



Making Meaning

USING READING
COMPREHENSION
STRATEGIES TO ENHANCE
MATHEMATICAL
UNDERSTANDING

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Why Reading Strategies?

What do
readers do to
promote their
understanding?

Characteristics of Readers	Characteristics Mathematicians

Characteristics of Readers	Characteristics of Mathematicians
They call upon their prior knowledge to make meaning from text.	They call upon prior knowledge to understand concepts and solve problems.
They are fluent readers.	They are procedurally fluent.
They have a mental image of what they are reading.	They create multiple representations of mathematics concepts and problems.
They use multiple strategies to understand and interpret text.	They use multiple strategies to understand concepts and solve problems.
They monitor their understanding as they read.	They monitor their understanding as they solve problems.
They can clearly explain their interpretation of the text to others.	They can clearly explain their mathematical thinking to others.



The Seven Comprehension Strategies

(Keene and Zimmerman, 2006)

1. Making Connections
2. Asking Questions
3. Visualizing
4. Making Inferences
5. Determining Importance
6. Synthesizing
7. Monitoring Meaning

Mathematicians as Readers (Lent, 2010)

When mathematicians read, they...

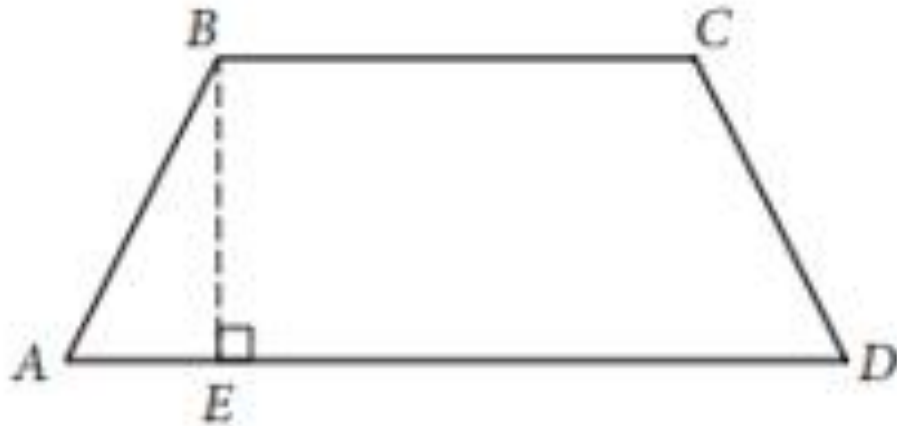
- Use information to piece together a solution
- Look for patterns and relationships
- Decipher symbols and abstract ideas
- Ask questions
- Apply mathematical reasoning

PSAT 8/9 Math Question

In a certain game, a player can solve easy or hard puzzles. A player earns 30 points for solving an easy puzzle and 60 points for solving a hard puzzle. Tina solved a total of 50 puzzles playing this game, earning 1,950 points in all. How many hard puzzles did Tina solve?

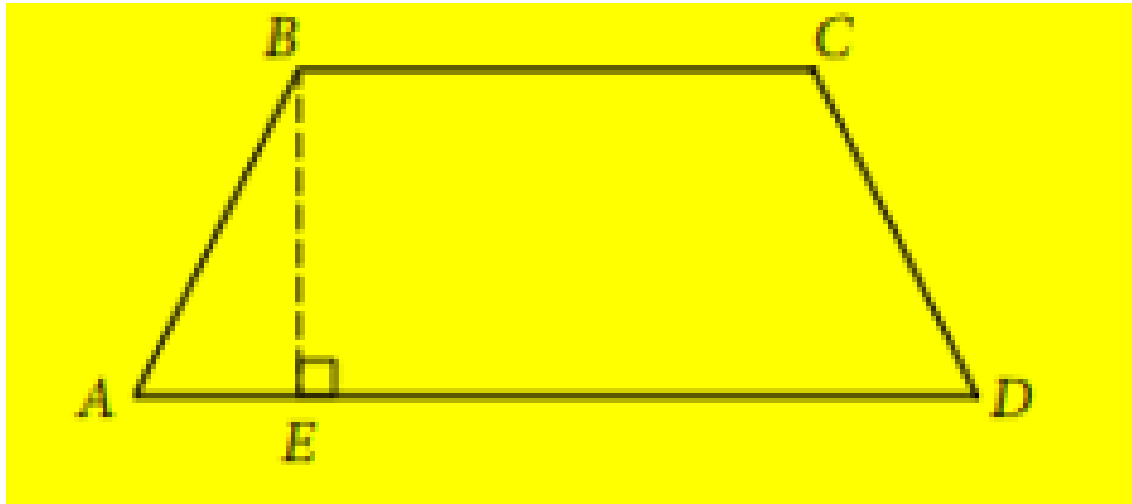
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PSAT 8/9 Math Question

In quadrilateral $ABCD$ above, \overline{BC} is parallel to \overline{AD} , and $AB = CD$. If BC and AD were each doubled and BE was reduced by 50 percent, how would the area of $ABCD$ change?

