

TEACHER NOTES

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These CSI projects are a great way to capture your students' interest in math. This activity is also a great way to reinforce some basic concepts involving fractions, decimals and percentages.

At the start of the pack there is a page titled 'Introduction' which can be used to help the students decode the hidden message. There is also an optional fraction table to fill out if you wish to use it with your students, however it is not required for the main CSI activity.

The main activity starts with a short story to hook the students into the math task. They then have to solve a series of five clues to find out which one of the guesses is the true hero who can save the kingdom.

Note: While there is an explanation with each clue – some students may still need further clarification and explanation from you of certain Math concepts.

Included in this activity you will find:

Five math clues which your students will need to solve in order to discover who the true hero is. There are also two extension activities which are optional and which can be given to students who finish early; a fraction multiplication activity and a short writing activity.



GNOME HERO QUEST.

Once upon a time there lived A Gnome King and Queen who ruled a faraway magical kingdom called Sugarbubble. All the gnomes that lived within the kingdom of Sugarbubble were happy and peaceful. In the center of the kingdom was a magical tree. This magic tree provided life to the area, and it was foretold that if the magic tree should ever wilt and die then terrible things would happen. The land would turn into desert, the food would stop growing, and the kingdom of Sugarbubble would fall into ruin.

One day, as the king was looking at the tree, he noticed one of its golden leaves starting to turn brown and shrivel. The king was not well with the tree. In desperation, the king ran to his queen and together they called upon their magic enchantress and asked her what to do to save the tree.

"The tree is dying," said the enchantress. "My magic is not powerful enough to save it. However, there is still a way it can be saved. Far away there is a cave of wonders, and in this cave is the staff of life. This staff will be able to heal the tree; however, it can only be carried and used by the one true hero. This one hero must be the most worthy, brave, magical, and kind gnome in the land."

"Who is this gnome, who is the one true hero?" asked the King.

"I cannot see that," said the enchantress. "You must round up your most worthy gnomes and send them on a quest to find the cave of wonders and the staff of life. On the way their worthiness will be tested through a series of trials and challenges, AND only then will you know who the one true hero is."



MATH ADVENTURE: GNOME KINGDOM QUEST

The kingdom of gnomes called Sugarbubble is in great danger and needs your help. There is a magic tree which gives life to the land; however, it is dying. It has been foretold that if it dies the land would turn into desert, food would stop growing, and the kingdom would fall into ruin.

The tree is sick and only the staff of life, which is hidden away in the cave of wonders, can save the tree. Only the one true gnome hero can use the staff. This one true hero must be the most worthy, brave, smart, and kind gnome in the land.

The most worthy gnomes were gathered up and are shown below, and one of these gnomes is the one true hero who has the power to use the staff of light. All of these gnomes will start on the quest to find the staff of life, but on the journey they will encounter a series of trials to prove their worth. These trials will determine who the one true hero is. Use the evidence on the following pages to find out which gnome is the chosen one.

			
Cheerful Chris	Colorer Eye	Tim Trumpeter	Walker Wayne
			
Pointer Paul	Gardener Garry	Digger Dave	Sam

ONE OF THESE GNOMES IS THE ONE TRUE HERO. SOLVE THE PROBLEMS ON THE FOLLOWING PAGES TO FIND OUT WHICH ONE.

AFTER YOU HAVE SOLVED EACH PAGE, COME BACK HERE TO CROSS GNOMES OFF THE HERO LIST UNTIL YOU ARE LEFT WITH THE ONE TRUE HERO.

HIDDEN MESSAGE



The brave gnomes trudged forward and set forth on their quest. After a solid week of marching, they came upon two giant dragon statues blocking the path. Suddenly both the dragons' eyes lit up and then they spoke, "We can see into your spirits. You all may pass, but let it be known that one of your group is not worthy; to find out who you must crack our coded message." Scribbles of numbers, fractions, and decimals then appeared on the road before the gnomes.

Decode the message to find out who in the group is not worthy. Convert each percentage or fraction into a decimal, then fill in the message spaces with the letters that match the correct decimals to read the secret message. This will let you cross off one gnome from the hero list.

