

Dot to Dot Easter Bunny Instruction Sheet



We designed our Easter Bunny template to help younger kids grasp the concept of paper circuits while enjoying dot to dot puzzles. The Easter Bunny dot to dot on the front can be completed with crayons or colored pencils. The dot to dot on the back is the circuit design which your kids will get a kick out of solving with copper tape.

Step 1 - Supplies:

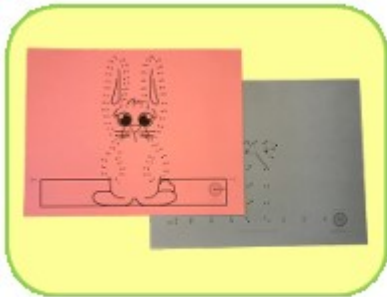


Image 1



Image 2

1.1 The Easter Bunny template needs to be printed using landscape orientation with double sided printing, flipped on the short edge. **Image 1** above shows the front and back of the template printed separately only to show you what each side looks like.

You will also need 2 LEDs, a coin cell battery, a 3/4" piece of foam tape, scotch tape, and around 32" of copper foil tape with conductive adhesive (**Image 2**).

Are your kids super creative? Try leaving an assortment of craft supplies out and see how your kids decorate their Easter Bunny once the circuit is complete. We decided a pom-pom tail made an adorable addition to our own Easter Bunny.

Step 2 - Testing:

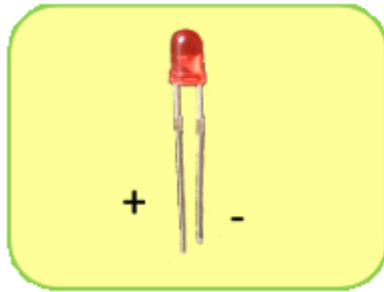


Image 3



Image 4

2.1 Test your battery and LEDs. The longer leg of the LED is positive, and the shorter leg is negative (**Image 3**). You can also use the flat side of your LED to determine which leg is negative as it's the leg closest to that side. We had a hard time finding the flat side during our investigation though, so we always looked at the leg length when testing.

2.2 Polarity is important with LEDs so be sure to place the positive leg on the positive side of the battery and the negative leg on the negative side. If both the battery and LED are working you should see the LED light up (**Image 4**).

If the LED doesn't light up, try switching the direction of the LED legs. If it still doesn't work, you either need a new battery or a new LED. It's a lot easier to replace a bad battery or LED now before you start the project, so these tests are very useful.

Step 3 - Build:

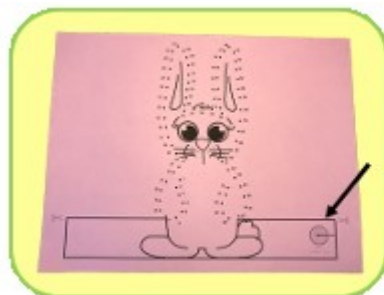


Image 5

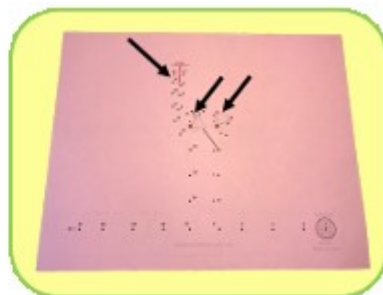


Image 6

Let's take a quick look at the front and back of the Easter Bunny template before we get started with the step by step instructions.

The front of the template is self-explanatory except for the gray circle on the right-hand side of the template. The positive side of the battery will make contact here when the rectangular strip is curved into a stand. The solid black line going into the gray circle shows where the copper tape will wrap around the edge of the template to make this connection possible (**Image 5**).

Note: Make sure when your kids cut out the Easter Bunny after completing the dot to dot on the front of the template, that they cut on the outside of the bunny outline, especially with the ears. If they cut inside the dot to dot outline they could cut off part of the circuit design located on the back of the template.

The back of the template is where things get interesting. The dot to dot on the back is the larger of the two conductive pathways in our circuit. The second, smaller pathway is the solid black line dissecting the bunny.

This design has three gaps in the circuit. The two LED gaps and a third gap located at the top of the ear. The gap in the ear is part of the switch assembly (**Image 6 arrows**).

The small red circles represent the placement of the LEDs with the attached dotted lines showing the position of the positive and negative LED legs.

