

Work Samples Classification and Commentaries

Task: Comparing Fractions, Grade 5

Important note: The teachers and project members that discussed these work samples were not always unanimous in their determinations of quality. Although we might even agree on what the student did do, did not do, and strengths of the argument, there were differences in how much “weight” people put on different strengths and weaknesses. Thus, two teachers might see the same things in the student work sample, but one might want to classify the argument as, say, adequate quality and the other as low quality. This points to the importance of professional *discussions* and talking through the work samples with colleagues. There is no one absolute answer to whether a student work sample is high, adequate or low. Rather, trying to do the categorization leads to important conversations and helps a group clarify strengths, weaknesses, and what we value. That said, the teams reviewing these work samples had focused on argumentation for a year and had some level of shared vision for this work which we think is helpful to share and is reflected in the commentaries.

A Key linking the work samples from this ordered set with the sorting packet appears at the end of the document.

Student A

Javier claims $\frac{1}{2} < \frac{3}{8}$. Do you agree or disagree and why?

We disagree because if you look at our picture it shows $\frac{3}{8}$ is less than $\frac{1}{2}$. If you ADD ONE MORE $\frac{1}{8}$ THEN IT WILL ~~BE~~ EQUAL $\frac{1}{2}$.

If you added 1 more $\frac{1}{8}$ to $\frac{4}{8}$ then it would be more than $\frac{1}{2}$.

Commentary

This argument is considered **High quality**.

The students' claim is that they disagree with Javier. They use a pictorial representation to show that $\frac{3}{8}$ is less than $\frac{1}{2}$. They explain in words that if they add $\frac{1}{8}$ to $\frac{3}{8}$ it would equal $\frac{1}{2}$.

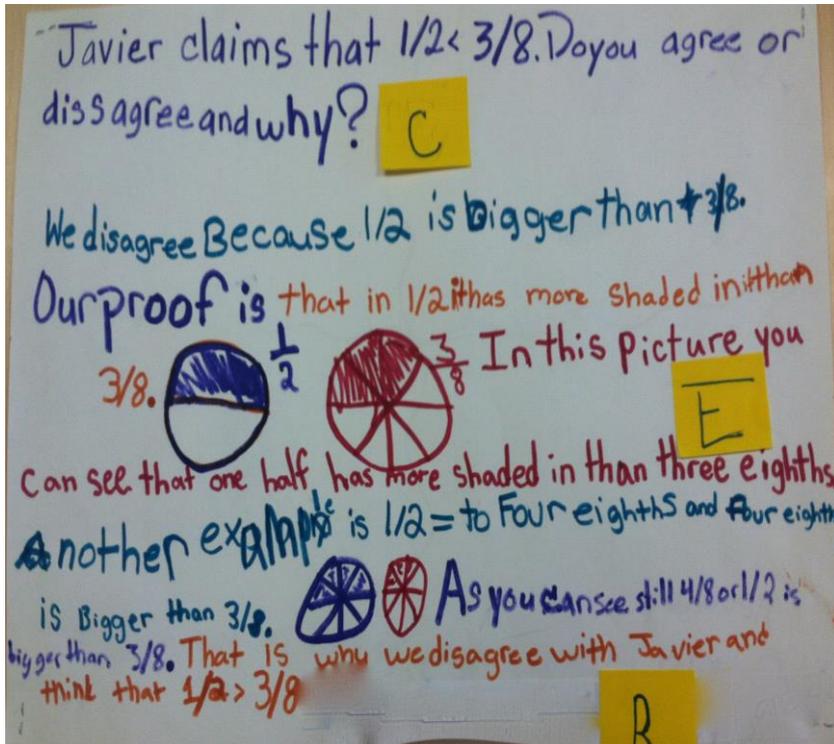
The response could be extended by including a statement explaining in words that $\frac{1}{2}$ and $\frac{4}{8}$ are equivalent fractions. The pictorial representation that compares $\frac{1}{2}$ and $\frac{5}{8}$ could be elaborated on to show the relationship with the comparison of $\frac{1}{2}$ and $\frac{3}{8}$.

Note: several students collaborated on the creation of this argument therefore it contains more than one way to support the claim but this is not necessary for a complete mathematical argument.

Argumentation Components

Claim	Evidence
The claim is clearly stated: "We disagree."	The students drew a pictorial representation of $\frac{1}{2}$ and $\frac{3}{8}$ and it clearly shows that $\frac{1}{2}$ has more shaded. They also included a pictorial representation of $\frac{1}{2}$ and $\frac{4}{8}$ to show equivalence. They then state that $\frac{3}{8}$ is $\frac{1}{8}$ less than $\frac{1}{2}$.
Warrants	Language & Computation
The students explicitly state that "If you add one more $\frac{1}{8}$ to $\frac{3}{8}$ then it will equal $\frac{1}{2}$."	All mathematical computations are correct and statements are true.

