

THEORETICAL VS. EXPERIMENTAL PROBABILITY

One skill, start to finish: the IEP goal, six probe forms, the graph. Untimed. Fillable PDF.

PROBABILITY Theoretical vs. Experimental Probability – Goal and Directions

Goal, baseline, directions and benchmarks for one skill. Untimed; score is problems correct out of 10.

Ten probability problems per form, each in words only, nothing drawn. Each pairs a simple event scenario with a short trial result and asks for two fractions: theoretical, and experimental reduced to lowest terms.

Sample goal — Invented; edit every bracket to fit the student

By [annual review date], given 10 simple event probability problems that pair a described scenario with a trial result, [Student] will write both the theoretical and the experimental probability as fractions for 8 of 10 problems on 3 consecutive weekly probes, as measured by teacher-scored probability probes.

BY (DATE) _____ CRITERION (SCORE OUT OF 10, OR PERCENT) _____

GIVEN CONDITION: WHAT IS SHOWN, ANY ALLOWED SUPPORT? _____ ON ____ OF ____ CONSECUTIVE PROBES _____

STUDENT WILL (THE BEHAVIOR, IN THE WORDS OF THE PROBE) _____ AS MEASURED BY (THIS PROBE: THEORETICAL VS. EXPERIMENTAL PROBABILITY, FORMS A-F, PAGE 4-11) _____

Baseline: give Forms A, B and C on three days and take the middle score

BASLINE PROBE 1	BASLINE PROBE 2	BASLINE PROBE 3	MEDIAN (THE BASLINE)

Benchmarks toward the goal

BENCHMARK	TARGET DATE	TARGET SCORE	ACTUAL SCORE	MEET?

Giving and scoring the probe

☐ Say: "Write the theoretical probability in the first box, the experimental in the second."

☐ Theoretical: the favorable-over-total fraction stated in the sentence, not simplified.

☐ Experimental: the trial result reduced to lowest terms — the only box score reduced.

☐ Untimed. Let the student finish at ten.

Scoring rules for this student (accepted answers, reversals, supports allowed)

What the errors say to reteach (carry over from the log)

My name: _____ Date: _____ Probability: Form A

Write the theoretical probability, then the experimental probability.

WRITE EACH PROBABILITY AS A FRACTION

A box has 7 yellow blocks and 3 black blocks. If you pick one block at random, what is the probability it is yellow? In a classroom trial of this same event, it happened 4 times in 16 tries.

A stack of 13 cards has 7 marked WIN and 6 marked TRY AGAIN. If you pick one card at random, what is the probability it is marked WIN? In a classroom trial of this same event, it happened 28 times in 35 tries.

A jar has one slip for each day of the week. If you pick one slip at random, what is the probability it is a day that starts with the letter T? In a classroom trial of this same event, it happened 5 times in 20 tries.

A basket has 6 apples, 3 bananas, and 1 orange. If you pick one piece of fruit at random, what is the probability it is a banana? In a classroom trial of this same event, it happened 30 times in 35 tries.

A hat has 6 name tags: 3 for Team A and 3 for Team B. If you pick one at random, what is the probability it is for Team B? In a classroom trial of this same event, it happened 4 times in 32 tries.

A spinner has 6 equal sections: 4 labeled STAR and 2 labeled MOON. If you spin once, what is the probability it lands on MOON? In a classroom trial of this same event, it happened 8 times in 12 tries.

A jar has 6 purple buttons, 4 orange buttons, and 2 white buttons. If you pick one button at random, what is the probability it is white? In a classroom trial of this same event, it happened 15 times in 18 tries.

A bag has 3 red marbles, 3 blue marbles, and 5 green marbles. If you pick one marble at random, what is the probability it is blue? In a classroom trial of this same event, it happened 15 times in 35 tries.

A stack of 10 cards is numbered 1 through 10. If you pick one card at random, what is the probability it shows a number greater than 5? In a classroom trial of this same event, it happened 32 times in 40 tries.

PROBABILITY Theoretical vs. Experimental Probability – Data Log and Graph

One row per probe. Three points in a row under the aim line is a decision, not a feeling: change the teaching and write what changed in the notes.

