Exemplars

Title: Time for Exercise

Achievement Level: Novice 1

Criteria and Performance Level	Rationales
Problem Solving *Novice*	The student's strategy of making a diagram to demonstrate six parts of a square would not work to solve the task. The student's answer, "my answer is 48 fifth graders," is not correct.
Reasoning & Proof *Novice*	The student does not demonstrate understanding of the concept of fractional parts of a whole. It appears that the student labels the space for soccer the same as the space for jogging. The basketball and football spaces appear to have the same area as the soccer and jogging area. The student multiplies the 12 fifth graders listed in the task by the four exercises for a total of 48 fifth graders. This reasoning could not support a correct answer.
Communication *Novice*	The student does not use any mathematical language.
Connections *Novice*	The student solves the task and does not make a mathematically relevant connection. Stating, "Basketball is the best exercise to do," is not relevant to the task.
Representation *Apprentice*	The student's diagram is appropriate to the task but is not accurate. The square is not partitioned into 1/2 for soccer, 1/4 for basketball, 1/8 for jogging and 1/8 for football. The student labels each section with 12 students, which is not correct.

Exemplars

Achievement Level: Novice 1

I am finding how many fifth graders are doing soccer, basketball, jogging and football.

fifthgrade exercisers

soccer 12	
basket 12 ball	football 12
12 jogging	

12 fifth graders
× 4 exercises
48 fifthgraders

My answer is 48 fifth graders

Basketball is the best exercise to do

Title: Time for Exercise

Achievement Level: Apprentice 1

Criteria and Performance Level	Rationales
Problem Solving *Apprentice*	The student's strategy of finding the equivalent fractions in eighths for 1/2 and 1/4 and making a circle graph to show eighths of the whole works to solve part of the task. The student does not compare the 12 students representing 1/8 of the whole that chose football to the 12 students who are jogging around the track, and does not continue for basketball and soccer. The student's answer, "That is my answer—12 7/8," is not correct. The student does not address the second question. The student does not state the number of students that are playing each sport."
Reasoning & Proof *Apprentice*	The student demonstrates correct understanding of the concept of eighths and equivalent fractions. The student does not show correct reasoning that if 12 students are tossing footballs, then 12 students must be jogging around the track. The student is also unable to find the number of students that are playing basketball or soccer. Placing the number 12 found in the task in front of the 7/8 that total soccer, basketball, and jogging in the area model is incorrect reasoning.
Communication *Practitioner*	The student correctly uses the mathematical terms *one-half, one-fourth, one-eighth*, from the task. The student also correctly uses the terms *circle graph, line, third number, shape*. The student correctly uses the mathematical notation 7/8, 1/2, 4/4, 4/8, 1/4, 2/2, 2/8, 1/8, 1/1, 1/8.
Connections *Novice*	The student solves the task and does not make a mathematically relevant connection.

|	
Representation *Apprentice*	The student's circle graph is appropriate to the task but is not accurate. The student's text explains how they arrived at 7/8 with 1/8 left but does not provide any types of exercise labels for each partitioned part of the circle.

Note:

The overall achievement level for this piece of student work falls under Exemplars exception to the rule category. If a student has all Apprentice scores or above, but a Novice in "Connections," the student may still receive an achievement level score of Apprentice. To learn more about Exemplars scoring, please refer to the section of your dashboard called "Tools for Success" and click on the link for "Using the Assessment Rubric."

Exemplars

Achievement Level: Apprentice 1

P/S	R/P	Com	Con	Rep	A/Level
A	A	P	N	A	A

I half to find all the students.

$= \dfrac{1}{8}$ + 12 students = 12 7/8 students doing exercise
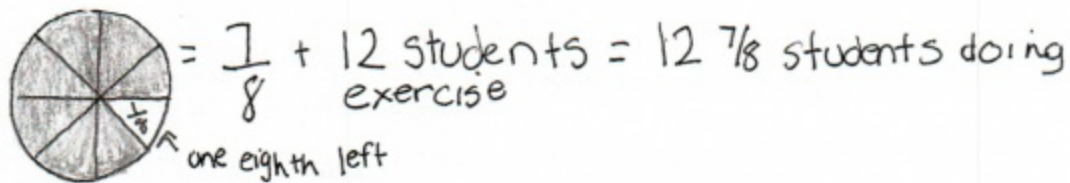
one eighth left

I choose A circle graph Because I did one-half then Added a line across which made One-fourth.
Then I just made an X shape and it made One-eighth All together it came to be $\dfrac{1}{8}$. So I added $\dfrac{7}{8}$ and the 12 for football and it is $12\dfrac{7}{8}$. That is my answer $-12\dfrac{7}{8}$.
You see

$\dfrac{1}{2} \times \dfrac{4}{4} = \dfrac{4}{8}$

$\dfrac{1}{4} \times \dfrac{2}{2} = \dfrac{2}{8}$

$\dfrac{1}{8} \times \dfrac{1}{1} = \dfrac{1}{8}$

I did the circle graph to show this in my head.

