and when the music stops, clap you hands and the music and sound will start again.



364. Vibration controlled musical sound of a police car (1).
Connect the vibration switch to terminals I and J, connect the motor to terminals I and J. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

365. Vibration controlled musical sound of a police car (2).
Connect the vibration switch to terminals J and K. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

366. Motor controlled musical sound of a police car (1).
Connect the motor to terminals I and J also connect terminals J and K. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

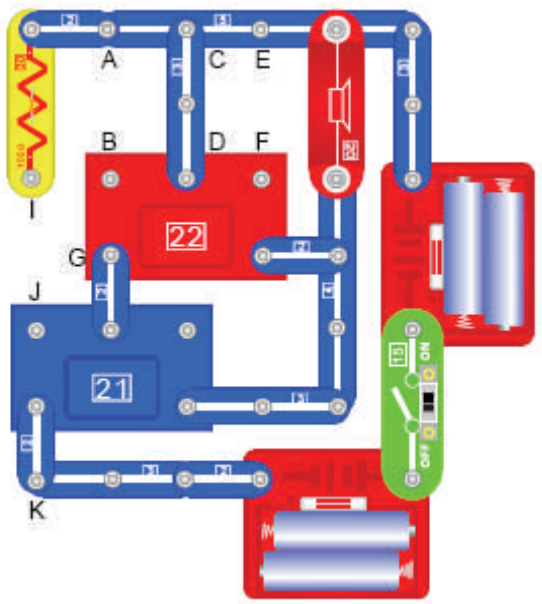
367. Motor controlled musical sound of a police car (2).
Connect the motor to terminals J and K also connect terminals I and J. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

368. Hand controlled musical sound of a machine gun (1).
Connect terminals D and F. Connect the press switch to terminals I and J. Switch on and when the music stops, press the press switch and the music and sound will start again.

369. Hand controlled musical sound of a machine gun (2).
Connect terminals D and F. Connect the press switch to terminals K and J, connect the motor to terminals I and K. Switch on and when the music stops, press the press switch and the music and sound will start again.

370. Sound controlled musical sound of a machine gun (1).
Connect terminals D and F. Connect the buzzer to terminals I and J. Switch on and when the music stops, clap you hands and the music and sound will start again.

371. Sound controlled musical sound of a machine gun (2).
Connect terminals D and F. Connect the buzzer to terminals K and J. Switch on and when the music stops, clap you hands and the music and sound will start again.



372. Vibration controlled musical sound of a machine gun (1).
Connect terminals D and F. Connect the vibration switch to terminals I and J, connect the motor to terminals I and J. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

373. Vibration controlled musical sound of a machine gun (2).
Connect terminals D and F. Connect the vibration switch to terminals J and K. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

374. Motor controlled musical sound of a machine gun (1).
Connect terminals D and F. Connect the motor to terminals I and J also connect terminals J and K. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

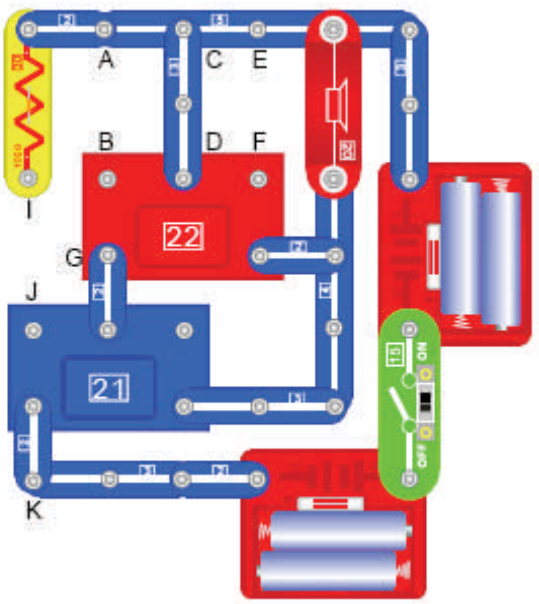
375. Motor controlled musical sound of a machine gun (2).
Connect terminals D and F. Connect the motor to terminals J and K also connect terminals I and J. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

376. Hand controlled musical sound of a fire engine (1).
Connect terminals B and D. Connect the press switch to terminals I and J. Switch on and when the music stops, press the press switch and the music and sound will start again.

377. Hand controlled musical sound of a fire engine (2).
Connect terminals B and D. Connect the press switch to terminals K and J, connect the motor to terminals I and K. Switch on and when the music stops, press the press switch and the music and sound will start again.

378. Sound controlled musical sound of a fire engine (1).
Connect terminals B and D. Connect the buzzer to terminals I and J. Switch on and when the music stops, clap you hands and the music and sound will start again.

379. Sound controlled musical sound of a fire engine (2).
Connect terminals B and D. Connect the buzzer to terminals K and J. Switch on and when the music stops, clap you hands and the music and sound will start again.



