The Mystery of the Missing Shortbread Sugar

In a small junior school, the children are making Valentine's Day shortbread biscuits to take home and share. After gathering the ingredients and preparing a demonstration, the teacher realises something terrible: the sugar is missing! Without this ingredient, the biscuits cannot be made.

Quickly, the children begin searching for the missing sugar.

Solve these fraction puzzles and reveal clues to find out who found the shortbread sugar.

Good luck!

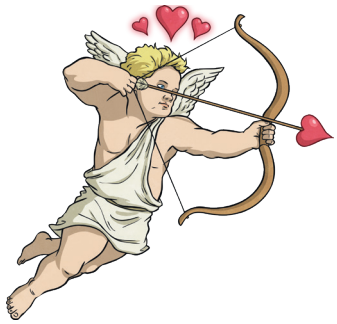
Name	Boy or Girl	Hair Colour	Year Group	Favourite Subject	Favourite Colour
Ava	Girl	Ginger	3	Music	Blue
Balvinder	Girl	Black	6	Music	Red
Carter	Boy	Brown	5	Computing	Pink
Destiny	Girl	Black	3	Maths	Green
Elias	Boy	Brown	4	Music	Yellow
Fred	Boy	Ginger	6	Music	Yellow
Gurvinder	Boy	Black	5	Computing	Green
Harry	Boy	Blonde	6	Science	Yellow
Isla	Girl	Black	4	Maths	Blue
Jack	Boy	Ginger	3	English	Blue
Kaylee	Girl	Black	4	Computing	Pink
Li	Boy	Brown	5	English	Red
Malik	Boy	Blonde	3	Maths	Blue
Nikita	Girl	Ginger	6	Computing	Green
Oscar	Boy	Blonde	4	Maths	Red
Poppy	Girl	Brown	5	Science	Red
Quinn	Boy	Brown	3	English	Green
Rhys	Boy	Brown	5	Computing	Blue
Selma	Girl	Black	6	English	Pink
Terrence	Boy	Ginger	6	Maths	Green
Uri	Girl	Black	5	English	Pink
Victor	Boy	Blonde	3	Computing	Pink
William	Boy	Black	4	English	Green
Xanthe	Girl	Black	5	Computing	Yellow
Yaseem	Boy	Brown	6	English	Red
Zoe	Girl	Blonde	4	Science	Red

Clue 1: Multiply Fractions

Solve the following problems.

The solution that occurs the most will give a clue about who found the missing ingredient.

$\frac{1}{5} \times 2 = \frac{\quad}{\quad}$	$\frac{2}{5} \times 1 = \frac{\quad}{\quad}$	$\frac{1}{4} \times 3 = \frac{\quad}{\quad}$
$\frac{5}{12} \times 2 = \frac{\quad}{\quad}$	$\frac{2}{10} \times 2 = \frac{\quad}{\quad}$	$\frac{2}{8} \times 3 = \frac{\quad}{\quad}$



$\frac{3}{4}$ The pupil doesn't have blonde hair.	$\frac{5}{6}$ The pupil doesn't have black hair	$\frac{2}{5}$ The pupil doesn't have brown hair

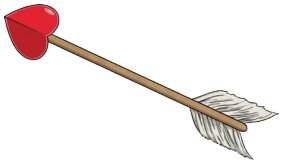
Clue 1: _____.

Clue 2: Mixed and Improper Fractions

Find a path through the maze by colouring in the matching mixed numbers and improper fractions.

The path will reveal a clue about the favourite subject of the person who found the sugar. Be careful - there are some tricks hidden in this maze!

