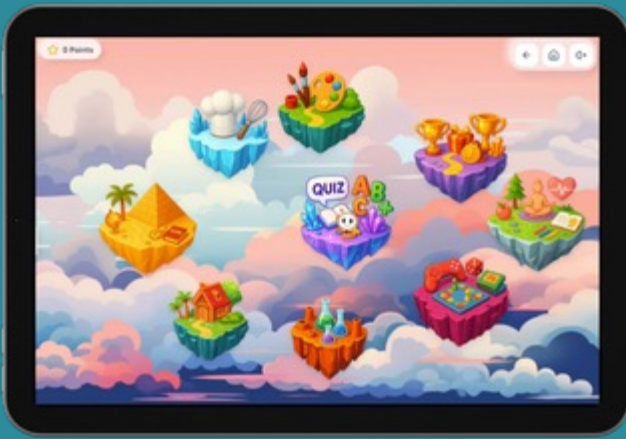


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Same Coin, Different Results - Year 3

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Teacher guide · preparation and lessons 1-2

Purpose and equipment

Learners name H/T outcomes, record repeated fair coin experiments and compare observed counts. Prepare a fair coin and tray per pair, pencils, and the recording pages. Use only pretend data for modelling.

Entry check

Ask every learner to name a possible outcome and show one tally mark. Note insecure counting or possible-event language. Teach that prerequisite briefly; do not restart the unit.

Lesson 1 • outcome and trial

Use the display and model cards 1–3. One toss is one trial, and H/T are the two possible results. Contrast a prediction with an observed record. Partners explain one example aloud; collect a response from each learner.

Lesson 2 • predict carefully

Use cards 4–6 and guided practice. Model “H is possible” without promising a count. Learners repair the 10-and-10 claim, then try a changed example. Check that each learner separates possibility from certainty.

Record honestly

The teaching runs A (5 H, 8 T) and B (9 H, 11 T) are fictional. Real class runs vary. Keep every actual observation and check each 20-toss total.

Teacher guide • lessons 3-5 and assessment

Lesson 3 • conduct and tally

Model one full challenge turn and correct one wrong response. Learners record every H/T result, complete the core practice, then use the challenge cards. Observe reasoning as well as turn-taking.

Lesson 4 • repeat and compare

Keep the coin, rule and 20-trial count unchanged. Use the transfer worksheet and variation rehearsal. Give specific feedback on the evidence used, then ask for a fresh comparison.

Lesson 5 • explain variation

Learners complete the assessment independently using two honest runs. Accept an oral response or scribe when writing is not the target. Use the marking page and rubric to record actual evidence and one targeted next step.

Access and extension

Support: begin with 10 tosses and adult recording, then repeat. Core: two complete 20-toss records. Extension: explain why changing equipment, procedure or count weakens a same-conditions comparison.

Marking boundary

The observed counts may differ. Each run must total 20 and contain H/T only. Fair does not guarantee equal short-run totals. Do not infer a cause from a small difference. Accept accurate alternative explanations.

Same Coin, Different Results

One fair coin. Two possible outcomes: H or T.

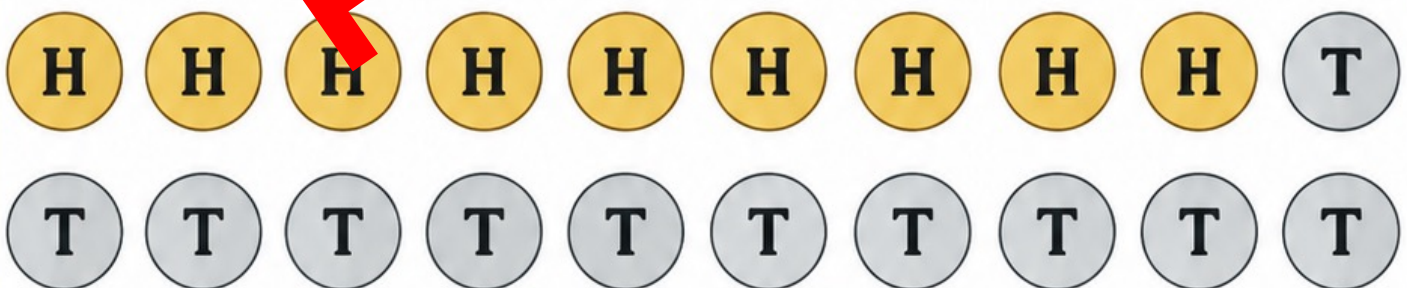


One toss is one trial.
Record every result.

