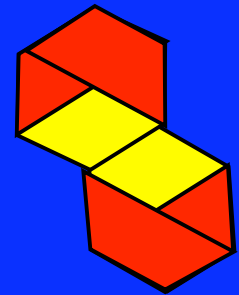
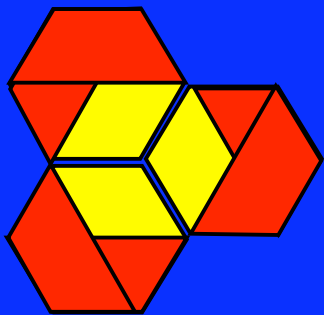


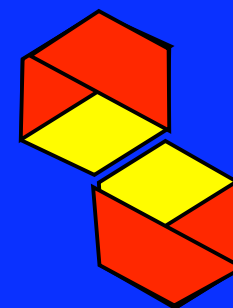
Good Day and Welcome!



Please introduce yourself to your group.

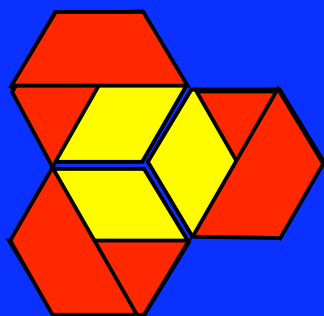
As a group, predict the answers to the
Wait Time questions.





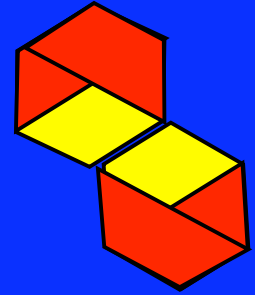
The Language of Mathematics!

Encouraging and Engaging
English Language Learners
in Rigorous Mathematics

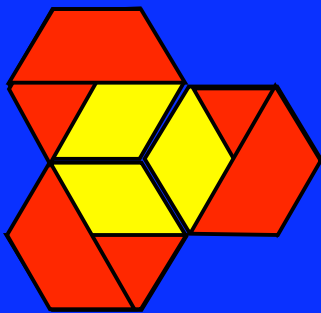


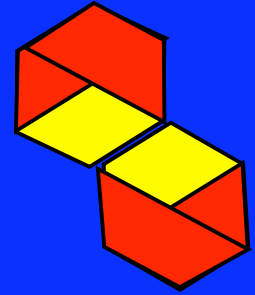
Sonoma County Office of Education

Session Goal:

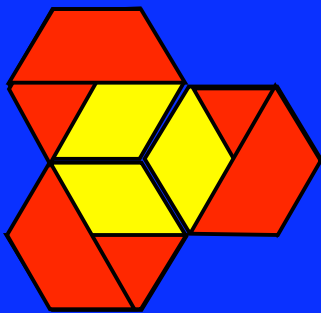


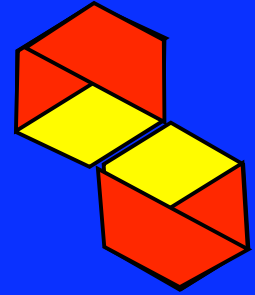
By paying attention to teacher questions and student responses, you will be aware of formative assessment skills which help move students thinking about language and math to higher levels.





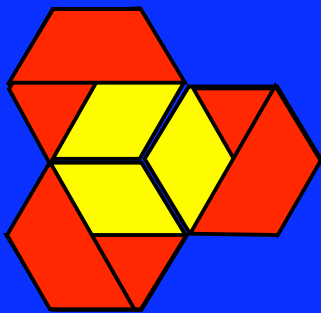
Our conjecture is that students
learn academic language
and rigorous mathematics
simultaneously
and that this will in fact
accelerate the learning of both content areas.