A 60% _0.6_	B 31% _____	C $\frac{1}{4}$ _____	D 2% _____	E $\frac{1}{2}$ _____	F $\frac{1}{3}$ _____	G $\frac{1}{3}$ _____
H $\frac{40}{100}$ _____	I $\frac{1}{5}$ _____	J 85% _____	K $\frac{3}{4}$ _____	L 110% _____	M $\frac{3}{10}$ _____	N $\frac{15}{100}$ _____
O 22% _____	P $\frac{2}{20}$ _____	Q 8% _____	R 5% _____	S 77% _____	T $\frac{16}{20}$ _____	U $\frac{42}{50}$ _____
V $\frac{45}{100}$ _____	W 25% _____	X 5% _____	Y 5% _____	Z 0.5% _____		

 0.22 0.15 0.5 _____ 0.22 0.63 _____ 0.05 0.22 _____ 0.04 0.16 _____ 0.33 0.66 0.22 0.84 0.1

 0.77 0.5 _____ 0.5 0.75 0.77 _____ 0.22 0.15 _____ 10 0.05 _____ 0.33 1.1 0.22 0.66 0.05

 0.63 0.22 0.66 _____ 0.8 0.4 0.5 0.3 0.77 0.5 1.10 0.63 _____ 0.6 0.15 0.02

 0.2 0.77 _____ 0.15 0.22 0.8 _____ 0.6 _____ 0.8 0.66 0.84 0.5 _____ 0.4 0.5 0.66 0.22

 0.2 0.8 _____ 0.2 0.77 _____ 0.77 0.6 0.3 _____

CROSS THIS GNOME OFF YOUR HERO LIST.

THE TEST OF WISDOM

The gnomes journeyed onward, and it wasn't long before they came upon an old monk sitting next to a river bed. "I know you are on a quest to find the staff of life," said the monk. I have set up a challenge which will help you find out who the one true hero is who can carry the staff. The one true hero must be wise, so this challenge will test your wisdom.

Before you in the river are eight islands. Each island has at least one treasure chest, and some of the islands have a stone guardian. Stone guardians require a payment before you can leave their island. You must each choose an island to swim to, and the more treasure you bring me back the more wise you must be!"

Calculate how much treasure each gnome can take off the island they swam to. Cross off the **TWO** gnomes who ended up with the **FEAST** amount of treasure.

Cheerful Chris	Explorer Eve	Timmy Tapper	Walker Wayne
Swam to Island B 2.220 <u>+ 1.007</u>	Swam to Island A 3.251 <u>-1.350</u>	Swam to Island C	Swam to Island E
Pointer Paul	Gardener Gary	Digger Dave	Sam
Swam to Island C	Swam to Island F	Swam to Island D	Swam to Island G



KIND OF HEART

The gnomes were exhausted after their long journey so far; however, they were fortunate enough to have plenty of water left. They came across a travelling party who had run out of water. "Please help us," the travellers cried. The gnomes all got out their water bottles and were generous in giving the travellers water. Some of the gnomes, however, were more generous than others. The two gnomes who had the most water left after they had given to the travellers can be crossed off the hero list, as the true hero must be kind of heart.

Calculate how much water each hero had, then calculate how much water they had left after giving some away.

Cross the **TWO** heroes with the **MOST** amount of water left of the hero list.



Blue Bottle	Green Bottle	Brown Bottle	Black Bottle
4 Liters 	2 Liters 	1 Liter 	$\frac{1}{2}$ liter (500mls) 

Cheerful Chris	Explorer Eve	Clampeter	Walker Wayne
1 Blue Bottle 1 Green Bottle Total Liters =	1 Blue Bottle 2 Black Bottles Total Liters =	3 Green Bottles 1 Brown Bottle Total Liters =	2 Green Bottles 4 Brown Bottles Total Liters =
Gave up 50% of the water in his green bottle. Total Liters left:	Gave up 100% of the water in her black bottle. Total Liters left:	Gave up half of the water in his green bottles. Total Liters left:	Gave up a quarter of his brown bottles. Total Liters left:
Pointer Paul	Gardener Garry	Digger Dave	Sam
Had 8 Green Bottles 1 Brown Bottle Total Liters =	3 Brown Bottles 3 Black Bottles Total Liters =	4 Blue Bottles 4 Black Bottles Total Liters =	3 Green Bottles 1 Brown Bottles Total Liters =
Gave up $\frac{4}{8}$ of all his green bottles. Total Liters left:	Gave up $\frac{1}{3}$ of his black bottles. Total Liters left:	Gave up 75% of all his blue bottles. Total Liters left:	Gave up 0.75 of the water in his brown bottle. Total Liters left:

PREVIEW THANKS FOR LOOKING!