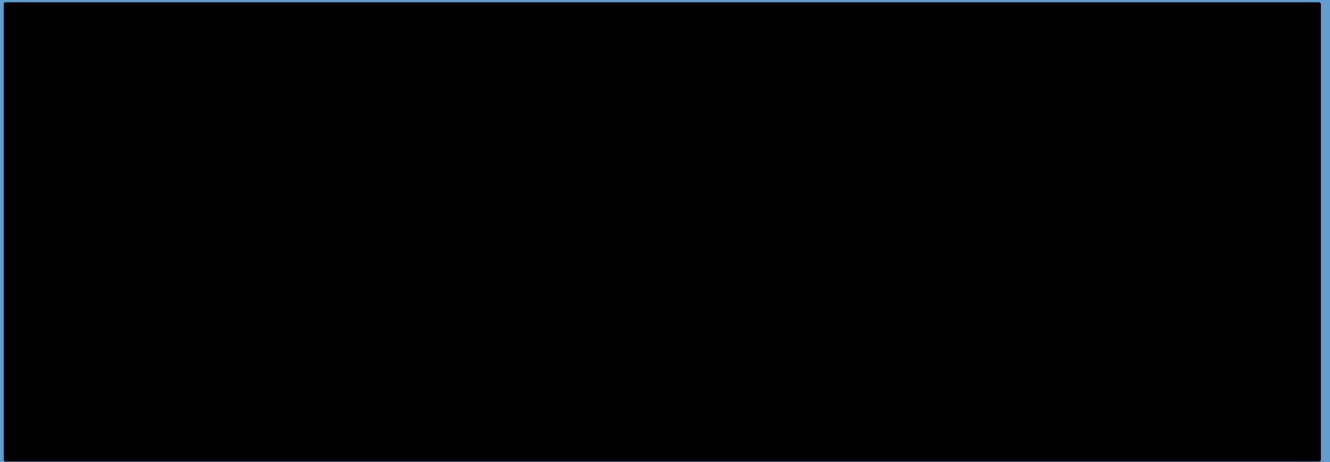


PSAT 8/9 Math Question

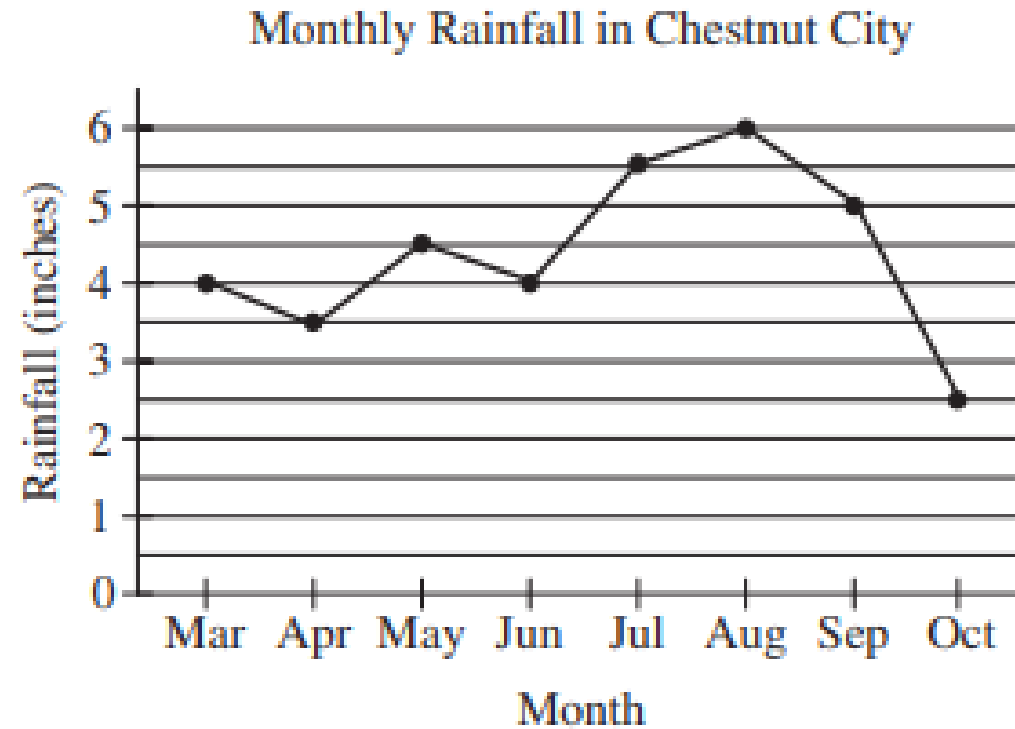
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Teach students
to anticipate the
question

