FLASHING CARD INSTRUCTIONS

Duration **1 hour**
Participants **up to 30**
Ages **6 and up**

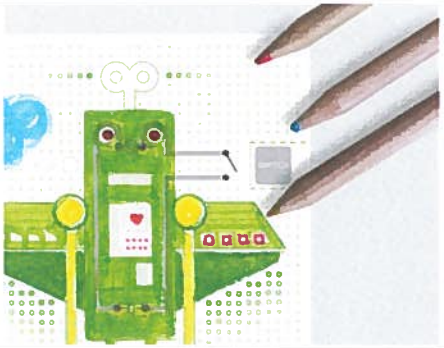
Every maker will need:
1 x Card Template
1 x LED
1 x Coin Cell Battery

Electric Paint pens may be shared one between three students.

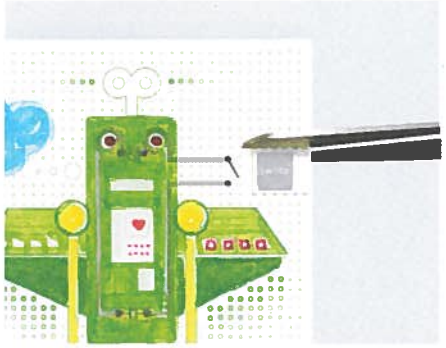
Before you start

These instructions are here to help you lead a group of up to 30 participants, through an activity to construct their own flashing robot cards. They'll need to do some decorating, attach components and draw a circuit with Electric Paint, in order to bring their cards to life. The robot card templates contain a key with a numbering system which corresponds to the numbered instructions overleaf — this will help you direct your group step-by-step.

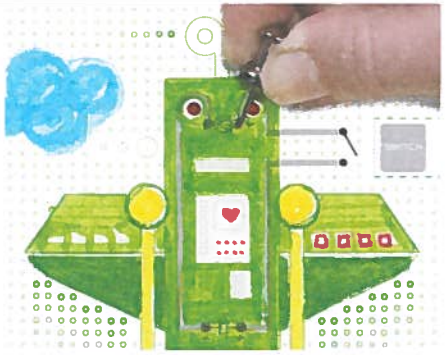
1 **Colour in** your robot — feel free to embellish however you choose!
Avoid dark colours so you don't obscure the circuit.



2 **Cut out your switch** With a pair of scissors snip the small dashed lines either side of the switch. This will allow you to close your switch later.
Don't cut the dotted fold line.

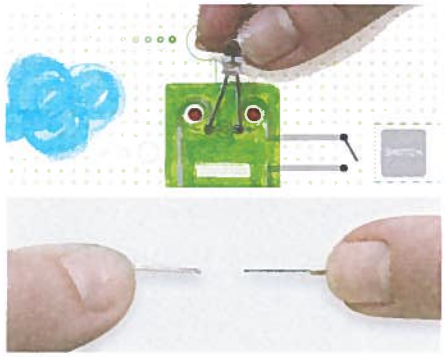


3 **Make pinholes** Put a piece of cardboard or newspaper under the template. Push the pin through the pinholes on each side of the LED and battery (see key). Take care not to prick yourself!



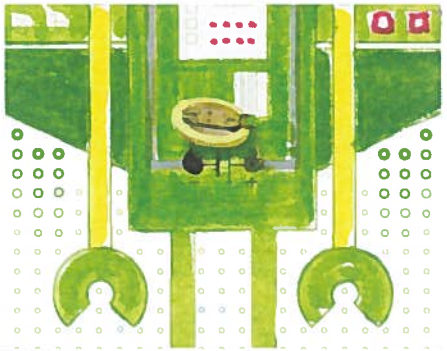
4 **Insert LED** at the LED symbol (see key). Push the long leg in the positive hole and the short leg in the negative hole. Bend legs apart to secure.

LED Note LEDs and batteries are polarised. This means electricity will only flow in one direction through them — from the positive leg of the battery to the positive leg of the LED. The longer leg of the LED is positive. Make sure you put the components in the right direction!



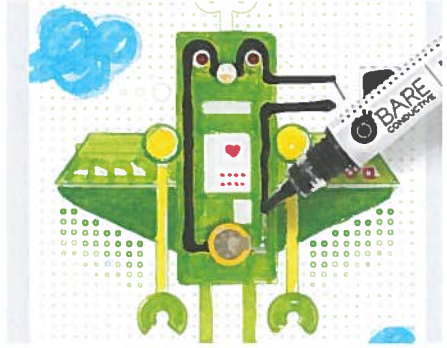
5 **Insert battery** at the battery symbol (see key). Push the top leg (over yellow band) in the positive hole and bottom leg in the negative hole. Lift up the battery and squeeze a blob of paint on the circuit at the base of the negative leg. Push through and bend legs apart to secure. Make sure not to short circuit!

Pen Note Before using the pens, unscrew the nib and remove the stopper. Replace nib and go!



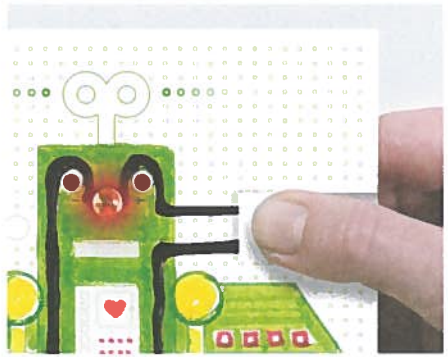
6 **Paint the circuit and switch** Squeeze a continuous bead of Electric Paint over the grey line, right up to the component legs. Add a nice blob at the base of the legs to ensure good contact. Don't forget to paint the grey square on your switch. Leave 5 –10 minutes in a warm spot until completely dry.

Helpful hint — you could use the drying time to talk about how the circuit works and to introduce further learning outcomes.



7 **Fold card** Check your paint to make sure it is completely dry. It should no longer be tacky to the touch. Then you can fold the greeting card and switch along the dotted lines to finish your greeting card.

8 **Close switch** The fun bit — fold your switch forward so that the black square of paint makes contact with the two open circuit lines. The LED should start to blink when the surfaces meet!



TROUBLESHOOTING:

If your greeting card doesn't blink don't worry — there are a few things you can check:

Broken circuit
Is your Electric Paint circuit broken or too thin? — paint over it thicker, mend breaks.

Contacts
Does your Electric Paint circuit actually make contact with the components? — add a blob at the base of the components to secure.

Polarity
Is your LED or battery the wrong way round? Ensure the components are correctly positioned, positive legs in + holes.

Short circuit
Are your LED or battery short-circuiting? — take care to prevent Electric Paint from connecting between the legs! Take out the components and scrape away the paint in between or start again with another card template.

Switch
Is the switch completely closing the circuit? — you may have to reposition it or paint a larger square of paint.

HOW THE CIRCUIT WORKS:

Electric Paint is conductive which means that electricity can pass through it. The battery provides electricity. When you make a circuit the LED and battery have to be joined in a complete loop for it to work. The paper switch has a conductive patch which completes the circuit when you close it — hence the LED starts flashing! Electricity flows from the positive leg of the battery to the positive leg of the LED and back round again. LEDs and batteries are polarised which means electricity will only flow in one direction and so they must go in the circuit the right way round.

When you're finished

Electric Paint pens contain enough paint for multiple makes. You can download more card templates online where we will continue to add more artwork! Spare components may be purchased at:

bareconductive.com

We would love to hear your feedback and ideas. Feel free to contact us with any questions or comments and send us your photos to feature on our community page!

Electric Paint pens are great for all kinds of hands-on projects for your class — for more project ideas go to

bareconductive.com/tutorials

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