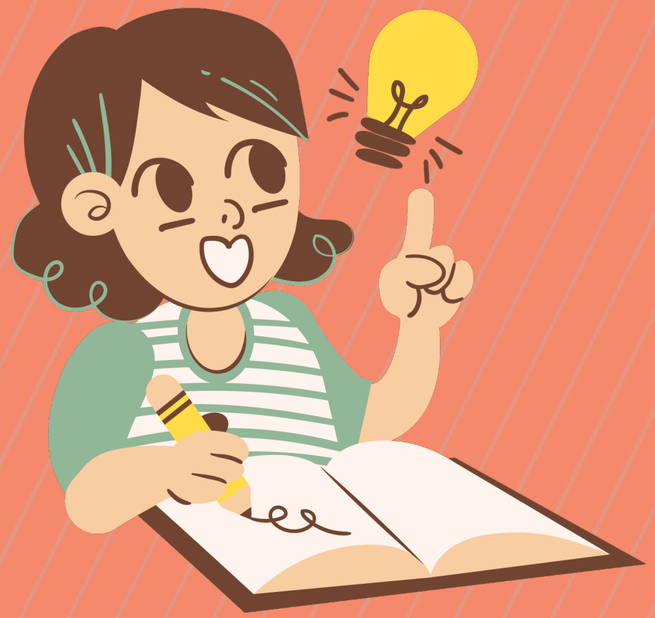
Lesson 02

Uncover the Language of Math

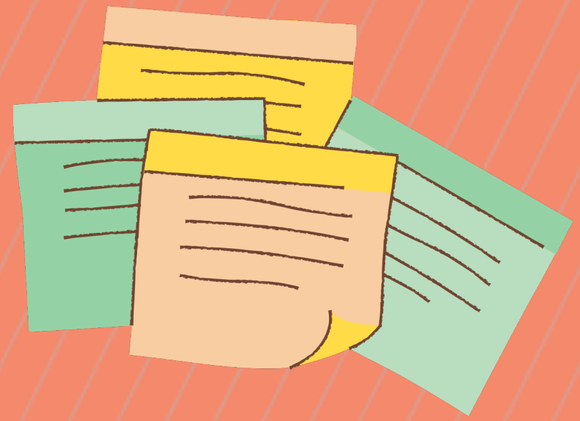
WITH ANN DECHENNE

Class Objectives

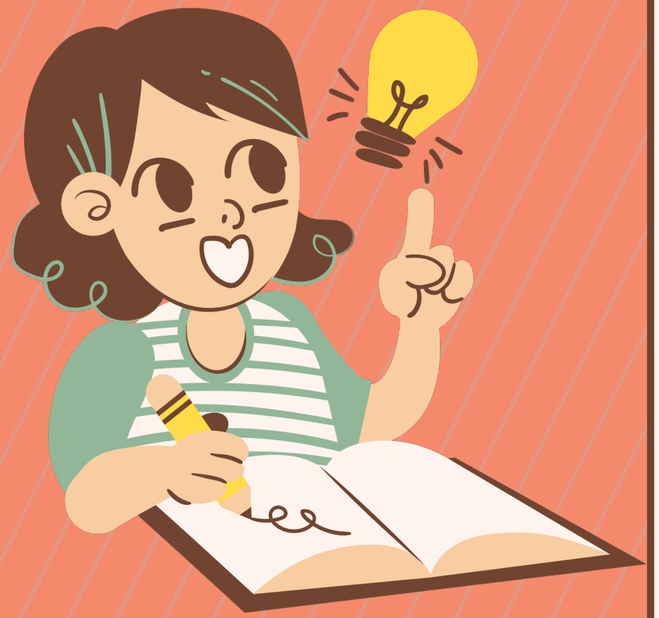


OBJECTIVE 1

Students will learn to identify a language function and explain why it is important.

