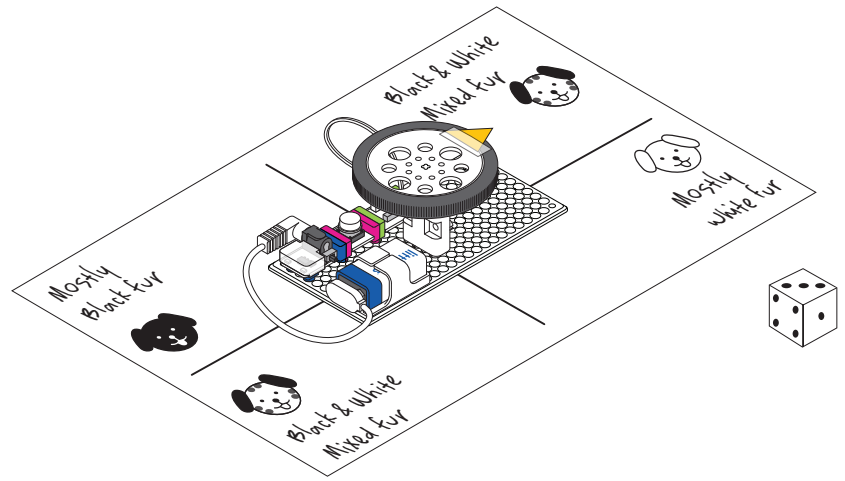


littleBits

INHERITED TRAITS



GUIDED

DESIGN CHALLENGE

Design a spinner that shows inherited traits for a litter of puppies.



WRITE

EXPLORE

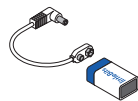
- Complete Writing Box #1 in your guided handout.



CREATE

CREATE

1. Gather your invention tools.



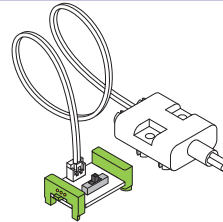
a1 battery & cable



p4 power



i3 button



a25 DC motor



a25 wheel



a30 mounting board

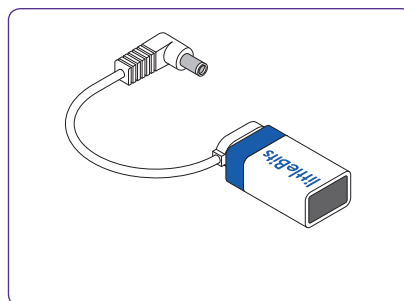
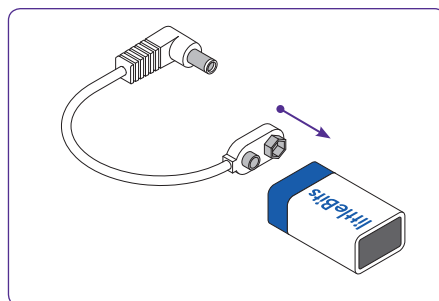


a31 battery clip

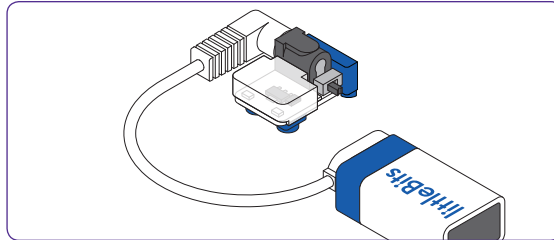
Other materials:

