Instructor's Manual

Module 12: Convert Between Inches and Feet

What Students Should Gain from this Module

At the end of this module, students should be able to:

- Convert between inches and feet

Recommended Timing for this Module   3 hours 30 minutes

Required Equipment and Materials

- An LCD projector and a Windows computer or laptop. The computer should have high speed internet access, a recent version of PowerPoint, an updated Internet browser, and speakers

- Cords for connecting the LCD projector to the computer

- A wireless presenter which allows you to move around the room while controlling the PowerPoint presentation

- A screen visible to all in the room

- A calculator for each student

- A tape measure for each student

- The *Converting Between Inches and Feet* PowerPoint file

- A copy of the *Converting Between Inches and Feet* handout for each student and instructor

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Set Up

- Set up the computer and projector.

- Identify a set of objects, such as table tops or other easily-accessible objects that pairs of students could measure with a tape measure. All of the objects should be the same size and all should be greater than 1' in both dimensions. Each object should be far enough apart from the others that pairs of students can measure the object without interfering with other students.

Optional Materials

At Math-Aids.com http://www.math-aids.com you can create and print a wide variety of practice problem sets (and answer keys) for students who want or need additional practice. You can also create problem sets that offer a higher degree of challenge for students who want an additional challenge. Be sure to confirm that your use of the Math-Aids resources complies with its usage guidelines.
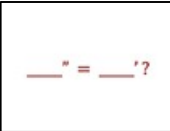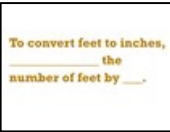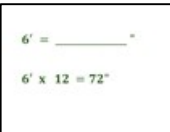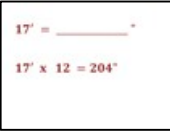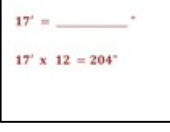
Note to the Instructor

Some of the slides for this module require you to "Click" or press enter on the keyboard to reveal additional information on the slide. Especially whe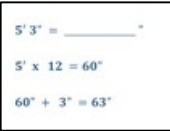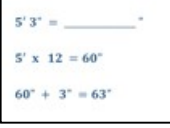re there is a lot of information on a slide, this will help you guide students' attention to the information you are addressing. In other cases, it engages students by giving them a chance to think through their own answer or strategy for solving a problem before the answer is revealed on the slide.

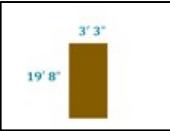| Time	Activity	Materials	What to Do
15	**Introduction**	**Tape measures** **Classroom objects students can measure (see Set Up above)**	**Have students** work in pairs to use tape measures to measure the length and width of their table or some other easily-accessible object. Assign some pairs to measure in feet and inches, and others to measure in inches only. **Ask** students what the dimensions are – both in feet and inches, and inches alone. **Write** the dimensions on the board. **Ask students** how they would know whether the measurements in feet and inches are the same as the measurements in inches only. **Say** that they will often need to convert inches to feet or feet to inches when making and working with measurements.

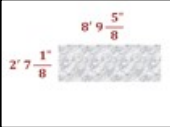| Time	Activity	Materials	What to Do
25	**Converting Feet to Inches**	**Handout:** *Converting Between Inches and Feet*	**Pass out** the *Converting Between Inches and Feet* handout
		At the end of this module, you should be able to convert between inches and feet.	**Review** the objective.
		___" = ___'?	**Ask** students how many inches are equal to one foot. Have students look at their tape measures if necessary.
		To convert feet to inches, _____ the number of feet by ___.	**Say** that, to convert feet to inches, you need to multiply the number of feet by 12. **Have students** fill in the blanks on their handout.
		6' = _____ " 6' x 12 = 72"	**Show** how 6' = 72".
		17' = _____ " 17' x 12 = 204"	**Show**, on the board, how 17' = 204".
		5' 3" = _____ " 5' x 12 = 60" 60" + 3" = 63"	**Click through the steps of the calculation** in the slide, or demonstrate it on the board, explaining each step and showing how each answer was calculated.

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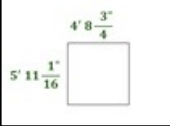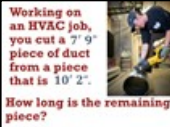
Time	Activity	Materials	What to Do
		$91'\,10" = \underline{\hspace{2cm}}"$ $91' \times 12 = 1,092"$ $1,092 + 10 = 1,102"$	**Click through the steps of the calculation** in the slide, explaining each step and showing how each answer was calculated, or invite a student to demonstrate it on the board.
		$36'\,8\frac{1"}{4} = \underline{\hspace{2cm}}"$ $36' \times 12 = 432"$ $432" + 8\frac{1"}{4} = 440\frac{1"}{4}"$	**Say** that, when converting feet and inches to inches only, fractions don't have to be part of the calculation and can just be carried forward to the final answer. **Click through the steps of the calculation** in the slide, explaining each step and showing how each answer was calculated, or invite a student to demonstrate it on the board. **Point out** how the 1/4 was brought forward without being included in the calculation.
		1. $15'\,1"$ $= \underline{\hspace{1cm}}'$ 2. $25'\,8"$ $= \underline{\hspace{1cm}}'$ 3. $14'\,6\frac{1"}{8}$ $= \underline{\hspace{1cm}}'$ 4. $13'\,10\frac{7"}{16}$ $= \underline{\hspace{1cm}}'$ 5. $5'\,9\frac{1"}{2}$ $= \underline{\hspace{1cm}}'$	**Ask** what they need to do to convert these measurements to inches only. **Have students write** the answers on their handouts.
		1. $15'\,1"$ $= 181"$ 2. $25'\,8"$ $= 308"$ 3. $14'\,6\frac{1"}{8}$ $= 174\frac{1"}{8}$ 4. $13'\,10\frac{7"}{16}$ $= 166\frac{7"}{16}$ 5. $5'\,9\frac{1"}{2}$ $= 69\frac{1"}{2}$	**Have students correct their answers** (if necessary) on their handout. **Point out** how the fractions were brought forward without being included in the calculations.

