

CONES, PYRAMIDS & SPHERES

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

Volume of Cones, Pyramids, and Spheres – Goal and Directions

Goal, baseline, directions and benchmarks for one skill. Untimed; score is volumes calculated correctly out of 10.

Ten volume problems per form: four cones, three rectangular pyramids and three spheres, each given whole-number dimensions. Pi is fixed at 3.14, every volume rounds to the nearest tenth, and every item has its own show-your-work space. No cone or pyramid repeats across the six forms; a sphere's radius may repeat on another form, never twice on the same form.

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

By [annual review date], given 10 volume problems mixing cones, pyramids and spheres with whole-number dimensions, [Student] will calculate the volume (3.14 for pi, nearest tenth) for [8 of 10] items on [3] consecutive weekly probes, as measured by teacher-scored volume 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: VOLUME OF CONES, PYRAMIDS, AND SPHERES, FORMS A-F, PAGE 6-11)

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

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

Benchmarks toward the goal

BENCHMARK	TARGET DATE	TARGET SCORE	ACTUAL SCORE	MEET

Giving and scoring the probe

☐ Say "Find the volume. Use 3.14 for pi, round to the nearest tenth. Show your work."

☐ Come: $1/3 \times \pi \times r^2 \times h$. Baseline: $1/3 \times \pi \times w \times h$. Sphere: $4/3 \times \pi \times r^3$

My name: _____ Date: _____

Find the volume of each shape. Use 3.14 for pi. Round to the nearest tenth. Show your work.

EACH ITEM NAMES ITS SHAPE. PI = 3.14 ON A CONE OR SPHERE. ROUND TO THE NEAREST TENTH

1 Cone: $r = 4, h = 4$

Show your work

V =

2 Cone: $r = 8, h = 10$

Show your work

V =

3 Sphere: $r = 4$

Show your work

V =

4 Pyramid: $l = 9, w = 9, h = 2$

Show your work

V =

5 Cone: $r = 4, h = 6$

Show your work

V =

6 Sphere: $r = 2$

Show your work

V =

7 Cone: $r = 6, h = 2$

Show your work

V =

8 Pyramid: $l = 3, w = 8, h = 9$

Show your work

V =

Volume of Cones, Pyramids, and Spheres – 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

WEEK	1	2	3	4	5	6	7	8	9	10	11	12

Score used on graph

DATE	FORM	CORRECT	ERRORS	NOTES (CONDITIONS, WHAT WAS RETEACHED)

Volume of Cones, Pyramids, and Spheres – 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	BASILINE	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 scores out of 10, not a percent, so the rows compare.

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

EXAMPLE A Filled-In Data Log (Invented Student)

Priya is invented. Twelve weekly probes on cone, pyramid, and sphere volume, the aim line, the change that three low points forced, and the criterion being met.

The goal, as written for Priya, eighth grade (invented)

By May 20, given 10 volume problems mixing cones, pyramids and spheres with whole-number dimensions, Priya will calculate the volume (3.14 for pi, nearest tenth) for 8 of 10 items on 3 consecutive weekly probes, as measured by teacher-scored volume probes (forms A-F).

#	DATE	FORM	CORRECT	ERRORS	GRAPHED	NOTES
1	3/8	A	3	7	3	baseline
2	3/9	B	4	6	4	baseline
3	3/10	C	4	6	4	baseline (median of 3, 4, 4 = 4)
4	3/17	D	4	6	4	found r squared or the base area correctly but left out the 1/3 or 4/3 factor; six several answers matched the wrong shape's formula
5	3/24	E	3	7	3	same pattern
6	10/1	F	4	6	4	3 under aim line: circled the 1/3 or 4/3 factor before starting each problem, one week of guided practice
7	10/8	A	5	5	5	—
8	10/15	B	6	4	6	—
9	10/22	C	6	4	6	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: "found r squared or the base area correctly but left out the 1/3 or 4/3 factor, so several answers matched the wrong shape's formula" is what sent the teaching somewhere specific, and a score on its own would not have said that.

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 it. 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** 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, B). 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, B).

☐ 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.