- 1 die
- 2 sheets of paper
- Markers
- Scissors
- Tape

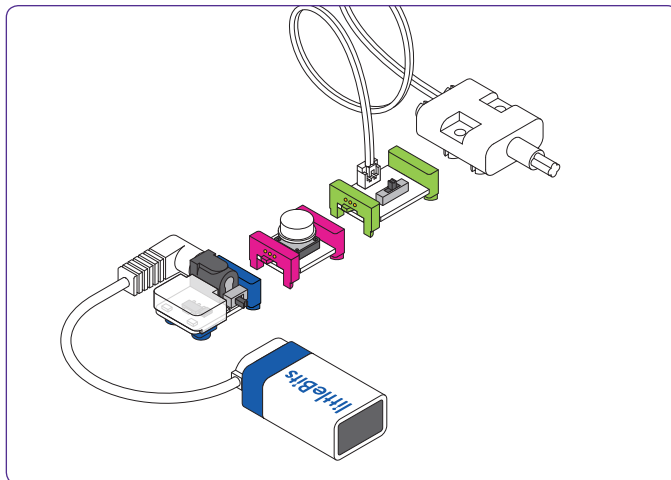
2. Attach the battery cable to the battery.



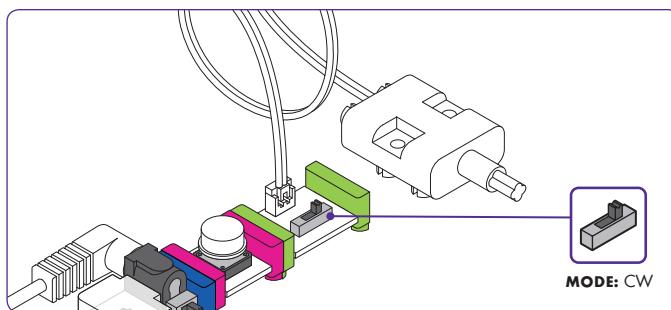
3. Attach the power Bit to the battery cable assembly.



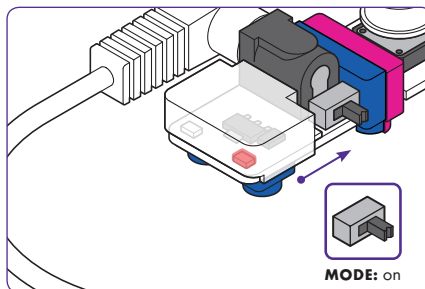
4. Snap this circuit together.



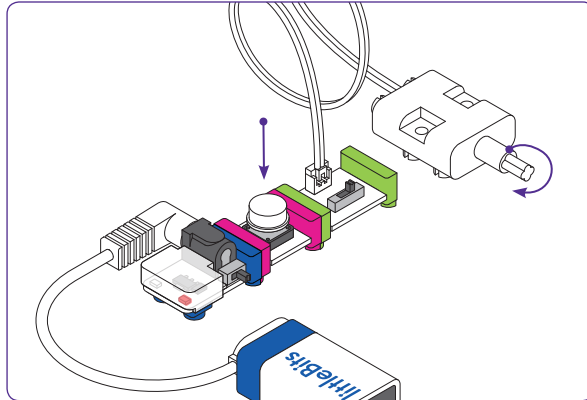
5. Set the DC motor to CW (clockwise).



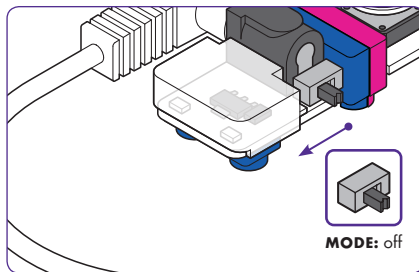
6. Let's test that your circuit works! Power on your circuit.



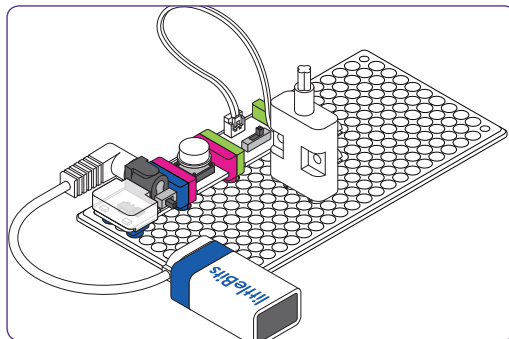
7. Push the button. The motor shaft should spin while the button is pressed. When you let go of the button, the motor should stop.