Title: Time for Exercise

Achievement Level: Apprentice 2

Criteria and Performance Level	Rationales
Problem Solving *Apprentice*	The student's strategy of making an area model to show the fractional parts of the whole for each exercise would work to solve the task, but the student does not find the correct total for all students exercising. The student's answer, "86 5th graders is my answer," is not correct. The student's second answer, 48 students like soccer and 24 like basketball and 12 like jogging and 12 like football," is correct."
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the concept of eighths and equivalent fractions. The student reasons that 12 students exercising with football would equal the same number of students exercising with jogging and that 12 + 12 = 24 students exercising with basketball and 24 + 24 = 48 students exercising with soccer. It appears that the student makes a computational error to arrive at an incorrect answer. This is considered a careless error and not one of applying incorrect reasoning and proof.
Communication *Practitioner*	The student correctly uses the mathematical term *5th* (fifth) from the task. The student also correctly uses the term *area model*. The student correctly uses the mathematical notation 1/2, 1/4, 1/8.
Connections *Novice*	The student solves the task and does not make a mathematically relevant connection.

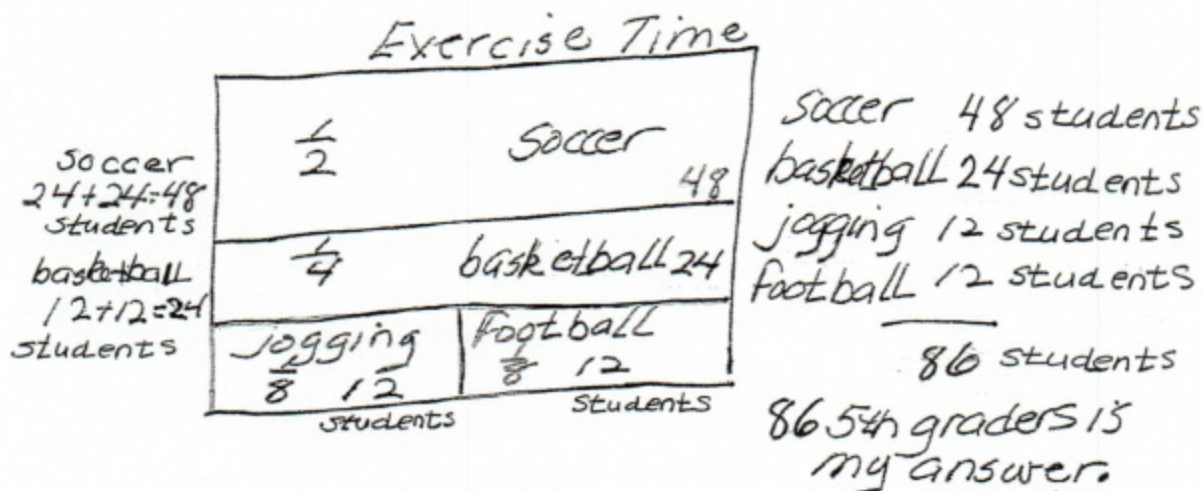| Representation *Practitioner*	The student's area model is appropriate to the task and accurate. Each part of the whole is partitioned and labeled with the correct fractions. The student's text also supports how many students do each type of exercise.

Note:

The overall achievement level for this piece of student work falls under Exemplars exception to the rule category. If a student has all Apprentice scores or above, but a Novice in "Connections," the student may still receive an achievement level score of Apprentice. To learn more about Exemplars scoring, please refer to the section of your dashboard called "Tools for Success" and click on the link for "Using the Assessment Rubric."

Achievement Level: Apprentice 2

I got to find how many 5th graders are doing exercise outside. I can make a area model.