380. Vibration controlled musical sound of a fire engine (1).
Connect terminals B and D. Connect the vibration switch to terminals I and J, connect the motor to terminals I and J. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

381. Vibration controlled musical sound of a fire engine (2).
Connect terminals B and D. Connect the vibration switch to terminals J and K. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

382. Motor controlled musical sound of a fire engine (1).
Connect terminals B and D. Connect the motor to terminals I and J also connect terminals J and K. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

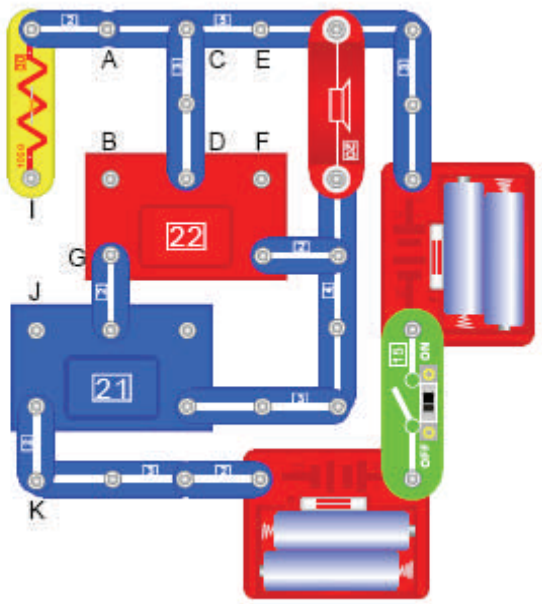
383. Motor controlled musical sound of a fire engine (2).
Connect terminals B and D. Connect the motor to terminals J and K also connect terminals I and J. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

384. Hand controlled musical sound of an ambulance (1).
Connect terminals B and G. Connect the press switch to terminals I and J. Switch on and when the music stops, press the press switch and the music and sound will start again.

385. Hand controlled musical sound of an ambulance (2).
Connect terminals B and G. Connect the press switch to terminals K and J, connect the motor to terminals I and K. Switch on and when the music stops, press the press switch and the music and sound will start again.

386. Sound controlled musical sound of an ambulance (1).
Connect terminals B and G. Connect the buzzer to terminals I and J. Switch on and when the music stops, clap you hands and the music and sound will start again.

387. Sound controlled musical sound of an ambulance (2).
Connect terminals B and G. Connect the buzzer to terminals K and J. Switch on and when the music stops, clap you hands and the music and sound will start again.



388. Vibration controlled musical sound of an ambulance (1).
Connect terminals B and G. Connect the vibration switch to terminals I and J. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

389. Vibration controlled musical sound of an ambulance (2).
Connect terminals B and G. Connect the vibration switch to terminals J and K. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

390. Motor controlled musical sound of an ambulance (1).
Connect terminals B and G. Connect the motor to terminals I and J also connect terminals J and K. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

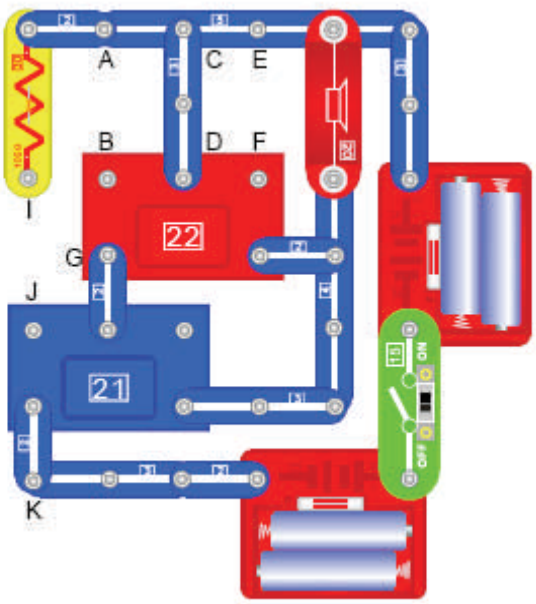
391. Motor controlled musical sound of an ambulance (2).
Connect terminals B and G. Connect the motor to terminals J and K also connect terminals I and J. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

392. Hand controlled musical sound of a gaming machine (1).
Remove the connection from C and D. Connect the press switch to terminals I and J. Switch on and when the music stops, press the press switch and the music and sound will start again.

393. Hand controlled musical sound of a gaming machine (2).
Remove the connection from C and D. Connect the press switch to terminals K and J, connect the motor to terminals I and K. Switch on and when the music stops, press the press switch and the music and sound will start again.

394. Sound controlled musical sound of a gaming machine (1).
Remove the connection from C and D. Connect the buzzer to terminals I and J. Switch on and when the music stops, clap you hands and the music and sound will start again.

395. Sound controlled musical sound of a gaming machine (2).
Remove the connection from C and D. Connect the buzzer to terminals K and J. Switch on and when the music stops, clap you hands and the music and sound will start again.



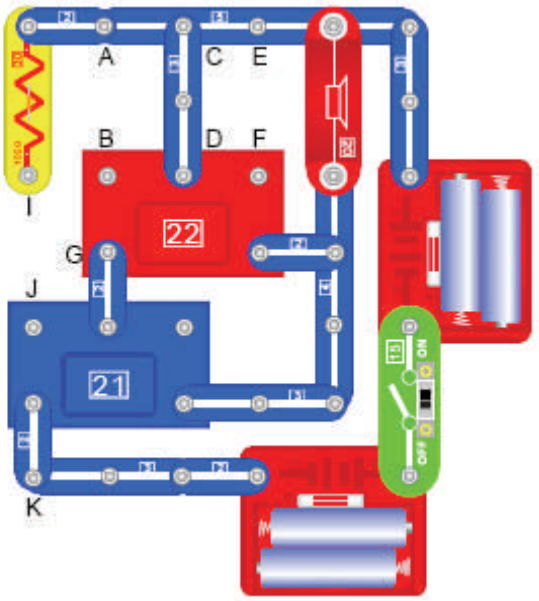
396. Vibration controlled musical sound of a gaming machine (1).
Remove the connection from C and D. Connect the vibration switch to terminals I and J, connect the motor to terminals I and J. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

