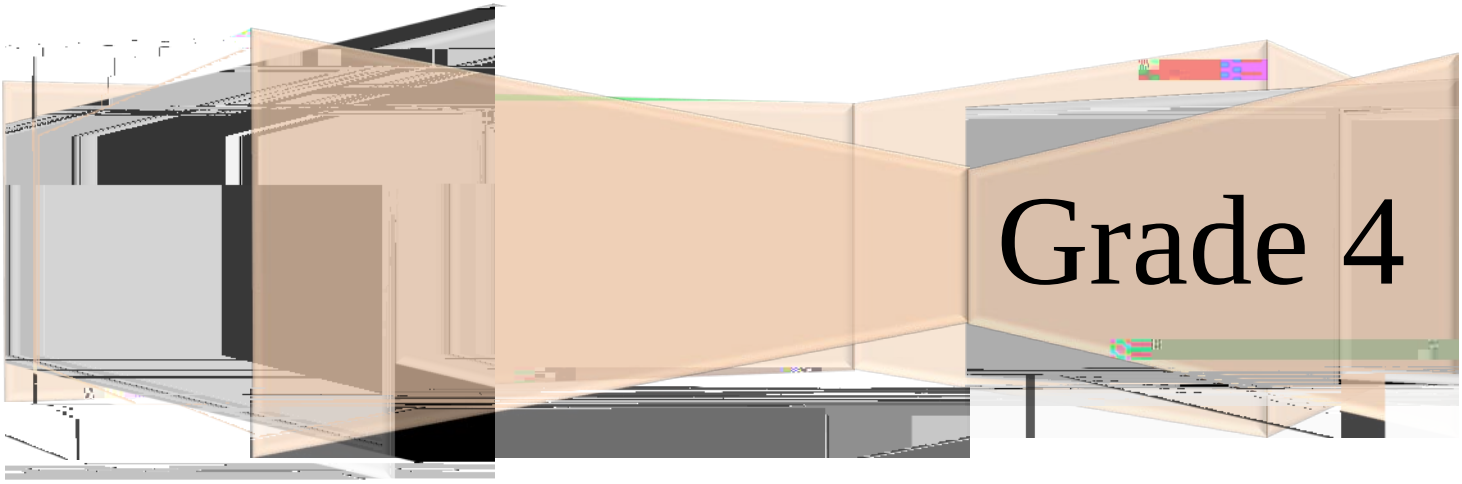
Scaffolding Instruction for All Students:

A Resource Guide for Mathematics



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Scaffolding Instruction for All Students
A Resource Guide for Mathematics
Grade 4

Acknowledgements

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Table of Contents

Introduction

The Next Generation English Language Arts (ELA) and Mathematics Learning Standards intend to foster the 21st century skills needed for college and career readiness and to prepare students to become

How to Use This Guide

The provision of scaffolds should be thoughtfully planned as to not isolate or identify any student or group of students as being "different" or requiring additional support. Therefore, in the spirit of inclusive and culturally responsive classrooms, the following is suggested:

- Make scaffolded worksheets or activities available to all students.
- Heterogeneously group students for group activities when appropriate.
- Provide ELLs/MLLs with opportunities to utilize their home language knowledge and skills in the context of the learning environment.
- Make individualized supports or adapted materials available without emphasizing the difference.
- Consistently and thoughtfully use technology to make materials more accessible to all students.

In the ELA guides, the Table of Contents is organized to allow teachers to access strategies based on the instructional focus (reading, writing, speaking and listening, and language) and includes a list of scaffolds that can be used to address those needs. In the mathematics guides, the Table of Contents is organi[redacted]caffolds themselves.

[redacted]cludes a description of what the scaffold is, who may benefit, and how it can be imple[redacted]son-specific model (see graphic below). The scripts provided are only for demo[redacted] scaffold might look like in action. Teachers are encouraged to make changes to preser[redacted]age to best support the learning needs of their students. While lessons from the Engag[redacted] used to illustrate how each scaffold can be applied, the main purpose of the exemp[redacted]ow teachers can incorporate these scaffolds into their lessons as appropriate.

