

10. Before sewing the front and the back felt shapes together, carefully check that all conductive thread is connected properly with the sections of the circuit. After switching on the module, touch both metal rings on the hands of the robot (5 & 6) at the same time to make the robot come alive! Touch the metal rings on the robot's cheeks (1 & 2) and the rings inside the heart (3 & 4) to activate the module again and make sure the light and sound functions are working properly.

If there is no sound/light: • Check that the module switched on. • Check that the metal rings and two extension cords from the LED module are well-connected. Otherwise, you may need to re-stitch conductive thread to strengthen the connection. • Restitch around where the turning points of the circuit to allow the electricity to flow smoothly. • Moisten your hands to increase the conductivity of your body.

11. Align corresponding holes on all the pairs of pre-cut felt shapes, with the felt legs put in between the front and back of the robot as shown. Start by sewing front and back felt body pieces together with the legs, using the yellow thread and the back stitch sewing technique as shown.

12. Continue stitching to join all the felt together. Before you finish stitching, leave a small part of the body unstitched to fill the robot with stuffing. Finish the stitching and tuck in the flap as shown to seal the stuffing inside. Your robot is now complete! Take off the flap and empty out the stuffing if you need to make any repairs or adjust the LED lights inside your robot.

13. Human Circuit Activity: Join hands with your robot and as many friends as you like to bring the robot to life! You can also experiment with different materials to see which ones electricity can flow through to complete the robot's circuit.

#### F. HOW IT WORKS

The circuit you stitched together becomes complete when your hands touch the metal rings, allowing an electrical current to flow smoothly and connect the two ends of the module. Your body becomes part of the circuit when the electrical current flows through your body and into the small circuits inside the module. This happens because a battery always has two poles; a positive one and a negative one. At the positive pole, there are very few electrons, while there are a lot of electrons at the negative pole. If the positive poles and negative poles are connected electrons move to correct the imbalance, creating an electrical current. The module's smaller circuits are then able to transform the energy from the electrical current into light and sound.

#### G. FUN FACTS

1. Around the year 1800, Alessandro Volta discovered that a copper and a zinc plate would produce electricity when connected by a cloth moistened by salt water. His discovery was the foundation for many of the amazing battery-related inventions we use today!
2. Electricity was discovered by the ancient Greeks who demonstrated that rubbing fur against tree resin (amber) made the two become attracted to each other.
3. The speed at which electrons flow within an electrical current is often close to the speed of light which is 1,079,252,850 kilometers per hour.
4. A team at the Korea Institute of Science and Technology created a sprinting robot inspired by a velociraptor dinosaur. The robot, named raptor, has two nimble legs and a mechanism similar to a tail which allow it to run at a top speed of 46 kilometers an hour. That is even faster than Olympic gold medalist Usain Bolt's top speed!

#### QUESTIONS AND COMMENTS

We value you as a customer and your satisfaction with this product is important to us. If you have any comments or questions, or you find any parts of this kit missing or defective, please contact our distributor in your country, whose address is printed on the packaging. You are also welcome to contact our marketing support team via email: infodesk@4M-IND.com, fax (852) 25911566, telephone (852) 28936241, or our website: WWW.4M-IND.COM.

# STITCH-A-CIRCUIT ROBOT

PLEASE SCAN THE QR CODE FOR VIEWING MULTI-LANGUAGE INSTRUCTIONS



FR. Veuillez scanner le code QR pour afficher les instructions multilingues pour ce kit. DE. Bitte scannen den QR-Code, um die mehrsprachige Anleitung für dieses Set anzusehen. NL. Scan de QR-code om de instructies voor deze set in verschillende talen te bekijken. IT. Scansiona il codice QR per visualizzare le istruzioni multi-lingua per questo kit. ES. Escanee el código QR para ver instrucciones en varios idiomas para este kit. JA. QRコードをスキャンして、本キットの多言語説明書をご覧ください。

#### WARNING

CHOKING HAZARD - Small parts.  
Not for children under 3 years old.