397. Vibration controlled musical sound of a gaming machine (2).
Remove the connection from C and D. Connect the vibration switch to terminals J and K. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

398. Motor controlled musical sound of a gaming machine (1).
Remove the connection from C and D. Connect the motor to terminals I and J also connect terminals J and K. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

399. Motor controlled musical sound of a gaming machine (2).
Remove the connection from C and D. Connect the motor to terminals J and K also connect terminals I and J. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

400. Hand controlled musical sound of vibration (1).
Connect terminals B and F. Connect the press switch to terminals I and J. Switch on and when the music stops, press the press switch and the music and sound will start again.



401. Hand controlled musical sound of vibration (2).
Connect terminals B and F. Connect the press switch to terminals K and J, connect the motor to terminals I and K. Switch on and when the music stops, press the press switch and the music and sound will start again.

402. Sound controlled musical sound of vibration (1).
Connect terminals B and F. Connect the buzzer to terminals I and J. Switch on and when the music stops, clap you hands and the music and sound will start again.

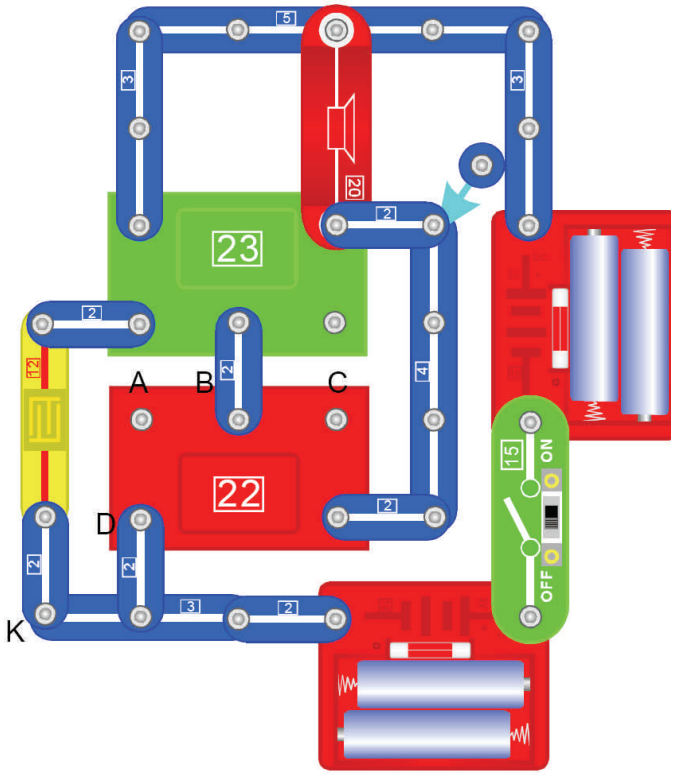
403. Sound controlled musical sound of vibration (2).
Connect terminals B and F. Connect the buzzer to terminals K and J. Switch on and when the music stops, clap you hands and the music and sound will start again.

404. Vibration controlled musical sound of vibration (1).
Connect terminals B and F. Connect the vibration switch to terminals I and J, connect the motor to terminals I and J. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

405. Vibration controlled musical sound of vibration (2).
Connect terminals B and F. Connect the vibration switch to terminals J and K. Switch on and when the music stops, tap the vibration switch and the music and sound will start again.

406. Motor controlled musical sound of vibration (1).
Connect terminals B and F. Connect the motor to terminals I and J also connect terminals J and K. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.

407. Motor controlled musical sound of vibration (2).
Connect terminals B and F. Connect the motor to terminals J and K also connect terminals I and J. Switch on and when the music stops, turn the motor shaft and the music and sound will start again.



408. Touch controlled sound of space police car.
Switch on and then touch the touch plate and the speaker will make the sound of a space police car.

409. Touch controlled sound of space machine gun.
Connect terminals B and C. Switch on and then touch the touch plate and the speaker will make the sound of a space machine gun.

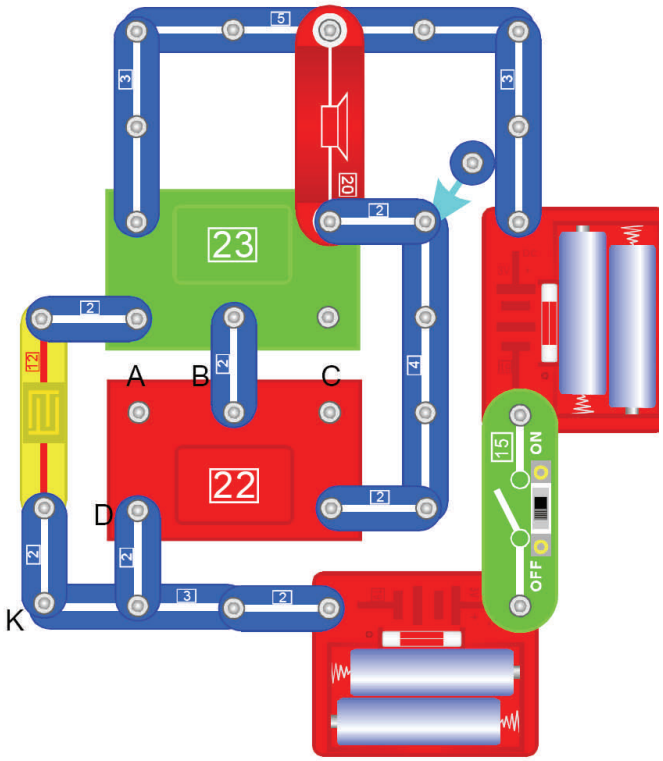
410. Touch controlled sound of space fire engine.
Connect terminals A and B. Switch on and then touch the touch plate and the speaker will make the sound of a space fire engine.