BRAVE SOULS

The heroes journeyed onward and were nearing the cave of wonders when suddenly a seven-headed monster slithered out in front of them. "Only the brave may pass, and to do that you will have to defeat us," said one of the heads.

Each head had a fraction written on it. In front of the monster was a pile of rocks with fractions written on them. In order to defeat a head, two rocks must be thrown at it. The fractions on the two thrown rocks must add together to be equivalent to the fraction written on the head.

Add together each gnome's fractions. Match them with the fractions on the monster's head. Cross off the gnome whose fraction doesn't match up with a head.

Example on how to add fractions

Jack has



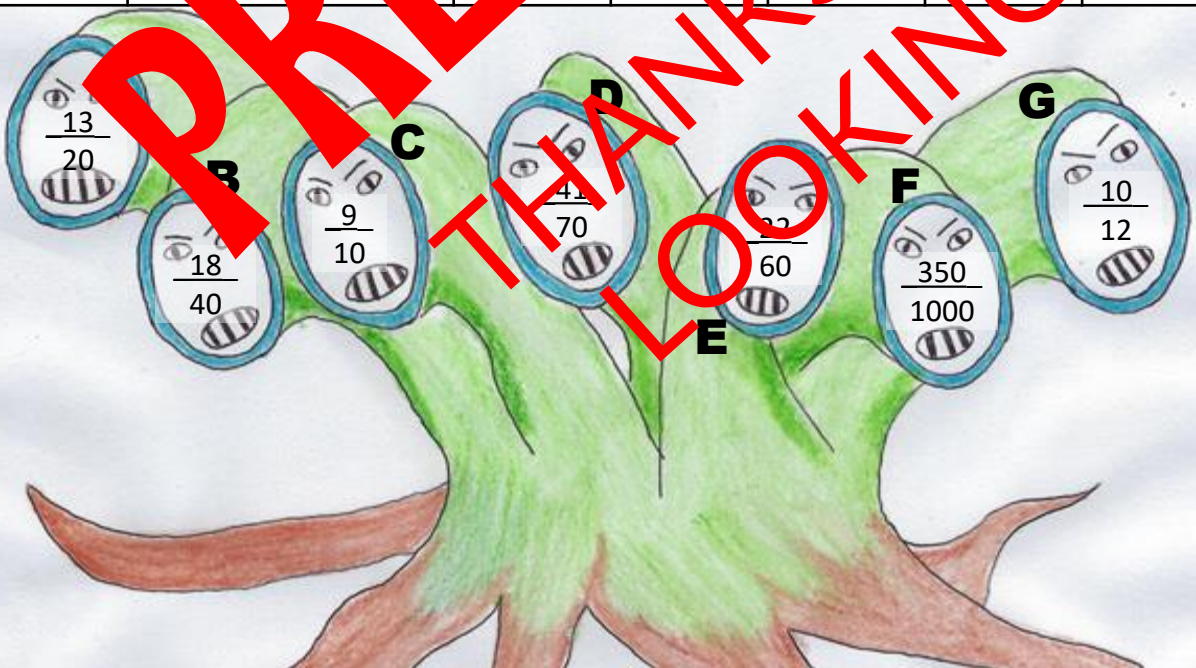
$$\frac{1}{3} + \frac{1}{2} \rightarrow \frac{1}{3} \times \frac{2}{2} + \frac{1}{2} \times \frac{3}{3} \rightarrow \frac{1 \times 2}{3 \times 2} + \frac{1 \times 3}{2 \times 3} \rightarrow \frac{2}{6} + \frac{3}{6} \rightarrow \frac{5}{6}$$

Multiply both numbers on the first fraction by the bottom number of the second fraction. Also multiply both numbers on the second fraction by the bottom number of the first fraction. (Just add together the numbers of each numerator.)



Match it up!