START	$\frac{5}{3} = 1\frac{2}{3}$	$\frac{7}{4} = 1\frac{3}{4}$	$\frac{9}{5} = 1\frac{4}{5}$	$2\frac{2}{3} = \frac{7}{3}$
$\frac{12}{3} = 4$	$3\frac{1}{4} = \frac{13}{4}$	$6\frac{1}{2} = \frac{11}{2}$	$\frac{23}{5} = 4\frac{3}{5}$	$3\frac{5}{6} = \frac{23}{6}$
$3\frac{1}{5} = \frac{15}{5}$	$\frac{16}{3} = 5\frac{2}{3}$	$\frac{11}{5} = 2\frac{1}{5}$	$4\frac{3}{10} = \frac{34}{10}$	$8\frac{1}{2} = \frac{17}{2}$
$5\frac{3}{8} = \frac{43}{8}$	$\frac{11}{6} = 1\frac{5}{6}$	$4\frac{1}{8} = \frac{33}{8}$	$1\frac{11}{12} = \frac{23}{12}$	$\frac{17}{8} = 2\frac{1}{8}$
$4\frac{2}{3} = \frac{14}{3}$	$\frac{13}{3} = 4\frac{2}{3}$	$2\frac{7}{8} = \frac{21}{8}$	$1\frac{7}{12} = \frac{19}{12}$	$\frac{18}{5} = 3\frac{2}{5}$
$4\frac{7}{8} = \frac{39}{8}$	$2\frac{2}{3} = \frac{3}{8}$	$1\frac{1}{2} = \frac{3}{2}$	$\frac{16}{5} = 2\frac{1}{5}$	$\frac{10}{3} = 3\frac{1}{3}$
The pupil's favourite subject isn't maths.	The pupil's favourite subject isn't computing.	The pupil's favourite subject isn't science.	The pupil's favourite subject isn't English.	The pupil's favourite subject isn't music.



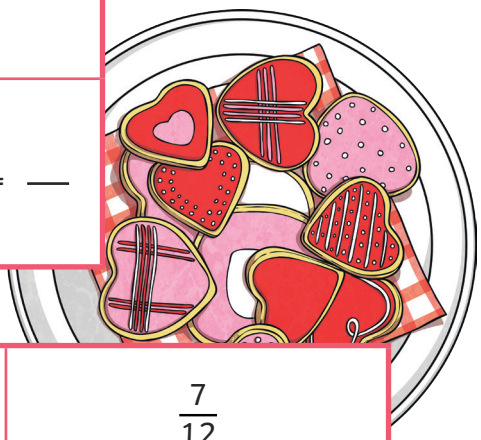
Clue 2: The pupil's favourite subject isn't _____.

Clue 3: Addition and Subtraction of Fractions

Find the answers to the calculations in the grid and cross them off.

The one **remaining** box will tell you a clue about the pupil who found the misplaced ingredient.

$\frac{3}{8} + \frac{1}{4} = \_\_$	$\frac{3}{5} + \frac{2}{10} = \_\_$
$\frac{3}{10} + \frac{2}{5} = \_\_$	$\frac{1}{3} + \frac{1}{4} = \_\_$
$\frac{3}{4} - \frac{3}{8} = \_\_$	$\frac{4}{5} - \frac{2}{10} = \_\_$
$\frac{11}{12} - \frac{1}{2} = \_\_$	$\frac{9}{10} - \frac{3}{5} = \_\_$



$\frac{5}{8}$ blue or yellow	$\frac{3}{5}$ green or pink	$\frac{7}{12}$ yellow or red
$\frac{3}{8}$ blue or green	$\frac{9}{10}$ pink or blue	$\frac{7}{10}$ red or green
$\frac{5}{12}$ pink or yellow	$\frac{3}{10}$ pink or red	$\frac{4}{5}$ green or yellow

Clue 3: The pupil who found the sugar has a favourite colour of _____

or _____.

Clue 4: Order Fractions

Here are sets of four fractions ordered from smallest to greatest. Highlight the sets of fractions that are ordered correctly.

The column with the most sets of fractions correctly ordered will tell you if the pupil who found the sugar is a boy or a girl.

	Girl	Boy
	$\frac{3}{8}, \frac{1}{2}, \frac{3}{4}, \frac{7}{8}$	$\frac{1}{2}, \frac{3}{4}, \frac{3}{8}, \frac{7}{8}$
	$\frac{1}{3}, \frac{2}{3}, \frac{4}{9}, \frac{8}{9}$	$\frac{1}{3}, \frac{4}{9}, \frac{2}{3}, \frac{8}{9}$
	$\frac{1}{5}, \frac{3}{10}, \frac{3}{5}, \frac{9}{10}$	$\frac{3}{10}, \frac{1}{5}, \frac{3}{5}, \frac{9}{10}$
	$\frac{1}{4}, \frac{1}{2}, \frac{5}{12}, \frac{7}{12}$	$\frac{1}{4}, \frac{5}{12}, \frac{1}{2}, \frac{7}{12}$
	$\frac{1}{3}, \frac{5}{12}, \frac{2}{3}, \frac{5}{6}$	$\frac{1}{3}, \frac{5}{12}, \frac{5}{6}, \frac{2}{3}$
Total		

Clue 4: The pupil who found the sugar is a girl / a boy .