Run A (fictional): 12 H, 8 T. Total: 20.



Run B (fictional): 9 H, 11 T. Total: 20.



**Same conditions can give
different short-run totals.**

10 tosses is
a different
trial count.

Coin outcomes and trials – Cards 1–3

1

Possible outcomes

A coin toss can show
H or T.

Name both before you toss.



What are the two outcomes?

2

One trial

One toss is one trial.
Twenty tosses are
twenty trials.

Show one trial.



3

Guess or record?

Before tossing: I think H might appear.
After tossing: I saw H, so I record H.

Which statement is evidence?



4

Possible, not promised



H is possible on the next toss.
T is possible too.

Can you promise H?

5

Fictional Run



12 H and 8 T.
Total 20 trials.

Which outcome appeared more often?

6

Careful claim



A fair coin does not have to
give 10 H and 10 T in 20 tosses.

Improve: It must be 10 and 10.

Record honestly — Cards 7–9

7

Fictional Run B

9 H and 11 T. Total 20 trials.



Check the total.

8

Every toss counts

Toss once. Say H or T.
Add one tally immediately.
Do not change it.



Why record each result?

9

Same trial count?

Run A has 20 tosses.
A new run has 10 tosses.

Run A
20 tosses

New run
10 tosses

Is the trial count the same? Explain.

Compare repeated runs — Cards 10–12

Card 10 Compare A and B

A: 12 H, 8 T.
B: 9 H, 11 T.
Each total is 20.



What changed?

Card 11 Same conditions

Same coin, same tossing rule.
20 trials each.
The observed counts can differ.



What stayed fixed?

Card 12 Evidence, not a story

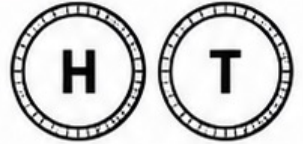
Different counts alone do not
prove that the coin changed.



What can the records actually show?

Name: _____ Date: _____

Guided practice: outcomes and trials



A coin can land in different ways. Answer the questions below.

H = heads
T = tails

- 1.** Name both possible outcomes of one coin toss.

- 2.** One toss is one trial.
How many trials are twenty tosses?

- 3.** Fictional Run A: 12 H and 8 T.
Add to check the total.

- 4.** Complete the careful claim:
Possible does not mean _____.

Name: **ANSWERS**

Date: _____

Guided practice: outcomes and trials



A coin can land in different ways. Answer the questions below.

H = heads
T = tails

1. Name both possible outcomes of one coin toss.

H and T (heads and tails).

2. One toss is one trial.
How many trials are twenty tosses?

20 trials.

3. Fictional Results: 12 H and 8 T.
Add to check the total.

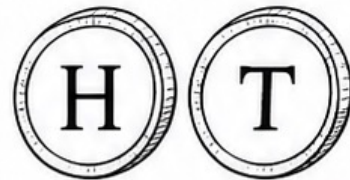
$12 + 8 = 20$ tosses.

4. Complete the careful claim:
Possible does not mean _____.

guaranteed

Name: _____

Core practice: read, decide, explain



1. Fictional Run B: 9 H and 11 T. How many tosses?

2. Run A has 12 H; Run B has 9 H. How many fewer H in B?

3. Before a toss, what outcomes are possible?

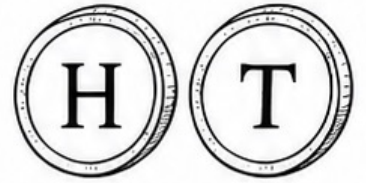
4. Is a 10-toss run the same trial count as a 20-toss run? Why?

5. A learner changes one recorded T to H. Is the record honest? Why?

6. Must a fair coin give 10 H and 10 T in 20 tosses? Explain.

PREVIEW

Name: **ANSWERS**



Core practice: read, decide, explain

1. Fictional Run B: 9 H and 11 T. How many tosses?

20 tosses (9 + 11).