411. Touch controlled sound of space ambulance.
Connect terminals A and D. Switch on and then touch the touch plate and the speaker will make the sound of a space ambulance.

412. Touch controlled sound of space vibration.
Connect terminals A and C. Switch on and then touch the touch plate and the speaker will make the sound of a space vibration.

413. Vibration controlled sound of space police car.
Replace the touch plate with the vibration switch. Switch on and then tap the vibration switch and the speaker will make the sound of a space police car.

414. Vibration controlled sound of space machine gun.
Replace the touch plate with the vibration switch. Connect terminals B and C. Switch on and then tap the vibration switch and the speaker will make the sound of a space machine gun.



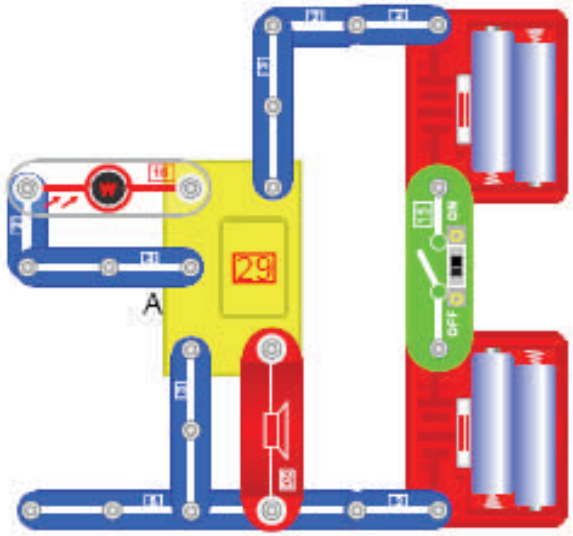
415. Vibration controlled sound of space fire engine.
Replace the touch plate with the vibration switch. Connect terminals A and B. Switch on and then tap the vibration switch and the speaker will make the sound of a space fire engine.

416. Vibration controlled sound of space ambulance.
Replace the touch plate with the vibration switch. Connect terminals A and D. Switch on and then tap the vibration switch and the speaker will make the sound of a space ambulance.

417. Vibration controlled sound of space vibration.
Replace the touch plate with the vibration switch. Connect terminals A and C. Switch on and then tap the vibration switch and the speaker will make the sound of a space vibration.

418. Vibration controlled flashing bulb.
Replace the touch plate with the vibration switch and the speaker with the bulb. Connect terminals B and C. Switch on and then tap the vibration switch and the bulb will light up.

419. Touch controlled flashing bulb.
Replace the speaker with the bulb. Connect terminals B and C. Switch on and then touch the touch plate and the bulb will light up.



420. Light controlled sound of space vibration.
Switch on. To stop the sound, put your finger over the photosensor, The light seal must be good to completely stop the sound, a bottle top works well!

421. Touch controlled sound of space vibration.
Replace the photosensor with the touch plate. Switch on and put your finger on the touch plate.

422. High pitched sound of space.
Replace the photosensor with the buzzer. Switch on and the speaker will make a high pitched space sound.

423. Hand controlled sound of space buzz.
Replace the photosensor with the press switch. Switch on and press the press switch.

424. Light controlled sound of space buzz.
Replace the speaker with the buzzer. Switch on. To stop the sound, put your finger over the photosensor, The light seal must be good to completely stop the sound, a bottle top works well!

425. Touch controlled sound of space noise.
Replace the photosensor with the touch plate. Replace the speaker with the buzzer. Switch on and put your finger on the touch plate.

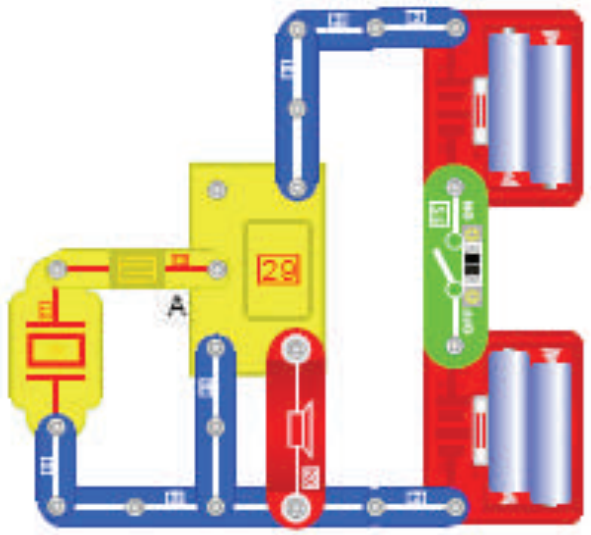
426. Hand controlled sound of space buzz.
Replace the photosensor with the press switch. Replace the speaker with the buzzer. Switch on and press the press switch.

