

MAT.04.ER.3.000NF.F.210 Claim 3

Sample Item Id:	MAT.04.ER.3.000NF.F.210
Grade:	04
Primary Claim:	Claim 3: Communicating Reasoning Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
Secondary Claim(S):	Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.
Primary Content Domain:	Number and Operations—Fractions
Secondary Content Domain(S):	
Assessment Target(S):	3 F: Base arguments on concrete referents such as objects, drawings, diagrams, and actions. 1 F: Extend understanding of fraction equivalence and ordering.
Standard(S):	4.NF.1
Mathematical Practice(S):	1, 2, 3, 4, 7
DOK:	2
Item Type:	ER
Score Points:	4
Difficulty:	M
Key:	See Sample Top-Score Response.
Stimulus/Source:	
Target-Specific Attributes (E.G., Accessibility Issues):	
Notes:	Part of PT set

James and Benito each have a bag of pencils. Some pencils are sharpened and some are not.

James' bag of pencils has:

- A total of 5 pencils
- Exactly 2 sharpened pencils

Benito's bag of pencils has:

- A total of 10 pencils
- Exactly ___ sharpened pencils

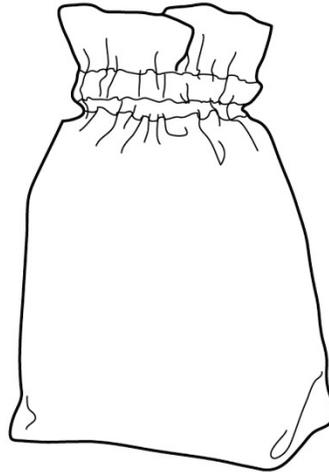
Benito has the same fraction of sharpened pencils in his bag as James has in his bag.

Part A

Exactly how many of Benito's pencils are sharpened?

Part B

In the space below, draw pictures of the pencils in James' bag and the pencils in Benito's bag. Use numbers to show the fractions of sharpened and unsharpened pencils in each bag.

James' BagFraction Sharpened: Fraction Unsharpened: **Benito's Bag**Fraction Sharpened: Fraction Unsharpened:

Part C

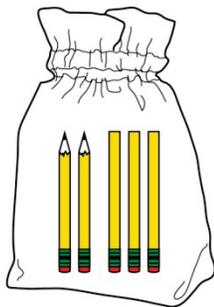
Benito's bag has a total of 10 pencils inside, and James' bag has a total of 5 pencils inside. How can the **fraction** of sharpened pencils in James' bag be the same as the fraction of sharpened pencils in Benito's bag, even though they have a different number of pencils? Explain your answer using both numbers and words.

Sample Top-Score Response:

Part A: 4

Part B:

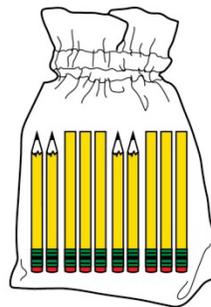
James' Bag



Fraction Sharpened: $\frac{2}{5}$

Fraction Unsharpened: $\frac{3}{5}$

Benito's Bag



Fraction Sharpened: $\frac{4}{10}$ (or $\frac{2}{5}$)

Fraction Unsharpened: $\frac{6}{10}$ (or $\frac{3}{5}$)

Part C:

A fraction describes a part out of the whole group. The fraction of sharpened

pencils in James' bag is $\frac{2}{5}$ or 2 out of 5 in the group. This is the same as the fraction of sharpened pencils in Benito's bag because the total number of pencils is 2 times more and the number of sharpened pencils is also 2 times more. When I divide Benito's pencils into fifths (like in James' bag), I see that there are two sets of fifths. Each set has 2 out of 5 pencils sharpened. So, even though the number of sharpened pencils in Benito's bag is 4, the fraction out of the whole group is the same as in James' bag.

Scoring Rubric:

Responses to this item will receive 0-4 points, based on the following:

- 4 points:** The student has a thorough understanding of equivalent fractions and modeling equivalent fractions with different denominators. The student correctly answered 4 for *Part A*. The student correctly modeled the fraction of sharpened pencils in each bag, along with including the correct fractions below each bag in *Part B*. The student described informally how equivalent fractions could be found by multiplying a/b by n/n in *Part C*.
- 3 points:** The student has a good understanding of equivalent fractions and modeling equivalent fractions with different denominators. The student correctly answered 4 for *Part A*. The student correctly modeled the fraction of sharpened pencils in each bag, along with including the correct fractions below each bag in *Part B*. The student's explanation may be incomplete or flawed when describing how equivalent fractions could be found by multiplying a/b by n/n in *Part C*. **OR** The student proceeded with a fraction other than $2/5$ for James' bag but correctly completed *Parts A, B, and C* accordingly.
- 2 points:** The student has a partial understanding of equivalent fractions and modeling equivalent fractions with different denominators. The student correctly answered 4 for *Part A*. The student correctly modeled most of the fractions of sharpened pencils in each bag, along with including corresponding fractions below each bag in *Part B*. The student made no attempt to explain how equivalent fractions could be found by multiplying a/b by n/n in *Part C*. **OR** The student proceeded with a number other than 4 in *Part A*, but answered *Part B* correctly using the other number in corresponding fractions, and *Part C* is incomplete. **OR** The student provided a good description of how equivalent fractions could be found by multiplying a/b by n/n in *Part C*, but left other parts of the problem incomplete.
- 1 point:** The student has little understanding of equivalent fractions and modeling equivalent fractions with different denominators. The student was able to complete part of the task correctly, but not enough to demonstrate knowledge of fractions or how similar fractions are related. **OR** The student proceeded with a fraction other than $2/5$ for James' bag and only answered 2 parts correctly.
- 0 points:** The student has no understanding of equivalent fractions and modeling equivalent fractions with different denominators. The student answered all parts incorrectly.