Aaron is staying at a hotel that charges \$99.95 per night plus tax for a room. A tax of 8% is applied to the room rate, and an additional onetime untaxed fee of \$5.00 is charged by the hotel.



Anticipate the Question



The line graph above shows the monthly rainfall from March to October last year in Chestnut City.



What
might I
ask you?

Source: 101.qs.com



What
might I
ask you?

How Many
Bundles of
Money are
there?

What %
Of The Room
Is Money?

Is there more
money or space?

How much
money
is
there?

What is the surface
area

What's the volume of
the money?

How much does
the money weigh?



Do kids with
background
knowledge
ask better
questions?

When might
you use
percent?

Percent

0/0

used in
simple interest

money
stock market


converting
decimals

compound interest

converting
fractions

grading

increase/
decrease



Per cent
Coupons
Grades

Percents have
a symbol of %

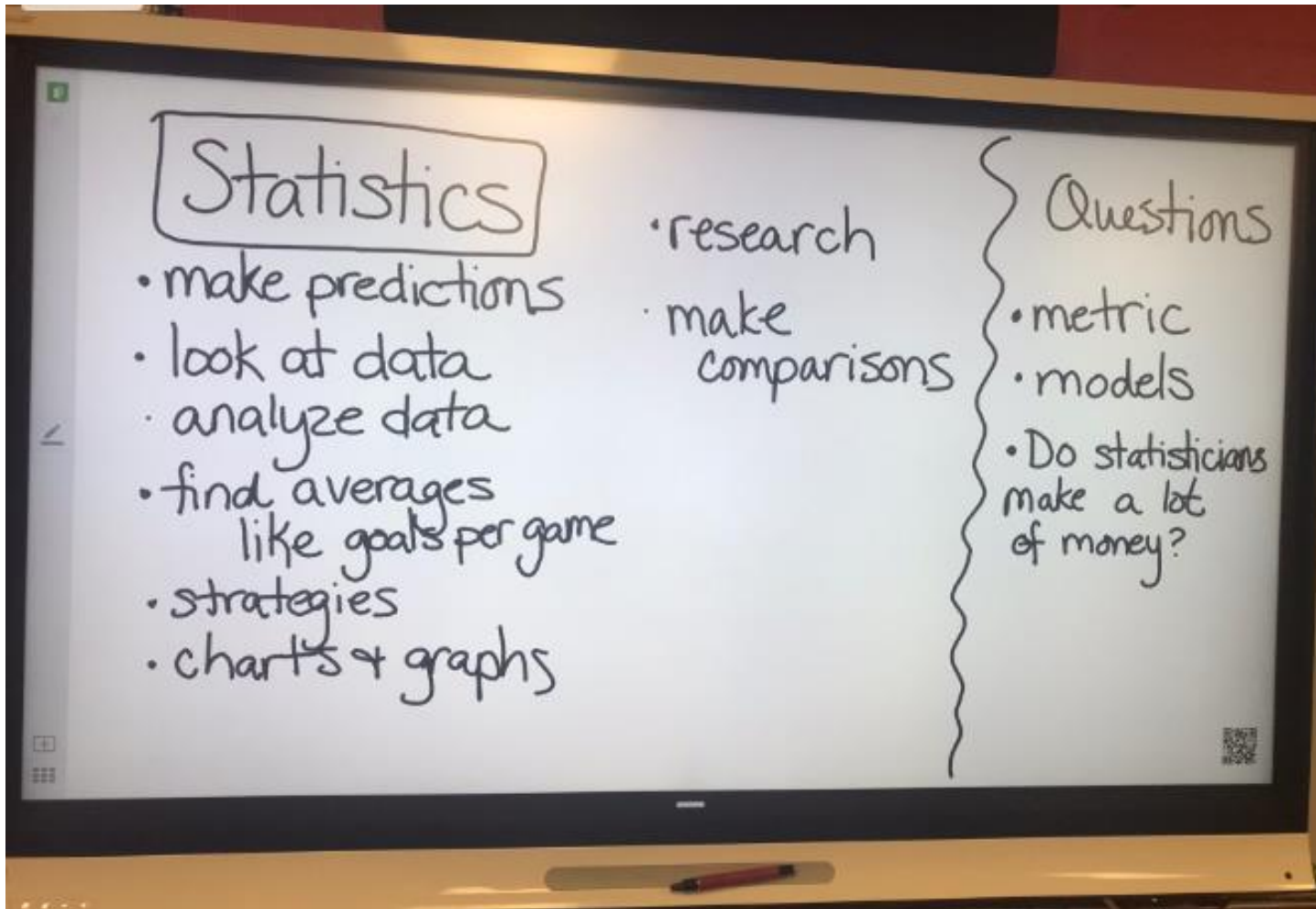
Percents are always
out of 100