427. Hand controlled sound of space buzz.
Replace the photosensor with the touch plate. Switch on and put a finger on the touch plate and on point A, remove and replace the finger on point A to vary the sound.

428. Touch controlled sound of howling.
Switch on and put your finger on the touch plate, the speaker will give out a howling sound.

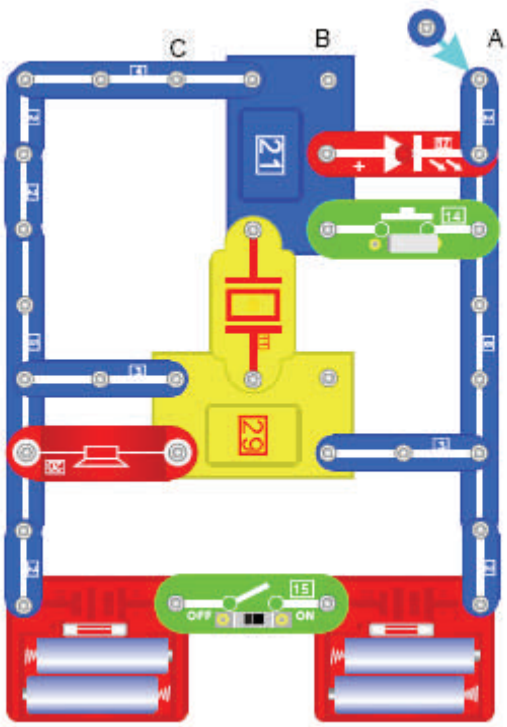
429. Light controlled sound of howling.
Replace the touch plate with the photosensor. Switch on and the speaker will give out a howling sound. To stop the sound, put your finger over the photosensor.

430. Hand controlled sound of howling.
Replace the touch plate with the press switch. Switch on and press the press switch, the speaker will give out a howling sound.



431. Touch controlled sound of squeaking.
Switch on and put a finger on the top speaker connection then rub the touch plate with another finger, the speaker will give out a squeaking sound.

432. Touch controlled loud sound of squeaking.
Switch on and put a finger on the top connection of module 29 then rub the touch plate with another finger, the speaker will give out a loud squeaking sound.



433. Hand controlled varied tone music.
Switch on and press the press switch, the speaker will give out varied tone music.

434. Magnet controlled varied tone music.
Replace the press switch with the dry reed relay. Switch on and bring a magnet close to the dry reed switch, the speaker will give out varied tone music.

435. Light controlled varied tone music.
Replace the press switch with the photosensor. Switch on and the speaker will give out varied tone music. To stop the music, put your finger over the photosensor.

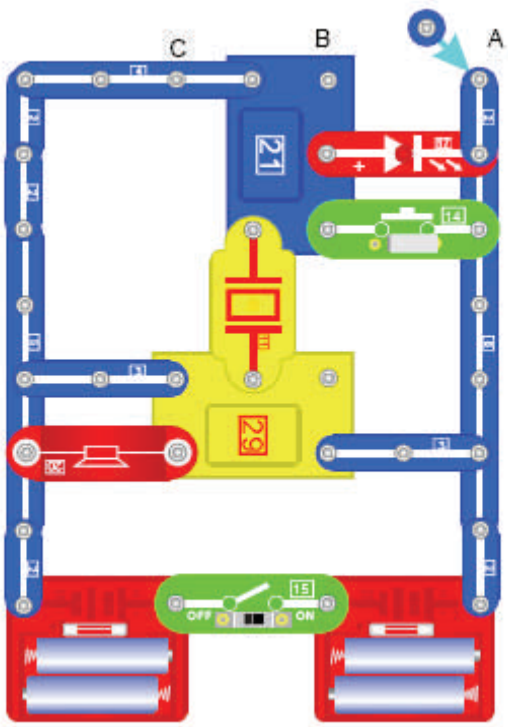
436. Vibration controlled varied tone music (1).
Replace the press switch with the vibration switch. Switch on and tap the vibration switch, the speaker will give out varied tone music.

437. Vibration controlled varied tone music (2).
Connect the vibration switch to terminals B and C. Connect the resistor switch to terminals A and B. Switch on and tap the vibration switch, the speaker will give out varied tone music.

438. Touch controlled varied tone music.
Replace the press switch with the touch plate. Switch on and put a finger on the touch plate, the speaker will give out varied tone music.

439. Hand controlled high volume music.
Replace the buzzer with the capacitor. Switch on and the speaker will give out high volume music.

440. Magnet controlled high volume music.
Replace the buzzer with the capacitor and replace the press switch with the dry reed switch. Switch on and bring a magnet close to the dry reed switch, the speaker will give out high volume music.