Chris	Eve	Tim	Way	Garry	Dave	Sam
$\frac{2}{5} + \frac{1}{2}$	$\frac{1}{6} + \frac{2}{10}$	$\frac{2}{8} + \frac{1}{5}$	$\frac{1}{3} + \frac{2}{10}$	$\frac{2}{7} + \frac{3}{10}$	$\frac{1}{3} + \frac{5}{8}$	$\frac{1}{4} + \frac{2}{5}$



GO THE DISTANCE

The gnomes struggled on, and they knew they must be coming close to the cave of wonders where the staff of life was hidden. As they turned the corner, the forest path they were on forked into many different paths. A monkey suddenly swung down from the trees and landed before them. It suddenly spoke. "You have done well to come this far, but the true hero will need to show they can go the distance. You each must choose a path, and how far along the path you can get in one day will determine if you can go the distance of a hero and enter the cave of wonders. Each path has a unique danger, so choose your path wisely. If the true hero shows he can go the distance then I will take them to the cave of wonders where the staff of life can be found."









Calculate how many miles each hero walked.

Cross the gnome who walked the **LEAST** amount of miles off the hero list.

This will leave only one gnome on the hero list.

The one true hero is: _____



Cheerful Chris	Explorer Eve	Trumpeter	Walker Wayne
 Danger: Snakes Path Length: 100miles Portion walked: 1/3 Total Miles Travelled:	 Danger: Mountains Path Length: 400miles Portion walked: 25% Total Miles Travelled:	 Danger: Desert Path Length: 600miles Portion walked: 0.5 Total Miles Travelled:	 Danger: Ghosts Path Length: 90miles Portion walked: 1/3 Total Miles Travelled:
Pointer Paul	Gardener Garry	Digger Dave	Sam
 Danger: Rivers Path Length: 100miles Portion walked: 75% Total Miles Travelled:	 Danger: Ninjas Path Length: 500miles Portion walked: 1/10 Total Miles Travelled:	 Danger: Blizzard Path Length: 80miles Portion walked: 50% Total Miles Travelled:	 Danger: Bees Path Length: 400miles Portion walked: 0.75 Total Miles Travelled:

EXTENSION - THE TREE IS SAVED!

A loud voice boomed around the cave of wonders as the true hero entered. "You have shown yourself worthy to hold the staff of life" the voice boomed, "it holds great power so make sure you use it wisely." The hero took the staff and then with haste journeyed back to the gnome kingdom and struck the magical tree with the staff. Slowly the brown leaves started to glow golden again. The tree of life was saved and the kingdom erupted with celebration.

The gnome king was overjoyed, "To celebrate I will be giving away some of my treasure, some will be used to benefit the kingdom and some will be given to our true hero as a reward for his deeds." Six chests of treasure were then brought out into the throne room, each chest was filled with a different precious jewel.



Work out the fraction of each chest that the hero got.

To do this you will need to multiply fractions together.

To multiply fractions just multiply the top numbers (numerators) together and the bottom numbers together (denominators).

Example

$$\frac{3}{4} \times \frac{2}{3} \rightarrow \frac{3 \times 2}{4 \times 3} = \frac{6}{12}$$

This can be simplified to $\frac{1}{2}$

<p>Chest of Gold</p> <p>$\frac{1}{2}$ Was given towards throwing a grand party.</p> <p>$\frac{2}{5}$ Of what was left was given to the hero.</p> <p>Fraction hero got:</p> $\frac{1}{2} \times \frac{2}{5} = \frac{1 \times 2}{2 \times 5} = \frac{2}{10} = \frac{1}{5}$	<p>Chest of Diamonds</p> <p>$\frac{4}{5}$ Was saved to fund the building of a town hall.</p> <p>$\frac{1}{3}$ Of what was left was given to the hero.</p> <p>Fraction hero got:</p> $\frac{4}{5} \times \frac{1}{3} = \frac{4 \times 1}{5 \times 3} = \frac{4}{15}$
<p>Chest of Rubies</p> <p>$\frac{2}{7}$ Was used to build a shrine around the tree.</p> <p>$\frac{3}{4}$ Of what was left was given to the hero.</p> <p>Fraction hero got:</p> $\frac{2}{7} \times \frac{3}{4} = \frac{2 \times 3}{7 \times 4} = \frac{6}{28} = \frac{3}{14}$	<p>Chest of Silver</p> <p>$\frac{4}{3}$ Was given to the poorest gnomes.</p> <p>$\frac{3}{8}$ Of what was left was given to the hero.</p> <p>Fraction hero got:</p> $\frac{4}{3} \times \frac{3}{8} = \frac{4 \times 3}{3 \times 8} = \frac{12}{24} = \frac{1}{2}$
<p>Chest of Emeralds</p> <p>$\frac{8}{10}$ Was divided between all the teachers!</p> <p>$\frac{4}{5}$ Of what was left was given to the hero.</p> <p>Fraction hero got:</p> $\frac{8}{10} \times \frac{4}{5} = \frac{8 \times 4}{10 \times 5} = \frac{32}{50} = \frac{16}{25}$	<p>Chest of Pearls</p> <p>$\frac{1}{9}$ Was divided between all the gnome children.</p> <p>$\frac{3}{4}$ Of what was left was given to the hero.</p> <p>Fraction hero got:</p> $\frac{1}{9} \times \frac{3}{4} = \frac{1 \times 3}{9 \times 4} = \frac{3}{36} = \frac{1}{12}$

