

About the Discourse Strategy: Always, Sometimes, Never

Purpose: To encourage students to examine absolute statements and generalizations while using evidence to support their position

Always, Sometimes, Never is a tool to help students:

- Prove or disprove a conjecture
- Use evidence and examples to support their ideas
- Recognize, develop, and dispute generalizations

Helpful Hint:

- Make sure that students share and respond to each other's arguments

Source: http://carmelarchimedesmathshub.org.uk/wp-content/uploads/2016/08/07-always_sometimes_never_true.pdf

Engaging with the Discourse Strategy

Decide if the following statements are true ALWAYS, SOMETIMES, or NEVER. Defend your response.

The sum of three consecutive numbers is divisible by 3

If the area of a shape decreases, so does the perimeter

50% is less than 75%

The graph of a linear function will intersect the x-axis and the y-axis

The Discourse Strategy + Language

How does this Discourse Strategy support expressive (active) language/discourse ?	How does this Discourse Strategy support receptive language/discourse ?

About the Discourse Strategy: Fermi Questions

Purpose: Fermi questions are estimation problems that foster quantitative understanding of the world around us and encourage creativity, communication, collaboration, and the ability to clearly identify initial assumptions. Discussion around this type of question is particularly effective when it highlights the weight that our assumptions have on the answer and the way modifying such assumptions affects our results.

Source: <https://www.nctm.org/Publications/Mathematics-Teaching-in-Middle-School/Blog/Making-Sense-with-Fermi-Problems/>

Resource:

- Fermi question could be posed as “question of the week”. Have students work on the question as the “Do Now” each day for the week
- [Fermi Questions Activity Bank](#)

Engaging with the Discourse Strategy

Choose one of the following problems to investigate with a partner or a group:

1. How many grains of rice are eaten in China each year?
2. How many semi trailer loads of bottled water (16.9 fl. oz.) were needed by New Orleans refugees in the week following Hurricane Katrina?
3. How many balloons will it take to fill the room we’re in right now?

As you work towards a solution, keep a running record of the questions you needed to ask in order to solve the problem. Additionally, keep track of the approximation, derived values, and reasoning for these values.

The Discourse Strategy + Language

How does this Discourse Strategy support expressive (active) language /discourse?	How does this Discourse Strategy support receptive language /discourse?

About the Discourse Strategy: Fraction Talks

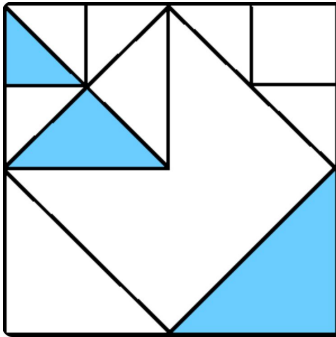
Purpose: To encourage whole class discussions and student actions while engaging in meaningful discourse. Fraction Talks can become a daily routine, or used for entire lessons.

Helpful Hints:

- Structure like a number talk.
 - Project an image
 - Choose a section to be shaded
 - Ask students, "What fraction is shaded?"
 - Students develop an answer (and reasoning) individually, and signal to me when they are done (usually with a thumbs up).
 - Extend invitations to share.

Source: <http://fractiontalks.com/>

Engaging with the Discourse Strategy



What fraction of the area is shaded blue? _____

Can you shade exactly one-quarter of the shape? _____

What other possible fractions can be shaded? _____

The Discourse Strategy + Language

How does this Discourse Strategy support expressive (active) language /discourse?	How does this Discourse Strategy support receptive language /discourse?

About the Discourse Strategy: I Notice... I Wonder...

Purpose: To create a safe environment where students focus on sharing their thoughts without pressure to answer or solve a problem.

Noticing and wondering is a tool to help students:

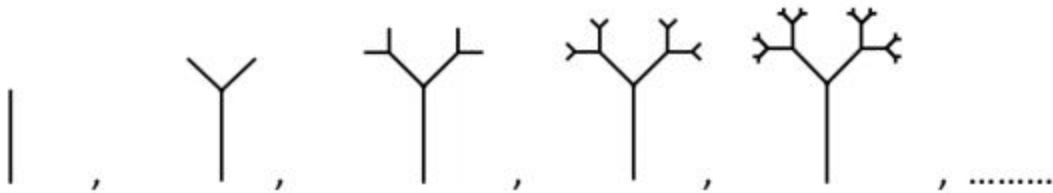
- Understand the story, the quantities, and the relationships in the problem
- Understand what the problem is asking and what the answer will look like
- Have some ideas to begin to solve the problem

This means that at the end of a noticing and wondering session, students should be able to:

- Tell the story of the problem in their own words.
- Give a reasonable estimate or high and low boundaries for the answer.
- Work independently on carrying out steps or generating more data toward solving the problem.

Source: <https://www.nctm.org/Classroom-Resources/Problems-of-the-Week/I-Notice-I-Wonder/>

Engaging with the Discourse Strategy



List at least 5 things you notice about this pattern.

List at least 5 things you wonder about this pattern.

The Discourse Strategy + Language

How does this Discourse Strategy support expressive (active) language /discourse?	How does this Discourse Strategy support receptive language /discourse?

About the Discourse Strategy: If I Only Had One Question

Purpose: Used as a partner quiz where each pair is allowed to ask the teacher just one question. This strategy builds students' ability to ask good questions, while, more importantly, promoting student-student discourse.