STUDENT _____ CRITERION / AIM _____ GOAL DATE _____

CORRECT OUT OF 10 — DRAW THE AIM LINE FROM THE BASELINE TO THE CRITERION FIRST, THEN PLOT EACH WEEK

Probe (week)	1	2	3	4	5	6	7	8	9	10	11	12

#	DATE	FORM	CORRECT	ERRORS	SCORE USED ON GRAPH	NOTES (CONDITIONS, WHAT WAS RETEACHED)

PROBABILITY Theoretical vs. Experimental Probability – Caseload Summary

Every student on this goal, on one grid. Twelve rows, eight probes, one decision column.

TEACHER / CASE MANAGER _____ SKILL (AS THE GOAL WORDS IT) _____ MARKING PERIOD _____

STUDENT	BASLINE	CRITERION	P1	P2	P3	P4	P5	P6	P7	P8	TREND	DECISION THIS MONTH

How to fill it

☐ One row per student who has a goal on this skill. Baseline is the median of the first three probes.

☐ One column per weekly probe; write the score out of 10, not a percent, so the rows compare.

☐ Trend up, flat or down over the last four probes. That word, not the last score, is what the decision follows.

☐ Decision: keep going, change the teaching, or raise the target. A blank decision on a flat row is the

What it is for

Grouping: When six students sit on the same goal, the individual graphs answer "how is this child doing" and nothing answers "who needs the same fifteen minutes." Rows that are flat together are a group; a row that is flat alone is a different question. Take this page to the data meeting instead of ten folders.

EXAMPLE A Filled-In Data Log (Invented Student)

Marcus is invented. Twelve weekly probes on theoretical vs. experimental probability, the aim line, the change that three low points forced, and the criterion being met.

The goal, as written for Marcus, seventh grade (invented)

By May 20, given 10 simple event probability problems that pair a described scenario with a trial result, Marcus will write both the theoretical and the experimental probability as fractions for 8 of 10 problems on 3 consecutive weekly probes, as measured by teacher-scored probability probes (Forms A-F).

#	DATE	FORM	CORRECT	ERRORS	GRAPHED	NOTES
1	5/8	A	3	7	3	baseline
2	5/9	B	4	6	4	baseline
3	5/10	C	4	6	4	baseline (median of 3, 4, 4 = 4)
4	5/17	D	4	6	4	wrote the experimental fraction unsimplified (8/40, not 1/5) on three items
5	5/24	E	3	7	3	same pattern
6	10/1	F	4	6	4	3 under aim line: added one step: simplify the trial fraction before writing it, one week
7	10/8	A	6	4	6	—
8	10/15	B	6	4	6	—
9	10/22	C	7	3	7	errors narrowing to one pattern
10	10/29	D	7	3	7	—
11	11/5	E	8	2	8	criterion met, 1 of 3
12	11/22	F	8	2	8	criterion met, 2 of 3

How to read the log

☐ Baseline was the median of three forms on three days: 3, 4, 4, so 4. Not the average, not the best.

☐ The aim line runs from 4 in week 1 to 8 at the goal date. Probes 4, 5 and 6 (4, 3, 4) sit under it: three in a row, so the teaching changed and the change is written on the row.

☐ The notes name the pattern, not just the count: "wrote the experimental fraction unsimplified (8/40, not 1/5) on three items" is what sent the teaching somewhere specific, and a score on its own would not have said that.

☐ Criterion met on probes 11 and 12: one more consecutive probe at 8 or better and the goal is met.

The progress report sentence this log produces

"On weekly theoretical vs. experimental probability probes (10 items, untimed), Marcus scored 4 of 10 at baseline in September and 8 of 10 on each of the two most recent probes in November. Progress is sufficient to

PROGRESS MONITORING How This Pack Works

Goal, baseline, weekly probe, graph, decision. Six steps, one skill.

A progress monitoring goal needs a thing to count and a page to count it on. This file is both, for one skill: a goal written in the probe's own words, 6 equivalent forms of the probe that measures it, and a graph scaled to fit. Nothing has to be built or found.

