

ROLL, RECORD, REPEAT

Put science into practice as you collect data to determine the fairness of dice

What you'll need:

- A die from a board game
- A pen, pencil or crayon
- Paper

Extension materials:

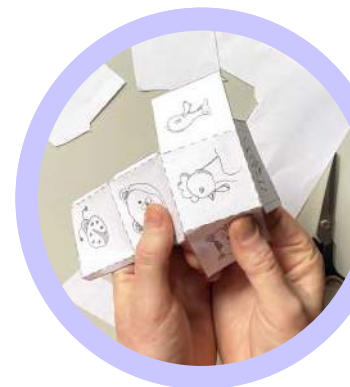
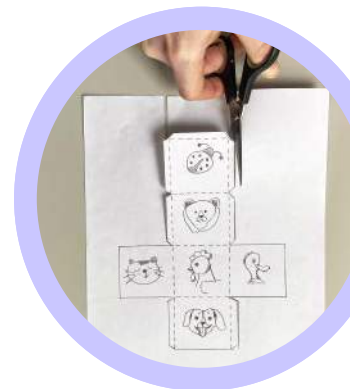
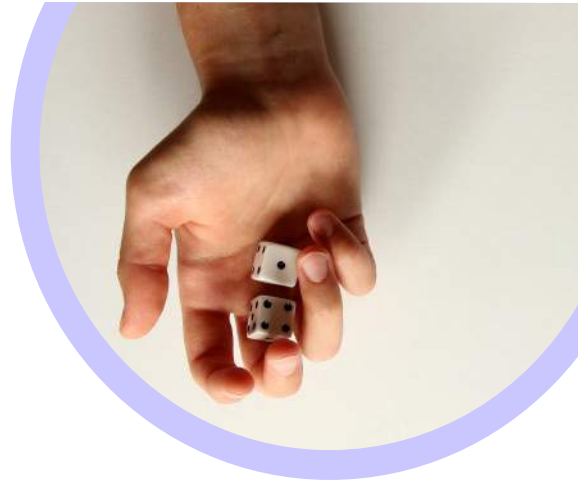
- Cardboard
- A ruler
- Scissors
- Tape
- A coin (optional)

Activity setup:

1. Print out the observation table on page 3. No printer? No problem! Simply copy the table onto a piece of paper.
2. Do you think your die will land on the same side an equal number of times? Before you begin, write down your guess.
3. Roll your die, then record which side it fell on in your observation table. Repeat this many times—the more rolls, the better! Do you notice any pattern? Does the die fall on some sides more often than others?

Extension:

4. You can make your own die using one of the templates below. Paper is fine, but you can make it sturdier if you glue it to a piece of cardboard. Alternatively, simply use a ruler to draw the template directly onto the cardboard.
5. Carefully cut out your template. If you're using the blank template, try drawing unique pictures instead of adding numbers to each side. Fold the template along the lines, then tape the die together.
6. Test your homemade die just as you did with the first one. Write down your hypothesis first, and be sure to record the results in your observation table. Do you notice any pattern?



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Try this!

As you test the board game die, consider these questions:

- Is one number coming up a lot more often than the others are?
- What trend do you notice after just six rolls?
- How many rolls does it take before you feel confident that one number is coming up more often than the others are?



Try adjusting your homemade die:

- Carefully open up your die (or make a new one), and tape a coin to the inside of one of its sides.
- What do you think will happen if you tape the coin behind one side compared to another?
- What will happen if you add two coins instead?

What's happening?

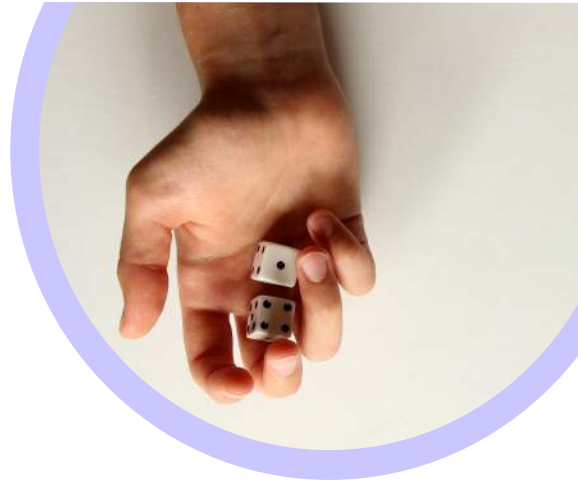
Dice can be **fair** or **unfair**. On a die that is fair, each number has the same chance of landing face up. This means that over time, the die will roll each side equally. If one number comes up much more often than the others do, we say the die is unfair or **weighted**.

If you added a coin to your homemade die, you created your own unfair die. By moving the coin, you could change the way the die was weighted.

Check out these two tables. Which die seems to be unfair?