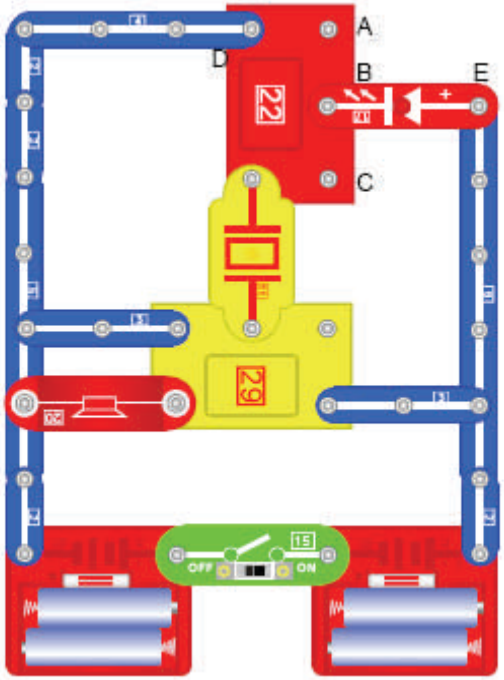
441. Light controlled high volume music.
Replace the buzzer with the capacitor. Replace the press switch with the photosensor. Switch on and the speaker will give out high volume music. To stop the music, put your finger over the photosensor.

442. Vibration controlled high volume music (1).
Replace the buzzer with the capacitor. Replace the press switch with the vibration switch. Switch on and tap the vibration switch, the speaker will give out high volume music.

443. Vibration controlled high volume music (2).
Replace the buzzer with the capacitor. Connect the vibration switch to terminals B and C. Connect the resistor switch to terminals A and B. Switch on and tap the vibration switch, the speaker will give out high volume music.

444. Touch controlled high volume music.
Replace the buzzer with the capacitor. Replace the press switch with the touch plate. Switch on and put a finger on the touch plate, the speaker will give out high volume music.

445. Dual sound of a police car.
Switch on and the speaker will make the dual sound of a police car.



446. Dual sound of a machine gun.
Connect terminals B and C. Switch on and the speaker will make the dual sound of a machine gun.

447. Dual sound of a fire engine.
Connect terminals A and B. Switch on and the speaker will make the dual sound of a fire engine.

448. Dual sound of an ambulance.
Connect terminals A and D. Switch on and the speaker will make the dual sound of an ambulance.

449. Dual sound of vibration.
Connect terminals A and C. Switch on and the speaker will make the dual sound of vibration.

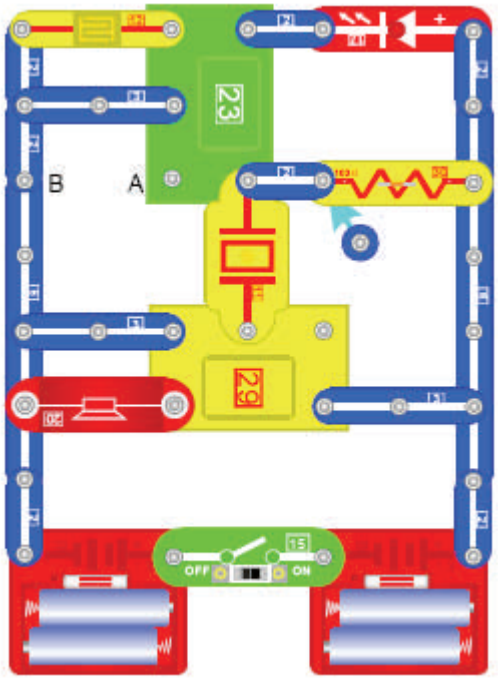
450. Power amplified sound of a police car.
Replace the buzzer 11 with the capacitor 44. Switch on and the speaker will make the power amplified sound of a police car.

451. Power amplified sound of a machine gun.
Replace the buzzer 11 with the capacitor 44. Connect terminals B and C. Switch on and the speaker will make the power amplified sound of a machine gun.

452. Power amplified sound of a fire engine.
Replace the buzzer 11 with the capacitor 44. Connect terminals A and B. Switch on and the speaker will make the power amplified sound of a fire engine.

453. Power amplified sound of an ambulance.
Replace the buzzer 11 with the capacitor 44. Connect terminals A and D. Switch on and the speaker will make the power amplified sound of an ambulance.

454. Power amplified sound of vibration.
Replace the buzzer 11 with the capacitor 44. Connect terminals A and C. Switch on and the speaker will make the power amplified sound of vibration.



455. Hand controlled varied tone sound of space war.
Connect the press switch to terminals A and B. Switch on and press the press switch, the speaker will make varied tone sound of space war.

456. Light controlled varied tone sound of space war.
Connect the photosensor to terminals A and B. Switch on and press the press switch, the speaker will make varied tone sound of space war. To stop the sound, cover up the photosensor.

457. Touch controlled varied tone sound of space war.
Switch on and touch the touch plate, the speaker will make varied tone sound of space war.

458. Vibration controlled varied tone sound of space war.
Replace the touch plate with the vibration switch. Switch on and tap the vibration switch, the speaker will make varied tone sound of space war.

459. Magnet controlled varied tone sound of space war.
Replace the touch plate with the dry reed switch. Switch on and bring the magnet close to the dry reed switch, the speaker will make varied tone sound of space war.