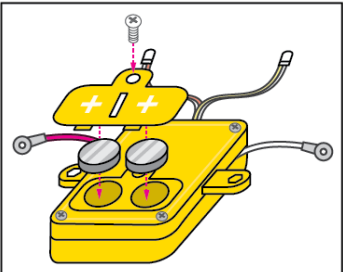
TO PARENTS: PLEASE READ THROUGH THESE INSTRUCTIONS BEFORE PROVIDING GUIDANCE TO YOUR CHILDREN

#### A. SAFETY MESSAGES

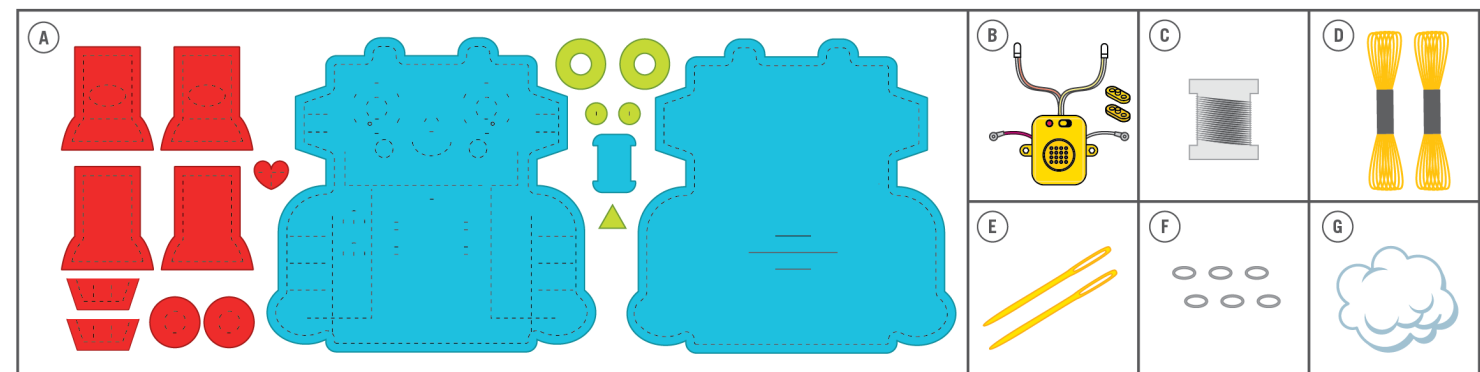
1) Adult assistance and supervision is required at all times. 2) This kit is intended for children over the age of 8. 3) This kit and its finished product contain small parts which may cause choking if misused. Keep away from children under the age of 3. 4) To prevent possible short circuits, never touch the contacts inside the battery case with any metal objects.

#### B. USE OF BATTERIES

1) Use 2 x 1.5V button cell batteries (Model AG13/LR44). 2) For the best results, always use fresh batteries. 3) Make sure you insert the batteries with the correct polarity. 4) Remove the batteries from the kit when not in use. 5) Replace exhausted batteries straight away to avoid possible damage to the kit. 6) Rechargeable batteries must be removed from the kit before recharging. 7) Rechargeable batteries must be recharged under adult supervision. 8) Make sure the supply terminals in the battery case are not short circuited. 9) Do not attempt to recharge non-rechargeable batteries. 10) Do not mix old and new batteries. 11) Do not mix alkaline, standard (carbon-zinc), or rechargeable batteries. 12) Unscrew the battery case to replace the batteries. Adult-supervision is required. 13) WARNING: Dispose of used batteries immediately. Keep new and used batteries away from children. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