	Colour in a box every time you roll that side.										
1											
2											
3											
4											
5											
6											

	Colour in a box every time you roll that side.										
1											
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6											



Think like a scientist:

In this activity, you asked a question: Is my die fair or unfair? You gathered lots of data by rolling your die and recording the outcomes, then came to a conclusion.

Think about what would happen if you continued testing your die. What if you rolled the die 10,000 more times, rolled it on a different surface or had someone else roll it for you? You might change your conclusions many more times as you collected new data—and that's okay!



This is exactly how science corrects and improves itself. As scientists collect new data and learn more, they use this new information to adapt their theories. Whether they are studying dice, subatomic particles or new viruses, scientists know that their understanding can always change.



Observation Table: Board Game Die

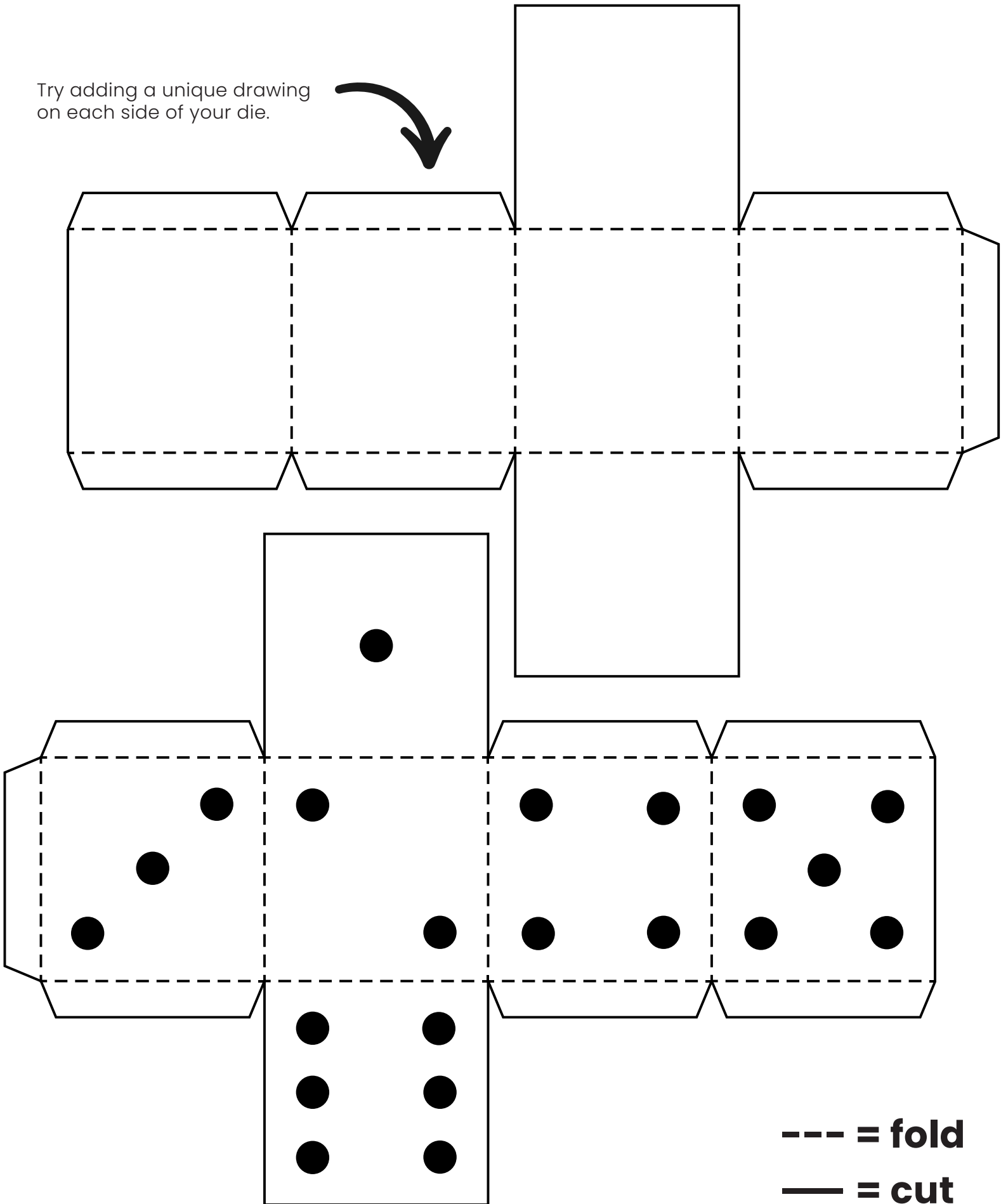
Side of the die	Colour in a box every time you roll that side.												
	1												
2													
3													
4													
5													
6													
Number of rolls													

Observation Table: Homemade Die

Side of the die	Colour in a box every time you roll that side.												
Number of rolls													

TEMPLATE

Try adding a unique drawing on each side of your die.



--- = fold
— = cut