Title of Scaffold Module: Unit: Lesson:
Explanation of scaffold This section provides a deeper explanation of the scaffold itself, including what it is and how it can and should be used. This section is helpful when implementing the scaffold in other lessons.

Teacher actions/instructions
This section provides specific instructions for the teacher regarding successful implementation of the scaffold.

Graphic Organizer (RDW (Read, Draw, Write) Template)
Exemplar from: Module 1: Topic A: Lesson 1: Application Problem

Explanation of scaffold

The RDW Template

Display the word problem:
Ben has a rectangular area 9 meters long and 6 meters wide. He wants a fence that will go a
it as well as grass sod to cover it. How many meters of fence will he need? How many square
meters of grass sod will he need to cover the entire area?

T: The first step is read. That means I have to read the problem. What is step 1?

S (student): Read.

T: T

T: Since we need to know how many square meters of grass sod are needed, let's write the answer to this equation as "54 sq m of grass sod." Did we answer the second question in the problem?

S: Yes. We found how many square meters of grass sod are needed to cover the area.

Step 5: Write a word sentence.

T: What is step 5?

S: Write a word sentence.

T: Finally, we have to write two sentences to answer each question. We have to remember to include all the information to tell the whole story. To tell how many meters of fence are needed to go around the perimeter of the rectangle, we will write, "Ben needs _____."

S: 30 meters of fence

T: Correct. Let's write this sentence. Now, tell me what the sentence needed to answer the second question should say, and write it on your RDW Template

S: "Ben needs 54 square meters of grass sod."

T: Great job! Remember, we are going to use RDW when we need to solve word problems.

As students become more familiar with the process, fade the use of modeling and guided practice, and provide opportunities for students to work in pairs or small groups. Once students demonstrate the ability to use the RDW process with limited prompting, provide multiple, independent practice

NAME _____

RDWTemplate(example)

Read	Make a r after you read the problem. 
Draw and label	Draw a picture and label it.
Read again	Make a r afm.

NAME _____

RDWTemplate

Read	Make a r after you read the problem. 
Draw and label	Draw a picture and label it.
Read again	Make a r after you read the problem again. 
Write	

Concrete-Representational-Abstract (CRA)

Exemplar from:
Module 1: Topic B: Lesson 5: Concept Development

Explanation of scaffold
CRA is a three-part instructional strategy in which the teacher begins by modeling and thinking aloud with concrete objects (e.g., blocks, disks, etc.), and then progresses to representing the concrete objects with drawings. The final level is the abstract level, where only numbers and mathematical symbols are used to complete the algorithm. Although the following exemplar connects to and uses the concept development section in this lesson as an exemplar, CRA is a method that can be used in any lesson when teaching abstract concepts that are difficult for students to understand.

Teacher actions/instructions:
Provide student partners with place value disks and the Comparison Place Value Chart (labeled). The place value charts should be put in plastic sleeves, so students are able to write on them and erase during lessons. Direct students to follow along as you model how to use these manipulatives. Use a document camera to project your work. As students gain competence in comparing numbers, fade to using drawings on labeled and then unlabeled place value charts, and finally to writing numerals on an unlabeled place value chart.

For students who require explicit instruction on how to use the materials provided to compare numbers, the following sample script (based on the language found in the concept development section of Module 1, Topic B, Lesson 5) is provided to demonstrate one way instruction might look like:

Problem 1: Comparing two numbers with the same largest unit.

Concrete

Students may need practice using a place value chart and place valu

S (student): Thousands.

T: That is correct. What is the name of the largest unit in the number 2,040?

S: Thousands.