2. Run A has 12 H; Run B has 9 H. How many fewer H in B?

3 fewer H.

3. Before a toss, what outcomes are possible?

H and T.

4. Is a 10-toss run the same trial count as a 20-toss run? Why?

No; 10 and 20 differ.

5. A learner changes one recorded T to H. Is the record honest? Why?

No; record each result honestly.

6. Must a fair coin give 10 H and 10 T in 20 tosses? Explain.

No; fair does not guarantee 10/10 in a short run.

Name: _____

Transfer practice: compare new runs

FICTIONAL:

Run C: 14 H, 6 T. Total 20.

Run D: 10 H, 10 T. Total 20.



1. Write one thing that stayed the same and one thing that changed.

2. A classmate says Run C proves the coin favours H. Explain why this is not justified.

3. What would you record in a new real class run so you could compare it honestly?

PREVIEW

Name: **ANSWERS**

Transfer practice: compare new runs

FICTIONAL:

Run C: 14 H, 6 T. Total 20.

Run D: 10 H, 10 T. Total 20.



1. Write one thing that stayed the same and one thing that changed.

Both runs had 20 trials; H changed from 14 to 10.

2. A classmate says Run C proves the coin favours H. Explain why this is not justified.

No. One short run with 14 H does not prove the coin favours H; D had 10 H.

3. What would you record in a new real class run so you could compare it honestly?

Record every H or T across 20 tosses using the same coin and rule, then compare.

Same-Conditions Challenge — how to play

Equipment



Rules

- 1 Work with a partner.
- 2 Choose one numbered card from the separate challenge sheets.
- 3 Say your answer and point to evidence.
- 4 Check the teacher key score for a supported explanation, not luck.
- 5 Try six cards, then swap roles.

Model turn

Fictional teaching records

Record	H	T	Total
A	12	8	20
B	9	11	20

**A has 3 more H than B;
different short-run
counts are possible.**

Remember



Use the same coin, toss rule and trial count for fair repeats.

Same-Conditions Challenge — Cards 1–6

Cut out the cards. Solve each question. Use the same type of coin and the same conditions.

Same coin.
Same conditions.
Different results!

1 Name both possible coin outcomes.



2 What is one trial?



3 Fictional A:
12 H, 8 T.

These results are fictional.

How many trials?

4 Fictional B:
9 H, 11 T.

These results are fictional.

Which outcome appears more?

5 A has 12 H;
B has 9 H.

How many more H
in A?

6 Does a fair coin
promise 10 H and
10 T in 20 tosses?



Same coin. Same conditions. Different results are possible!

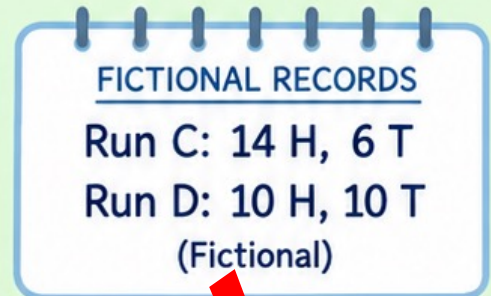
Same-Conditions Challenge — Cards 7–12

Cut apart the cards. Read each question. Think and discuss.

- 7** Same coin, 20 tosses each. Can observed counts differ?



- 8** Fictional C: 14 H, 6 T.
Fictional D: 10 H, 10 T.
What stayed fixed?



- 9** Run A has 20 tosses.
A new run has 10.
Is trial count fixed?



- 10** A learner changes a recorded T to H.
Is that an honest record?



- 11** Run C has more H.
Does this alone prove a cause?



- 12** What should you do after one fair 20-toss run to study variation?



Same coin. Same conditions. Different results can happen!

Same-Conditions Challenge — teacher key

The questions refer to a 20-toss coin experiment carried out under the same conditions. Use the recorded results (**fictional**) to answer.



1 H and T.

2 One toss.

3 20; $12 + 8 = 20$.

4 T; 11 is greater than 9.

5 3 more H.

6 No; fair does not guarantee 10/10 in a short run.

7 Yes; short-run counts can vary.

8 H/T outcomes and 20-toss count; same procedure is stated.

9 No; 20 and 10 differ.

10 No; record what actually occurred.

11 No; one short run does not prove a cause.

12 Repeat the same 20-toss procedure, tally every result, compare.

All numerical records are **fictional**.