Protocol:

1. **Partner** - Partners may work ONLY with each other
2. **One Question** - Each team is allowed to ask the teacher exactly one question during the quiz
3. **Revision** - Partnerships work on their quizzes on Day 1, then submit both copies for teacher input. The teacher selects one quiz and provides feedback to provoke further discussion during Day 2 without guiding the students directly

Source:

<https://www.nctm.org/Publications/mathematics-teaching-in-middle-school/2006/Vol12/Issue4/If-I-Only-Had-One-Question-Partner-Quizzes-in-Middle-School-Mathematics/>

Engaging with the Discourse Strategy

1. How much would it cost to make 30 hamburger patties with ground beef purchased from Streamline? Show your work.

$$\begin{array}{r} 19.75 \\ + 10.43 \\ \hline 30.18 \end{array}$$

2. How much would 30 hamburgers cost at Bulky's? Show your work.

$$\begin{array}{r} 1.49 \\ \times 20 \\ \hline 29.80 \end{array}$$

3. Which store offers the better buy for cola? Explain.

6 cans - 1.99 12 cans = 3.98 18 cans = 5.97 24 cans = 7.95
24 cans - 6.99 48 cans = 13.98 - 29 cans better deal

4. You need to purchase enough hamburger buns to make 30 sandwiches. Buns come in packages of 8 or 12, depending where you shop. Where would you purchase the buns, and how much would they cost? Explain.

8 buns = 1.49 24 buns = 4.47
12 buns = 2.09 24 buns = 4.18
Bulky's has the better deal.

5. The meal at the picnic will include:

- One 12-ounce can of cola
- One hamburger with bun
- One small bag of potato chips (10.5 ounce bag)

The school cafeteria donated mustard, ketchup, relish, onions, paper plates and napkins.

The students will buy each item at whichever store has the best price.

There are 30 people attending the picnic.

How much should the students charge each person in order to cover the food expenses? Show how you determined the amount.

colas = 24 pack 2 packs = 29¢ per person
hamburgers = 25¢ per person
11.97 Patties = 66¢

$$\begin{array}{r} 29 \\ 25 \\ 66 \\ + 93 \\ \hline 213 \end{array}$$

Fig. 6 Charlotte and Pam's initial work on the partner quiz

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8 x 4 = 32 = \$5.96
you'd have 2 buns left over from streamline for \$5.96, and you'd have 6 leftovers for \$6.27. So streamline is the better deal because you have little leftover for a cheaper price.

5 colas - 29¢ per person - 2 packs
buns - 25¢ per person - 4 packs
patties - 66¢ per person - 3 packs
chips - 4 packs - 93¢

\$2.13 is price per person

$$\begin{array}{r} 29 \\ 25 \\ 66 \\ + 93 \\ \hline 213 \end{array}$$

Fig. 7 Charlotte and Pam's revisions

Reflect on Charlotte and Pam's initial and revised work.

-What evidence do we have that they engaged in meaningful student discourse?

About the Discourse Strategy: Which One Doesn't Belong?

Purpose: To create a safe environment where students focus on similarities and differences while sharing their thoughts without pressure to have the “correct” answer

Which One Doesn't Belong is a tool to help students:

- Identify and explain similarities and differences
- Use reasoning and relationships to make connections among mathematical representations
- Engage with a visual and reference the visual when giving an oral explanation

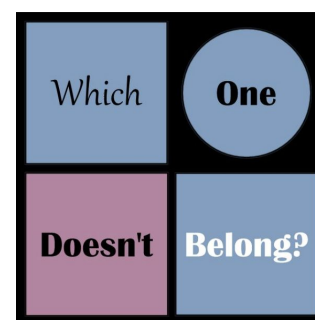
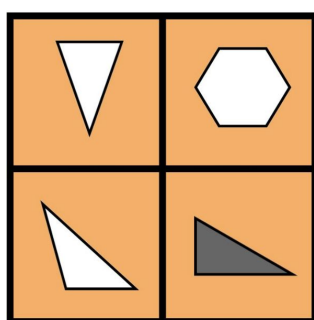
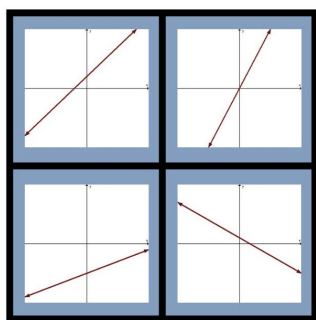
Helpful Hints:

- Each object in a set has at least one reason not to belong—there is not one right answer
- Accept all responses
 - It is expected that students notice properties they can describe, but not name precisely
- Have students test their ideas with a neighbor before needing to share with the large group
- Have students build their own

Source: <http://wodb.ca/index.html>

Engaging with the Discourse Strategy

For each set, justify why one image “doesn’t belong”.



The Discourse Strategy + Language

How does this Discourse Strategy support expressive (active) language /discourse?	How does this Discourse Strategy support receptive language /discourse?

The Discourse Strategy + Mathematical Content

What conceptual understanding does this DS support and/or solidify?

The Discourse Strategy Framework

Goal: Use this strategy to build student mathematical identity, sense of belonging in the math class and open spaces for all students to talk-think-learn!

HOW would you decide if this strategy meets the needs of all your students?

WHEN would you decide to use strategy to meet the needs of all your students?

WITH WHOM would you use this strategy to meet the needs of all your students?

Goal: Use this strategy to create an equitable mathematics classroom by providing access to all learners.

In what ways does this discourse strategy give access for all students to develop a sense of belonging in your math classroom?

How might this DS support an advanced and a struggling student share his/her thinking?

How might this DS support give access to all learners?