Student B



Commentary

This argument is categorized as **High quality**.

The students' claim is that they disagree with Javier. The students give two pieces of evidence and a warrant. The first piece of evidence is a pictorial representation of $1/2$ compared to $3/8$. The second piece of evidence is a picture that shows the comparison of $3/8$ and $4/8$, and a statement that $1/2 = 4/8$ and $4/8$ is bigger than $3/8$. The warrant, "As you can see still $4/8$ or $1/2$ is bigger than $3/8$," links back to the claim.

This response could be extended by including specific math vocabulary, and more precise language related to fractions (bigger = greater) Note: several students collaborated on this argument therefore there is repetitive information.

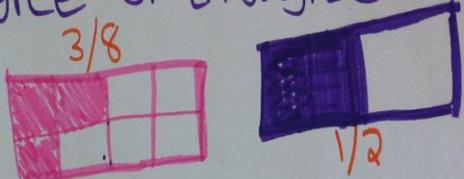
Argumentation Components

Claim	Evidence
The claim is stated "we disagree..."	The fraction $1/2$ is represented as an equivalent fraction with denominator of 8 as $4/8$. The students state that $1/2$ is greater than $3/8$ as a result of comparing $4/8$ and $3/8$. Pictures are used to show the equivalence and the comparison.
Warrants	Language & Computation
The students explicitly state that $1/2$ is bigger than $3/8$ because $4/8$ (which is equivalent to $1/2$) is bigger than $3/8$.	Explanations of diagrams are accurate and grade level appropriate.

Student C

Javier Claims that $1/2 < 3/8$.
Do you agree or disagree and why?

C started



$3/8$ $1/2$

We disagree with Javier because ^{five} $1/2$ and $3/8$ in equivalent fractions and it was $1/2$ changed to $4/8$ and $3/8$ stayed the same and $4/8$ was bigger than $3/8 < 1/2$.

We also disagree because $1/2$ could be half of anything like 100,000,000 and $1/2$ is just $50,000,000$.

We disagree with Javier because we think $3/8$ is less and $1/2$ is more because $3/8$ is not even equal yet because if you change the 3 to a 4 it would be equal.

We disagree because if you have 1 whole and put $1/2$ on the 1 whole that will be more covered than $3/8$ on 1 whole.

R is missing

Commentary

This argument is categorized as **Adequate quality**.

The students' claim is that they disagree with Javier. They use a pictorial representation to show that $3/8$ is less than $1/2$. They also explain using words that $3/8$ is less than $1/2$ when compared to one whole.

The argument could be strengthened by combining the ideas presented in all bullets but the second one. The pictorial representation communicates the ideas in a clear manner, but could be strengthened by showing eights in the picture representing $1/2$.

It is unclear why the students have the second bullet point. It should be omitted as it does not connect well with the rest of the pieces in this argument and shows a misunderstanding.

Argumentation Components

Claim	Evidence
The claim is clearly stated: "We disagree with Javier."	The students show a pictorial representation of $1/2$ and $3/8$, and the picture clearly shows that $1/2$ has more shaded. They then state that if you consider $1/2$ as $4/8$, then it is clear that $3/8$ is less than $1/2$ or $4/8$.
Warrants	Language & Computation
The warrants are implicit in the use of equivalent fractions and relying on areas to compare the values of the fractions.	With the exception of the second and third bullet points, all mathematical computations and statements are true. The third bullet needs to be polished and the second bullet shows a misconception.

Student D



Commentary

This argument is considered **Adequate quality**.

The students claim that they disagree with Javier and use a model as evidence to communicate reasoning. The students show each fraction as part of a circle. The student shows understanding of the equivalence between $1/2$ and $4/8$ and use appropriate labels and vocabulary to represent each fraction (as part of a whole circle) correctly, as well as equivalence. However, the students need a stronger connection between the visual pictures and state an explicit warrant that does not rely on the cookie story. The visual implies that $1/2$ is greater than $3/8$, but the link between the two visuals is missing (that $3/8$ is $1/8$ less than $4/8$). In regards to the warrant, the explanation does not link directly to the visual evidence, and is open for misinterpretation.