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Time	Activity	Materials	What to Do
60	**Converting Inches to Feet**	To convert inches to feet, _____ the number of inches by ___.	**Say** that, to convert inches to feet, you need to divide the inches by 12. **Have students** fill in the blanks on their handout. **On the board,** show how to convert students' measurements of the classroom object (taken at the beginning of the module) from inches, to feet and inches.
		48″ = _____′ 48″ ÷ 12 = 4′	**Show** how 48″ = 4′.
		72″ = _____′ 72″ ÷ 12 = 6′	**Show** how 72″ = 6′.
		25″ = _____′ 42″ = _____′	**Ask** how many feet 25″ is equal to. Write the answer on the board, pointing out that 1″ is left over. **Ask** how many feet 42″ is equal to. Write the answer on the board, pointing out that 6″ are left over.
		1. 24″ = _____′ 2. 36″ = _____′ 3. 19″ = _____′ 4. 29″ = _____′ 5. 38″ = _____′	**Ask** students what they need to do to convert these measurements to feet and inches. **Have students write** the answers on their handouts.

Time	Activity	Materials	What to Do
		1. 24″ = 2′ 2. 36″ = 3′ 3. 19″ = 1′ 7″ 4. 29″ = 2′ 5″ 5. 38″ = 3′ 2″	**Have students correct their answers** (if necessary) on their handout. **Say** that, for some conversions from inches to feet, especially with small measurements, it can be easy to quickly make the conversion in their head. **Say** that knowing their division and multiplication tables by memory can help them quickly do these kinds of conversions without a calculator.
		165″ = _____′ 165″ ÷ 12 = 13.75′ 13′ x 12 = 156″ 165″ − 156″ = 9″ 13′ + 9″ = 13′ 9″	**Say** that, for other measurements, it can be faster and easier to use a calculator to convert inches to feet. **Click through the steps of the calculation** in the slide, or demonstrate it on the board, explaining each step and showing how each answer was calculated.
		317″ = _____′ 317″ ÷ 12 = 26.41666667′ 26′ x 12 = 312″ 317″ − 312″ = 5″ 26′ + 5″ = 26′ 5″	**Click through the steps of the calculation** in the slide, or demonstrate it on the board, explaining each step and showing how each answer was calculated, or invite a student to demonstrate it on the board.
		$230\frac{1}{2}″$ = _____′ 230″ ÷ 12 = 19.16666667′ 19′ x 12 = 228″ 230″ − 228″ = 2 19′ + 2″ = $19′ 2\frac{1}{2}″$	**Say** that, when converting inches to feet, fractions don't have to be part of the calculation and can just be carried forward to the final answer. **Click through the steps of the calculation** in the slide. **Point out** how the 1/2 was brought forward without being included in the calculation.

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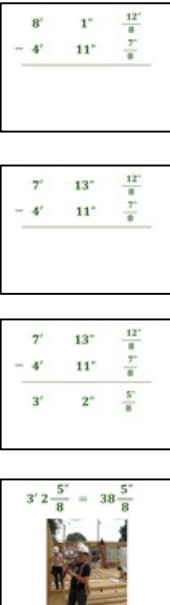
Time	Activity	Materials	What to Do
		1. 97" = _____ ' 2. 113" = _____ ' 3. $277\frac{5}{8}$ = _____ ' 4. $451\frac{1}{16}$ = _____ ' 5. $194\frac{3}{4}$ = _____ '	**Have students write** the answers on their handouts.
		1. 97" = 8' 1" 2. 113" = 9' 5" 3. $277\frac{5}{8}$ = $23'\,1\frac{5}{8}$ 4. $451\frac{1}{16}$ = $37'\,7\frac{1}{16}$ 5. $194\frac{3}{4}$ = $16'\,2\frac{3}{4}$	**Have students correct their answers** (if necessary) on their handout. **Point out** how the fractions were brought forward without being included in the calculations.
		3' 3" 19' 8"	**Ask** students how they would determine the perimeter of this trench.
		19' 8" 19' 8" 3' 3" 3' 3"	**Show** students how to align the feet and inches.
		44' 22" Convert inches to feet + 45' 10"	**Show** students how the 44' 22" was determined. **Show** students how the inches were converted to feet. **Have students write** down, on their handout, how many inches 45' 10" is equal to.
		45' 10" = 550"	**Have students correct their answers** (if necessary) on their handout.