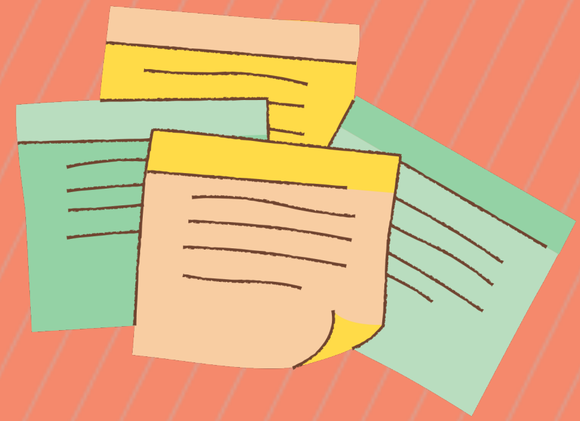


Class Objectives

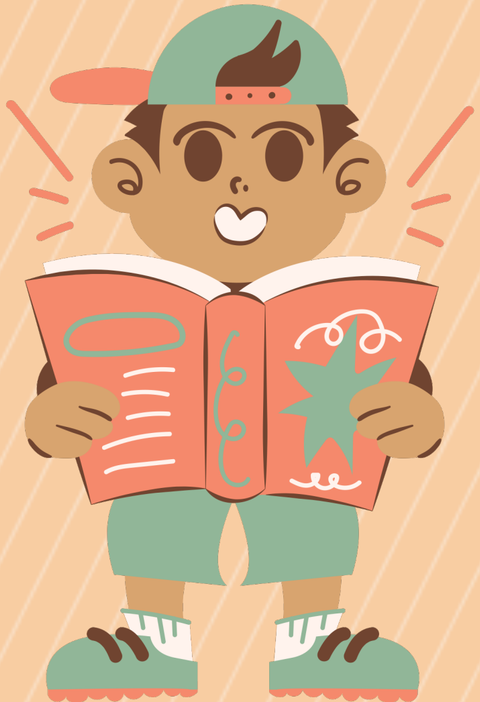


OBJECTIVE 1

For the purposes of this course I will use the word **purpose** in place of the word function. A math teacher friend of mine suggested it would serve better than function as function could be confused with the mathematical term function.



Language
*Purpose Defined



Definition

A language purpose is what we DO with the language to engage in our work, discussions, school content, etc.

In terms of school and content, the language purpose is what the standard, or you, as the teacher, is asking the student to do.

Often purposes overlap, as you will see in the coming slides.

Purposes

There are so many purposes available that it can be overwhelming. I like to stick with **5** general purposes: **Cause and Effect, Compare and Contrast, Argument and Support, Sequence, and Description and Elaboration.**

Cause and Effect

Aim

When one thing prompts another to occur, there is a cause-and-effect link between the two.

Cause and effect is often implied in math. You add A to B and get C. The language becomes apparent in story problems and when students are asked to discuss their work.

Cause and Effect

Example

Dependent and independent variables are prime examples of cause and effect.

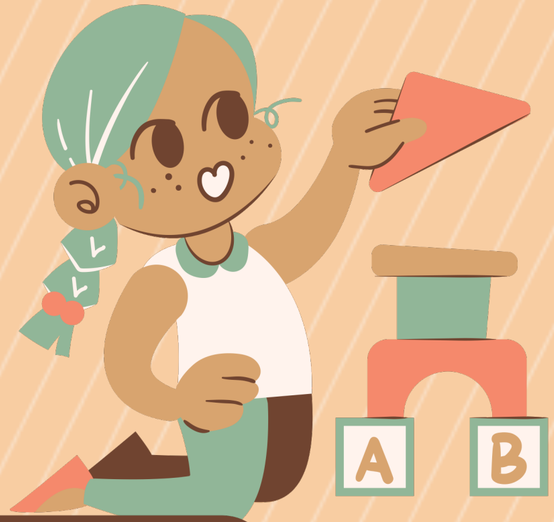
Y=Dependent or effect with X=Independent or cause.

Y is a function of X

How much you pay for rent (Y) is a function of housing prices (X).

Your cost of rent is a function of housing prices

_____is a function of _____

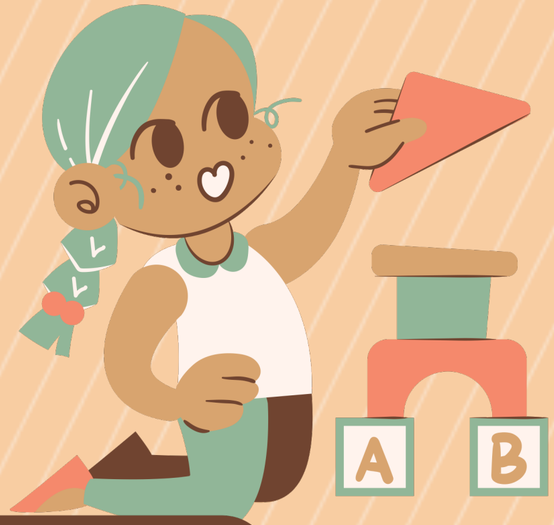


Compare & Contrast

Aim

When you are looking for how things are the same, you are comparing.
When you are looking for ways, things are different that would be contrasting.

