



Probability models

Assign a probability to every outcome

- Today: build a model, use it, and test it against data.

Two dice. Totals from 2 to 12.

- Eleven possible totals.

Turn & talk: is each total $\frac{1}{11}$?

Find what's REALLY equally likely

- Not the 11 totals — the 36 PAIRS.
- Each pair (first die, second die) is equally likely.

Count the ways

- Total 7: $1+6, 2+5, 3+4, 4+3, 5+2, 6+1 \rightarrow 6 \text{ ways} \rightarrow \frac{6}{36}$
- Total 2: $1+1 \text{ only} \rightarrow 1 \text{ way} \rightarrow \frac{1}{36}$

7 is SIX times as likely as 2.

Listing is not the same as equally likely

- You can list any outcomes you like.
- Whether they're equally likely comes from the SITUATION.

Your turn

- How many ways make a total of 6? What is $P(6)$?
- Thumbs up when you have both.

Testing a model against data

- Fair die, 60 rolls, expect ~ 10 each.
- 8, 12, 9, 11, 13, 7 $\rightarrow$ fits fine. 2, 3, 4, 5, 6, 40 $\rightarrow$ does not.

Judge a discrepancy by its SIZE, not by whether it exists.

Now you

- → In-class practice sheet