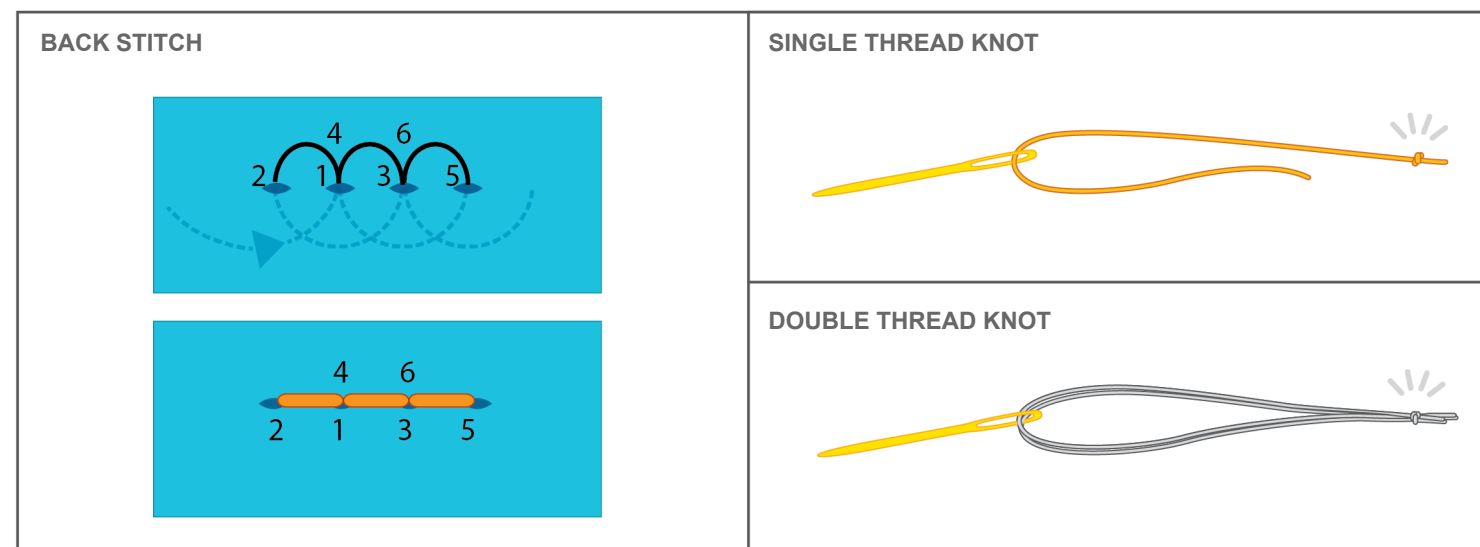


#### C. CONTENTS



Part: A: 1 set of pre-cut felt shapes, B: 1 sound & light LED circuit module with 2 plastic base holders (2x 1.5V AG13/LR44 button cell batteries included), C: 1 spool of conductive thread, D: 2 spools of embroidery thread, E: 2 plastic needles, F: 6 metal rings, G: stuffing. A pair of scissors and tape is required but is not included. (Adult supervision is required when using scissors.)