The gray circle located on the back of the template represents the battery position. This section will connect with the positive battery area on the front of the template when you curve the base into a stand. This will leave the gap in the ear as the section that will 'switch' the circuit on and off (**Image 6**).

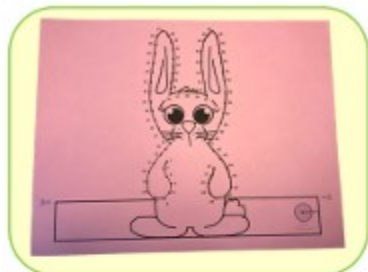


Image 7

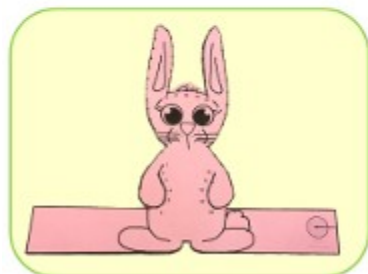


Image 8



3.1 Use a crayon or colored pencil to complete the Easter Bunny dot to dot on the front of the template (**Image 7**).

3.2 Cut out the Easter Bunny template, following the solid black line that forms the base for the stand and the dot to dot outline from step 3.1 that forms the Easter Bunny (**Image 8**).

Note: Be sure to cut along the outside of the lines to prevent cutting off part of the circuit design on the back of the template.

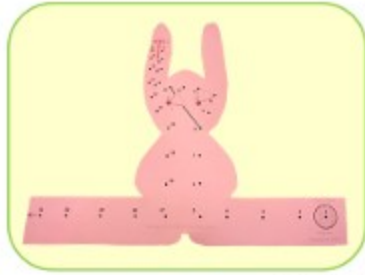


Image 9



Image 10

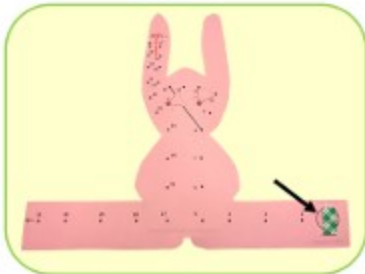


Image 11

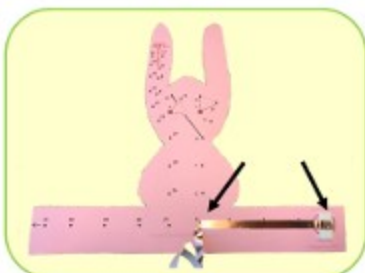


Image 12

3.3 Turn the template over to start work on the back of the template (**Image 9**).

3.4 Carefully poke two small holes through the red circles that represent the LED positions (**Image 10**).

3.5 Attach the 3/4" piece of foam tape to the gray circle labeled Battery in a vertical direction. Be sure to place the foam tape vertically or the copper tape in the next step will cover too much of the adhesive surface needed for the battery to stay attached (**Image 11**).

3.6 Attach the copper tape along the dot to dot puzzle. Start on the right edge of the foam tape and continue along the dot to dot, peeling the backing off as you go. Don't remove the backing all at once or the copper tape will twist and stick to itself (**Image 12, arrow on the right**).

3.7 You will reach your first corner, which can be tricky, once you reach dot #5 on the dot to dot path. We're using copper tape that's conductive on both sides, so it should be okay if things get a little messy here (**Image 12, arrow on the left**).



Image 13



Image 14



Image 15



Image 16



3.8 When you reach a corner the trick is to bend the copper tape in the opposite direction from where you want to go first, creating a diagonal fold (**Image 13**).

3.9 Hold this folded section in place with your finger as you bend the copper tape back over to continue going in the right direction. You should see a nice corner formed (**Image 14**).

3.10 Continue to attach the copper tape along the dot to dot path until you reach dot #10. This is the first LED gap that you need to create. Cut the tape with your fingers and then continue attaching the tape along the path from the other side of the gap, starting at dot #11 (**Image 15**).

3.11 Attach the copper tape from dot #11 to dot #17. Some sections require you to curve the copper tape slightly, but you should only need to create a corner fold in the copper tape at dot #14. Use your fingers on the rest of the curves to gently coax the copper tape along the path (**Image 16**).

Note: Ignore the black line that cuts across the circuit from dot #13 - dot #8 for now. This is the second pathway to the circuit which you will build later.

3.12 Use your fingers to cut the copper tape at dot #17 where you should see the 'Switch Gap' label (**Image 16**).



Image 17



Image 18



Image 19



Image 20



3.13 Continue to attach the copper tape from dot #18 on the other side of the switch gap until you reach dot #31 at the left edge of the template (**Image 17**).