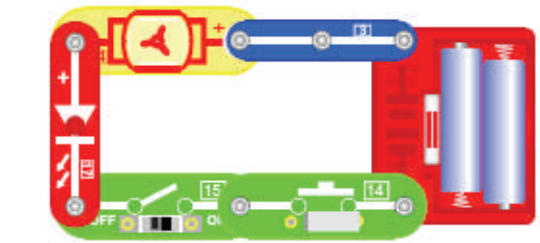
460. Hand controlled power amplified sound of space war.
Replace the buzzer with the capacitor and connect the press switch to terminals A and B. Switch on and press the press switch, the speaker will make power amplified sound of space war.

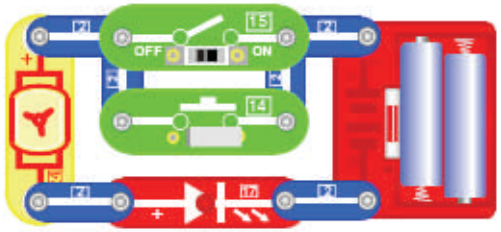
461. Light controlled power amplified sound of space war.
Replace the buzzer with the capacitor and connect the photosensor to terminals A and B. Switch on and the speaker will make power amplified sound of space war. To stop the sound, cover up the photosensor.

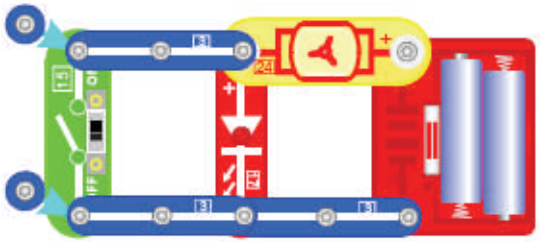
462. Touch controlled power amplified sound of space war.
Replace the buzzer with the capacitor and connect the touch plate to terminals A and B. Switch on and touch the touch switch, the speaker will make power amplified sound of space war.

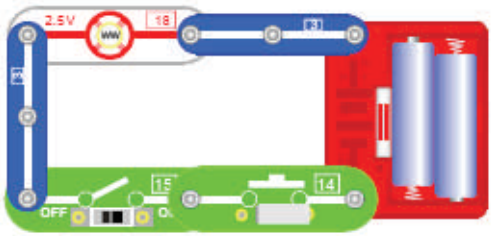
463. Vibration controlled power amplified sound of space war.
Replace the buzzer with the capacitor and connect the vibration switch to terminals A and B. Switch on and tap the vibration switch, the speaker will make power amplified sound of space war.

464. Magnet controlled power amplified sound of space war.
Replace the buzzer with the capacitor and connect the dry reed switch to terminals A and B. Switch on and bring the magnet close to the dry reed switch, the speaker will make power amplified sound of space war.









465. The ‘AND’ gate.
In the upper left diagram, both switches must be closed at the same time if the LED is to light. It is called the AND gate because switch 1 **and** switch 2 must be used.
The AND gate might be used on a missile site. Two people each have a switch to fire the missile so that one person alone can not fire the missile. Both people must use their switch if the missile is to be launched.

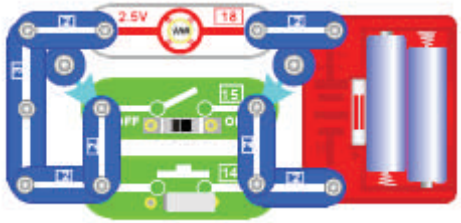
466. The ‘OR’ gate.
In the upper right diagram, either of the switches can be used at the same to light the LED. It is called the OR gate because switch 1 **or** switch 2 can be used.
The OR gate is used in many homes to light the stairs. There are two switches, one at the top and one at the bottom of the stairs. Either the switch at the top or the switch at the bottom can be used to switch the light on or off.

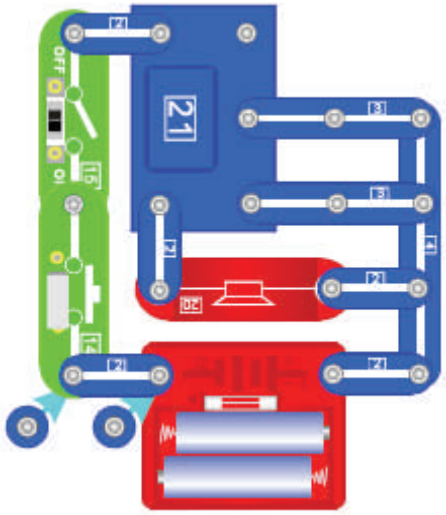
467. The ‘NOT’ gate.
In the lower left diagram, the LED will light and the motor will run. It will go out when the switch is closed. The LED is **not** lit when the switch is closed.
This type of circuit could be used in a room where the ventilation fan must be run all the time but the light can be turned off when not required.

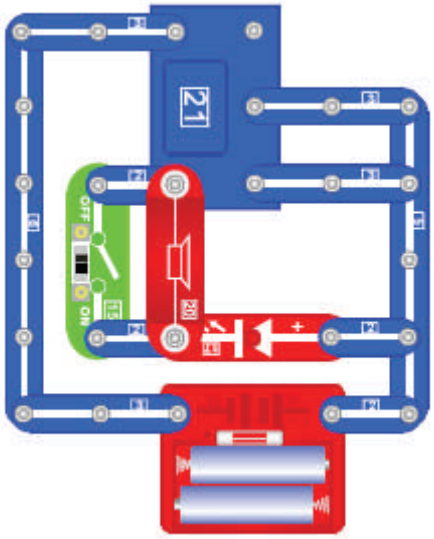
468. The ‘NAND’ gate.
This is short for NOT AND. In the lower left diagram, Swap the top 3 connector for the press switch. The LED will light. It will only go out when both of the switch are closed.