A HEROS JOURNEY

Imagine you are the one true hero gnome. All is well for many months after you have saved the magical tree protecting the kingdom. One day however the king and queen gnome come to you with grave faces. I have another quest for you says the king...

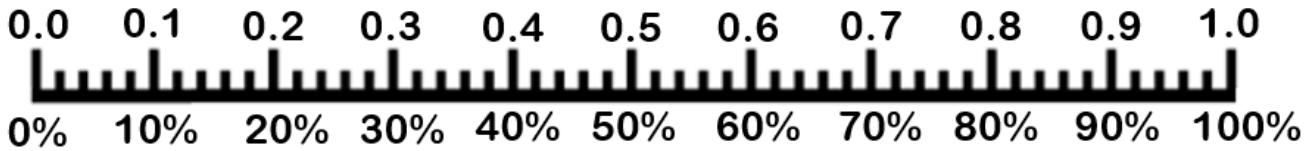
What is the new quest from the king? _____

Write a story describing what happens on your new quest.

**PREVIEW
THANKS FOR
LOOKING!**

Picture

FRACTION RULER



One Whole $\frac{1}{1} = 100\% = 1.0$				
One Half $\frac{1}{2} = 50\% = 0.5$		One Half $\frac{1}{2} = 50\% = 0.5$		
One Third $\frac{1}{3} = 33.3\% = 0.33$	One Third $\frac{1}{3} = 33.3\% = 0.33$	One Third $\frac{1}{3} = 33.3\% = 0.33$		
Two Thirds $\frac{2}{3} = 66.6\% = 0.66$				
Quarter $\frac{1}{4} = 25\% = 0.25$	Quarter $\frac{1}{4} = 25\% = 0.25$	Quarter $\frac{1}{4} = 25\% = 0.25$	Quarter $\frac{1}{4} = 25\% = 0.25$	
Three Quarters $\frac{3}{4} = 75\% = 0.75$				
$\frac{1}{5} = 20\%$ $\frac{1}{5} = 0.2$	$\frac{1}{5} = 20\%$ $\frac{1}{5} = 0.2$	$\frac{1}{5} = 20\%$ $\frac{1}{5} = 0.2$	$\frac{1}{5} = 20\%$ $\frac{1}{5} = 0.2$	$\frac{1}{5} = 20\%$ $\frac{1}{5} = 0.2$
$\frac{1}{10} = 0.1$	$\frac{1}{10} = 0.1$	$\frac{1}{10} = 0.1$	$\frac{1}{10} = 0.1$	$\frac{1}{10} = 0.1$
Three Tenthths $\frac{3}{10} = 0.3$				
Ten Twentieths $\frac{10}{20} = 50\% \text{ or } 0.50$				$\frac{1}{20} = 0.05$
$\frac{2}{20} = 0.1$			$\frac{16}{20} = 0.8$	

You can use this ruler to convert percentages and fractions into decimals.

Percentages can be easily converted into decimals, all you need to do is to think of 100% as being 1.00, or one whole.

Examples, 44% turns into 0.44 and 2% turns into 0.02.

The table above can also help you to convert fractions into decimals and percentages

FRACTION TABLE

Fill in the table below. For each fraction write an equivalent fraction, write it as a percent and a decimal and draw it as a diagram.

Fraction	Equivalent Fraction	Percent	Decimal	Diagram
$\frac{1}{2}$	$\frac{50}{100}$	50%	0.5	
$\frac{1}{3}$				
$\frac{3}{4}$				
$\frac{1}{10}$				
$\frac{1}{100}$				

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Paula Kim



Romero's Room