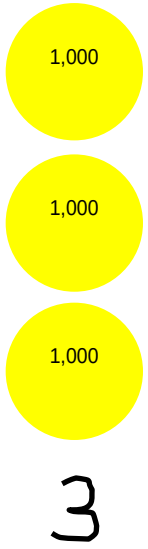
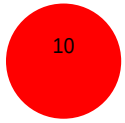
T: Right. Let's put a circle around the word "thousands" since this is the unit we are going to use to compare the value of the numbers. If we look at the thousands and count the place value disks, we count 1, 2, 3 in the top row. c 0.06 Tc 0.068 Tw 1(p r)-1(3Tw 1.18 0 Td 4139.1r)-1(3Tw 1-6(32 -31.18 -(wc-

Representational

A sample script on how to do the previous problem in a representational form can be found in the conceptual development section of this lesson. Students will represent the amounts of units for the two given numbers

Scaf

Comparison Place Value Chart (labeled) (example)

hundred thousands	ten thousands	thousands	hundreds	tens	ones
					

Comparison Place Value Chart (labeled)

hundred thousands	ten thousands	thousands	hundreds	tens	ones
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

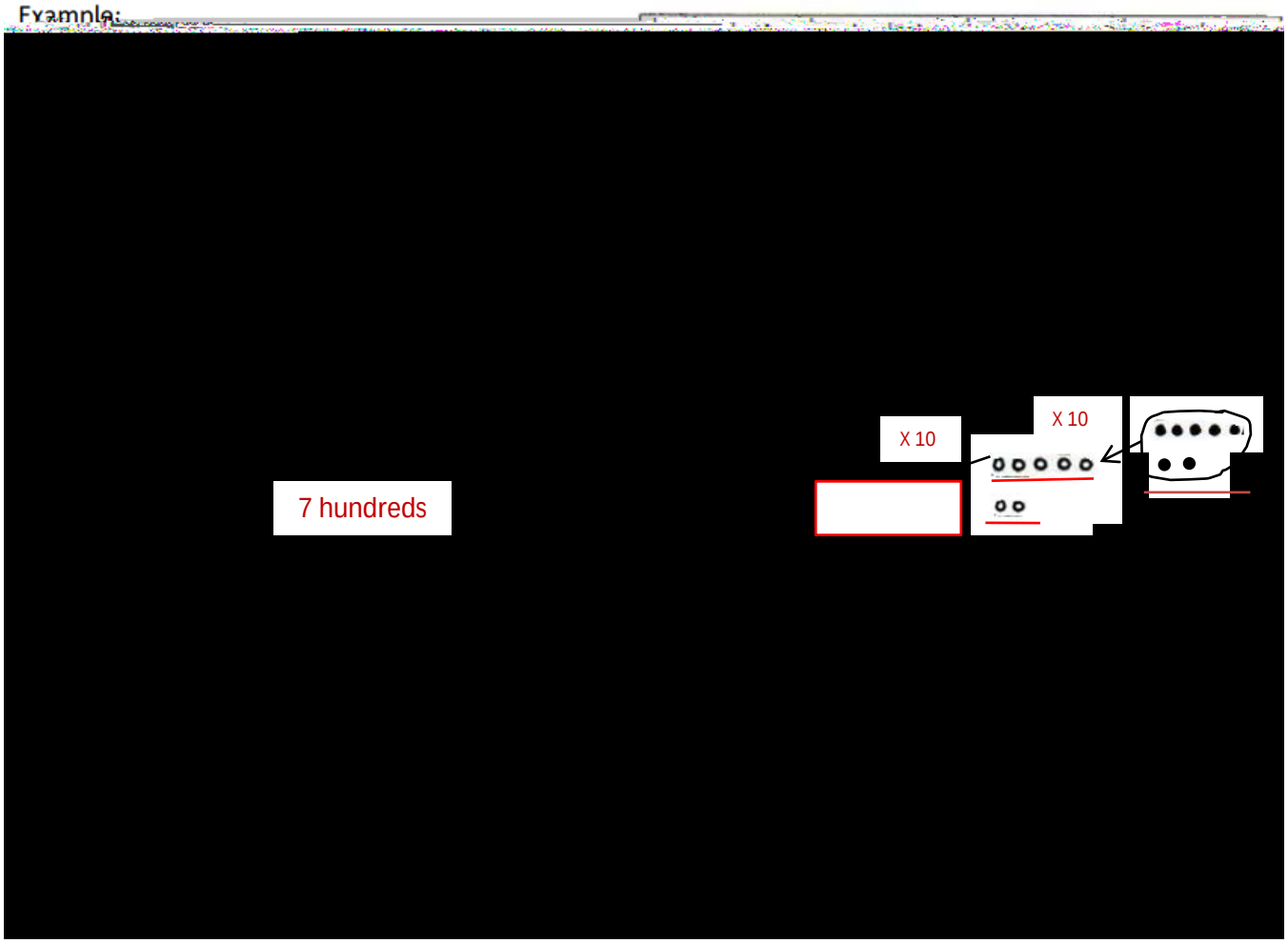
_____ | _____ or _____ | _____

Worked Problems

Lesson 4 Homework

Name _____ Date _____