percents
are never
negative

PERCENT
%

percents are
an easier way
to represent numbers
that are fractions

percents can ^{be} used instead
of fractions and decimals



Background Builder Video

“What is
Statistics?”

Four Essential Understandings About How We Learn Words

- ❖ Our depth of word knowledge is determined by how we use words.
- ❖ We need to have a reason to learn new words. Engagement matters.
- ❖ Words are concepts related to other words and can have multiple uses, which means that our knowledge of words can deepen.
- ❖ We learn words both through intentional instruction and incidentally.



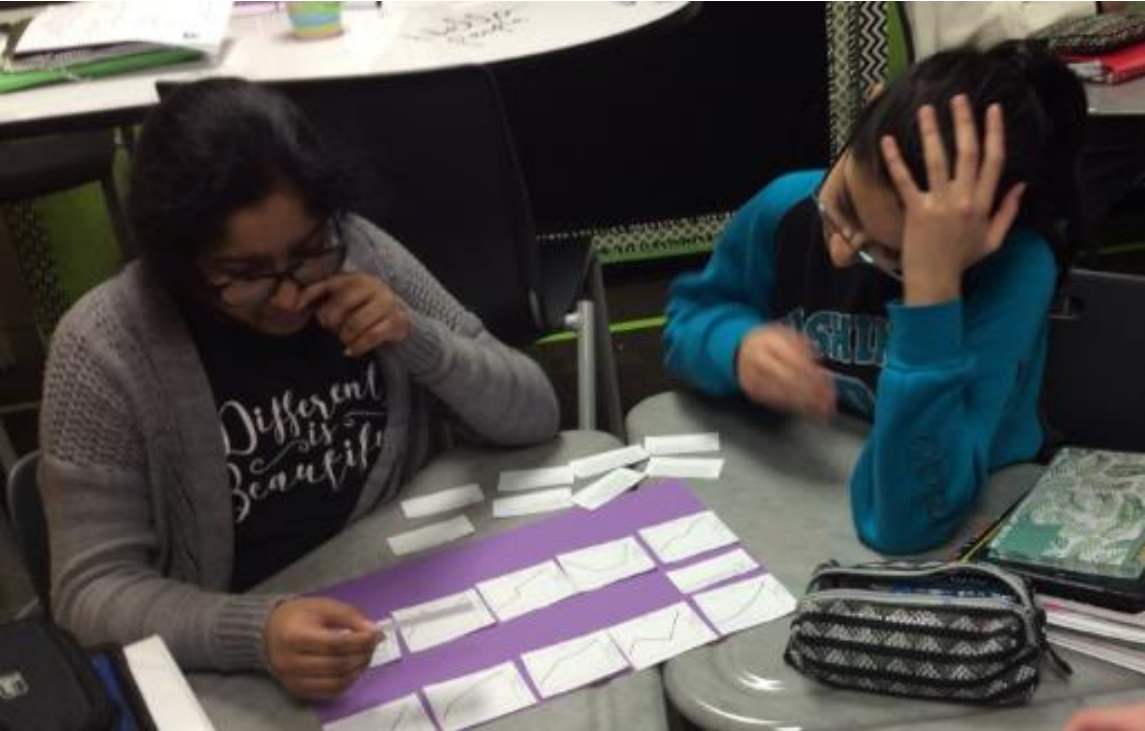
The power of word study

- Whole
- Integer
- Rational

Vocabulary Demands

Marzano and Pickering identify over 200 words/phrases in the Grade 6 – 8 Mathematics Word List (2005)

Students add 3000-4000 words per year to their active vocabulary during middle school. (Cobb and Blachowicz)



What might
these words
have in
common?