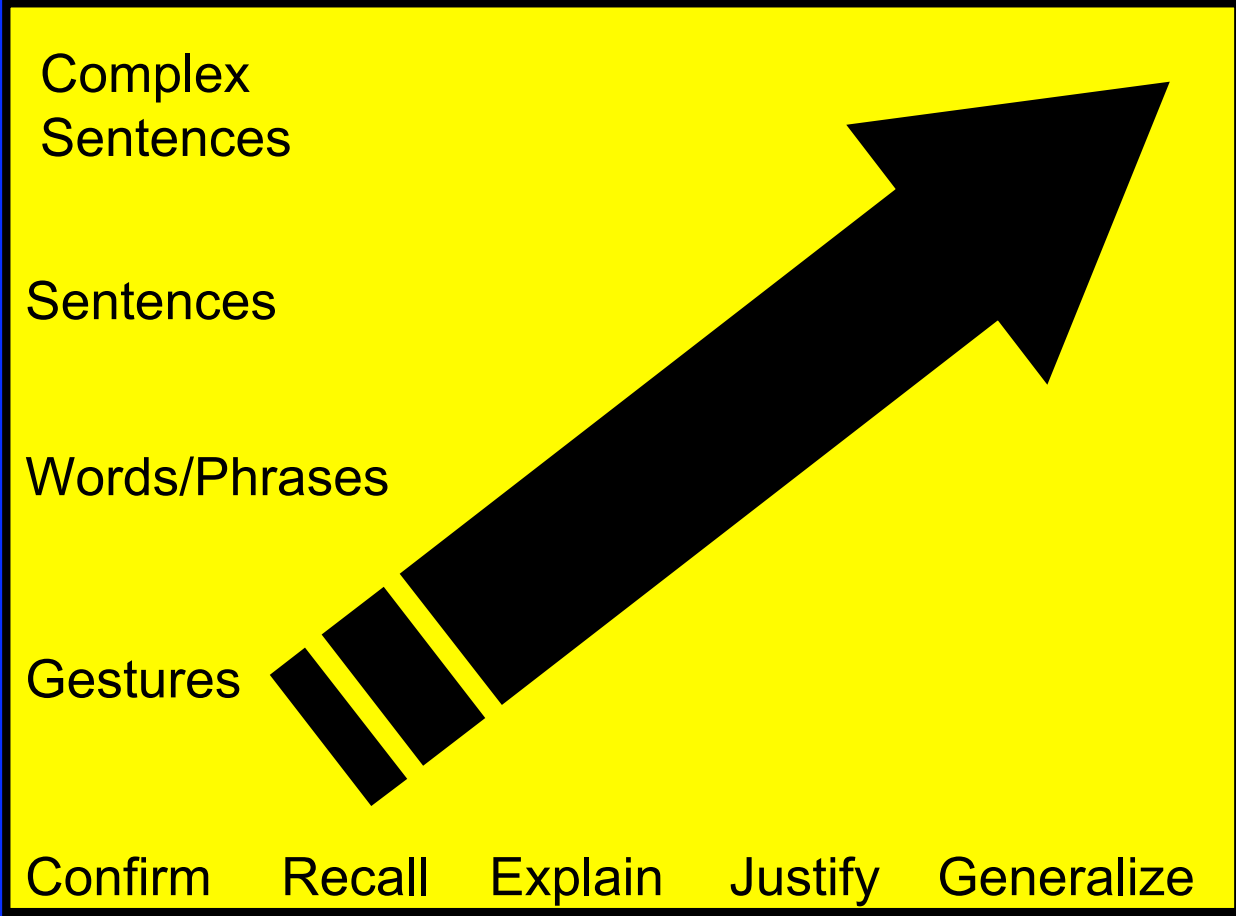


*Based on research that reports
increased learning by:*

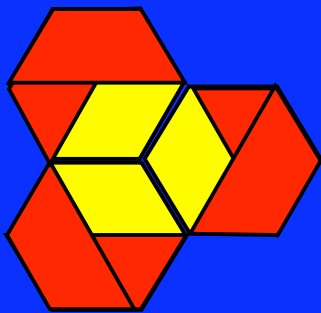
- Increasing instructional conversations.
- Scaffolding vocabulary and language structures.
- Asking questions related to important content.
- Asking questions that ask students to analyze.
- Increasing wait time.