Accept equivalent evidence-based wording.

Name: _____

Rehearsal: what varied?

FICTIONAL TEACHING RECORDS

Run C: 14 H, 6 T. Total 20.

Run D: 10 H, 10 T. Total 20.

1. Both runs used the same fair coin and 20 tosses. Explain one thing that stayed the same and one thing that varied.

PREVIEW

2. A classmate says, 'Run C proves the coin favours heads.'
Repair this claim using evidence and a limitation.

Name: **ANSWERS**

Rehearsal: what varied?

FICTIONAL TEACHING RECORDS

Run C: 14 H, 6 T. Total 20.

Run D: 10 H, 10 T. Total 20.

1. Both runs used the same fair coin and 20 tosses. Explain one thing that stayed the same and one thing that varied.

Same coin and 20 tosses; H counts varied from 14 to 10.

2. A classmate says, 'Run C proves the coin favours heads.' Repair this claim using evidence and a limitation.

No. C had 14 H in one short run, while D had 10 H. Those records do not prove the coin favours H.

Name: _____

Rehearsal: apply the same method

FICTIONAL TEACHING RECORDS

Run E: 11 H, 9 T. Total 20.

Run F: 7 H, 13 T. Total 20.

1. Compare E and F. What stayed the same? What changed? Use a number in your answer.

PREVIEW

2. A new run uses only 10 tosses. Explain why it is not the same trial count, and describe one careful next step.

Name: **ANSWERS**

Rehearsal: apply the same method

FICTIONAL TEACHING RECORDS

Run E: 11 H, 9 T. Total 20.

Run F: 7 H, 13 T. Total 20.

1. Compare E and F. What stayed the same? What changed? Use a number in your answer.

Both runs had 20 tosses. E had 11 H; F had 7 H, so H counts differed by 4.

2. A new run uses only 10 tosses. Explain why it is not the same trial count, and describe one careful next step.

10 is not 20. Repeat with 20 tosses under the same coin and rule, recording each result.

Name: _____

Assessment: Same Coin, Different Results

Toss one fair coin 20 times. Record H or T after every toss. Repeat the same procedure for another 20 tosses. Record what actually happens.

Possible outcomes: _____ and _____.

Run 1 — 20 tosses																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Tally of H				Tally of T				Number of H				Number of T				Total			

Run 2 — 20 tosses																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Tally of H				Tally of T				Number of H				Number of T				Total			

1. What stayed the same, and what differed in your records?
2. Can fair repeated runs differ? Explain using your results.

Name: ANSWERS

Assessment: Same Coin, Different Results

Toss one fair coin 20 times. Record H or T after every toss. Repeat the same procedure for another 20 tosses. Record what actually happens.

Possible outcomes: H and T.

Run 1 — 20 tosses																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Tally of H	Tally of T	Number of H	Number of T	Total

Actual results vary; $H + T = 20$.

Run 2 — 20 tosses																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Tally of H	Tally of T	Number of H	Number of T	Total

Actual results vary; $H + T = 20$.

1. What stayed the same, and what differed in your records?

Same coin, H/T outcomes, rule and 20 trials; observed H/T counts may differ.

2. Can fair repeated runs differ? Explain using your results.

Yes. Fair repeated short runs can differ; cite the pupil's two honest records.

You may explain aloud or use a scribe; your results must remain your own.

Learning evidence rubric

	Needs teaching	Developing with support	Target met independently
Concept / accuracy	Inaccurate record or claim	Correct familiar model with prompt	Names H/T and applies idea to fresh case
Application / procedure	Cannot complete two records yet	Records with step prompts	Completes honest repeated records
Reason / evidence	Guess or unsupported claim	Uses detail with prompting	Explains variation with specific data
Transfer / communication	Unclear or no transfer	Clear with support; new case insecure	Clear comparison in fresh case

Evidence observed

Targeted next step

Same Coin,
Different Results

PREVIEW



Our aim and first thoughts

We will name H and T, record two fair 20-toss runs and explain why their counts may differ.

What can one toss show?