Model

Sample

Scale

Root

Table

Argument

Odds

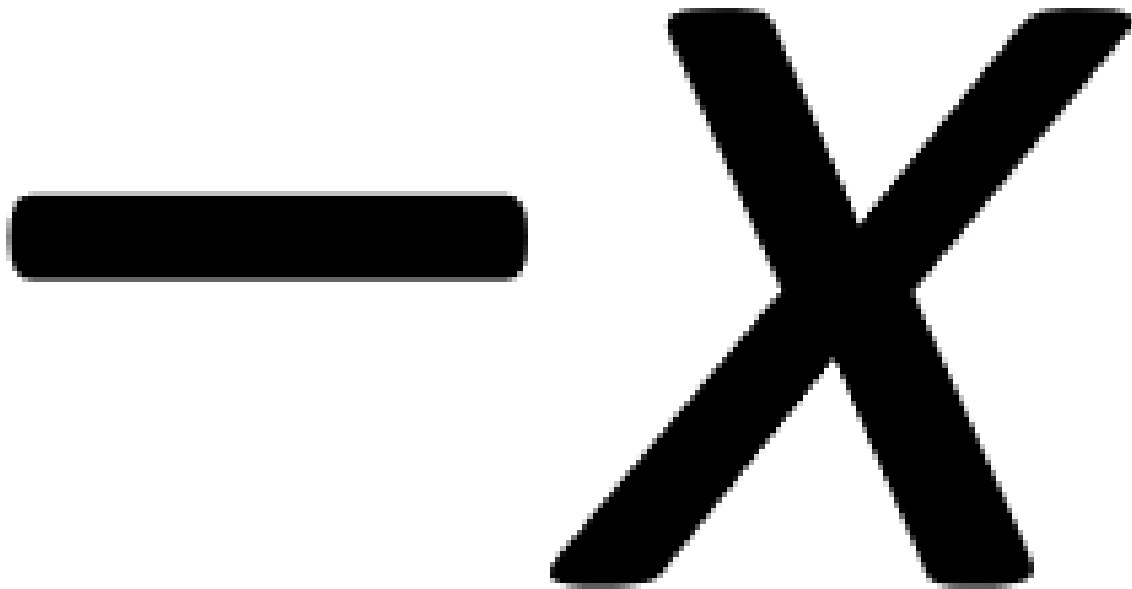
Plane

Slide

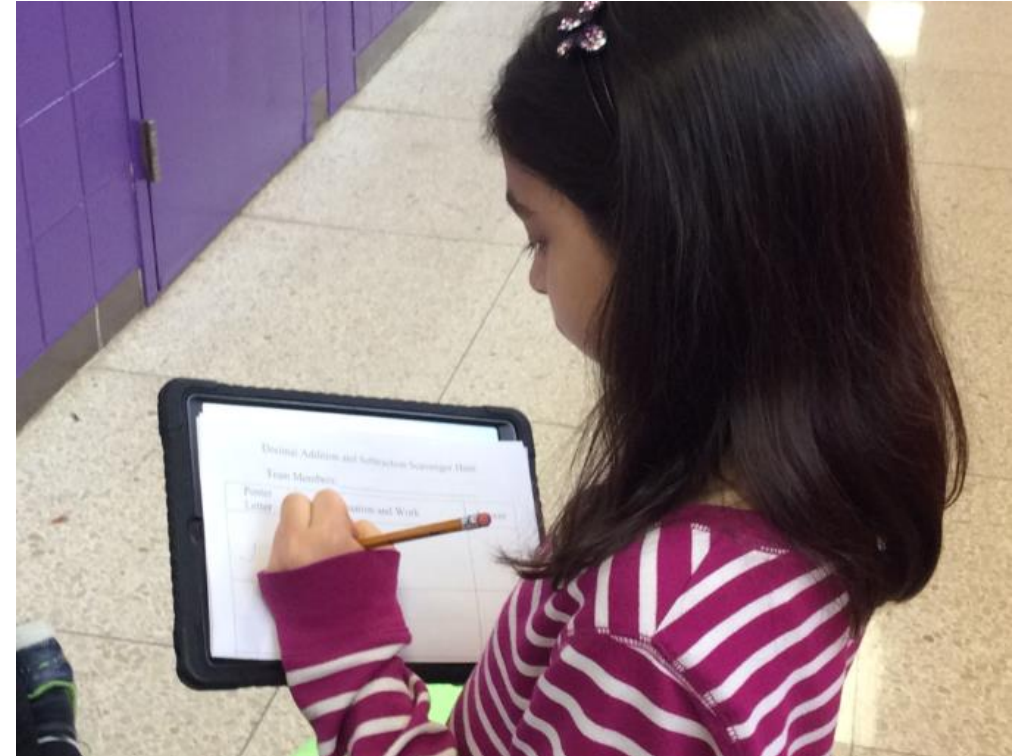
There is a
difference
between knowing
the word and
knowing its
meaning.

