

Scaffolding Instruction for All Students:

A Resource Guide for Mathematics

The University of the State of New York
State Education Department
Office of Curriculum and Instruction
and Office of Special Education
Albany, NY 12234

Scaffolding Instruction for All Students A Resource Guide for Mathematics Grade 6

Acknowledgements

The New York State Education Department Office of Curriculum and Instruction and Office of Special Education gratefully acknowledge the following individuals for their valuable contributions in the development of this guide:

Annmarie Urso, Ph.D., Associate Professor, State University of New York at Geneseo

Paul J. Riccomini, Ph.D., Associate Professor, Pennsylvania State University

Dawn Hamlin, Ph.D., Associate Professor, State University of New York at Oneonta

January 2020

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Warm-up Review

Exemplar from:

Module 1: Topic A: Lesson B Equivalent Ratios

Explanation of scaffold

This scaffold provides students

Student actions

Students complete the Warm-up Review sheet and participate in the warm-up review routine as directed.

Student handouts/materials

Warm-up Review sheet (found on d. (r)4 (e 6 t04 Tc 04).76 Tm [(-)Tj 0)27 0 Td9()Tj ET 46.44 665.76 30 T

Warm-up Review

Guided Notes
Module 1, Topic A, Lesson 1 Ratios

Name _____ Date _____

Example 1

What are some other team compositions where there are three boys for every two girls on the team?

# of Boys	# of Girls	Total # of Players
3	2	5
6		10
		15
		20

	True	False
There are 3 times as many boys as girls.		
The ratio of boys to girls is 3 to 2.		
There are 2 times as many boys as girls.		
The ratio of boys to girls is 2:3.		

Make a tape diagram that shows there are $\frac{7}{6}$ as many boys as girls.

Boys

Girls:

Example 2: Class Ratios

1. What is the ratio of boys to girls in our class? _____ :

How can we describe this relationship in words? For every _____ boys, there are _____ girls.

How can we say this as a multiplicative comparison without using ratios? There are _____ as many boys as girls.

2. What is the ratio of number of girls to number of boys in our class? _____ :

4. Is this an interesting multiplicative comparison for this class? worth commenting on in our class?

Yes/No because _____

5. If our class had 15 boys and 5 girls, might it be a more interesting observation?

Yes/No because _____

6. How many students in our class...

x Traveled out of state this summer? _____ Did not travel out of state this summer? _____

x Have at least one sibling? _____ Are an only child? _____

x Think their favorite class is math? _____ Think their favorite class is not math? _____

7. Write a ratio for each example. Describe each relationship in words (i.e., For every _____, there are _____).

x A ratio for the number of students who traveled out of state this summer to the number of students who did not travel out of state this summer:

Ratio: _____

Description _____

x A ratio for the number of students who have at least one sibling to the number of students who have no siblings:

Ratio: _____

Description _____

x A ratio for the number of students whose favorite class is math to the number of students

Cooperative Learning

Exemplar from:

Module 1: Topic B: Lesson 3 Tables of Equivalent Ratios

Explanation of scaffold

Cooperative learning includes those strategies wher21 foPegr(h)15 (m:)wo-rat5-3 (u(-)6.2 d(o)-3.2e)-7 (n(-)6.2 t)6 (

Instruction with Computer Technology

Exemplar from:

Module 1: Topic A: Lesson Ratios

Explanation of scaffold

Instruction with computer technology involves using computer programs and websites to increase academic engagement and reinforce understanding of concepts. This scaffold provides visual and conceptual support for students who need additional models and practice opportunities to learn new

Guided Notes
Finding Ratios: An Introduction

Name _____ Date _____

x What is the ratio of apples to oranges?

As a ratio, we write _____ to _____ or _____ : _____

x We can reduce 6:9 to _____ : _____ by dividing each number (group) by _____ .

This tells us that for every _____ apples, we have _____ oranges.

x What is the ratio of oranges to apples?

_____ to _____ or _____ : _____

This tells us that for every _____ oranges, we have _____ apples.

Check for Understanding

ConcreteRepresentationalAbstract (CRA)

Exemplar from:

Module 1: Topic A: Lesson: 3Equivalent Ratios

Explanation of scaffold

CRA is a model used when teaching abstract, mathematical concepts that are difficult for students to understand. This scaffold employs a combination of a representation in the form of physical objects, a representation written on paper, and a carefully constructed engagement of an idea or representation in one's mind. The teacher begins by modeling and thinking aloud with concrete objects (e.g., blocks, disks, etc.), then progresses to representing the concrete objects with drawings. The final level is the abstract level, where only numbers, notations, and mathematical symbols are used to complete the algorithm. Each phase of instruction builds on the previous phase to promote student learning and can help students better apply mathematical concepts to real world situations.

Teacher actions/instructions

CRA can be used with individuals, small groups, or during whole class instruction when introducing a concept or teaching word problems. When using CRA, model the strategies, and provide multiple opportunities for student practice. Verbal explanations, visual demonstrations, and time for questions should be provided during each phase.

The following is a model of how CRA could be used to deepen students' understanding of equivalent ratios:

Exercise 2:

Concrete

1. Provide students with cubes or blocks of two different colors (e.g., red and blue).
2. Guide students to represent 7:3 with the blocks. Provide a model if needed, using a document camera to project your work. In this case, seven red blocks placed in the first row will represent the length of Shanni's ribbon, and three red blocks placed in the second row will represent the length of Mel's ribbon.
3. Replace each red block with two blue blocks to change the unit. Now, 14 blue blocks represent the length of Shanni's ribbon, and six blue blocks represent the length of Mel's ribbon (see illustration below).