#### D. STITCHING TECHNIQUES

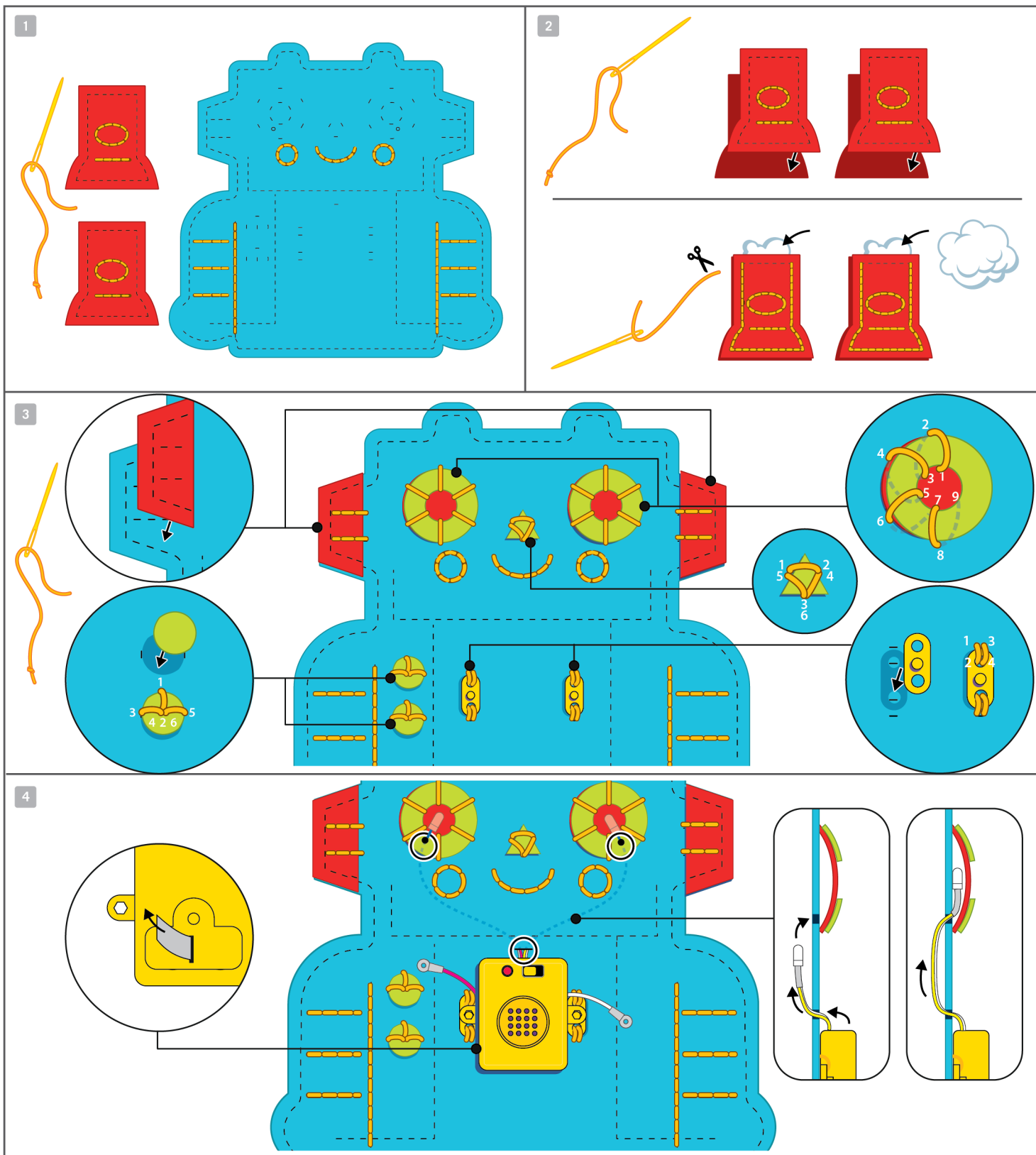


[Back Stitch] Before you start to make your robot, first learn how to back stitch by following the numbered guidelines in the diagram. A back stitch is a reliable way to hold 2 layers of fabric together or for making an outline.

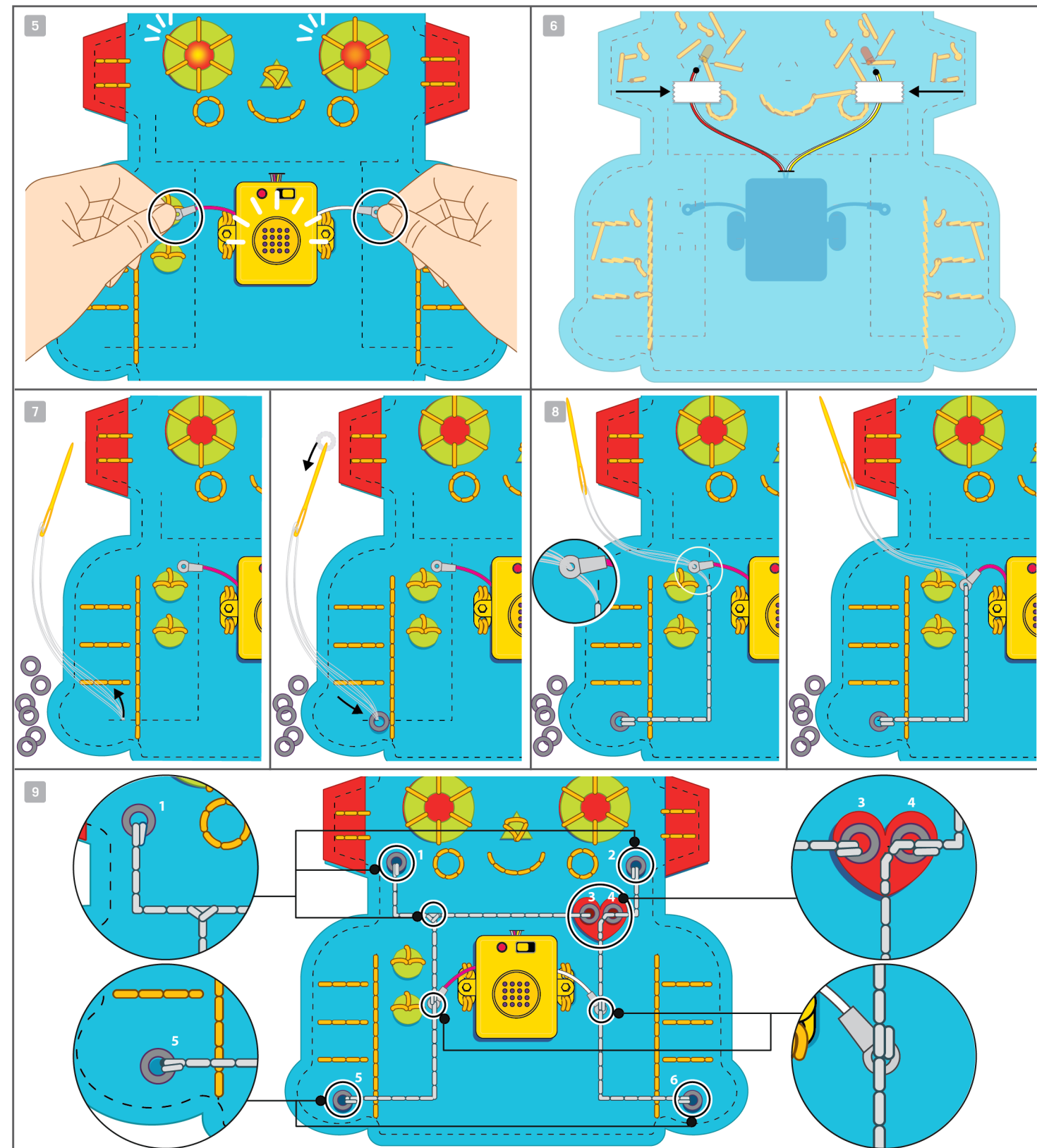
[Single Thread Knot] This is the most common sewing technique to create a thin stitch. The string can easily separate from the needle which will cause a few stitches to come loose. Stitch carefully so that you don't pull the thread out of the needle by accident while sewing.