Must a fair coin give exactly 10 H and 10 T in 20 tosses?



Words for this investigation

Outcome: a result, H or T. Trial: one toss.

Repeat: use the same procedure again. Tally: record each result.

Variation: a difference in observed counts. Replacement matters for draws from a bag, not for a coin.



A fair 20-toss procedure

Use one coin and the same toss and recording method.

Toss 20 times in each run. After every toss, record the H or T that actually appeared.

Keep every result, even when the totals surprise you.



Fictional Run A

Run A recorded 12 H and 8 T. The total is 20.

The possible outcomes were H and T. Each toss was one trial.

This record shows what happened in one teaching example. It does not predict the next run.



A prediction is not a promise

Heads is possible on the next toss. Tails is possible too.

A fair coin does not promise 10 H and 10 T in 20 tosses.

A 10-toss run has a different trial context, it is not a same-conditions 20-toss repeat.



Pause and reason

Fictional Run A: 12 H and 8 T.

How many trials were recorded? Name one possible outcome.

What cannot be known exactly before the next run?



Check your reason

12 + 8 = 20 trials. H and T were the possible outcomes.

Before a new run, we cannot promise its exact observed H and T totals.



Predict carefully

Before tossing, say what could happen: Heads or Tails and This is possible.

Then test and record what actually happened.

Improve this claim: "Heads will appear exactly ten times."



One complete challenge turn

Read card 5: fictional A has 12 H; B has 9 H. Both runs total 20.

Answer with evidence: A has 3 more H because 12 minus 9 is 3.

Wrong reply: "That proves the coin favors heads." Correct it: two short runs cannot prove a cause. Check the key, then take turns.



Your turn to compare

Fictional A: 12 H, 8 T. Fictional B: 9 H, 11 T

Name one thing that stayed the same and one thing that changed.

Explain why different counts are possible under the same fair procedure.



The 10-and-10 mistake

“A fair coin must give 10 H and 10 T in 20 tosses.

That claim is too strong. Fair describes the procedure, not a guaranteed short-run tally.

The fictional records A and B are both possible 20-toss results.



A fresh comparison

Fictional C: 14 H, 6 T. Fictional D: 10 H, 10 T.

Both total 20 and use the same stated origin procedure.

What stayed fixed? Which observed outcomes varied?



Choose the right support

Support: begin with 10 tosses and an adult crib then repeat.

Core: complete two honest 20-toss records.

Extension: explain why changing the coin rule or trial count weakens a same-conditions comparison.



Independent assessment

Name both possible outcomes. Toss and record results then repeat with the same procedure.

Compare your actual record. Explain whether fair repeated runs can differ.

Record what happens; do not adjust a result to make the runs match.



Check your own evidence

Point to one recorded trial. Recount each item to

Name a specific similarity and difference between your two records.

Choose one next step if a record or explanation needs repair.