Example:



Draw place value disks and arrows to represent each product.

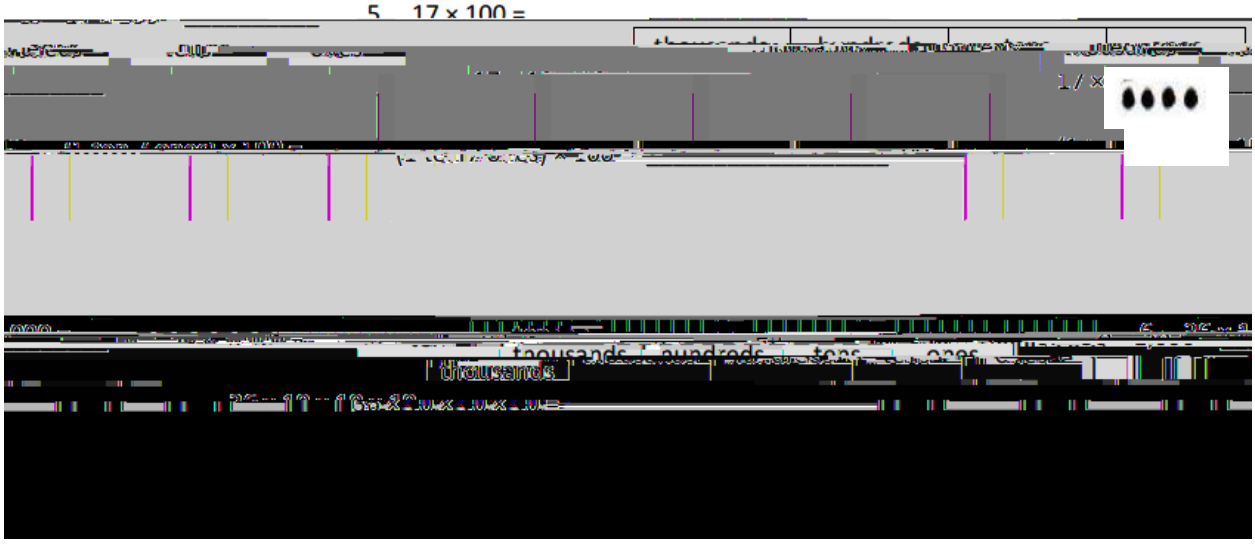
ds	tens	ones
	15 tens	

150

4. 15 × 10 = _____

(_ _en 5 ones) × 10 = _____

5. 17 × 100 =



Decompose each multiple of 10, 100, or 1000 before multiplying.

7. 2 × 80 = 2 × 8 × _____

= 16 × _____

= _____

8. 2 × 400 = 2 × _____ × _____

= _____ × _____

= _____

5 × 5,000 = _____ × _____ × _____ 10 × 7 × 6,000 = _____ × _____ × _____

= _____ × _____

= _____

= _____ × _____

= _____

Frayer Model

Exemplar from:
Module 3: Topic F: Lesson 22: Concept Development

Explanation of scaffold

The Frayer model is a four-square graphic organizer that includes a student-friendly definition, a description of important characteristics, examples, and nonexamples. It provides a format to organize information and visual representations of the mathematical term being defined. Developing vocabulary skills is essential for students as they learn to

T: We are going to learn about the term prime number. What term?