Often students hear “compare and contrast” but only ever compare, but they are two separate ideas.



Compare & Contrast

Example

Let's go with something simple for compare and contrast, such as squares and rectangles. Squares have 4 sides that are the same size. Rectangles have 2 short sides and 2 longer sides.

A and B are comparable, while C is different.

_____ and _____ are comparable while ___ is different.

A

B

C

Argument & Support

Aim

Argument and support could be any purpose requiring someone to state something and then provide evidence or support to back up their statement. In math, the word proof comes to my mind. When you, as a teacher, ask your students to justify their answers, you are asking them to provide support for their decision. This is the perfect purpose for mathematics, especially with current trends towards using math in authentic contexts, STEM, and discourse in the math classroom. I am a fan.

Argument

&

Support/Justification

Example +

In mathematics, teachers should push students to think beyond just getting the correct answer; in order to get the proper solution, students must comprehend the steps involved and the underlying ideas.

In the description and elaboration section, there will be a slide that provides some sentence starters to assist students with expressing their arguments and support.

Argument

&

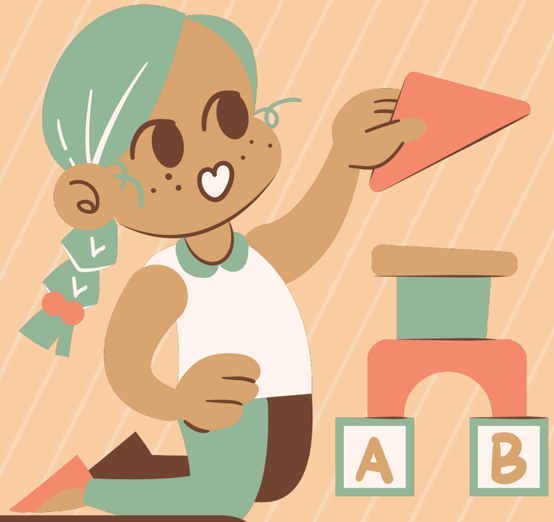
Support/Justification

Example +

The justification or support for the answer can come in many forms.

A student may use a sequencing method: First, I ____, and I came up with ____, then I ____, and finally _____, which is the answer.

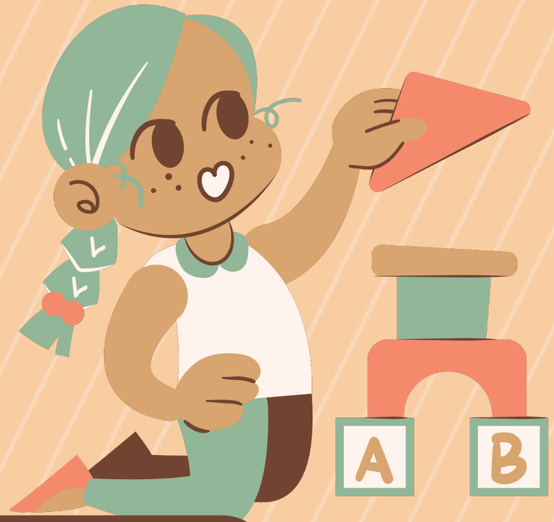
Or maybe a compare and contrast method: ___ and ___ meet the criteria, but ___ doesn't, so therefore_____.



Sequence

Aim

Sequencing can be used in many different ways, such as explaining steps toward solving a problem or providing justification for an answer. While there are many sequences in mathematics, for the purposes of this course, we will be looking at simple sequencing. Sequencing is all about one thing following another, first, second, next, then, after, finally, etc.



Sequence

Example +

Knowledge of sequencing language can aid students in explaining their process and justifying their answers. Knowledge of sequencing language can also assist with comprehension. The steps to solve the problem are A then B, next C, and finally D.

I was able to find my answer by following the sequence A, then B, next C, and finally D.

First I _____ then_____ that led me to____.

Description & Elaboration

Aim

Description and elaboration are all about expanding on an idea or sentence. Students often struggle with more than simple sentences. For example: How was your day? Fine. In math, when asking students to describe how they came up with the answer or how they would complete the project, students sometimes need a little assistance with language.

___has ___and _____.

Description & Elaboration

Example

Description and elaboration can be used to support all the purposes. All word problems contain descriptions. As a teacher, you can ask students to use elaboration to explain their thinking.