Exercise Time

Soccer
24+24=48
students

basketball
12+12=24
students

$\frac{1}{2}$	Soccer
	48
$\frac{1}{4}$	basketball 24

jogging
$\frac{1}{8}$ 12
students

football
$\frac{1}{8}$ 12
students

Soccer 48 students
basketball 24 students
jogging 12 students
football 12 students
_____
86 students

86 5th graders is
my answer.

48 students like soccer and 24 like basketball and 12 like jogging and 12 like football.

Title: Time for Exercise

Achievement Level: Practitioner 1

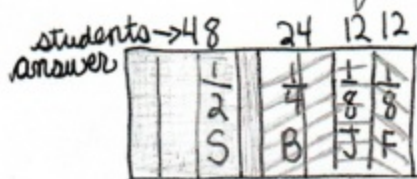| Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of making an area model to indicate the fractional parts of the whole for each exercise, as well as how many students exercise for each activity, works to solve the task. The student's answer, "96 students," is correct.
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the concept of equivalent fractions. The student reasons that 12 students exercising with football would equal the same number of students exercising with jogging and that 12 + 12 = 24 students exercising with basketball and 24 + 24 = 48 students exercising with soccer. The student uses addition to find the total number of fifth graders that are exercising.
Communication *Practitioner*	The student correctly uses the mathematical term *fifth*, from the task. The student also correctly uses the terms *area model, key, dozen, equal amount*. The student correctly uses the mathematical notation 1/2, 1/4, 1/8, 2/8, 4/8.
Connections *Practitioner*	The student makes mathematically relevant connections. The student states, "A dozen students jog and a dozen students do football," and, "96 students is 8 dozen," "2/8 = 1/4, 1/2 = 4/8, 1/8 = 1/8—use if you don't want to count back," and, "jogging and football is equal amounts of students."
Representation *Practitioner*	The student's area model is appropriate to the task and accurate. Each part of the whole is partitioned and labeled correctly. The entered fractions are also correct and a key defines S, B, J and F.

Achievement Level: Practitioner 1

P/S	R/P	Com	Con	Rep	A/Level
P	P	P	P	P	P

I have to find how many fifth grade students are outside for recess. My strategy is a area model.

students → 48   24   12 12
answer

[area model diagram with fractions: $\frac{1}{2}$ S, $\frac{1}{4}$ B, $\frac{1}{8}$ J, $\frac{1}{8}$ F]

Key
S soccer
B basketball
J jogging
F football

$48 + 24 + 12 + 12 =$
$48 + 24 + 24 =$
$48 + 48 =$
$80 + 16 = 96$

answer
96 students

connections
① A dozen students jog and a dozen students do football.
② 96 students is 8 dozen.
③ $\frac{2}{8} = \frac{1}{4}$ $\frac{1}{2} = \frac{4}{8}$ $\frac{1}{8} = \frac{1}{8}$ - use if you don't want to count back.
④ jogging and football is equal amount of students.

Title: Time for Exercise

Achievement Level: Practitioner 2

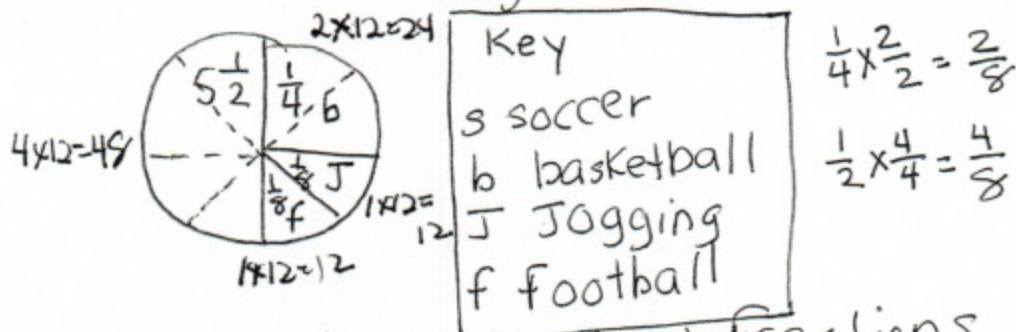| Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of making a diagram (area model) to indicate the fractional parts of the whole for each exercise, determining how many eighths of the whole for each exercise, as well as how many students exercise for each activity, works to solve the task. The student's answer, "96 students is my answer," is correct.
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the concept of equivalent fractions. The student reasons that 12 students playing football would equal the same number of students jogging and that 2 x 12 = 24 students playing basketball and 4 x 12 = 48 students playing soccer. The student uses addition to find the total number of fifth graders that are exercising.
Communication *Practitioner*	The student correctly uses the mathematical terms *diagram, key, equivalent, fractions, most*. The student correctly uses the mathematical notation 1/2, 1/4, 1/8, 2/2, 2/8, 4/4, 4/8.
Connections *Practitioner*	The student makes a mathematically relevant connection. The student states, "The most popular exercise is soccer."
Representation *Practitioner*	The student's diagram (area model) is appropriate to the task and accurate. Each part of the whole is partitioned and labeled correctly. The entered fractions are also correct and a key defines s, b, J and f.