- Baseline.** Give Forms A, B and C on three different days. The middle score of the three is the baseline; write it on the goal page.
- Write the goal.** Fill the goal from the six-part frame on the goal page. Start from the sample and change every bracket: the date, the condition, the criterion, the number of probes.
- Probe once a week** with the forms in rotation (A, B, C, D, E, F, A...). Never the same form two weeks running. Every form is ten items, untimed. Score it against the answer key (pages 16-17).
- Log and plot** the score the same day. Draw the aim line first, from the baseline on the left to the criterion at the goal date on the right, then plot each week's dot.
- Decide from the graph.** Three dots in a row under the aim line: change the teaching this week and write the change on the log. Three in a row over it: raise the target.
- Report from the log.** The log gives the progress report its numbers: baseline, the last two scores, and what the errors keep landing on.

The weekly routine, about five minutes

☐ Monday: pull the next form in the rotation (A, B, C, D, E, F, A...).

☐ Any day: give the probe one-to-one, untimed; ten items takes a few minutes.

☐ Same day: score it, log the row, plot the point, look at the last three points.

☐ Friday: if three points sit under the aim line, write the change you are making on the log.

Print and prep

☐ Print one copy per student per week: the student writes on the form and that same sheet is the one you score.

☐ The forms are student sheets with nothing on them but the problems. The answer key and the Correct ____ / 10 box for every form are on pages 16 and 17; score there, then log it.

☐ Keep the goal page and the graph page for each student at the front of the data folder; type into them or write on them.

☐ The caseload page is one grid for every student on this goal; print it once a month.

What this probe is not

It is not a norm-referenced test and it carries no benchmark score. The sample goal uses invented criteria in brackets; your team sets the real ones from the baseline and the student's IEP. Every form

Equivalent forms, and why it matters

Every form has ten items drawn the same way, from one shuffle of the same bank, and no item appears on two forms — 60 different items across the six forms. A score on one form means the same as a

Goal, baseline, weekly probe, graph, decision. Six steps, one skill.

A progress monitoring goal needs a thing to count and a page to count it on. This file is both, for one skill: a goal written in the probe's own words, 6 equivalent forms of the probe that measures it, and a graph scaled to it. Nothing has to be built or found.

- 1 **Baseline.** Give Forms A, B and C on three different days. The middle score of the three is the baseline; write it on the goal page.
- 2 **Write the goal** from the six-part frame on the goal page. Start from the sample and change every bracket: the date, the condition, the criterion, the number of probes.
- 3 **Probe once a week** with the forms in rotation (A, B, C, D, E, F, A...). Never the same form two weeks running. Every form is ten items, untimed. Score it against the answer key (pages 16–17).
- 4 **Log and plot** the score the same day. Draw the aim line first, from the baseline on the left to the criterion at the goal date on the right, then plot each week's dot.
- 5 **Decide from the graph.** Three dots in a row under the aim line: change the teaching this week and write the change on the log. Three in a row over it: raise the target.
- 6 **Report from the log.** The log gives the progress report its numbers: baseline, the last two scores, and what the errors keep landing on.

The weekly routine, about five minutes

- ☐ Monday: pull the next form in the rotation (A, B, C, D, E, F, A...).
- ☐ Any day: give the probe one-to-one, untimed; ten items takes a few minutes.
- ☐ Same day: score it, log the row, plot the point, look at the last three points.
- ☐ Friday: if three points sit under the aim line, write the change you are making on the log.

Print and prep

- ☐ Print one copy per student per week: the student writes on the form and that same sheet is the one you score.
- ☐ The forms are student sheets with nothing on them but the problems. The answer key and the Correct ____ / 10 box for every form are on pages 16 and 17; score there, then log it.
- ☐ Keep the goal page and the graph page for each student at the front of the data folder; type into them or write on them.
- ☐ The caseload page is one grid for every student on this goal: print it once a month.

What this probe is not

It is not a norm-referenced test and it carries no benchmark score. The sample goal uses invented criteria in brackets; your team sets the real ones from the baseline and the student's IEP. Every form is untimed and ten items long, so a score of 8 means the same thing on every form, and a student is never scored on speed.

Equivalent forms, and why it matters

Every form has ten items drawn the same way, from one shuffle of the same bank, and no item appears on two forms — 60 different items across the six forms. A score on one form means the same as a score on another, so the line on the graph is the student, not the paper. Rotate the forms and the page cannot be memorized.

Theoretical vs. Experimental Probability — Goal and Directions

Goal, baseline, directions and benchmarks for one skill. Untimed; score is problems correct out of 10.