(Circle the correct answer.)

Clue 5: Equivalent fractions

In each row, circle the fraction that is equivalent to the first fraction.

The column with the most correct answers will tell you which year group the pupil who found the missing ingredient is in.

$\frac{3}{4}$	$\frac{6}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{7}{8}$
$\frac{1}{6}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{1}{12}$	$\frac{2}{12}$
$\frac{3}{8}$	$\frac{8}{24}$	$\frac{9}{24}$	$\frac{10}{24}$	$\frac{7}{24}$
$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{5}{10}$	$\frac{7}{12}$
$\frac{3}{5}$	$\frac{5}{10}$	$\frac{5}{8}$	$\frac{6}{10}$	$\frac{7}{12}$
$\frac{3}{4}$	$\frac{12}{15}$	$\frac{11}{16}$	$\frac{10}{15}$	$\frac{12}{16}$
$\frac{12}{18}$	$\frac{9}{10}$	$\frac{2}{3}$	$\frac{6}{12}$	$\frac{3}{4}$
$\frac{15}{24}$	$\frac{5}{8}$	$\frac{4}{6}$	$\frac{2}{3}$	$\frac{7}{10}$
$\frac{3}{10}$	$\frac{9}{30}$	$\frac{7}{20}$	$\frac{10}{30}$	$\frac{5}{20}$
Year	3	4	5	6

Clue 4: The pupil who found the sugar is in year _____.

The pupil who found the shortbread sugar is: _____

The Mystery of the Missing Shortbread Sugar **Answers**

Clue 1: Multiply Fractions

$\frac{1}{5} \times 2 = \mathbf{\frac{2}{5}}$	$\frac{2}{5} \times 1 = \mathbf{\frac{2}{5}}$	$\frac{1}{4} \times 3 = \mathbf{\frac{3}{4}}$
$\frac{5}{12} \times 2 = \mathbf{\frac{5}{6}}$	$\frac{2}{10} \times 2 = \mathbf{\frac{2}{5}}$	$\frac{2}{8} \times 3 = \mathbf{\frac{3}{4}}$

$\frac{3}{4}$	$\frac{5}{6}$	$\mathbf{\frac{2}{5}}$
The pupil doesn't have blonde hair.	The pupil doesn't have black hair	**The pupil doesn't have brown hair**

Clue 1: The pupil doesn't have brown hair.

Clue 2: Mixed and Improper Fractions

START	$\frac{5}{3} = 1\frac{2}{3}$	$\mathbf{\frac{7}{4} = 1\frac{3}{4}}$	$\mathbf{\frac{9}{5} = 1\frac{4}{5}}$	$2\frac{2}{3} = \frac{7}{3}$
$\frac{12}{3} = 4$	$3\frac{1}{4} = \frac{13}{4}$	$6\frac{1}{2} = \frac{11}{2}$	$\mathbf{\frac{23}{5} = 4\frac{3}{5}}$	$\mathbf{3\frac{5}{6} = \frac{23}{6}}$
$3\frac{1}{5} = \frac{15}{5}$	$\frac{16}{3} = 5\frac{2}{3}$	$\frac{11}{5} = 2\frac{1}{5}$	$4\frac{3}{10} = \frac{34}{10}$	$\mathbf{8\frac{1}{2} = \frac{17}{2}}$
$\mathbf{5\frac{3}{8} = \frac{43}{8}}$	$\mathbf{\frac{11}{6} = 1\frac{5}{6}}$	$\mathbf{4\frac{1}{8} = \frac{33}{8}}$	$\mathbf{1\frac{11}{12} = \frac{23}{12}}$	$\mathbf{\frac{17}{8} = 2\frac{1}{8}}$
$\mathbf{4\frac{2}{3} = \frac{14}{3}}$	$\frac{13}{3} = 4\frac{2}{3}$	$2\frac{7}{8} = \frac{21}{8}$	$1\frac{7}{12} = \frac{19}{12}$	$\frac{18}{5} = 3\frac{2}{5}$
$\mathbf{4\frac{7}{8} = \frac{39}{8}}$	$2\frac{2}{3} = \frac{3}{8}$	$1\frac{1}{2} = \frac{3}{2}$	$\frac{16}{5} = 2\frac{1}{5}$	$\frac{10}{3} = 3\frac{1}{3}$
The pupil's favourite subject isn't maths.	The pupil's favourite subject isn't computing.	The pupil's favourite subject isn't science.	The pupil's favourite subject isn't English.	The pupil's favourite subject isn't music.