S (student): Prime number

T: When we use the Frayer model, the first thing we do is write the vocabulary word in the middle circle. Let's write prime number in the circle.

Step 2: Define the term.

T: You can see there are also 4 boxes. The first box is labeled Definition. A definition tells us the meaning of the term. Prime number means a number that is greater than 1 that has exactly two different factors, 1 and itself. Let's say that together. [Chorally say the definition with students.] Now, let's write that in the Definition box.

Step 3: Describe the word in terms of its characteristics.

T: The next box is Characteristics. This means we want to think of words and pictures and equations that describe prime numbers or that are important to help us understand what it means. [Draw a factor pair table.] If we wanted to list all the factor pairs for the number 7, what would we write?

S: 1 and 7.

T: What is another factor pair for the number 7?

S: There are no other factor pairs for 7.

T: That's right. The number 7 only has one factor pair because it has exactly two different factors, 1 and itself. That means 7 is a _____.

S: Prime number

T: Right again. Now, let's look at the number 23. [Ask students to name all the factor pairs for the number 23. Write down additional information as needed to describe prime number.]

Step 4: List examples.

T: The third box is Examples. Let's name some more examples of prime numbers. [Write down any reasonable answers and their factors.]

Step 5: List nonexamples.

T: The last box is Nonexamples. This is an important box because it shows we really understand what the word means and what it doesn't mean. We've already written down some examples of prime

NAME _____

Frayer Model (example)

Definition

A whole number greater than 1 that has exactly two different factors, 1 and itself.

Characteristics

Only two factors, 1 and itself.