Ten probability problems per form, each in words only, nothing drawn. Each pairs a simple-event scenario with a short trial result and asks for two fractions: theoretical, and experimental reduced to lowest terms.

Sample goal — invented; edit every bracket to fit the student

By [annual review date], given 10 simple-event probability problems that pair a described scenario with a trial result, [Student] will write both the theoretical and the experimental probability as fractions for [8 of 10] problems on [3] consecutive weekly probes, as measured by teacher-scored probability probes.

BY (DATE)

CRITERION (SCORE OUT OF 10, OR PERCENT)

GIVEN (CONDITION: WHAT IS SHOWN, ANY ALLOWED SUPPORT)

ON ____ OF ____ CONSECUTIVE PROBES

STUDENT WILL (THE BEHAVIOR, IN THE WORDS OF THE PROBE)

AS MEASURED BY (THIS PROBE: THEORETICAL VS. EXPERIMENTAL PROBABILITY, FORMS A–F, PAGE 6–11)

Baseline: give Forms A, B and C on three days and take the middle score

BASELINE PROBE 1	BASELINE PROBE 2	BASELINE PROBE 3	MEDIAN (THE BASELINE)

Benchmarks toward the goal

BENCHMARK	TARGET DATE	TARGET SCORE	ACTUAL SCORE	MET?

Giving and scoring the probe

- ☐ Say: "Write the theoretical probability in the first box, the experimental in the second."
- ☐ Theoretical: the favorable-over-total fraction stated in the sentence, not simplified.
- ☐ Experimental: the trial result reduced to lowest terms — the only box scored reduced.
- ☐ Untimed. Let the student finish all ten.

Scoring rules for this student (accepted answers, reversals, supports allowed)

.....

.....

What the errors say to reteach (carry over from the log)

.....

.....

My name: _____

Date: _____



Write the theoretical probability, then the experimental probability.

WRITE EACH PROBABILITY AS A FRACTION

THEORETICAL

EXPERIMENTAL

1. A box has 7 yellow blocks and 3 black blocks. If you pick one block at random, what is the probability it is yellow? In a classroom trial of this same event, it happened 4 times in 16 tries.

2. A stack of 13 cards has 7 marked WIN and 6 marked TRY AGAIN. If you pick one card at random, what is the probability it is marked WIN? In a classroom trial of this same event, it happened 28 times in 35 tries.

3. A jar has one slip for each day of the week. If you pick one slip at random, what is the probability it is a day that starts with the letter T? In a classroom trial of this same event, it happened 5 times in 20 tries.

4. A basket has 6 apples, 3 bananas, and 1 orange. If you pick one piece of fruit at random, what is the probability it is a banana? In a classroom trial of this same event, it happened 30 times in 35 tries.

5. A hat has 6 name tags: 3 for Team A and 3 for Team B. If you pick one at random, what is the probability it is for Team B? In a classroom trial of this same event, it happened 4 times in 32 tries.

6. A spinner has 6 equal sections: 4 labeled STAR and 2 labeled MOON. If you spin once, what is the probability it lands on MOON? In a classroom trial of this same event, it happened 8 times in 12 tries.

7. A jar has 6 purple buttons, 4 orange buttons, and 2 white buttons. If you pick one button at random, what is the probability it is white? In a classroom trial of this same event, it happened 15 times in 18 tries.

8. A bag has 3 red marbles, 3 blue marbles, and 5 green marbles. If you pick one marble at random, what is the probability it is blue? In a classroom trial of this same event, it happened 15 times in 35 tries.

9. A stack of 10 cards is numbered 1 through 10. If you pick one card at random, what is the probability it shows a number greater than 5? In a classroom trial of this same event, it happened 32 times in 40 tries.

10. A number cube has faces numbered 1 through 6. If you roll it once, what is the probability it lands on an odd number? In a classroom trial of this same event, it happened 12 times in 27 tries.

My name: _____

Date: _____



Write the theoretical probability, then the experimental probability.

WRITE EACH PROBABILITY AS A FRACTION

THEORETICAL

EXPERIMENTAL

1. A box has 8 yellow blocks and 5 black blocks. If you pick one block at random, what is the probability it is yellow? In a classroom trial of this same event, it happened 16 times in 28 tries.

2. A stack of 9 cards has 4 marked WIN and 5 marked TRY AGAIN. If you pick one card at random, what is the probability it is marked TRY AGAIN? In a classroom trial of this same event, it happened 6 times in 12 tries.

