EaD Comprehensive Lesson Plans

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BASIC 8

WEEKLY LESSON PLAN – WEEK 6

<table>
<tr><td>Strand:</td><td colspan="2">Number</td><td colspan="2">Sub-Strand:</td><td colspan="2">Ratio and Proportion</td></tr>
<tr><td>Content Standard:</td><td colspan="6">B8.1.4.1 Demonstrate an understanding of ratio, rate and proportions and use it these to solve real-world mathematical problems.</td></tr>
<tr><td>Indicator (s)</td><td colspan="3">B8.1.4.1.1 Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

B8.1.4.1.2 Solve unit rate problems including those involving unit pricing and constant speed; and speed translation.</td><td colspan="3">Performance Indicator: Learners can draw speed on graphs</td></tr>
<tr><td>Week Ending</td><td colspan="6">04-08-2023</td></tr>
<tr><td>Class</td><td>B.S.8</td><td>Class Size:</td><td colspan="2"></td><td>Duration:</td><td></td></tr>
<tr><td>Subject</td><td colspan="6">Mathematics</td></tr>
<tr><td>Reference</td><td colspan="6">Mathematics Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook.</td></tr>
<tr><td>Teaching / Learning Resources</td><td colspan="2">Chart, Poster, picture, Video</td><td colspan="2">Core Competencies:</td><td colspan="2">• Ability to merge simple/ complex ideas to create novel situation or thing
• Exhibit strong memory, intuitive thinking; and respond appropriately</td></tr>
<tr><td>DAY/DATE</td><td>PHASE 1 : STARTER</td><td colspan="4">PHASE 2: MAIN</td><td>PHASE 3: REFLECTION</td></tr>
<tr><td>MONDAY</td><td>Demonstrate on how to use ratio reasoning to convert measurement units from one to another.</td><td colspan="4">1. Learners brainstorm to interpret ratios of measurement units.
2. Assist Learners to identify the process of converting or expressing between units which are ratios related.
3. Learners brainstorm to use units appropriately to solve word problems.

interpreting a ratio scale;

A ratio scale is a quantitative scale where there is a true zero and equal intervals between neighboring points. Unlike on an interval scale, a zero on a ratio scale means there is a total absence of the variable you are measuring. Length, area, and population are examples of ratio scales
Unit Conversion Process

1. Identify the unit you have. These are the Starting Units.</td><td>Learners in small groups to discuss and solve more examples of converting from one measuring unit to another.</td></tr>
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2. Identify the unit you want. These are the Desired Units.
3. Identify appropriate unit conversion factor(s).
4. Cancel units and perform the math calculations (e.g., multiply, divide).
5. Evaluate the result.

Example 1: miles per hour to kilometers per hour

This problem can be solved using either 1 mi = 1.61 km or 1 km = 0.621 mi. I'll work it both ways, in parallel.

To start, write the original measurement as a fraction:

11.6 mi

----

hr

Going from mi/hr to km/hr, you see that you end up with the same denominator you started with, so only the numerator has to change units. In other words, this is just our old friend miles → kilometers, with the "per hour" tagging along unchanged. So the conversion is the same one you've done before. Simply pick a fraction with the desired units (km) on top and the given units (mi) on the bottom:

11.6 mi   1.61 km   11.6 mi   1 km

------- × -------   or   ------- × --------

hr   1 mi   hr   0.621 mi

As you see, you can use either conversion factor, miles to kilometers or kilometers to miles. It doesn't matter because, by forming a fraction equal to 1, you automatically make the right choice between dividing and multiplying.

Going on to simplify the fractions, you have

11.6 × 1.61 mi km   11.6 mi km

----------------   or   -----------

hr mi   0.621 hr mi

Either way, divide top and bottom by mi and you have

11.6 × 1.61 km   11.6 km

-------------   or   --------

		hr 0.621 hr Do the arithmetic to get 18.7 km/hr either way. Example 2: miles per second to miles per hour Escape velocity from the earth's surface is about 7.0 mi/sec. What is that in mi/hr? Here again, you're converting only one unit, seconds to hours (1 hr = 3600 sec), and the "miles per" is just along for the ride. But what's different here is that the units you're converting are in the denominator of the fraction, not in the numerator. Look what happens if you apply the old rule of desired units on the top: 7.0 mi 1 hr ------ × ----- --- sec 3600 sec and you end up with 7.0 mi hr -------- ---- 3600 sec sec This is no good: you can't simplify this fraction to remove the seconds (sec). Rule 2 in picking a fraction, as originally stated, only applied when the units to be converted were in the top of the fraction (or not in a fraction at all). Here's the more general form of Rule 2, the form that will *always* work: when picking your fraction that equals 1, **put the given units in the opposite position from where they are in the original** measurement. If the original measurement had the given units on the top, your 1-fraction will have them on the bottom; but if the given units are on the bottom of the original measurement then your 1-fraction must have them in the top. Do this so that you can divide top and bottom by the given units when simplifying. Let's come back to the example, 7.0 mi/sec converted to mi/hr, and do it the right way: Write the conversion equation: 1 hr = 3600 sec	

The given units (sec) are in the denominator (bottom) of the original measurement, so sec must be in the numerator (top) of the conversion fraction:	3600 sec 1 = -------- 1
Multiply the original measurement by 1:	7.0 mi 3600 sec ------ × -------- sec hr
Ah, that's much better! Now you can divide top and bottom by sec:	7.0 × 3600 mi ------------- hr
Multiply 7 by 3600 to get your final answer, to two significant figures:	about 25,000 mi/hr

Example 3: kilometers/hour to meters per second

A race car has a top speed of 310 km/hr. What is that in m/sec? For this example you'll combine chaining multiple conversions with the new and more general form of Rule 2 for picking the fraction.

You have two conversions to do, kilometers to meters and hours to seconds. You know the conversion factors:	1 hr = 3600 sec 1 km = 1000 m

In converting km to m, the given units (km) are on top, so in the conversion fraction km will be on the bottom. By contrast, in converting hr to sec, the given units (hr) are on the bottom so the conversion fraction will have hr on the top. To do two conversions, you multiply by two fractions (1 × 1):

310 km
1000 m
1 hr

------ × -
----- × --
------

hr 1
km
3600
sec

Now divide top and bottom by hours (hr) and by kilometers (km):

310 ×
1000 m

--

3600
sec

and do the arithmetic to obtain the answer:

310
km/hr =
86
m/sec

Example 4: square feet to square meters

Sometimes you have to deal with squared units. In the US, you often see them with a “sq” prefix. But they are actually easier to manipulate if you treat them just like variables (again!) and use the ² sign.

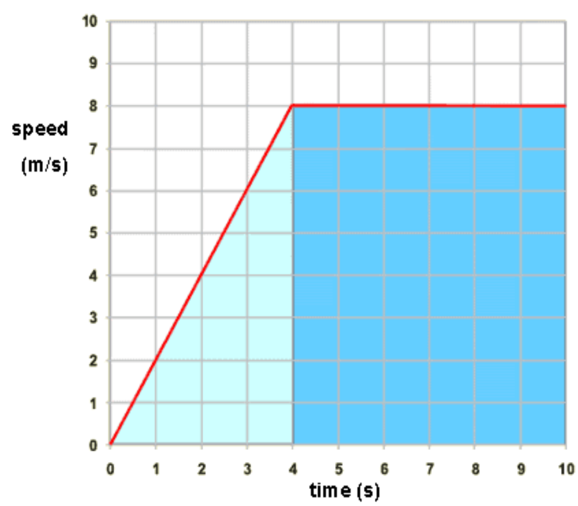
I correspond with a friend outside the US, and we are describing our homes to each other. If my apartment measures 850 square feet, what is that in square meters? In other words, convert 850 ft^2 to m^2.

Solution: I need a fraction equal to 1, with m^2 on the top and ft^2 on the bottom. The way to obtain that is to form a fraction equal to 1 with plain m on the top and plain ft on the bottom, and then square it (since $1^2 = 1$).

As it happens, I don’t remember the conversion from feet to me
the conversions between both of them and inches:

		So I construct my fraction in two steps: Now remember that the original measurement is in ft². Therefore I must multiply the original measurement, 850 ft², by the square of the above fraction, to get ft² in the denominator and match the ft² in the original measurement: When a fraction is squared, that's the same as squaring the top and squaring the bottom, *including units*: Divide through by ft² top and bottom, and do the arithmetic to get the answer:	

		What about cubic measure? How many cubic feet is 12 cubic yards? It's exactly the same deal, except that you'll need to cube your well-chosen form of 1 to do the conversion. Start with 1 yard = 3 feet, so your fraction is (3 ft)/(1 yd): $12\ yd^3 \times \left(\frac{3\ ft}{1\ yd}\right)^3$ This simplifies to $\frac{12 \times 3^3\ yd^3\ ft^3}{1\ yd^3}$ $12 \times 27\ ft^3$ $12\ yd^3 = 324\ ft^3$	
TUESDAY	Review Learners knowledge on the previous lesson.	1. Assist Learners to identify examples of unit rate word problems. 2. Demonstrate on solving unit rate problems including those involving unit pricing and constant speed. 3. Individual Learners to practice solving examples of rate problems involving unit pricing and constant speed. 4. Assist Learners to solve unit rate problems with a double number line diagram. **Solving unit-rate problems** **Finding A Unit Rate by using a table** 1) Using a ratio table 2) Using division Example: It took Valerie 80 minutes to drive 120 miles. How many miles per hour is this? **Solve Unit Rate Problems with a Double Number Line Diagram (Singapore Math)** This video explains how to solve unit rate problems using a double number line diagram. This is a pictorial method for solving rate problems in the Singapore math curriculum when you are dealing with only 2 different units. Example:	Learners brainstorm to find unit rates using division. **Exercise;** 1. Changying bikes 36 miles in 3 hours. How many miles per hour does she travel? 2. A car travels about 25 miles on 1 gallon of gas. About how far can the car travel on 8 gallons of gas? 3. Ramon drives at a rate of 60 miles per hour. He stops for lunch

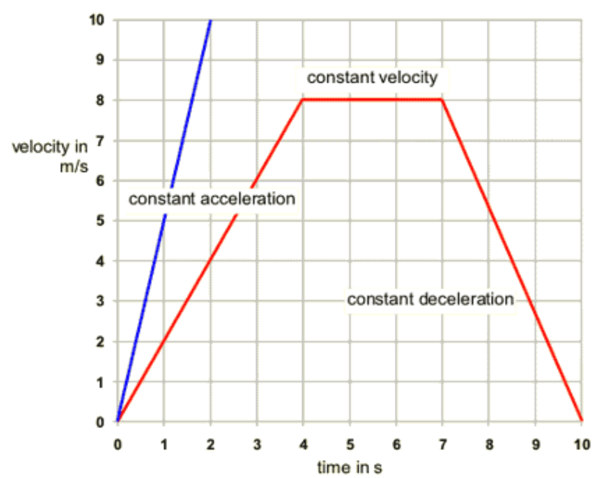
		If James earned $72 in 8 hours, how much money would he earn in 3 hours at that rate? **Find unit rates using division** Example: 1. If a box of wheat crackers contains 6 servings and has a total of 420 calories. Find the number of calories in 1 serving. 2. Two sizes of sports drink bottles are 32 oz. and 24 oz. If the 32 oz. drink cots $1.29 and the 24 oz. drink costs $1.20, which is the better buy? Round each unit cost to the nearest cent.	after driving for 1/ 2 hour. How many miles did Ramon drive in 1/2 hour?
THURSDAY	Discuss with Learners on how to interpret the speed distance and time graph	1. Demonstrate on how to shows speed on a distance-time graph 2. Assist Learners to find speed with distance and time 3. Learners brainstorm to draw graph for a passage on a distance time graph. 4. Assist learners to use the formula for calculating the speed time graph. **How to calculate distance travelled from a speed-time graph** 2(g) calculate the area under a speed-time graph to determine the distance traveled for motion with uniform speed or uniform acceleration. **Calculating Distance traveled a from speed-time graph** Speed time-graphs are mostly meant to be as velocity-time graphs in the CIE exams. What speed time graphs basically show us is the speed of an object at a particular time.  But from a speed time graph, we can also obtain the following quantities. • Distance	Through questions and answers, conclude the lesson.

- Uniform Acceleration and Deceleration

Distance from speed time graphs

We know that speed = distance/time. From this equation, we can derive the formula for distance which is = speed * time. Now, always remember one thing. In a speed time graph of an object, the distance traveled by that object is always the **area under the graph**. By that, it means that the area under the figure that is formed as a result of the speed-time graph is the distance covered by that body.

You might wonder why this is so. This is due to the fact that the area under the graph is actually the product of the speed and time, which equates to the distance which we needed in the first place. Now in the following figure, lets consider the red trapezium. We can calculate the area of the trapezium by the formula, 1/2 sum of parallel sides* height. That is 1/2 (3+10) * 8. The answer is 52m. This is the total distance traveled by the body in the following speed time graph during the 10s.



Name of Teacher: ***School:*** ***District:***