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Time	Activity	Materials	What to Do
			Ask students how they would determine the perimeter of this slab of marble.
			Show students how to align the feet, inches, and fractions.
			Show students how the 20' 32 12/8" was determined.
			Click through the steps of the calculation in the slide, or demonstrate it on the board, explaining each step and showing how each answer was calculated.
			Show students how to change improper fractions to proper fractions.
			Then convert inches to feet.
			Then simplify fractions if necessary.
			Have students write down, on their handout, how many inches 22' 9 ½" is equal to.
			Have students correct their answers (if necessary) on their handout.
			Point out how the ½" was carried forward into the final answer.
			Ask students how they would determine the perimeter of this shape.

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Time	Activity	Materials	What to Do
			Show students how to align the feet, inches, and fractions.
			Show students how the 18' 38 26/16" was determined.
			Click through the steps of the calculation in the slide, or demonstrate it on the board, explaining each step and showing how each answer was calculated.
			Show students how to change improper fractions to proper fractions.
			Then convert inches to feet.
			Then simplify fractions if necessary.
			Have students write down, on their handout, how many inches 21' 3 5/8" is equal to.
			Have students correct their answers (if necessary) on their handout.
			Point out how the 5/8" was carried forward into the final answer.
			Have students draw an image, on their handout, that illustrates what they think the problem is asking.
			Invite a student to the board to draw the image she created.

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Time	Activity	Materials	What to Do
			Ask students what they will need to do to subtract the inches.
			Show students how 10' 2" was converted to 9' 14" and how the final answer was calculated.
			Have students write down, on their handout, how many inches 2' 5" is equal to.
			Have students correct their answers (if necessary) on their handout.
			Have students draw an image, on their handout, that illustrates what they think the problem is asking, then solve this problem.
			Ask students what they will need to do to subtract the fractions.
			Show students how 1/4 was renamed 9/16.
			Show students how 6 4/16 was renamed 5 20/16.
			Ask students what they will need to do to subtract the (whole) inches.

Time	Activity	Materials	What to Do
		10' 17" $\frac{20"}{16}$ − 3' 8" $\frac{9"}{16}$	**Show** students how 11' 5" was renamed 10' 17".
		10' 17" $\frac{20"}{16}$ − 3' 8" $\frac{9"}{16}$ 7' 9" $\frac{11"}{16}$	**Show** students how the final answer was calculated. **Have students write** down, on their handout, how many inches 7' 9 11/16" is equal to.
		$7' 9\frac{11"}{16} = 93\frac{11"}{16}$	**Have students correct their answers** (if necessary) on their handout.
		While framing a house, you need a board that is 4' 11 $\frac{1}{2}$ long. If you cut the piece you need from a board 8' 2 $\frac{1}{2}$ long, how long is the remaining piece?	**Have students** work in pairs to find the answer and write it in feet and inches, and inches only. **Have students start by drawing an image**, on their handout, that illustrates what they think the problem is asking.
		8' 2" $\frac{1"}{2}$ − 4' 11" $\frac{7"}{8}$	**Show students** how to solve the problem using the following slides, on the board, or invite a student to demonstrate it on the board. **Ask** students what they will need to do to subtract the fractions.
		8' 2" $\frac{4"}{8}$ − 4' 11" $\frac{7"}{8}$	**Show** students how 1/2 was renamed 4/8.

Time	Activity	Materials	What to Do
			Show students how 2 4/8 was renamed 1 12/8.
			Ask students what they will need to do to subtract the (whole) inches.
			Show students how 8' 1" was renamed 7' 13".
			Show students how the final answer was calculated.
			Have students correct their answers (if necessary) on their handout.
			Have students correct their answers (if necessary) on their handout.
100	**Practice Converting Between Inches and Feet**	**Handout:** *Converting Between Inches and Feet*	**Have students form groups** of 3 or 4.
			Say to remember that, in class or on the job, they will need to work as a team, which means supporting and empowering one another. It is not enough for the group to get the right answers. Instead, they should take responsibility for helping one another until each member of the group has mastered the process and feels confident in her ability to solve the problems on her own.
			Say that they should remember the goal(s) they set for themselves, what they pledged to do to "Commit to Grit" in the *Being Gritty* handout at the beginning of the course, and the importance of maintaining a growth mindset if they have difficulty or get frustrated.

Time	Activity	Materials	What to Do
			Say that you can provide additional problem sets for students who want additional practice or additional challenge. See the information about Math-Aids under Optional Materials above.
			Have students work through the pages titled *Converting Between Inches and Feet Practice* in the *Converting Between Inches and Feet* handout. As they do, check in with groups to answer questions and ensure that no individual(s) in the group is being left behind.
			Review the answers, answer questions, and review content students are struggling with.
10	**Planning to Apply their Learning**		**Have students reflect** on the learning from this module and note in their journal what they have learned that will be useful to them on the job, what they want to remember, tips, etc., and when they have demonstrated grit or a growth mindset.