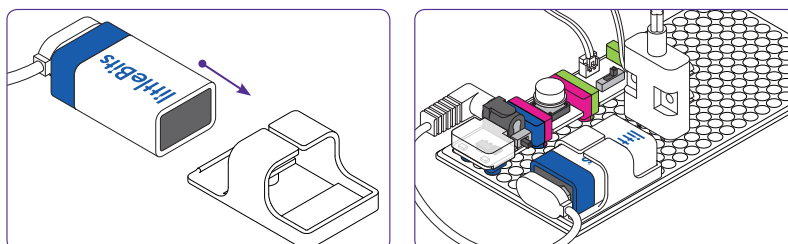
8. Power off your circuit.



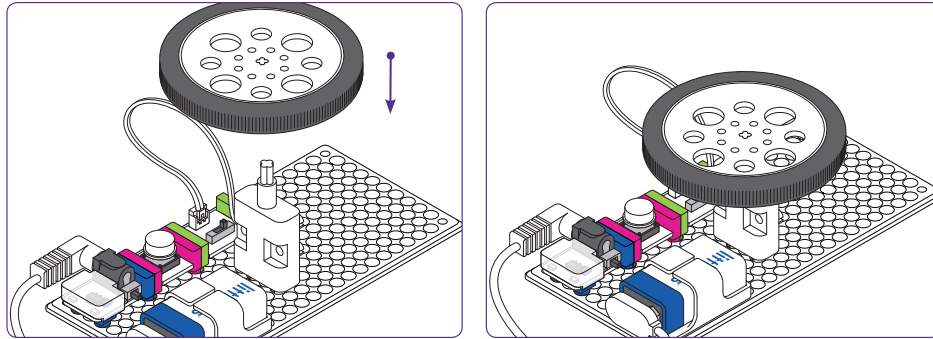
9. Press your circuit into the mounting board as shown, making sure that the cross axle of the DC motor points straight up in the middle of the board.



10. Slide the 9-volt battery into the battery clip and press it onto the mounting board.

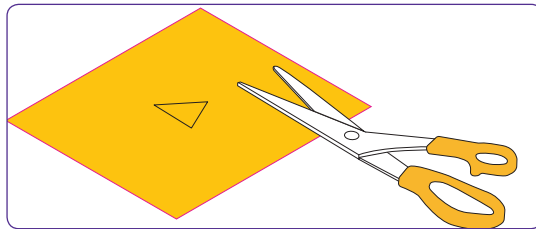


- 11.** Now pick up a wheel with the longer axle side facing down. Line up the cross axle of the DC motor with the cross hole of the wheel and gently press the two together.

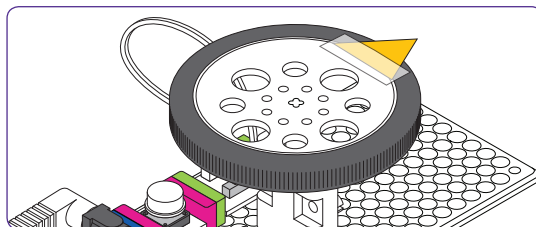


Let's add some design to our spinner!

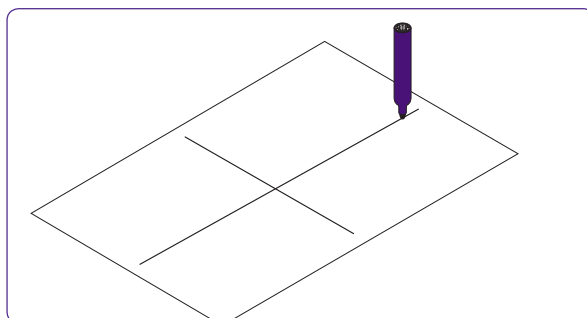
- 12.** Use a marker or pen to draw a small triangle about the size of a quarter on paper. Then cut it out.