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

Four cones and three pyramids come from one pool shared across all six forms, so neither repeats. Three spheres reshuffle from six radii each form, never twice on one form. 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.

Volume of Cones, Pyramids, and Spheres — Goal and Directions

Goal, baseline, directions and benchmarks for one skill. Untimed; score is volumes calculated correctly out of 10.

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

By [annual review date], given 10 volume problems mixing cones, pyramids and spheres with whole-number dimensions, [Student] will calculate the volume (3.14 for pi, nearest tenth) for [8 of 10] items on [3] consecutive weekly probes, as measured by teacher-scored volume 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: VOLUME OF CONES, PYRAMIDS, AND SPHERES, FORMS A–F, PAGE 6–11)

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

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

Benchmarks toward the goal

BENCHMARK	TARGET DATE	TARGET SCORE	ACTUAL SCORE	MET?

Giving and scoring the probe

- ☐ Say: "Find the volume. Use 3.14 for pi; round to the nearest tenth. Show your work."
- ☐ Cone: $\frac{1}{3} \times \pi \times r^2 \times h$. Pyramid: $\frac{1}{3} \times l \times w \times h$. Sphere: $\frac{4}{3} \times \pi \times r^3$.
- ☐ Rounding: a hundredths digit of 5 rounds UP (12.45 → 12.5). Show work for credit.
- ☐ 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: _____

 Find the volume of each shape. Use 3.14 for pi.
Round to the nearest tenth. Show your work.

EACH ITEM NAMES ITS SHAPE · $\pi = 3.14$ ON A CONE OR SPHERE · ROUND TO THE NEAREST TENTH

1

Cone · $r = 4$, $h = 4$

Show your work

 $V \approx$

2

Cone · $r = 8$, $h = 10$

Show your work

 $V \approx$

3

Sphere · $r = 4$

Show your work

 $V \approx$

4

Pyramid · $l = 9$, $w = 9$, $h = 2$

Show your work

 $V \approx$

5

Cone · $r = 4$, $h = 6$

Show your work

 $V \approx$

6

Sphere · $r = 2$

Show your work

 $V \approx$

7

Cone · $r = 6$, $h = 2$

Show your work

 $V \approx$

8

Pyramid · $l = 3$, $w = 8$, $h = 9$

Show your work

 $V \approx$

9

Sphere · $r = 7$

Show your work

 $V \approx$

10

Pyramid · $l = 4$, $w = 8$, $h = 6$

Show your work

 $V \approx$

My name: _____ Date: _____

 Find the volume of each shape. Use 3.14 for pi.
Round to the nearest tenth. Show your work.