EX: You have a baseball card purchased for 5 dollars in 2005 and has appreciated 5% yearly. Find the value of the card 25 years later. After finding the answer turn to an elbow partner and describe how you came up with your answer.

Can you elaborate...

What do you mean by...

Can you be more specific...

I wonder if...

Can you clarify the part about...

How so...

I think it means that...

In other words....

I believe that...

It is important because...

Indicator Words

however, but, unlike, similarly, produced, share the same, just like, on the other hand, yet, as opposed to, just as

Compare and Contrast

found, revealed, led to, resulted in, due to, it follows that, because, if...then, as a result of

Cause and Effect

I think, I believe, in my opinion, claim, position, view, according to, in fact, argues against/in favor of, supports the position

Argument and Support

Indicator Words

described as, contain, have, has, is, are, include, defined by, indicates, characterized by, for example, associated with, belongs, exhibits

Description and Elaboration

before, after, meanwhile, later eventually during, since, next, first, second, since, ultimately, finally

Sequence

If you google any of the functions you should find multiple lists of words that can be used and taught.

There is more

Class Recap

POINT 1

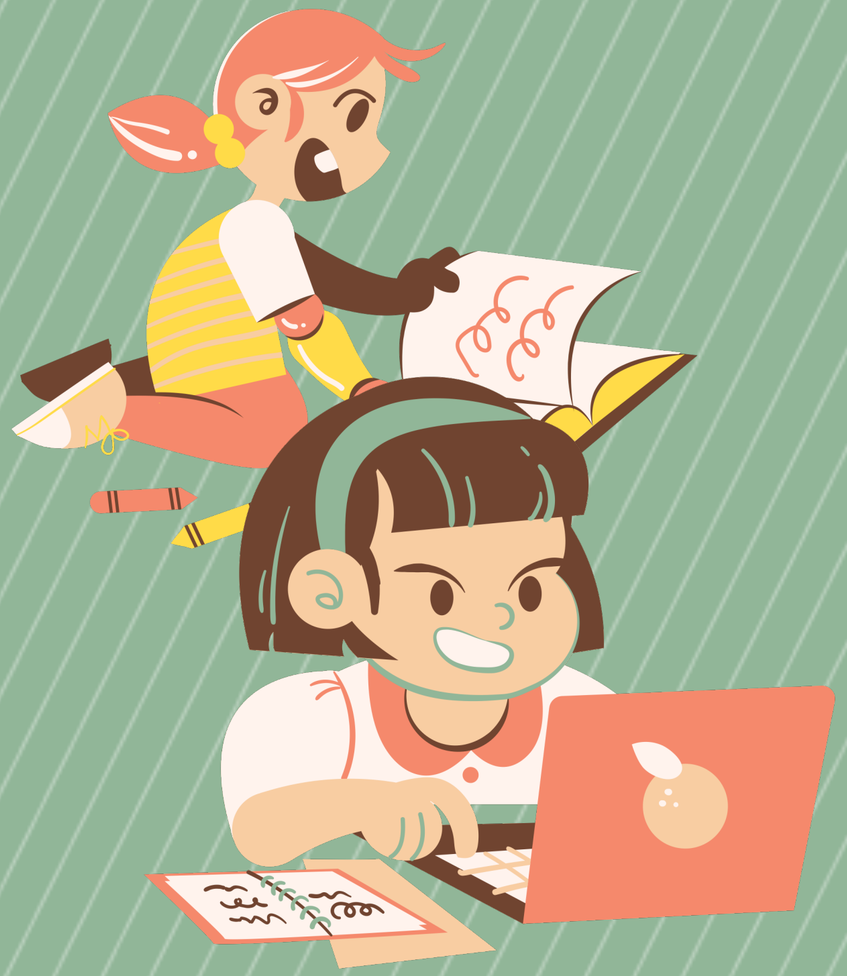
Language purpose is what we DO with the langauge.

POINT 2

There are many language purposes, but the mains ones covered here are Cause and Effect, Compare and Contrast, Argument and Support, Sequence, and Description and Elaboration

POINT 3

Lesson 3 will focus on how to identify the langauge purposes of the math standards.



Homework

Please reflect on the presentation and the reading. Why is the purpose of language important especially in math? Was anything presented a surprise or did you have an 'aha' moment? (1-3 paragraphs)

Additional Resources

https://sites.google.com/site/teachingthinking2010/cause-effect-in-math

Thank You

IF YOU HAVE ANY QUESTIONS, PLEASE FEEL FREE TO CONTACT ME AT:

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