M

Applying and Problem-solving

Number

Fractions

Making Blackberry Jam

The grading rubric assesses the student's performance in designing a label for **one jar of blackberry jam** and answering questions related to the approximate amount of blackberries, water, lemon juice, sugar, comparison to one cup, estimation of teaspoons of jam, and estimation of blackberries.

Element	h The learner	i The learner	j The learner	K The learner
Applying and problem-solving	Use fractions to solve more complex word problems and puzzles involving numbers and measures.	Completes problem-solving tasks involving fractions and measures, explaining methods and reasoning.	Solves problems involving proportions.	Solves problems involving changing ratios.

National Council for Curriculum and Assessment (2022, p. 58)

| Grading Rubric	What learners can typically do			
Applying and problem-solving	h The learner	i The learner	j The learner	K The learner
Label Design	The label is somewhat clear but lacks approximate amounts or is difficult to understand	The label is clear and includes some details	The label design is visually appealing and includes all important information	Clear and visually appealing label design Includes all necessary information Accurately lists the approximate amount of blackberries, water, lemon juice, and sugar in one jar of blackberry jam

Ingredients for 5 jars of jam:

- 8 cups of blackberries
- ½ cup water
- Juice of ¼ lemon
- 4 cups of sugar

Facts about jam.
- One cup of blackberries is approximately 150 grams.
- If you consider each blackberry to be a tablespoon of fruit, then about 16 blackberries are in a one cup serving.
- 500 g blackberries = approximately 2 ⅔ cups whole = approximately 400 ml (1 ⅔ cups), crushed.
- A typical jar of jam may contain anywhere from 40-60% sugar by weight. This means that a 28-gram serving of jam may contain approximately 10-15 grams of sugar, or 2.5 - 3.5 teaspoons.
- Generally the fruit-to-sugar ratio for traditional jams is 1:1 (ie. 450g sugar to 450g fruit).

Characteristics	Observations
Comparison to One Cup Correctly identifies whether one jar of jam contains more or less than one cup of blackberries Correctly identifies whether one jar of jam contains more or less than one cup of sugar	
Estimation of Teaspoons Provides a reasonable estimation of the number of teaspoons of jam in one jar Reasoning and calculations support the estimation	
Estimation of Blackberries Provides a reasonable estimation of the number of blackberries in one teaspoon of jam Reasoning and calculations support the estimation	
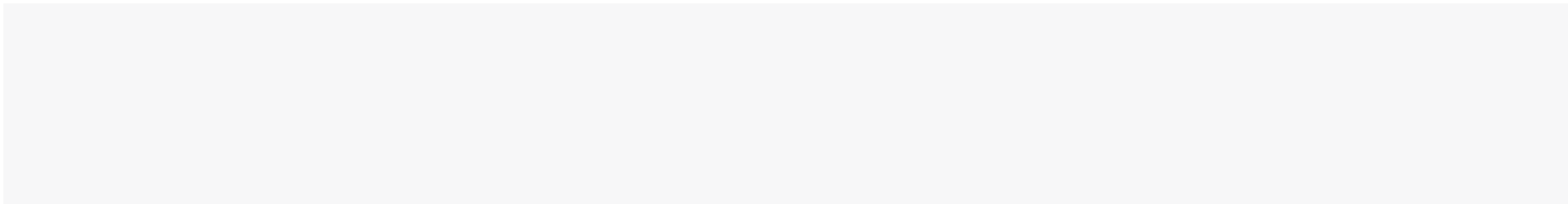
Student solution strategies: Calculate the quantity of ingredients required to make a specific number of jars of blackberry jam and determine the number of jars that can be made with a given amount of blackberries.

Characteristics	Criteria	Observations
Calculate the ingredients needed for different quantities of jars a) For 20 jars of jam: • Blackberries: 8 cups × (20 jars ÷ 5 jars) = 32 cups • Water: ½ cup × (20 jars ÷ 5 jars) = 2 cups • Lemon juice: Juice of ¼ lemon × (20 jars ÷ 5 jars) = 1 lemon's worth of juice • Sugar: 4 cups × (20 jars ÷ 5 jars) = 16 cups b) For 50 jars of jam: • Blackberries: 8 cups × (50 jars ÷ 5 jars) = 80 cups • Water: ½ cup × (50 jars ÷ 5 jars) = 5 cups • Lemon juice: Juice of ¼ lemon × (50 jars ÷ 5 jars) = 2.5 lemons' worth of juice • Sugar: 4 cups × (50 jars ÷ 5 jars) = 40 cups c) For 100 jars of jam: • Blackberries: 8 cups × (100 jars ÷ 5 jars) = 160 cups • Water: ½ cup × (100 jars ÷ 5 jars) = 10 cups • Lemon juice: Juice of ¼ lemon × (100 jars ÷ 5 jars) = 5 lemons' worth of juice • Sugar: 4 cups × (100 jars ÷ 5 jars) = 80 cups Determine the number of jars that can be made with 20 cups of blackberries:	I. Learners apply the rule of dividing by 5 to get ingredients for one jar and then multiplying by 20, 50, or 100. II. Learners are able to see the multiples of 5. So to get 20 jars they multiply by 4, 50 jars by 10 etc. III. Calculations using multiplication of fractions by a whole number.	

• Number of jars: 20 cups ÷ (8 cups ÷ 5 jars) = 12.5 jars (round down to the nearest whole number) The family can make approximately 12 jars of jam with 20 cups of blackberries.		
Calculate the number of jars of jam that can be made using 20 cups of blackberries • Number of jars: 20 cups ÷ 8 cups = 2.5 jars Since we cannot have a fraction of a jar, round down to the nearest whole number. The Berry family can make approximately 2 jars of jam using 20 cups of blackberries.	I. Attempt by doubling the quantity of jars and a little more II. Accurately calculates double of the quantity and four more jars. III. Calculates using fractions and/or decimals.	