3. A jar has 4 purple buttons, 5 orange buttons, and 5 white buttons. If you pick one button at random, what is the probability it is white? In a classroom trial of this same event, it happened 3 times in 27 tries.

4. A number cube has faces numbered 1 through 6. If you roll it once, what is the probability it lands on a number greater than 4? In a classroom trial of this same event, it happened 6 times in 30 tries.

5. A spinner has 12 equal sections: 7 labeled STAR and 5 labeled MOON. If you spin once, what is the probability it lands on MOON? In a classroom trial of this same event, it happened 24 times in 42 tries.

6. A bag has 3 red marbles, 5 blue marbles, and 6 green marbles. If you pick one marble at random, what is the probability it is blue? In a classroom trial of this same event, it happened 16 times in 24 tries.

7. A stack of 10 cards is numbered 1 through 10. If you pick one card at random, what is the probability it shows a number greater than 7? In a classroom trial of this same event, it happened 5 times in 40 tries.

8. A hat has 13 name tags: 9 for Team A and 4 for Team B. If you pick one at random, what is the probability it is for Team B? In a classroom trial of this same event, it happened 6 times in 21 tries.

9. A basket has 3 apples, 4 bananas, and 2 oranges. If you pick one piece of fruit at random, what is the probability it is a banana? In a classroom trial of this same event, it happened 3 times in 24 tries.

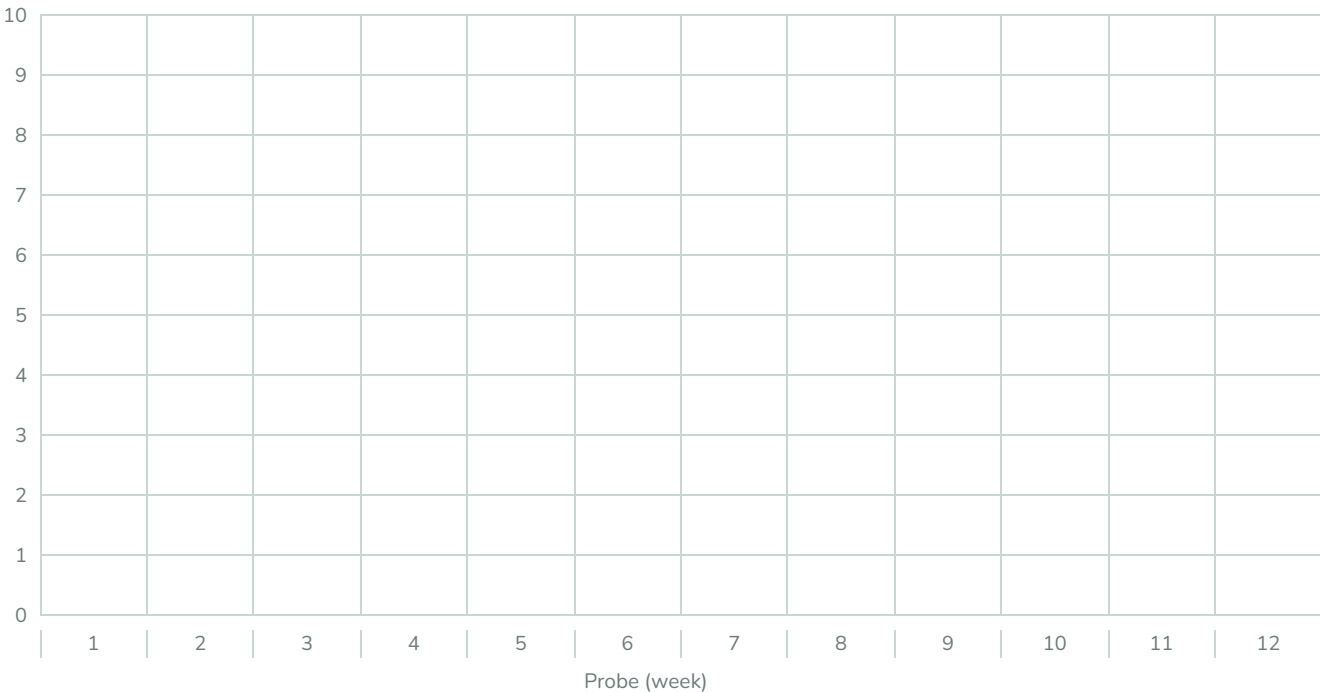
10. A jar has one slip for each day of the week. If you pick one slip at random, what is the probability it is a weekday? In a classroom trial of this same event, it happened 24 times in 28 tries.