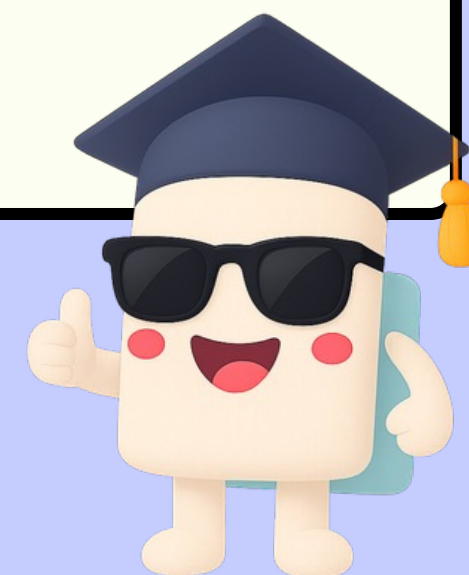
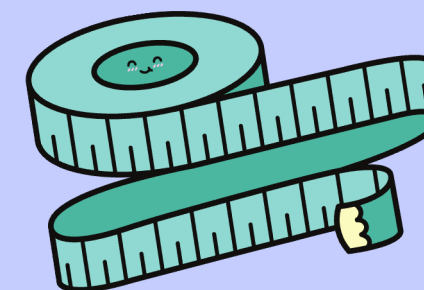
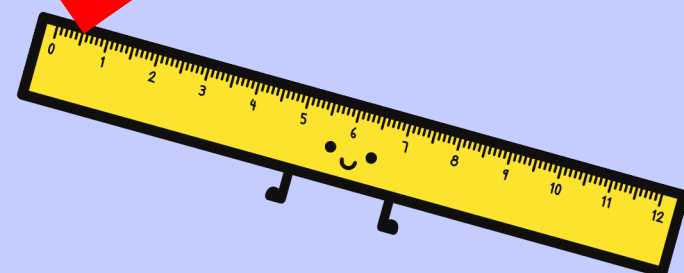
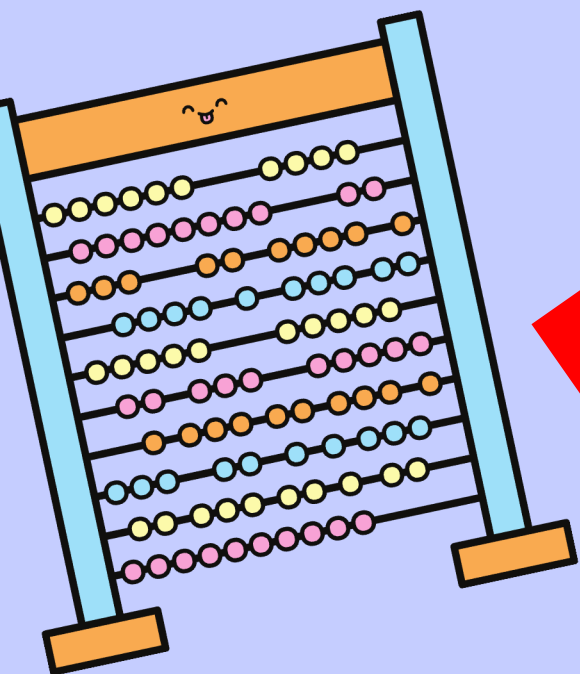
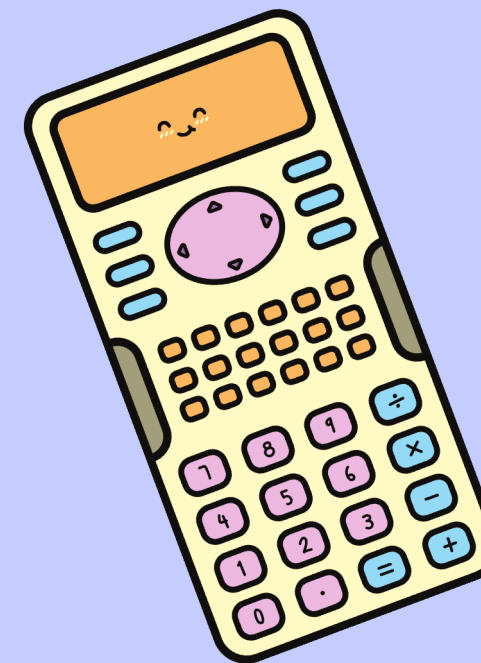
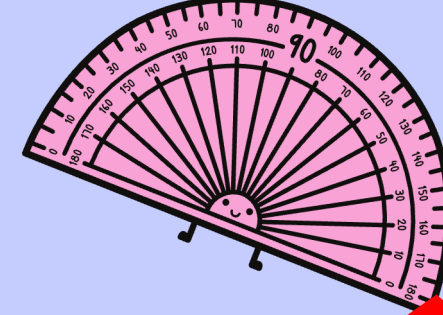
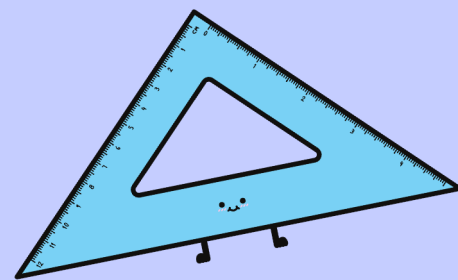
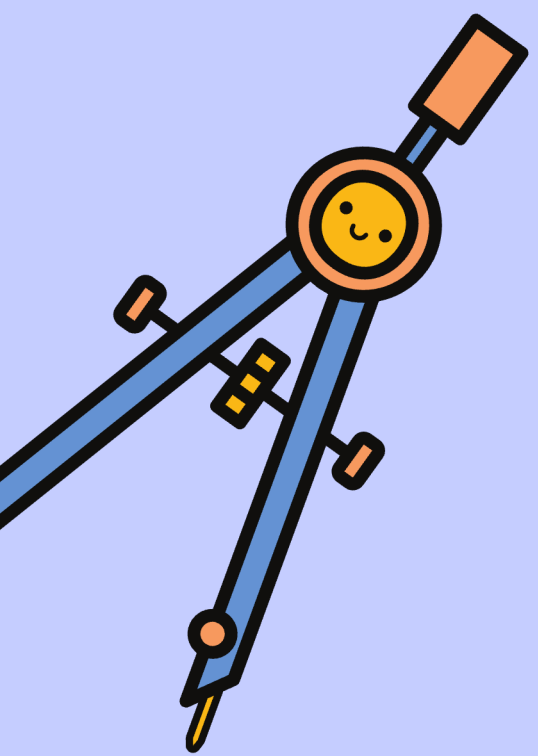
What this unit shows

