



## **Building a Soldier's Hut: 4<sup>th</sup>-5<sup>th</sup> Grade Edition**

In the winter of 1776-1777, 1,500-2,000 soldiers were garrisoned at Fort Ticonderoga. The soldier's barracks of the fort can only hold about 400 soldiers, so additional shelter is needed to survive the winter. Many accounts exist of soldiers constructing huts and other wooden structures for protection from the elements. This math worksheet takes your students through some of the steps used to build a soldier's hut. This worksheet can be used to introduce or review converting feet into inches, and using simple division to determine the materials soldiers will need for their hut.

At Fort Ticonderoga, you can visit both site where the huts were originally built, as well as reconstructed huts. For more detail, you can read a blog post our staff wrote about this at:

<http://www.fortticonderoga.org/blog/lodging-as-the-nature-of-the-campaign-will-admit/>

### Common Core Standards Addressed:

#### [CCSS.MATH.CONTENT.4.OA.A.2](#)

Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.<sup>1</sup>

#### [CCSS.MATH.CONTENT.4.OA.A.3](#)

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

#### [CCSS.MATH.CONTENT.4.MD.A.2](#)

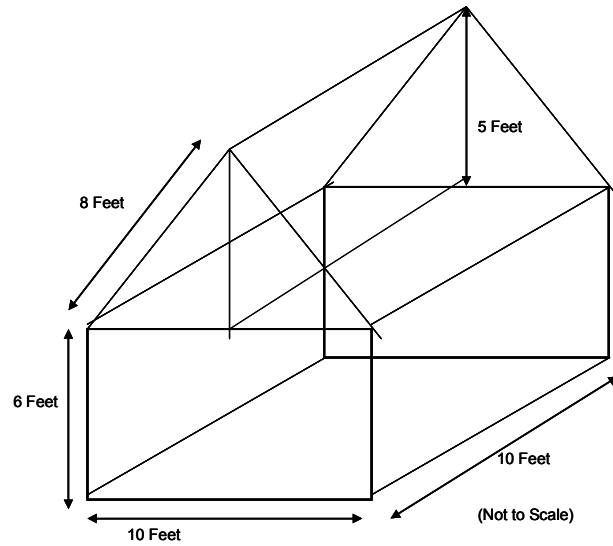
Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Winter will soon be here at Fort Ticonderoga, and the soldiers need a roof over their heads. They can't all fit inside the fort, so some of them will be building wooden huts. Help the soldiers with the math they will need to build their huts. You will want to use the measurements provided in this diagram of a hut:

**1. Digging the foundation:** First you must dig a foundation for your hut. Each hut was set approximately 2 feet into the ground. Although the huts are only 10 feet long and 10 feet wide, you need to dig an extra foot on each side of the hut. How many feet long will you need to make the foundation?

How many feet wide will you need to make the foundation?

How many cubic feet will you need to dig?



**2. Setting in the Floor:** The floor of this hut will be made of planks that are 10 feet long by 10 inches wide. How many planks will you need?

**3. Covering the Walls:** You need enough planks to cover all four walls of the hut. The sawmill has given you planks that are 8 inches by 10 feet. How many planks do you need for one wall?

How many planks will you need for all four walls? (We'll ignore the door for now)

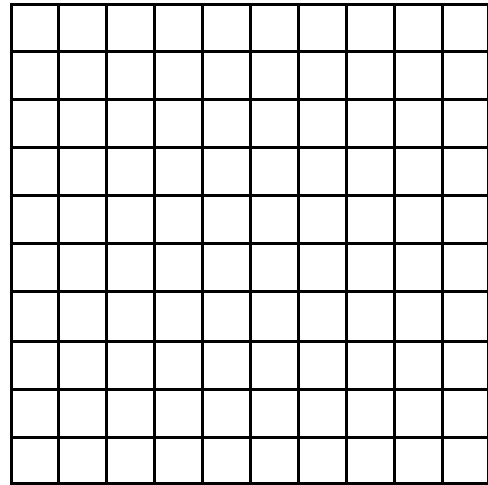
**4. A roof over your head!** A good way to build a hut that doesn't leak is with a clapboard roof where each board is laid in horizontally and overlaps the one below it. You have boards from the sawmill that are 10 feet by 11 inches, and they each overhang the next by 1 inch. How many boards will you need for one side of the roof? You will have a little extra overhang.

How many boards will you need for both sides of the roof?

**5. Building a door:** You need a door that is 5' 6" tall and 3' wide. You have some smaller planks that are only 4 inches wide. If you saw them all to the right height, how many planks will you need?

8. **Moving in:** Now it's time to move into your hut! If each soldier takes an area of 6 feet by 2 feet on the floor, how many soldiers can sleep in this hut?

To help you, here's a graph of the floor where each square represents one square foot. You can shade an area for each soldier. You'll have a little room left over for them to store their equipment, but not much!



9. With this many soldiers sleeping in a hut, how many huts will you need to build to keep 1,400 soldiers out of the rain and snow?

10. **Bonus 1: Back to the Foundation:** Each time you use a shovel, you move about  $\frac{1}{4}$  cubic feet of dirt. How many times will you need to shovel to dig the foundation of one hut?

**Bonus 2:** How many times will you need to shovel to dig the foundations of all the huts you need for 1,400 soldiers? You'll need an army just to do the digging!