Theoretical vs. Experimental Probability – Data Log and Graph

One row per probe. Three points in a row under the aim line is a decision, not a feeling: change the teaching and write what changed in the notes.

STUDENT	CRITERION / AIM	GOAL DATE

CORRECT OUT OF 10 · DRAW THE AIM LINE FROM THE BASELINE TO THE CRITERION FIRST, THEN PLOT EACH WEEK



#	DATE	FORM	CORRECT	ERRORS	SCORE USED ON GRAPH	NOTES (CONDITIONS, WHAT WAS RETEACHED)

Theoretical vs. Experimental Probability – Caseload Summary

Every student on this goal, on one grid. Twelve rows, eight probes, one decision column.

TEACHER / CASE MANAGER

SKILL (AS THE GOAL WORDS IT)

MARKING PERIOD

STUDENT	BASELINE	CRITERION	P1	P2	P3	P4	P5	P6	P7	P8	TREND	DECISION THIS MONTH

How to fill it

- ☐ One row per student who has a goal on this skill. Baseline is the median of the first three probes.
- ☐ One column per weekly probe; write the score out of 10, not a percent, so the rows compare.
- ☐ Trend: up, flat or down over the last four probes. That word, not the last score, is what the decision follows.
- ☐ Decision: keep going, change the teaching, or raise the target. A blank decision on a flat row is the thing this page exists to catch.

What it is for

Grouping. When six students sit on the same goal, the individual graphs answer “how is this child doing” and nothing answers “who needs the same fifteen minutes.” Rows that are flat together are a group; a row that is flat alone is a different question. Take this page to the data meeting instead of ten folders.

EXAMPLE

A Filled-In Data Log (Invented Student)

Marcus is invented. Twelve weekly probes on theoretical vs. experimental probability, the aim line, the change that three low points forced, and the criterion being met.

The goal, as written for Marcus, seventh grade (invented)

By May 20, given 10 simple-event probability problems that pair a described scenario with a trial result, Marcus will write both the theoretical and the experimental probability as fractions for 8 of 10 problems on 3 consecutive weekly probes, as measured by teacher-scored probability probes (forms A–F).

#	DATE	FORM	CORRECT	ERRORS	GRAPHED	NOTES
1	9/8	A	3	7	3	baseline
2	9/9	B	4	6	4	baseline
3	9/10	C	4	6	4	baseline (median of 3, 4, 4 = 4)
4	9/17	D	4	6	4	wrote the experimental fraction unreduced (8/40, not 1/5) on three items
5	9/24	E	3	7	3	same pattern
6	10/1	F	4	6	4	3 under aim line: added one step: simplify the trial fraction before writing it, one week
7	10/8	A	6	4	6	–
8	10/15	B	6	4	6	–
9	10/22	C	7	3	7	errors narrowing to one pattern
10	10/29	D	7	3	7	–
11	11/5	E	8	2	8	criterion met, 1 of 3
12	11/12	F	8	2	8	criterion met, 2 of 3

How to read the log

- ☐ Baseline was the median of three forms on three days: 3, 4, 4, so 4. Not the average, not the best.
- ☐ The aim line runs from 4 in week 1 to 8 at the goal date. Probes 4, 5 and 6 (4, 3, 4) sat under it: three in a row, so the teaching changed and the change is written on the row.
- ☐ The notes name the pattern, not just the count: “wrote the experimental fraction unreduced (8/40, not 1/5) on three items” is what sent the teaching somewhere specific, and a score on its own would not have said that.
- ☐ Criterion met on probes 11 and 12; one more consecutive probe at 8 or better and the goal is met.

The progress report sentence this log produces

“On weekly theoretical vs. experimental probability probes (10 items, untimed), Marcus scored 4 of 10 at baseline in September and 8 of 10 on each of the two most recent probes in November. Progress is sufficient to meet the goal of 8 of 10 on three consecutive probes by May.” Every number in it is on the log above; nothing is from memory.