[Double thread knot] This knot makes the thread thicker to create a reliable stitched circuit. The thick thread makes it easier for your robot to conduct electricity. Fold a piece of thread in half and slide one end through the needle hole. Pull it through until the piece of folded thread is in the middle of the hole. Tie a knot with the four ends so the thread won't slide out of the needle while you are sewing.

## E. CREATING THE CIRCUIT



1. Pick up the front felt shapes of the robot body and the legs. Cut a piece of yellow thread about 60-70 cm in length and stitch the felt as shown.
2. Align both the front and back pieces of pre-cut felt legs. Stitch the legs together, leaving the top part of the felt unstitched. Tie a knot at the end of each piece of thread and trim the excess thread. Fill the legs with stuffing and then put them aside to use later on in step 11.
3. Align the corresponding pre-cut holes on each pair of eye, ear, nose and button felt shapes with the front felt piece of the robot body. Then, follow the basic stitching techniques for each piece of felt as shown in the diagram. There are also two plastic base joints which the module will be attached to. Stitch the two joints onto the felt to create a strong foundation for the module.
4. Remove the plastic strip from the back of the LED module and push it onto the plastic base joints. Afterwards, carefully thread each LED light through the hole at the bottom of each eye patch.



5. After you turn on the LED module, hold the two small metal circles at the end of the wires coming out of the module to turn on the red and yellow LED lights. Adjust the two LED's so that they are in the centre of the robot's red felt eyes. If the lights don't come on: Make sure the plastic strip is taken out from the back of the module and that the batteries are inserted in the correct direction. Also, moisten your hands to increase your ability to conduct electricity and complete the circuit.
6. Once the eyes are positioned in the centre of the felt eyes, secure them in place with tape at the back of the felt.
7. Turn off the module before you start to sew your circuit using the back stitch sewing technique! Cut a piece of silver conductive thread about 200cm long and fold it in half. Then, thread it through the end of the needle to create four pieces all about 50cm long and tie a double thread knot to complete the loop. Thread the needle through the second hole as shown. Slide a metal ring down the conductive thread and lie it flat against the front felt body of the robot.
8. Begin to stitch the circuit together by first stitching around the metal ring twice. Stop right after you pass the mid-point of the module. Then, thread the needle through the small metal loop connected to the left side of the module as shown. Stitch slowly and refer to step 9 to see where a metal ring or module wire needs to be connected with the conductive thread.
9. Stitch the holes around the 6 metal rings (numbers 1-6 in the diagram) and 2 rings attached to the module twice over to create a secure connection. It is important to make sure all the conductive thread is connected properly to complete & reliable the circuit. When the thread attached to your needle is almost used up, secure the loose end with a knot and cut the leftover string off. Then, create a new piece of thread using the technique in step 7 and continue sewing from the last stitch you made to make sure the circuit is connected. Be careful not to stitch metal rings 3 & 4 together, otherwise the circuit will turn on when you are not touching it.