What is this? How is it used?





What is this?
How is it used?



Reading and Writing Reciprocity

When mathematicians write, they...

- Explain, justify, describe, estimate or analyze
- Favor calculations over words
- Use precise vocabulary
- Include reasons and examples
- Utilize real-world situations

Mathematicians as
Writers (Lent, 2010)

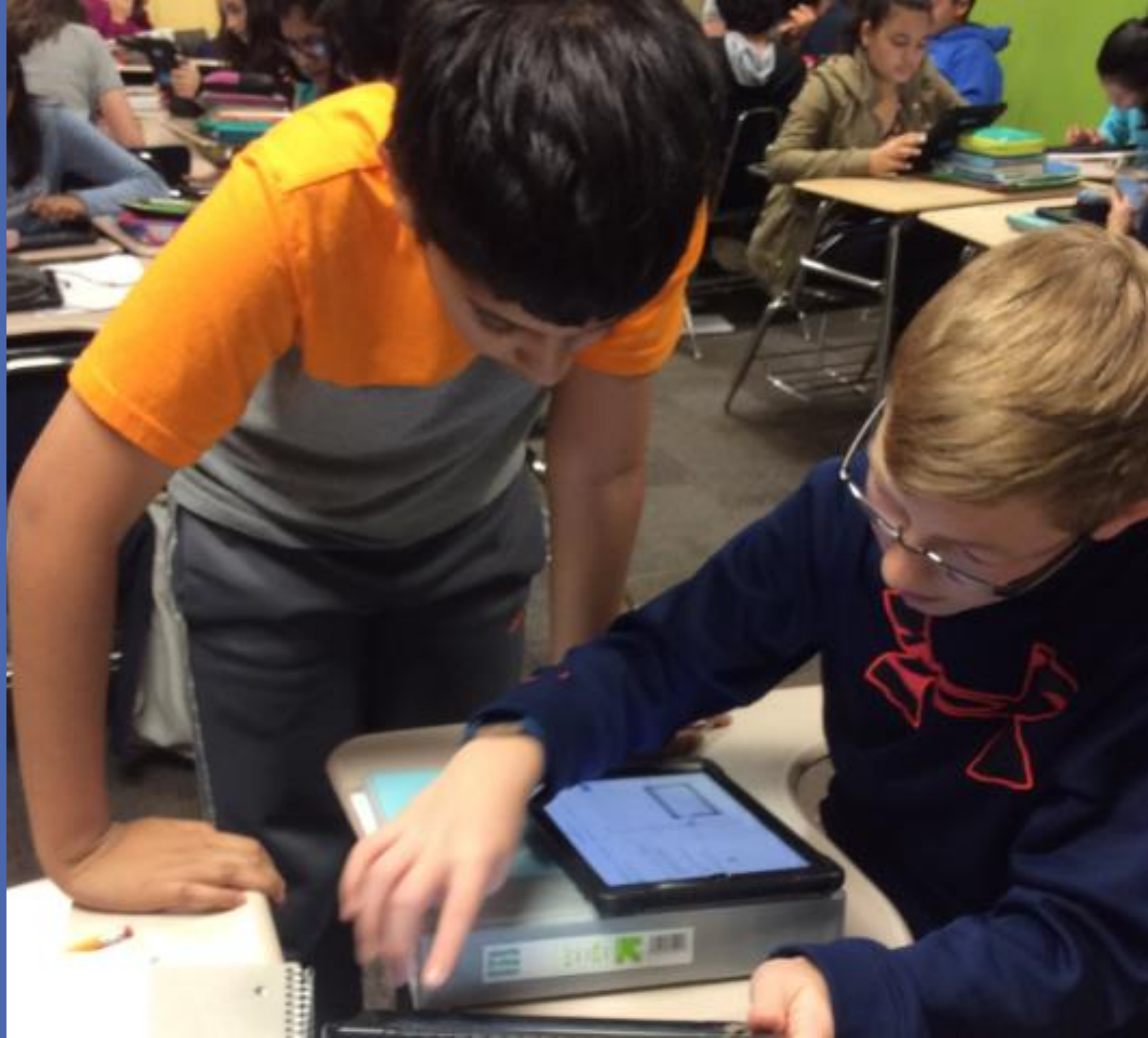
www.ascd.com/express

Convince yourself

Convince a friend

Convince a skeptic

www.youcubed.org



Convince Me...

- ❖ ***Show your thinking:*** Use numbers, symbols and models (pictures, tables, graphs...) to show how you arrived at your answer.
- ❖ ***Explain:*** Use words to describe the process you used to arrive at your answer or to support your claim.
- ❖ ***Justify:*** Use words to state your conclusion/answer and support your thinking by showing your mathematical evidence.

a) How many total students are in the class?

28

$$\begin{array}{r} 28 \\ - 4 \\ \hline 10 \\ - 15 \\ \hline 5 \end{array}$$

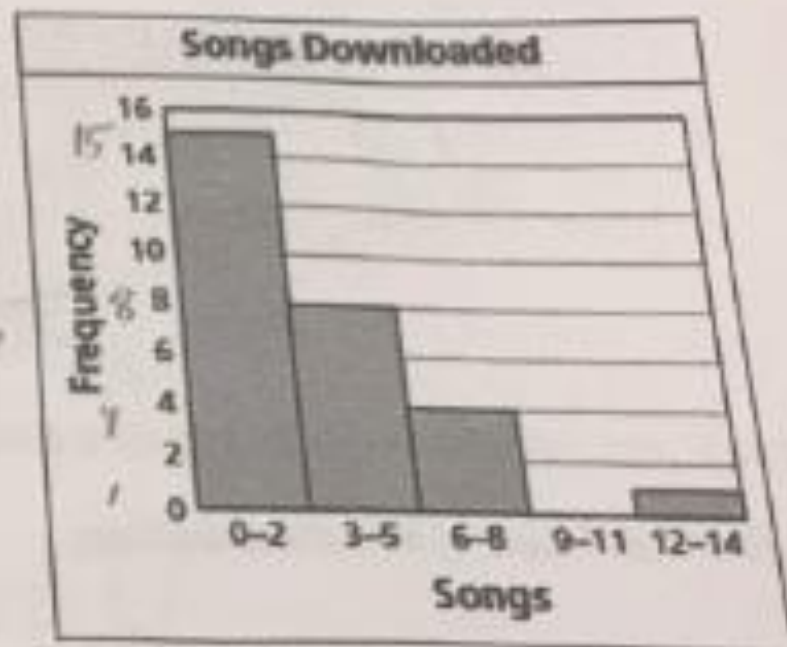
b) What fraction of the students downloaded fewer than 6 songs?

$\frac{23}{28}$

$$\begin{array}{r} 15 \\ 10 \\ 1 \\ \hline 26 \end{array}$$

c) Which interval contains the median of the data?

0-2



d) Molly claims the mode is in the interval 0-2. Is Molly correct?
Briefly explain your thinking.

No because you can't determine the numbers in every interval, for example, there could be 5 or 0, 1, 2 in the 0-2 interval but there are eight threes in 3-5, making the mode in the 3-5 interval, so if you can't determine the numbers, you can't determine the mode.



Why Reading Strategies?

Boaler, J. (n.d.). Week of Inspirational Math - Week 1, Day 3. Retrieved from
<https://www.youcubed.org/weeks/week-1-grades-5-9/>

Cobb, C., & Blachowicz, C. L. (2014). *No more "look up the list" vocabulary instruction*. Portsmouth, NH: Heinemann.

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Retrieved from <http://www.ascd.org/ascd-express/vol12/1212-lent.aspx>

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