469. The ‘NOR’ gate.
This is short for NOT OR. In the lower left diagram, Connect the press switch in parallel with the Slide switch, i.e connect it across the two 3 connectors. The LED will light. It will go out if either of the switch are closed.

470. The ‘AND’ gate (2).
In the lower right diagram, both switches must be closed at the same time if the lamp is to light. It is called the AND gate because switch 1 **and** switch 2 must be used.







471. Dual switched lamp (OR gate).
In the upper left diagram, the light can be switch on by either of the two switches. This circuit would be useful in a room with two doors so that the light can be switched on or off from either of the doors. It is called an OR gate because the lamp can be switch on by switch 1 OR switch 2.

472. Musical AND gate.
In the right hand diagram, both of the switches must be closed for the music to play.

473. Musical OR gate.
In the right hand diagram, connect the switches in parallel. Either of the switches can be used to play the music.

474. Machine gun controlled by an AND gate.
In the right hand diagram, swap the music IC 21 with the IC 22. both of the switches must be closed to operate the machine gun.

475. Machine gun controlled by an OR gate.
In the right hand diagram, swap the music IC 21 with the IC 22. Either of the switches can be used to play the machine gun sound.

476. Machine gun controlled by a NOT gate.
In the lower left diagram, the sound will stop when the switch is closed.

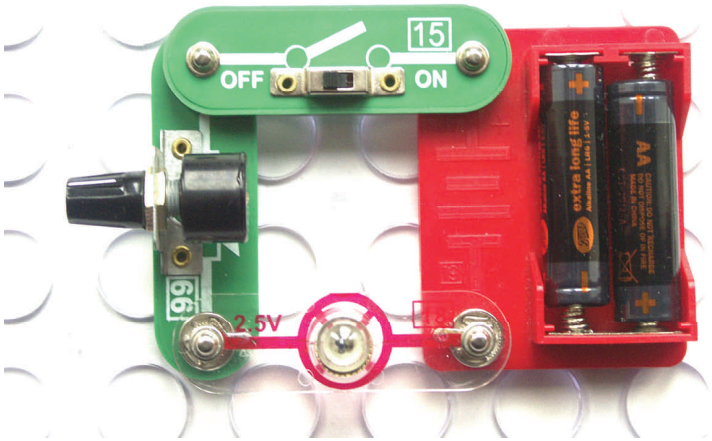
477. Machine gun controlled by a NAND gate.
In the lower left diagram, connect the press switch in series with the slide switch. The sound will stop when both of the switches are closed.

478. Machine gun controlled by a NOR gate.
In the lower left diagram, connect the press switch in parallel with the slide switch. The sound will stop when either of the switches is closed.
479. Musical NOT gate.
In the lower left diagram, the sound will stop when the switch is closed.
480. Musical NAND gate.
In the lower left diagram, connect the press switch in series with the slide switch. The sound will stop when both of the switches are closed.
481. Musical NOR gate.
In the lower left diagram, connect the press switch in parallel with the slide switch. The sound will stop when either of the switches is closed.

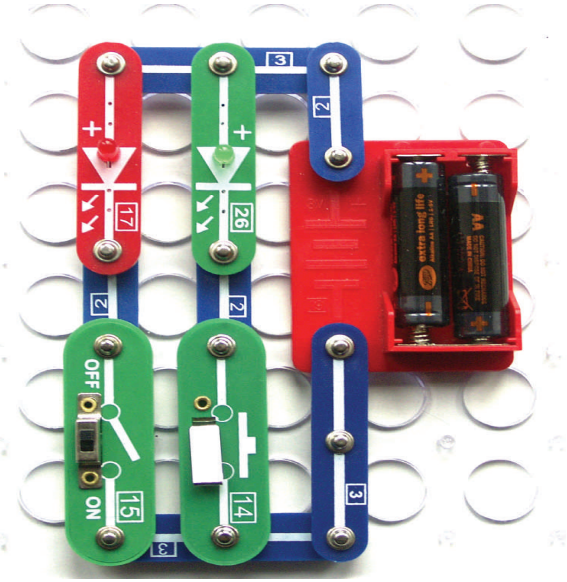
482. Using the variable resistor.
In experiment 7, a resistor was used to prevent too much electricity flowing through an LED. This was a fixed resistor and the resistance could not be changed.

The resistance of the variable resistor can be changed by turning the shaft. Inside the resistor case is a long length of wire coiled up to make it fit inside the case. One end of the wire is connected to one of the press studs. The shaft is connected to a slider which touches the coil of wire. When the shaft is turned, the slider adds more wire to the circuit and so increases the resistance. The slider is connected to the other press stud.

Switch on an change the brightness of the bulb by rotating the shaft of the variable resistor,



483. Controlling the speed of a motor.
Replace the bulb with the motor and rotate the variable resistor to control the speed of the motor. If you put the yellow fan on the motor, remember to keep your head out of the way as the fan may fly off!



484. Stop-Go traffic light.
This could be used to control traffic at road works.

Slide switch 15 to the on position, the Red LED will light. Switch off and press switch 14, the Red LED will go out and the Green LED will light.