The possible outcomes remain H and T.

The coin, rule and number of trials can stay fixed.

The observed H and T counts may vary between repeated short runs.





Well Done!
Record what happens and compare the evidence.

PREVIEW

Same Coin, Different Results Quiz



Question 1

Must a fair coin give 10 H and 10 T in 20 tosses?

PREVIEW



Answer 1

No. Fair does not guarantee equal observed counts in a short run.

PREVIEW



Question 2

Fictional A: 12 H, 8 T. Fictional B: 9 H, 11 T. What should the same?

PREVIEW



Answer 2

H and T were possible, and both used the same procedure and 20-trial count.



Question 3

What varied between fictional Runs A and B?

PREVIEW



Answer 3

Observed counts varied. A had 12 H; B had 8 H. L still totalled 20.

PREVIEW



Question 4

Fictional C: 14 H, 6 T. How many trials? How many more H than T?

PREVIEW



Answer 4

20 trials. There were 8 more H than T because $14 \div 2$ plus 6 is 8.

PREVIEW



Question 5

C uses 20 tosses; E uses 10. Is E a same-trial count repeat?

PREVIEW



Answer 5

No. The trial count changed from 20 to 10.

PREVIEW



Question 6

"The coin preferred heads because A had 3 heads. Repair the claim."

PREVIEW



Answer 6

One short run cannot show a coin's preference. Record another fair run without inventing a cause.



Question 7

How can you compare B with A using evidence?

PREVIEW



Answer 7

Both total 20. B has 9 H and A has 12 H, so has 3 fewer H.

PREVIEW



Question 8

Fictional C: 14 H, 6 T. Fictional D: 10 H, 10 T. Give a similarity and difference.

PREVIEW



Answer 8

Both have 20 trials. Their observed H count differs by four

PREVIEW



Question 9

In a fictional example, teams use the same coin and a toss rule. One gets 11 H/9 T; the other 7 H/13 T. What may differ?



Answer q

The observed totals may differ even under the same fair conditions.

PREVIEW



Question 10

What numerical evidence supports your answer to the previous question?

PREVIEW



Answer 10

Each run totals 20. Their H counts are 11 and 17, a difference of four.

PREVIEW



Question II

“Different counts prove one team cheated. Is this justified?”

PREVIEW



Answer II

No. Different short-run counts alone do not provide a changed procedure or cheating.



Question 12

What should you do after one fair 20-toss run to study variation?