Argumentation Components

Claim	Evidence
The claim is stated "we disagree with Javier".	Students use diagrams to compare the two fractions. Each fraction is accurately represented visually and is correctly labeled. Pictures are used to show that $1/2$ is greater than $3/8$ which support the claim.
Warrants	Language & Computation
The implicit warrant is offered in the form of a story about cookies.	The visual representations are labeled correctly using appropriate mathematical vocabulary such as equivalent fraction. However, the cookie explanation is unclear, and could be interpreted incorrectly.

Student E

Javier claims that $\frac{1}{2} < \frac{3}{8}$. Do you agree or disagree and why?

We disagree because the denominator in $\frac{1}{2}$ is smaller than the denominator in $\frac{3}{8}$, so the smaller the denominator is the bigger the peices are. Also if you make two circles and one of them is shaded in $\frac{1}{2}$ and the other is $\frac{3}{8}$ $\frac{1}{2}$ has more of the circle shaded in than $\frac{3}{8}$.

R is missing

so one half is greater than $\frac{3}{8}$.

C started

E

Commentary

This argument is categorized as **Low quality**.

The students' claim is that they disagree with Javier. They correctly use a pictorial representation to show that $\frac{3}{8}$ is less than $\frac{1}{2}$. However, the argument needs to be strengthened by clarifying the first statement, where they focus solely on the denominators to compare the fractions. This focus on denominators may indicate a misunderstanding of how fractions should be interpreted.

The argument could be strengthened by better supporting the sole focus son denominators. For example, students could use the equivalency between $\frac{1}{2}$ and $\frac{4}{8}$ and relating that back to $\frac{3}{8}$. In addition, more accurate mathematical vocabulary could make the reasoning clearer.

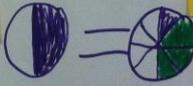
Argumentation Components

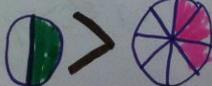
Claim	Evidence
The claim is stated: "We disagree."	The students show a pictorial representation of $\frac{1}{2}$ and $\frac{3}{8}$. They explain that one half of the circle covers more area than $\frac{3}{8}$.
Warrants	Language & Computation
The warrant for the beginning sentence relies on the comparison of the denominators, which does not completely support the argument. The warrant related to the picture is missing.	The first sentence is inaccurate. Language used to describe the pieces is vague: "bigger pieces". Similarly for the description of the shaded areas "more of the circle shaded".

Student F

Javier claims that $\frac{1}{2} < \frac{3}{8}$. Do you agree or disagree?

C We disagree with Javier because $\frac{1}{2}$ would be equivalent to $\frac{4}{8}$, not $\frac{3}{8}$. We think that $\frac{3}{8}$ would be the smaller fraction.

R 

E 

Commentary

This argument is considered **Low quality**.

This student's claim is that they disagree with Javier, and support this claim with the statement that $\frac{1}{2}$ would be equivalent to $\frac{4}{8}$, not $\frac{3}{8}$. There is no comparison made between $\frac{1}{2}$ and $\frac{3}{8}$ other than that they are not equivalent. There is not enough justification to support that $\frac{3}{8}$ is the **smaller** fraction due to the relationship of $\frac{4}{8}$ and $\frac{1}{2}$.

The students provide visual representations (without labels) that imply an understanding but this is not linked back to the claim.

The argument could be strengthened by noting how equivalent fractions and the comparison of $\frac{4}{8}$ and $\frac{3}{8}$ can be combined to support their statement that $\frac{3}{8}$ is smaller, or by explaining how the visuals to support the statement.

Argumentation Components

Claim	Evidence
The claim is stated: "We disagree with Javier."	Students offer two visual representations: one that shows $\frac{1}{2}$ as equivalent to $\frac{4}{8}$, the other that shows that $\frac{1}{2}$ is bigger than $\frac{3}{8}$. Students also state that $\frac{1}{2}$ is equivalent to $\frac{4}{8}$.
Warrants	Language & Computation
Warrant is " $\frac{1}{2}$ would be equivalent to $\frac{4}{8}$, not $\frac{3}{8}$ ". However, this is not sufficient.	Further explanation is necessary to make the reasoning clearer. Visuals are missing appropriate labels and sufficient support.

Key Connecting Sorting Packet to Argumentation Resource Packet

Student number (Soring Packet)	Resource Packet Sample
1	C (Adequate)
2	D (Adequate)
3	A (High)
4	B (High)
5	E (Low)
6	F (Low)

Student number (Soring Packet)	Resource Packet Sample (category)
3	A (High)
4	B (High)
1	C (Adequate)
2	D (Adequate)
5	E (Low)
6	F (Low)