Factor Pairs for 7	
1	7

7 is a prime number

Factor Pairs for 23	
1	23

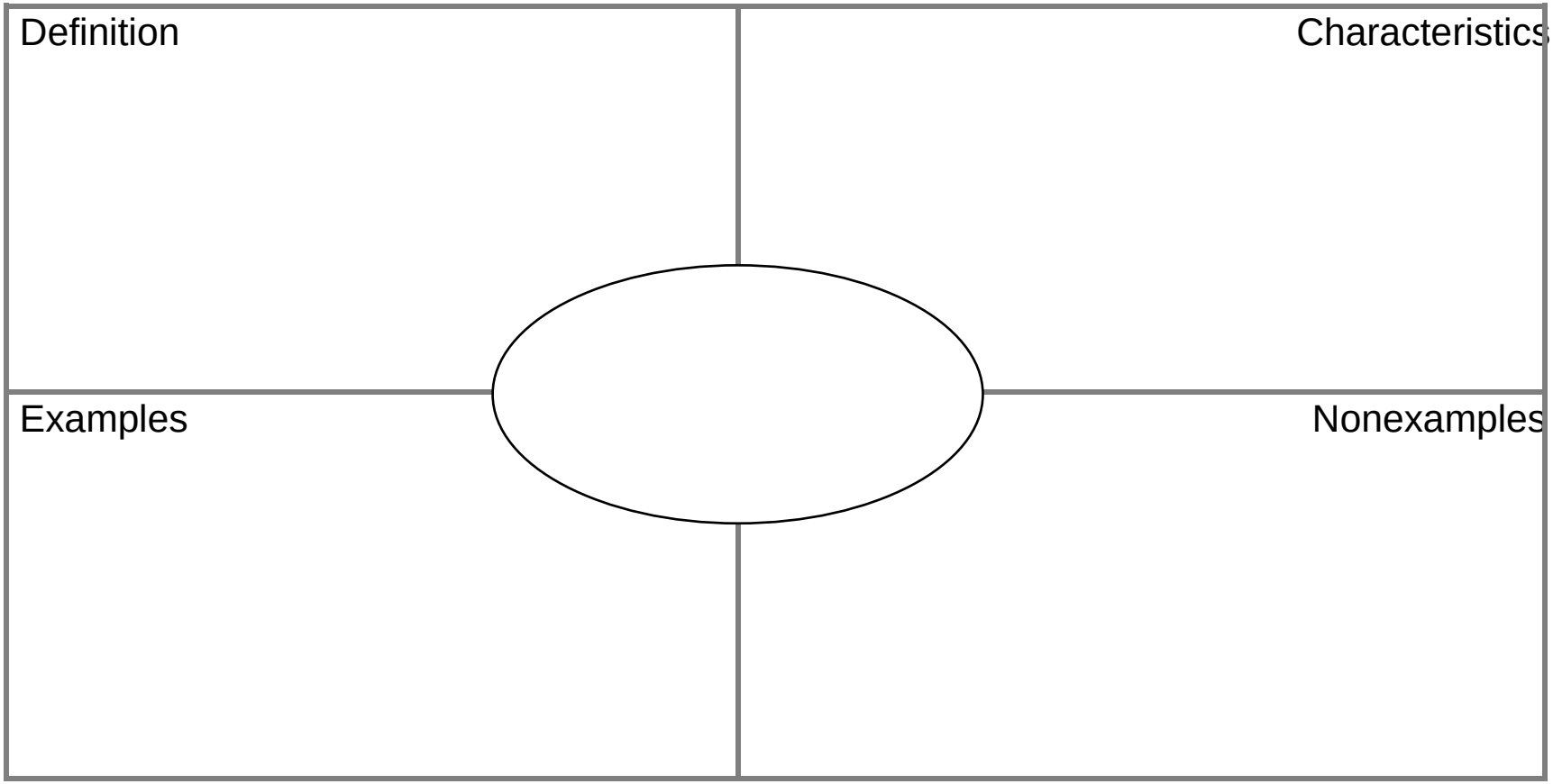
23 is prime number

Examples

Numbers	Factors
2	1, 2

NAME _____

Frayer Model



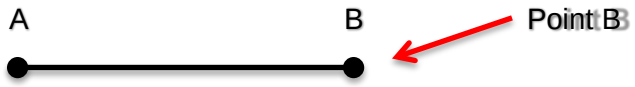
Desk Reference Sheet

Exemplar from:
Module 4: Topics A-C, lessons 1-10: Problem Sets and Homework

Explanation of scaffold
A desk reference sheet

Desk Reference Sheet A
Points, Lines, and Rays

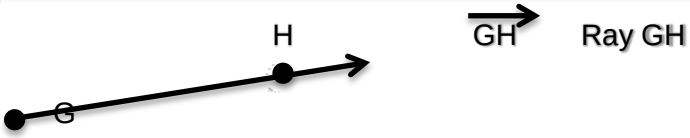
Point: an exact location in space



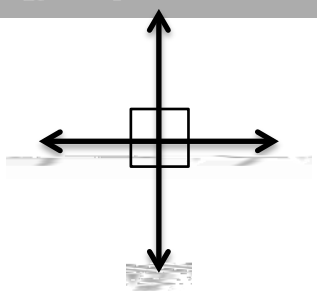
Line: an infinite set of points in opposite directions forming a straight path

Line segment: the set of points on a line consisting of two fixed points and all points between those two fixed points

Ray: part of a line that has one endpoint and extends in one direction



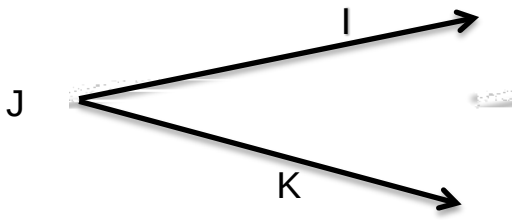
Perpendicular: two lines, segments, or rays that intersect to form right angles



Parallel lines: lines in the same plane that never intersect no matter how far they are extended; they are equidistant (equal distance) from each other

Desk Reference Sheet B
Angles

Angle: a geometric figure formed by two rays that have a common endpoint called a vertex.



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