PREVIEW

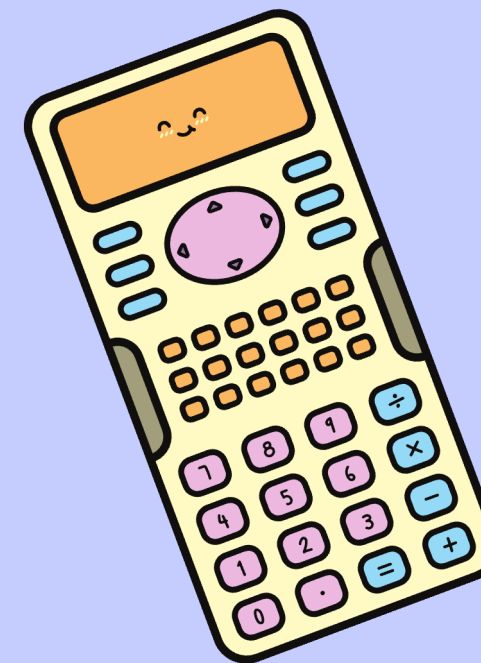
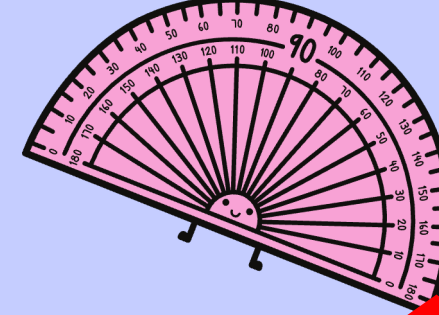
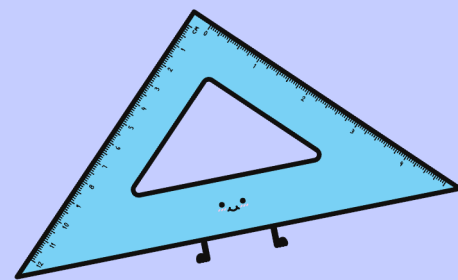
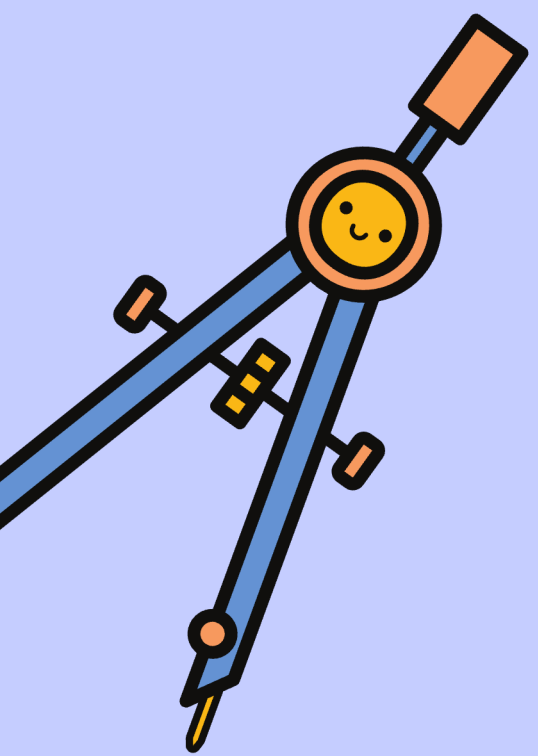


Answer 12

Repeat the same 20-toss procedure, record every result, then compare the two honest records.

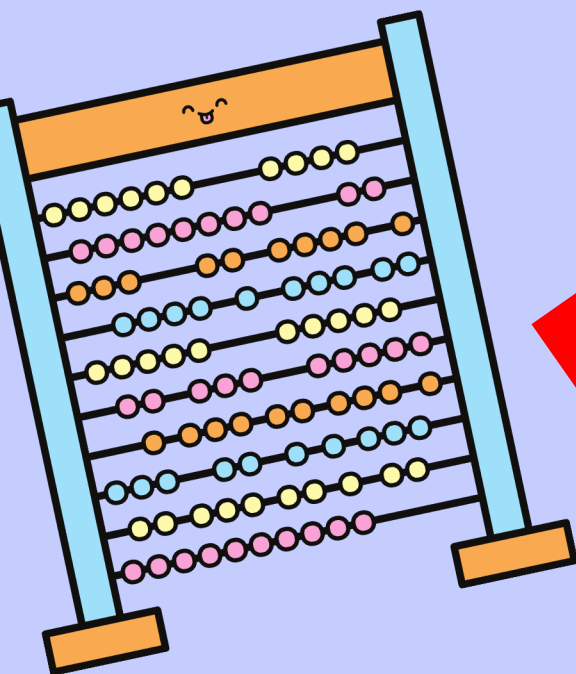
PREVIEW





Well Done!

Fair rules can give different short-run totals.



PREVIEW