Clue 2: The pupil's favourite subject isn't **maths**.

Clue 3: Addition and Subtraction of Fractions

$\frac{3}{8} + \frac{1}{4} = \mathbf{\frac{5}{8}}$	$\frac{3}{5} + \frac{2}{10} = \mathbf{\frac{4}{5}}$
$\frac{3}{10} + \frac{2}{5} = \mathbf{\frac{7}{10}}$	$\frac{1}{3} + \frac{1}{4} = \mathbf{\frac{7}{12}}$
$\frac{3}{4} - \frac{3}{8} = \mathbf{\frac{3}{8}}$	$\frac{4}{5} - \frac{2}{10} = \mathbf{\frac{3}{5}}$
$\frac{11}{12} - \frac{1}{2} = \mathbf{\frac{5}{12}}$	$\frac{9}{10} - \frac{3}{5} = \mathbf{\frac{3}{10}}$

$\frac{5}{8}$ blue or yellow	$\frac{3}{5}$ green or pink	$\frac{7}{12}$ yellow or red
$\frac{3}{8}$ blue or green	$\mathbf{\frac{9}{10}}$ **pink or blue**	$\frac{7}{10}$ red or green
$\frac{5}{12}$ pink or yellow	$\frac{3}{10}$ pink or red	$\frac{4}{5}$ green or yellow

Clue 3: The pupil who found the sugar has a favourite colour of **pink** or **blue**.

Clue 4: Order Fractions

	Girl	Boy
	$\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{7}{8}$
	$\frac{1}{3}$, $\frac{2}{3}$, $\frac{4}{9}$, $\frac{8}{9}$	**$\frac{1}{3}$, $\frac{4}{9}$, $\frac{2}{3}$, $\frac{8}{9}$**
	$\frac{1}{5}$, $\frac{3}{10}$, $\frac{3}{5}$, $\frac{9}{10}$	$\frac{3}{10}$, $\frac{1}{5}$, $\frac{3}{5}$, $\frac{9}{10}$
	$\frac{1}{4}$, $\frac{1}{2}$, $\frac{5}{12}$, $\frac{7}{12}$	**$\frac{1}{4}$, $\frac{5}{12}$, $\frac{1}{2}$, $\frac{7}{12}$**
	$\frac{1}{3}$, $\frac{5}{12}$, $\frac{2}{3}$, $\frac{5}{6}$	$\frac{1}{3}$, $\frac{5}{12}$, $\frac{5}{6}$, $\frac{2}{3}$
Total	**3**	**2**

Clue 4: The pupil who found the sugar is **a girl** / a boy .

(Circle the correct answer.)

Clue 5: Party Bag Coordinates

$\frac{3}{4}$	**$\frac{6}{8}$**	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{7}{8}$
$\frac{1}{6}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{1}{12}$	**$\frac{2}{12}$**
$\frac{3}{8}$	$\frac{8}{24}$	**$\frac{9}{24}$**	$\frac{10}{24}$	$\frac{7}{24}$
$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	**$\frac{5}{10}$**	$\frac{7}{12}$
$\frac{3}{5}$	$\frac{5}{10}$	$\frac{5}{8}$	**$\frac{6}{10}$**	$\frac{7}{12}$
$\frac{3}{4}$	$\frac{12}{15}$	$\frac{11}{16}$	$\frac{10}{15}$	**$\frac{12}{16}$**
$\frac{12}{18}$	$\frac{9}{10}$	**$\frac{2}{3}$**	$\frac{6}{12}$	$\frac{3}{4}$
$\frac{15}{24}$	**$\frac{5}{8}$**	$\frac{4}{6}$	$\frac{2}{3}$	$\frac{7}{10}$
$\frac{3}{10}$	**$\frac{9}{30}$**	$\frac{7}{20}$	$\frac{10}{30}$	$\frac{5}{20}$
Year	**3**	**4**	**5**	**6**

Clue 4: The pupil who found the sugar is in year **3**.

The pupil who found the shortbread sugar is: **Ava**