Achievement Level: Practitioner 2

The question is to find out how many students are doing exercise.

I think a diagram is a good plan.

$2 \times 12 = 24$

$5\frac{1}{2}$ | $4,6$

$4 \times 12 = 48$

$\frac{1}{8}f$ | J

$1 \times 2 = 12$

$1 \times 12 = 12$

Key

s soccer
b basketball
J Jogging
f football

$\frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$

$\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$

I will do equivalent fractions

f is $\frac{1}{8}$ - 12 students   answer 2

J is $\frac{1}{8}$ - 12 Students

b is $\frac{1}{4} = \frac{2}{8}$ - 24 students

S is $\frac{1}{2} = \frac{4}{8}$ $\overline{+}$ 48 students

$\underline{+}$

96 students is my answer 1

The most popular exercise is soccer

Exemplars

Title: Time for Exercise

Achievement Level: Practitioner 3

Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of making a number line to indicate the fractional parts in eighths for each exercise, and how many students exercise for each activity works to solve the task. The student's answer, "80 + 16 = 96 fifth graders—my answer," is also correct.
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the concept of equivalent fractions. The student reasons that 12 students playing football would equal the same number of students jogging (1 x 12 = 12) and that 2 x 12 = 24 students playing basketball and 4 x 12 = 48 students playing soccer. The student uses addition to find the total number of fifth graders that are exercising.
Communication *Practitioner*	The student correctly uses the mathematical term *fifth*, from the task. The student also correctly uses the terms *number line, eighths, denominator, whole, most, diagrams*. The student correctly uses the mathematical notation 1/8, 2/8, 3/8, 4/8, 5/8, 6/8, 7/8, 8/8, 1/2, 1/4.
Connections *Practitioner*	The student makes mathematically relevant connections. The student states, "Most of the fifth graders did soccer," and, "Jogging and football were the same—12 fifth graders each." The student also states, "This is how it looks in in diagrams," and then demonstrates 1/2, 1/4, and 1/8.

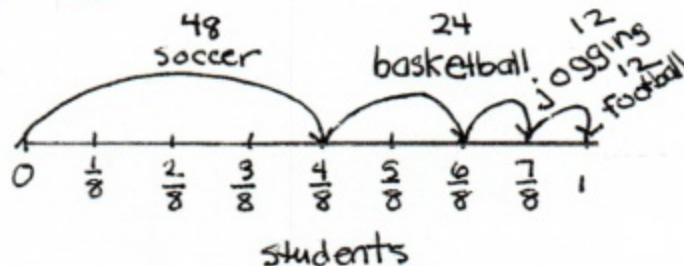|	
Representation *Practitioner*	The student's number line is appropriate to the task and accurate. Each eighth is represented in correct intervals, the students and activity labels are correct and the student uses an arrow to show how all eighths are used to represent the types of exercise. The student's diagram indicating how many students are playing soccer, basketball, or jogging is appropriate for part of the task and is accurate."

P/S	R/P	Com	Con	Rep	A/Level
P	P	P	P	P	P

I need to find how many fifth graders are exercising. I will do a number line. I have to use eighths as the denominator.

My answer

$\frac{1}{2} = \frac{4}{8}$ $\frac{1}{8} = 12$
$1 \times 12 = 12$

$\frac{1}{4} = \frac{2}{8}$ $\frac{2}{8} = 24$
$2 \times 12 = 24$

$\frac{4}{8} = 48$
$4 \times 12 = 48$

48 soccer   24 basketball   12 jogging   12 football

0   $\frac{1}{8}$ $\frac{2}{8}$ $\frac{3}{8}$ $\frac{4}{8}$ $\frac{5}{8}$ $\frac{6}{8}$ $\frac{7}{8}$ 1

students

48 + 24 + 12 + 12

80 + 16 = 96 fifth graders — my answer

$\frac{4}{8} + \frac{2}{8} + \frac{1}{8} + \frac{1}{8} = \frac{8}{8} = 1$ whole group of fifth graders.