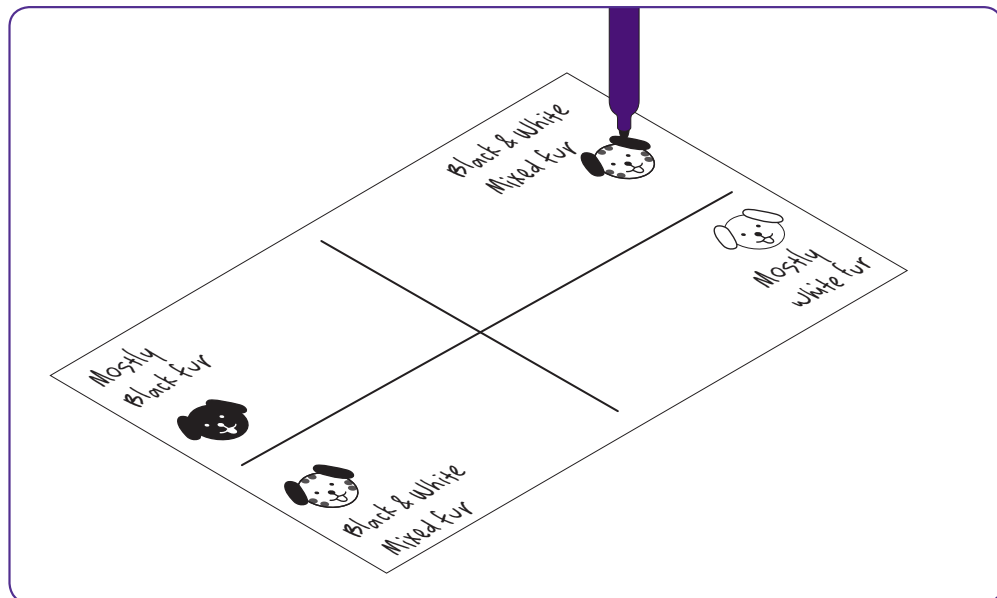
- 13.** Tape the triangle to the outer edge of the wheel.



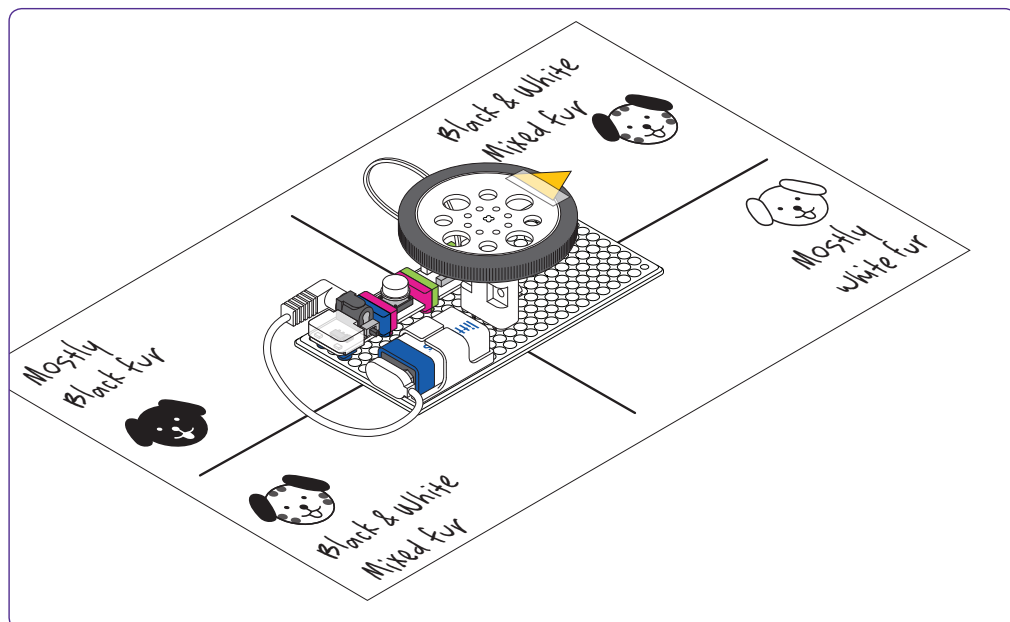
- 14.** Take a full sheet of paper and draw two lines, one straight down and one across, to divide the paper into four equal sections.