EACH ITEM NAMES ITS SHAPE · $\pi = 3.14$ ON A CONE OR SPHERE · ROUND TO THE NEAREST TENTH

1

Cone · $r = 6$, $h = 3$

Show your work

 $V \approx$

2

Sphere · $r = 2$

Show your work

 $V \approx$

3

Cone · $r = 2$, $h = 12$

Show your work

 $V \approx$

4

Pyramid · $l = 2$, $w = 8$, $h = 12$

Show your work

 $V \approx$

5

Cone · $r = 8$, $h = 3$

Show your work

 $V \approx$

6

Sphere · $r = 3$

Show your work

 $V \approx$

7

Cone · $r = 6$, $h = 9$

Show your work

 $V \approx$

8

Pyramid · $l = 2$, $w = 4$, $h = 12$

Show your work

 $V \approx$

9

Sphere · $r = 4$

Show your work

 $V \approx$

10

Pyramid · $l = 8$, $w = 9$, $h = 4$

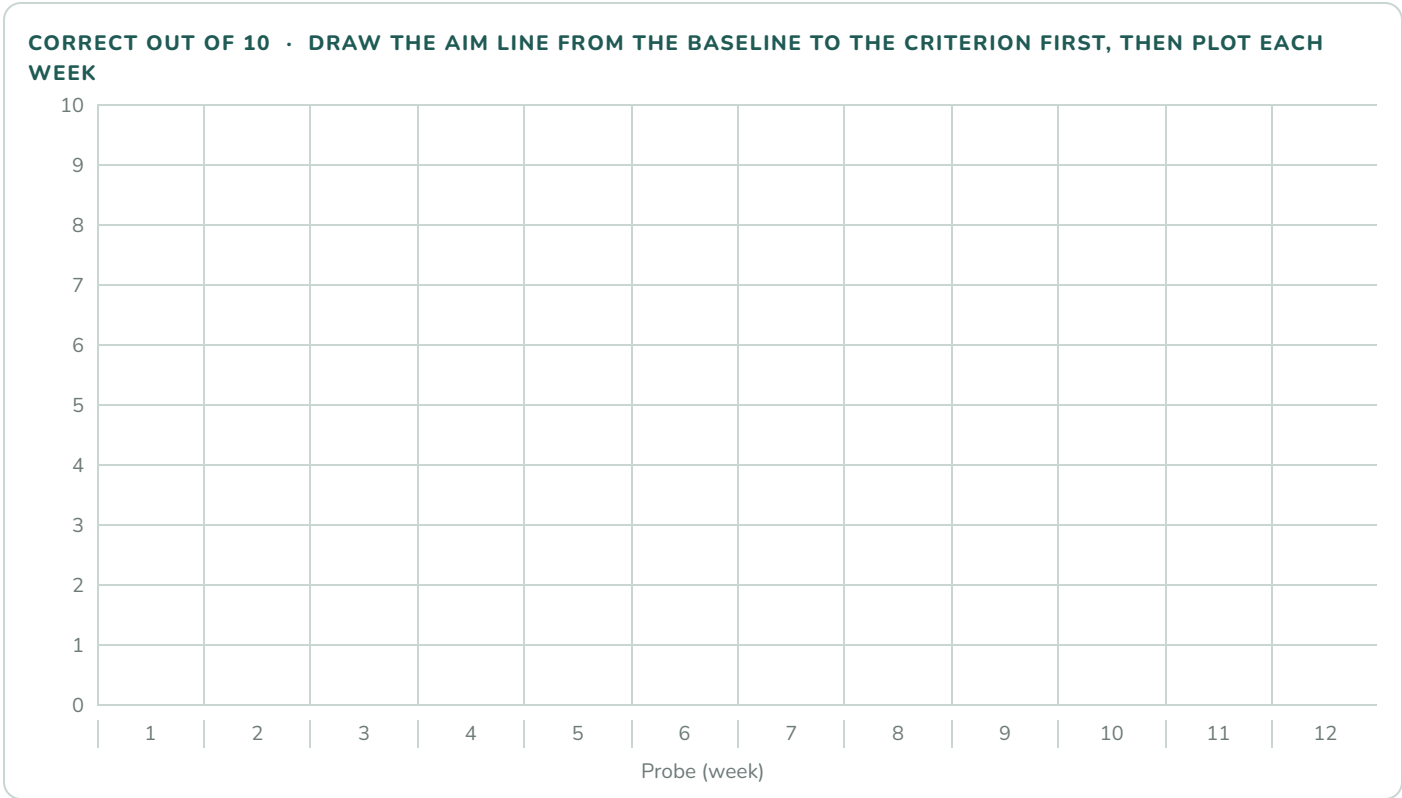
Show your work

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Volume of Cones, Pyramids, and Spheres — 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
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Volume of Cones, Pyramids, and Spheres — 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)

Priya is invented. Twelve weekly probes on cone, pyramid, and sphere volume, the aim line, the change that three low points forced, and the criterion being met.

The goal, as written for Priya, eighth grade (invented)

By May 20, given 10 volume problems mixing cones, pyramids and spheres with whole-number dimensions, Priya will calculate the volume (3.14 for π , nearest tenth) for 8 of 10 items on 3 consecutive weekly probes, as measured by teacher-scored volume probes (forms A–F).

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7	10/8	A	5	5	5	–
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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: “found r squared or the base area correctly but left out the 1/3 or 4/3 factor, so several answers matched the wrong shape's formula” 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 cone, pyramid, and sphere volume probes (10 items, untimed), Priya 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.