NUMERACY CONSULTANTS

Word Problem Prompting Schema Guide

Instructional Prompts for Multiplication & Division

Schema 1 Equal Groups	Schema 2 Partitive Division	Schema 3 Measurement Division	Schema 4 Multiplicative Comparison

What is schema-based instruction?

Instead of hunting for keyword shortcuts, schema-based instruction teaches students to ask: *"What kind of story is this?"* When students can name the structure of a problem, they can identify what's missing — and choose the right operation every time.

TEACHER TIP

Start with the "Identify the Schema" prompt on each page. Once students name the schema, work through the remaining prompts in order. Your goal is building student language for problem structure — not rushing to the answer.

The Four Schemas at a Glance

	Equal Groups	Partitive Division	Measurement Division	Multiplicative Comparison
Structure	Groups of equal size — total unknown or either factor	Total and number of groups known — group size unknown	Total and group size known — number of groups unknown	One quantity is a multiple of another
Signal words	groups of, rows of, bags of, equal, each, per, in all	shared equally, split among, each person gets, divided by	how many groups, how many times, fits into, sets of	times as many, times as much, n times more, as tall as
Missing value	Total OR number of groups OR group size	Group size (unit value)	Number of groups	Bigger quantity, smaller quantity, or multiplier
Organizer	Equal Groups mat	Fair-Share mat	Measurement strip	Comparison bar model

SCHEMA 1

Equal Groups

Groups of equal size — multiply to find the total, or divide to find a missing factor.

	TEACHER PROMPTS	
1	**Identify the Schema**	"Are there equal-sized groups in this story? Does each group have the same amount?"
2	**Name the Groups**	"How many groups are there? What is each group called?"
3	**Name the Group Size**	"How many are in each group? Is every group the same size?"
4	**Find the Unknown**	"Do we know the total — or are we trying to find it? Or do we know the total and need to find a missing factor?"
5	**Choose the Equation**	"If we know both factors, we multiply to find the total. If the total is given, we divide to find a missing factor."

TEACHER TIP

Key clue: look for equal-sized groups with a multiplier. If students see repeated addition (3 + 3 + 3), redirect: "Can we write that as one multiplication sentence?" Anchor the language: Number of Groups × Group Size = Total.

VISUAL EXAMPLE **EXAMPLE PROBLEM**

There are 4 bags of apples. Each bag has 6 apples. How many apples are there in all?

Graphic Organizer

Number of Groups	×	Group Size	=	Total
4 bags	×	6 apples each	=	? apples

Solution: 4 × 6 = 24 — There are 24 apples in all.

SCHEMA 2

Partitive Division

The total and number of groups are known — divide to find the size of each group.

	TEACHER PROMPTS	
1	**Identify the Schema**	"Do we already know the total AND the number of groups — and we're trying to find out how much is in each group?"
2	**Find the Total**	"What is the total amount we're starting with, before it gets divided up?"
3	**Find the Number of Groups**	"How many equal groups are we splitting the total into?"
4	**Name the Unknown**	"What we don't know is the size of each group — how much each person or container gets."
5	**Choose the Equation**	"We divide the total by the number of groups to find out how much is in each one."

TEACHER TIP

Students most often confuse partitive with measurement division. The key difference: in partitive division, we know how many groups — we're finding group size. Ask: "Do we know how many groups there are? Then divide to find what each group gets."

VISUAL EXAMPLE **EXAMPLE PROBLEM**

A baker has 24 cookies. She puts them equally into 4 boxes. How many cookies are in each box?

Graphic Organizer

Total	÷	Number of Groups	=	Group Size
24 cookies	÷	4 boxes	=	? cookies per box

Solution: 24 ÷ 4 = 6 — There are 6 cookies in each box.

SCHEMA 3

Measurement Division

The total and group size are known — divide to count how many groups there are.

TEACHER PROMPTS		
1	**Identify the Schema**	"Do we know the total AND the size of each group — and we need to figure out how many groups there are?"
2	**Find the Total**	"What is the total amount we're dividing up?"
3	**Find the Group Size**	"How big is each group? How many go into each set?"
4	**Name the Unknown**	"What we don't know is how many groups — how many times that group size fits into the total."
5	**Choose the Equation**	"We divide the total by the group size to count the number of groups."

TEACHER TIP

Measurement division asks: 'How many times does this fit in?' Encourage students to think of it as repeated subtraction or skip-counting: 'How many times can we take 4 away from 24?' Draw the measurement strip to make the grouping concrete.

VISUAL EXAMPLE

EXAMPLE PROBLEM

A teacher has 30 stickers. She gives 5 stickers to each student. How many students get stickers?

Graphic Organizer

Total	÷	Group Size	=	Number of Groups
30 stickers	÷	5 per student	=	? students

Solution: 30 ÷ 5 = 6 — Six students each receive 5 stickers.

SCHEMA 4

Multiplicative Comparison

One quantity is described as a multiple of another — use multiplication or division.

		TEACHER PROMPTS
1	**Identify the Schema**	"Are we comparing two amounts where one is described as a multiple of the other — like 'three times as many'?"
2	**Find the Smaller Amount**	"What is the smaller or reference quantity — the one being multiplied?"
3	**Find the Multiplier**	"How many times bigger is the larger amount? What is the scale factor?"
4	**Watch the Language**	"'Times as many' is a multiplication comparison — it is NOT the same as adding. Draw the bar model to see the scale."
5	**Choose the Equation**	"Smaller Amount × Multiplier = Larger Amount. If the larger is unknown, multiply. If a factor is unknown, divide."

TEACHER TIP

Multiplicative comparison is the most misread schema at the upper elementary level. Students see 'more' and add. Emphasize: 'times as many' means one quantity is a multiple of the other — always draw the comparison bar model before writing any equation.

VISUAL EXAMPLE **EXAMPLE PROBLEM**

Jaylen has 5 marbles. Sofia has 4 times as many marbles as Jaylen. How many marbles does Sofia have?

Graphic Organizer

Smaller Amount	×	Multiplier	=	Larger Amount
Jaylen: 5 marbles	×	4 times as many	=	Sofia: ? marbles

Solution: 5 × 4 = 20 — Sofia has 20 marbles.

QUICK-CHECK DIAGNOSTIC

When a student is stuck, use this table to guide them to the right schema. Match what the student notices in the problem to the prompt in the center column.

IF THE STUDENT SEES…	SAY THIS:	IT'S LIKELY…
Phrases like "groups of," "rows of," "each," or "per" — and a total is asked for	"Are there equal-sized groups here? How many groups, and how many in each group?"	**Equal Groups (Multiplication)**
A total is given and shared into a set number of groups	"We know the total and how many groups — but what goes in each group?"	**Partitive Division**
A total and a group size are given — we need to count the groups	"How many times does that group size fit into the total?"	**Measurement Division**
Comparative language like "times as many," "times as much," or "n times more"	"Are we comparing two amounts where one is a multiple of the other?"	**Multiplicative Comparison**

Common Misconceptions

Watch for these patterns when students struggle to identify the schema.

Equal Groups

Students confuse multiplication with repeated addition — ask: "How many groups? How many in each? Can we write that as one multiplication equation?"

Partitive Division

Students divide by the wrong number — remind them: "We know the number of groups. What we're finding is the size of each group."

Measurement Division

Students confuse this with partitive — ask: "Do we know how big each group is? Then we're counting how many groups fit."

Multiplicative Comparison

Students add instead of multiply — clarify: '3 times as many' means multiply. Draw the comparison bar to show the scale relationship.

NOTES