- 15.** For this challenge, let's imagine that one dog parent has mostly black fur with some white spots, and the other parent has mostly white fur with some black spots. Label each section with four potential outcomes for their offspring: mostly black fur, black & white mixed fur, black & white mixed fur, and mostly white fur.



- 16.** Place the mounting board on top of the paper, with the wheel centered in the middle.



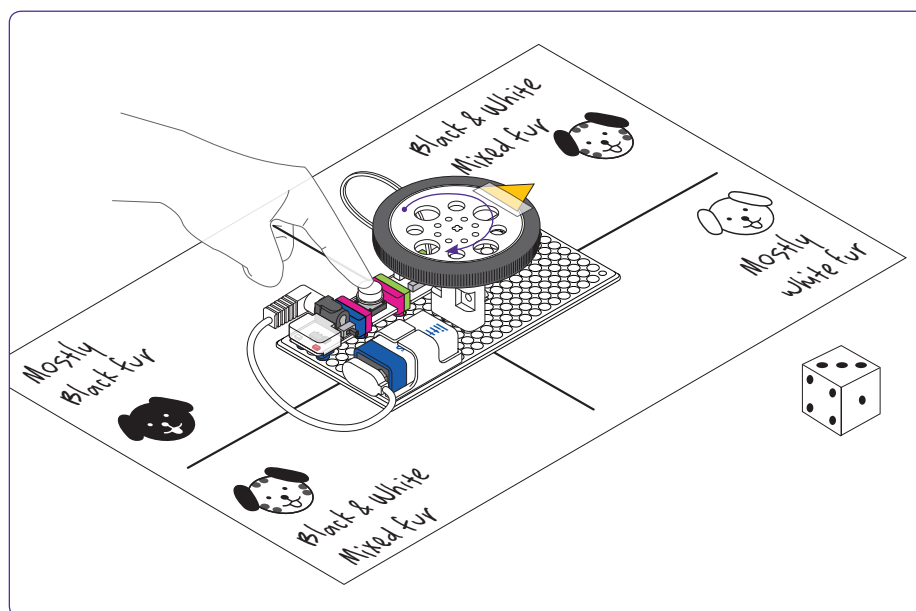


PLAY

PLAY

- 17.** Test out your design! What will your litter of puppies look like?
Let's find out!

Roll the die. Press and hold the button for that many seconds, and then let go of the button.



WRITE

- Complete Writing Box #2 in your guided handout.



REMIX



WRITE

REMIX

- Complete Writing Box #3 in your guided handout.



SHARE



WRITE

SHARE

- Complete Writing Box #4 in your guided handout.



CLEAN

CLEAN UP

- **Until next time, littleBits!** Place the Bits gently back in the box according to the diagram on the back of the Bit Index; return classroom materials to their proper place and check the area around your workstation.

INHERITED TRAITS

Name: _____

CHALLENGE OVERVIEW

Let's design a spinner that shows inherited traits for a litter of puppies!

GUIDING QUESTIONS TO REACH LEARNING OBJECTIVES

Why do offspring look similar to their parents?

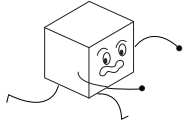


CREATE

1. Sketch a picture of one or both of your parents. Label any traits that you have inherited from them.

Large empty rectangular area for sketching and labeling.





- Roll the die, press the button on your spinner, and record the puppy fur color result. Each person in the group takes a turn!

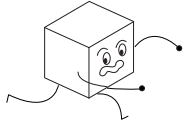
PUPPY	FUR COLOR
Puppy 1	
Puppy2	
Puppy 3	
Puppy 4	
Puppy 5	
Puppy 6	

Which fraction of your puppies have:

All black fur _____

All white fur _____

Mixed black and white fur _____



REMIX

3. Why did we use a die? In what way does this make our model more accurate?
How could our model be improved?



SHARE

4. Offspring inherit more than just their looks from their parents. Consider other traits that your puppies inherited from their parents. Sketch and label your ideas below: