

ADD/SUBTRACT MIXED STANDARD UNITS



GRADE **4-5**

- Teacher Guidelines ▶ pages 1 – 2
- Instructional Pages ▶ pages 3 – 4
- Activity Page ▶ page 5
- Practice Page ▶ page 6
- Homework Page ▶ page 7
- Answer Key ▶ pages 8 – 9

Classroom Procedure:

1. Begin by explaining to students that often times measurements may have two units.
2. While reading the content pages, reinforce vocabulary and give students additional examples of adding and subtracting standard mixed unit problems in order to help them practice the new algorithm. Use the additional resources to enhance understanding.
3. Introduce the notes on adding and subtracting standard mixed unit problems. Have students practice problems with and without regrouping. Use the additional resources to enhance understanding.
4. Have students practice problems while using the conversion chart.
5. Follow Activity page with students. Have students work with a partner to measure their height and then as a whole class to add and subtract measurements.
6. Distribute Practice page. Check and review the students' responses as a class.
7. Distribute the Homework page. Have students work a few problems at the beginning of the next class to reinforce the algorithm.
8. In closing, ask students to explain how to regroup using standard measurements.
9. Allow for responses and discussion.

Approximate Grade Level: 4 – 5

Objectives:

The students will be able to add and subtract standard mixed measurements.

State Educational Standards*

None for Grade 4

CCSS.Math.Content.5.MD.A.1

Class Sessions (45 minutes): 1 class

Teaching Materials/Worksheets:

Add/Subtract Mixed Standard Units content pages (2), Activity pages (1), Practice page (3), Homework page, Quiz

Student Supplies: Measuring tape

Prepare Ahead of Time:

Copy materials

Index cards (one for each student)

Options for Lesson:

Have students weigh their backpacks and then add and subtract each measurement, have students pour different amounts of liquids and then measure them, have students practice their conversions by drawing their own charts.

*Lessons are aligned to meet the education objectives and goals of most states. For more information on your state objectives, contact your local Board of Education or Department of Education in your state.



Teacher Notes

Add/Subtract Mixed Standard Units

The standard or customary system is a measurement system that is most commonly used in the United States. In this measuring system, there is no predictable way to relate the measurements to one another.

The US standard system is used most often in products you buy and for industrial manufacturing, or making products you buy!

The standard units and conversions for distance, capacity, and weight/mass are listed in the following chart.

Standard Units Chart

LENGTH	WEIGHT	CAPACITY	TIME
12 in = 1ft	16 oz = 1 lb	128 fl oz = 1 gal	60 sec = 1 min
3ft = 1 yrd	2000 lb = 1 ton	2 pt = 1 qt	60 min = 1 hr
5,280 ft = 1 mi		8 pt = 1 gal	24 hr = 1 day
1,760 yrd = 1 mi		4 qt = 1 gal	7 days = 1 wk
			52 wk = 1 yr
			12 mon = 1 yr
			365 days = 1 yr

But what happens when the measurements aren't perfect? What if you need to add or subtract standard units that contain both feet and inches or quarts and gallons? Never fear – let us show you!

Let's walk through a few examples to get the hang of it ...

You need to add the following measurements:

$$2 \text{ ft } 5 \text{ in} + 4 \text{ ft } 3 \text{ in}$$

First, line up the units from largest to smallest. Then add the corresponding measurements. In this case, feet with feet and inches with inches.

Feet	Inches
2	5
4	3

$$\begin{array}{r} 2 \text{ ft } 5 \text{ in} \\ + \\ 4 \text{ ft } 3 \text{ in} \\ \hline \end{array}$$

You can use a box to keep the units aligned or you can write them out in the standard format.

Then, add the feet $2 + 4 = 6$.

Then, add the inches $5 + 3 = 8$

Your answer is **6 ft 8 in.**

Let's explore another type of addition problem.

1 gal 3 qts + 5 gal 2 qts

First, line up the units from largest to smallest. Then add the corresponding measurements. In this case, gallons with gallons and quarts with quarts.

You can use a box to keep the units aligned or you can write them out in the standard format.

Then, add the meters $1 + 5 = 6$

Then, add the centimeters $3 + 2 = 5$

$$\begin{array}{r} 1 \text{ gal } 3 \text{ qts} \\ + 5 \text{ gal } 2 \text{ qts} \\ \hline \end{array}$$

The answer is 6 gal 5 qts, but WAIT! 4 quarts = 1 gallon so the number of quarts can be converted into gallons because it is over 4. Now we have 5 quarts = 1 gallon 1 quart, so our final answer is **7 gal 1 qt**. We have removed 4 quarts and added 1 gallon to the answer!

Just as we converted and added to the previous problem, we can regroup in subtraction problems when working with two units.

Borrow **1** pound to create 16 ounces. Then subtract.

$$6 \text{ lbs} - 3 \text{ lbs} = 3 \text{ lbs}$$

$$19 \text{ oz} - 7 \text{ oz} = 12 \text{ oz}$$

Your answer is **3 lbs 12 oz.**

7 lbs 3 oz - 3 lbs 7 oz

$$\begin{array}{r} \overset{6}{\cancel{7}} \text{ lbs } 3 \text{ oz} \\ - 3 \text{ lbs } 7 \text{ oz} \\ \hline \end{array} \quad \overset{+16}{=} \quad \begin{array}{r} 6 \text{ lbs } 19 \text{ oz} \\ - 3 \text{ lbs } 7 \text{ oz} \\ \hline \end{array}$$



Activity

Name _____ Date _____



Instructions

Measure Up!

Measure the height of each student in feet and inches.

Write their measurement on an index card.

Have students pair with other students in the class to find the sum and difference of their heights.

Have students record their work on a sheet of paper to turn in at the end of class.

Depending upon the amount of time available, require a specific number of partners and calculations for each student.



Instructions

Answer the following questions.

Approximate vehicle weights

Lower weight limits for about 1,000 bridges in the region will mostly affect heavy truck traffic:



AVERAGE STANDARD CAR: 1 ton 500 lbs



AVERAGE PICKUP TRUCK: 3 tons 200 lbs



AVERAGE AMBULANCE: 4 tons 1400 lbs



AVERAGE DELIVERY TRUCK: 6 tons 400 lbs



AVERAGE LOADED SCHOOL BUS: 17 tons 800 lbs



AVERAGE LOADED GARBAGE TRUCK: 25 tons 300 lbs



AVERAGE LOADED CHARTER BUS: 20 tons 600 lbs



AVERAGE FIRE TRUCK: 23 tons 1900 lbs



AVERAGE LOADED PLOW TRUCK: 28 tons 1000 lbs



AVERAGE LOADED CEMENT TRUCK: 33 tons 400 lbs



AVERAGE LOADED DUMP TRUCK: 36 tons 700 lbs

AVERAGE LOADED TRACTOR TRAILER:

40 tons 1600 lbs





Practice

Name _____ Date _____



Instructions

Answer the following estion

Tractor Trailer minus Garbage Truck	School Bus plus Delivery Truck
Pickup Truck subtracted from the Cement Truck	Ambulance take away Standard Car
Charter bus added to Dump Truck	Plow Truck minus Fire Truck
Standard car plus school bus plus charter bus	Tractor Trailer minus Cement Truck



Instructions

Solve.

Tractor Trailer minus Garbage Truck 15 tons 1300 pounds	School Bus plus Delivery Truck 23 tons 1200 pounds
Pickup Truck subtracted from the Cement Truck 30 tons 200 pounds	Ambulance take away Standard Car 3 tons 900 pounds
Charter bus added to Dump Truck 56 tons 1300 pounds	Plow Truck minus Fire Truck 4 tons 1100 pounds
Standard car plus school bus plus charter bus 38 tons 1900 pounds	Tractor Trailer minus Cement Truck 7 tons 1200 pounds



Homework

Name _____ Date _____



Instructions

Create your own set of three addition and three subtraction problems with a table of measurements. You can make your own table or find one online to use. Be creative!

ADDITION	SUBTRACTION



QUIZ

Name _____ Date _____

Instructions

Solve the following problems.

6 miles 1,780 feet – 4 miles 480 feet

1 ton 1800 pounds + 3 tons 300 pounds



Instructions

Solve the following problems.

<p>6 miles 1,780 feet – 4 miles 480 feet</p> <p>6 mi 1780 ft</p> <p>- 4 mi 480 ft</p> <p>2 mi 1300 ft</p>	<p>1 ton 1800 pounds + 3 tons 300 pounds</p> <p>1 ton 1800 lbs</p> <p>+ 3 tons 300 lbs</p> <p>4 tons 2100 lbs</p> <p>**2000 lbs = 1 ton</p> <p>5 tons 100 lbs</p>
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