Fruyer Model

Exemplar from:

Module 1: Topic A: Lesson Ratios

Explanation of scaffold

The Fruyer model is a graphic organizer that can be used in any lesson to help students understand unfamiliar vocabulary, including mathematical terms. This four-quadrant model 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 “speak mathematically” and develop their abstract reasoning and problem-solving skills. The term ratio is used to demonstrate how to apply this strategy when working with students.

Teacher actions/instructions

Select key mathematical terms. These terms should be a limited number and essential to developing a deeper understanding of the mathematical concepts or skills in the lesson.

Instruct students to complete Fruyer models as follows:

NAME: _____

Frayer Model (example)

Definition

A ratio is a comparison of two numbers or two quantities by division that indicates how much of one thing there is compared to the amount of another.

Characteristics

An ordered pair of nonnegative numbers which are not both zero, used to show a comparison.

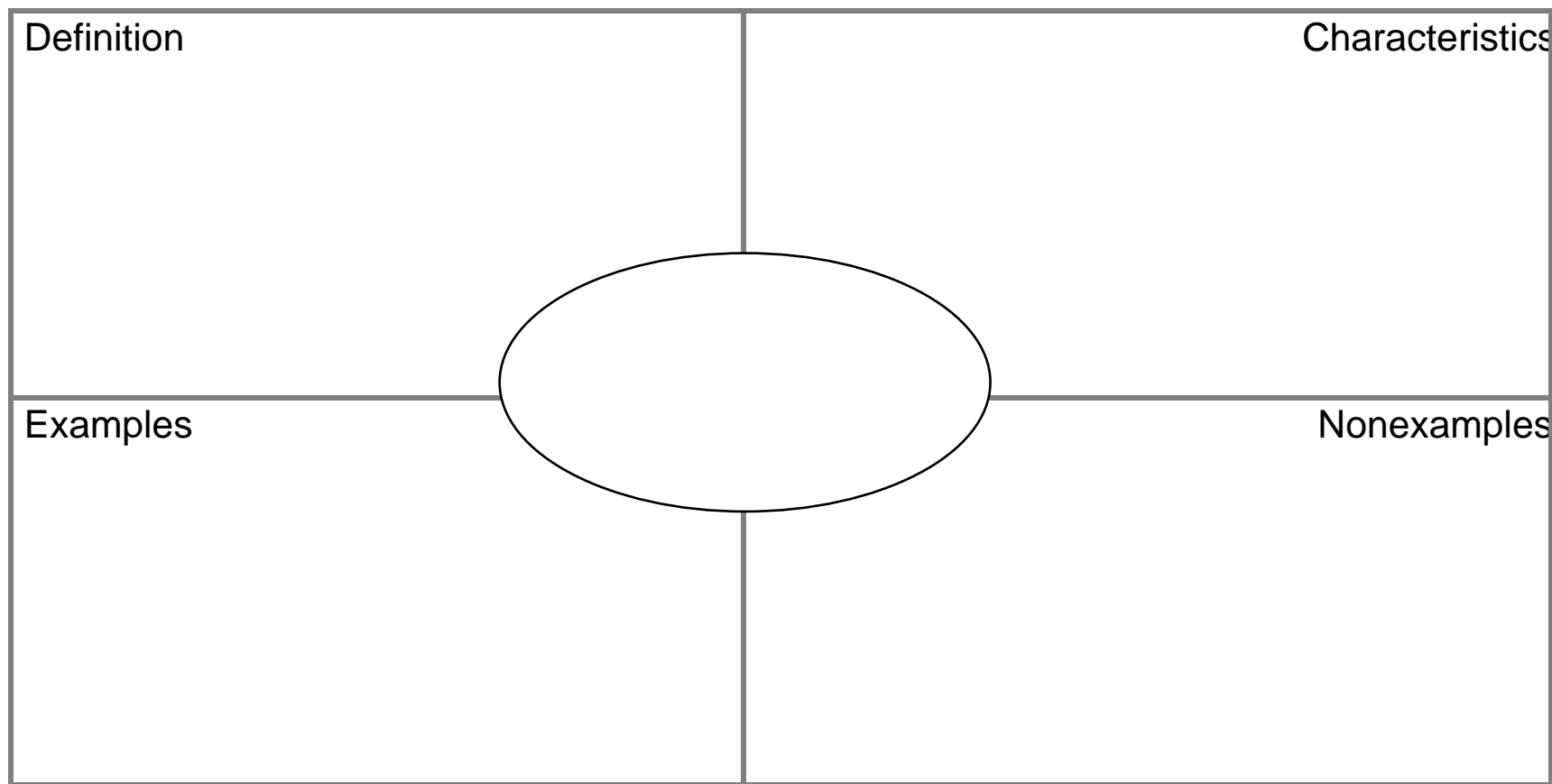
Ratios can be written three ways

$$A \div B, A \text{ to } B \text{ or } \frac{A}{B}$$

Order of the numbers is important to meaning

NAME: _____

Fruyer Model



Evidence of Effectiveness

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