Most of the fifth graders did soccer, Jogging and football were the same – 12 fifth graders each.

This is how it looks in diagrams

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$
soccer   basketball   jogging

Title: Time for Exercise

Achievement Level: Expert 1

Criteria and Performance Level	Rationales
Problem Solving *Expert*	The student's strategy of making a chart to indicate the type of exercise, fraction of students, students, and total students works to solve the task. The student's box around the third column label, "students," correctly indicates the number of students doing each activity. The student's second boxed answer, "96 5th grade students" is correct. The student also creates an area model to support their answer and brings prior knowledge of variables, percents, decimals, and outcome to the task.
Reasoning & Proof *Expert*	The student demonstrates correct understanding of the concept of equivalent fractions. The student uses least common denominator to determine how many students are taking part in each exercise activity. The student correctly computes the total number of students for their second answer. The student verifies their answer with a table to justify that their answer is correct. The student extends their thinking to include the concepts of variables, percents and decimals, as well as statistics.
Communication *Expert*	The student correctly uses the mathematical term *fifth*, from the task. The student also correctly uses the terms *chart, total, data, equivalent fractions, area model, key*. The student correctly uses the mathematical notation 1/8, 1/4, 2/8, 1/2, 4/8, 1/1, 2/2, 4/4, 50%, 25%, 12 1/2%, 100%.5, .25, .125, 24/96.

Connections *Expert*	The student makes Expert connections. The student states, s + b + j + f = T. The student provides a key to define the variables and solves for 96 fifth graders. The student extends their thinking to percents and decimals. The student writes, I also noticest soccer is 50% of the 5th graders," "basketball is 25%," "jogging and football is 12 1/2% each," and "That is a total of 100%, "I see 1/2 is .5," "1/4 is .25," and "1/8 is .125." The student extends their thinking to statistics and probability. The student shows outcome by stating, "24/96 means 24 out of 96 students are doing soccer for exercise." The student also states I think a new 5 grader would want to do soccer for exercise." The student supports their first answer and verifies the second answer by making an area model as a new strategy and states, "I got 96 students 2 ways so I know I am correct."
Representation *Expert*	The student's chart is appropriate to the task and accurate. All labels are indicated and the entered data is correct. The student's area model is appropriate to the task and accurate. Each part of the model is labeled with correct fractions and a key defines s, b, j, f, and T. The student uses the area model to verify that their answer is correct.

Achievement Level: Expert 1

P/S	R/P	Com	Con	Rep	A/Level
E	E	E	E	E	E

I will find out how many students are having exercise. I will do a chart.

Exercise	fraction of students	Students	total students
football	$\frac{1}{8}$	12	12
jogging	$\frac{1}{8}$	12	24
basketball	$\frac{1}{4} = \frac{2}{8}$	24	48
soccer	$\frac{1}{2} = \frac{4}{8}$	48	96

I got my data by using equivalent fractions so I started with $\frac{1}{8}$.

$\frac{1}{8} = \frac{1}{8}$ = 12 students $\frac{1}{8} \times \frac{1}{1} = \frac{1}{8}$

$\frac{1}{8} = \frac{1}{8}$ = 12 students $\frac{1}{8} \times \frac{1}{1} = \frac{1}{8}$

$\frac{1}{4} = \frac{2}{8}$ = 24 students $\frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$

$\frac{1}{2} = \frac{4}{8}$ = 48 students $\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$ the answer

$\frac{8}{8} = 1$ = all 5th graders or 96 5th grade students

I can do an area model

Key
- s soccer
- b basketball
- j jogging
- f football
- T total fifthgraders 5th

$1 \times 12 = 12$
$1 \times 12 = 12$
$2 \times 12 = 24$
$4 \times 12 = 48$
$\overline{96}$

$s + b + j + f = T$
$48 + 24 + 12 + 12 = 96$ 5thgraders

I got 96 students 2 ways so I know I am correct.

I also noticest Soccer is 50% of the 5th graders, basketball is 25%, jogging and football is $12\frac{1}{2}$% each. That is a total of 100%. I think a new 5 grader would want to do Soccer for exercise.

I see $\frac{1}{2}$ is .5 $\frac{1}{4}$ is .25 $\frac{1}{8}$ is .125

$\frac{24}{96}$ means 24 out of 96 students are doing soccer for exercise.