Note: We found it easiest if we used our fingers to guide the copper tape along any curves in this section, except at dot #24 and dot #27. These two spots worked best with the corner fold method.

3.14 Do **NOT** cut the copper tape at dot #31 when you reach the edge of the template. You need to fold the copper tape around the edge from back to front and into the gray circle on the front of the template (**Image 18**).

3.15 Locate the black dotted line at the top of the left bunny ear section of the circuit design. Attach two strips of copper tape parallel to the dotted line (**Image 19**).

Note: The bunny ear will act as a switch once the circuit is complete.

3.16 It's time to connect the first LED so we can test the circuit before adding the second pathway. It will be easier to find a problem in the circuit now before we add more components.

3.17 Bend the LED legs wide enough to connect to the copper tape on both sides of the gap along the dot to dot line of the circuit. Next you need to gently push the LED through the hole in the template created in step 3.4 before bending the LED legs back flat against the template (**Image 20**).

Note: Remember that polarity matters. The positive leg needs to connect to the side marked positive and the negative leg needs to connect to the side marked negative.



Image 21

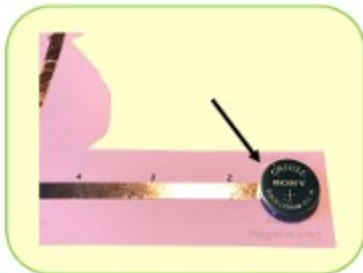


Image 22



Image 23



Image 24



3.18 Tear off two small pieces of copper tape and use them to cover the LED legs and stick them to the existing copper tape (**Image 21**).

3.19 Attach the coin battery to the piece of foam tape from step **3.5**. Be sure to have the positive side of the battery facing up so it connects to the positive side of the circuit when the template base is curved into a round stand (**Image 22**).

3.20 You have just finished building the first pathway in your Easter Bunny circuit. It's time to curve the base of the template together until the battery connects to the copper tape on the front of the template (**Image 23**).

3.21 The battery is now in position to close the circuit but until you close the switch the LEDs won't light up.

3.22 Fold the left bunny ear along the black dotted line just below the two strips of copper tape. Once the ear is folded firmly AND the battery is still in place the LED eyes should light up (**Image 24**).

Note: If your LED doesn't light up you should check out our trouble shooting tips at the beginning of this post, next to the investigation tab.

You should also make sure there's a tight connection at the battery location. If your kids are having a hard time holding both sections of the circuit together you can hold the battery area together with a binder clip like we did to take the photo (**Image 24**).



Image 25

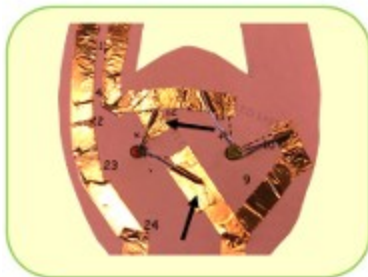


Image 26



Image 27



Image 28

3.23 Let's create the pathway for the second LED. Attach the copper tape to the solid black line that cuts across the center of the parallel circuit. Start on the left side of the line and be sure to overlap the vertical piece of copper tape already in place so a connection is formed (**Image 25**).

3.24 When you reach the gap in the second pathway use your fingers to cut the tape and then continue placing the tape along the black line on the other side of the gap.

3.25 This second pathway is completed when the copper tape reaches the vertical piece of copper tape on the right side of the circuit. Again, be sure to overlap the two pieces of copper tape so a connection is formed (**Image 25**).

3.26 It's time to connect the second LED. Bend the LED legs wide enough to connect to the copper tape on both sides of the gap, gently push the LED through the hole, and then fold the legs flat along the dotted lines (**Image 26**).

Note: Remember that polarity matters. The positive leg needs to connect to the side marked positive and the negative leg needs to connect to the side marked negative.

3.27 Tear off two small pieces of copper tape and use them to cover the LED legs and stick them to the existing copper tape (**Image 26**).

3.28 You have just finished creating your dot to dot Easter Bunny. It's time to tape the ends of the base together so the battery connection will be permanently connected. Fold the bunny ear and watch the eyes light up (**Image 27**).

3.29 Once the eyes light up your kids may want to personalize their Easter Bunny with whatever craft supplies you have around the house (**Image 28**).

Note: If your LED doesn't light up you should check out our trouble shooting tips again at the beginning of this post, next to the investigation tab.