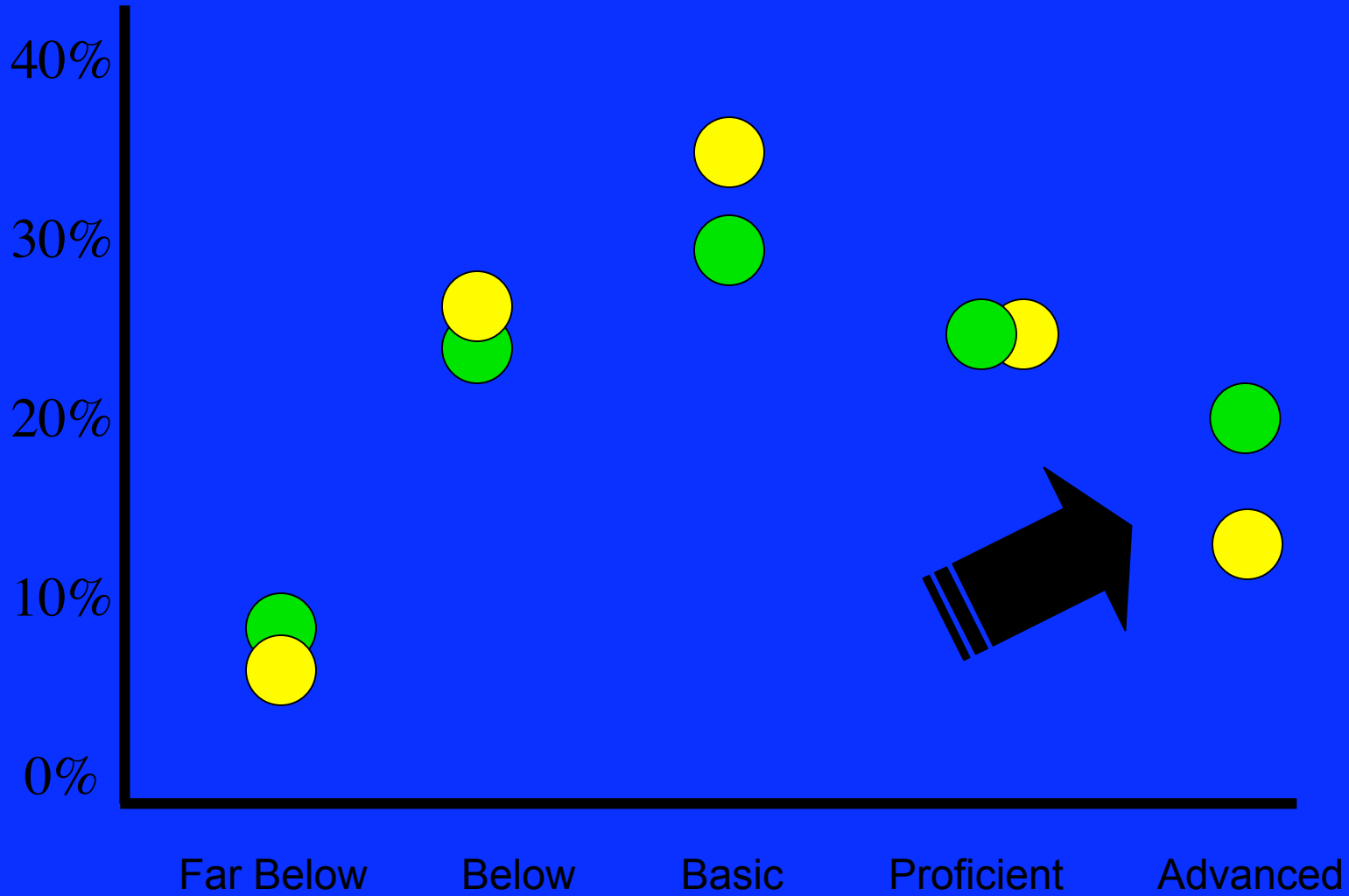
Academic Language



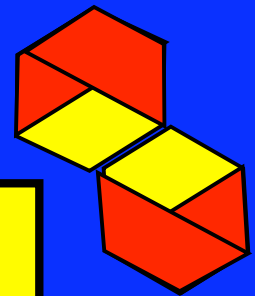
Mathematics



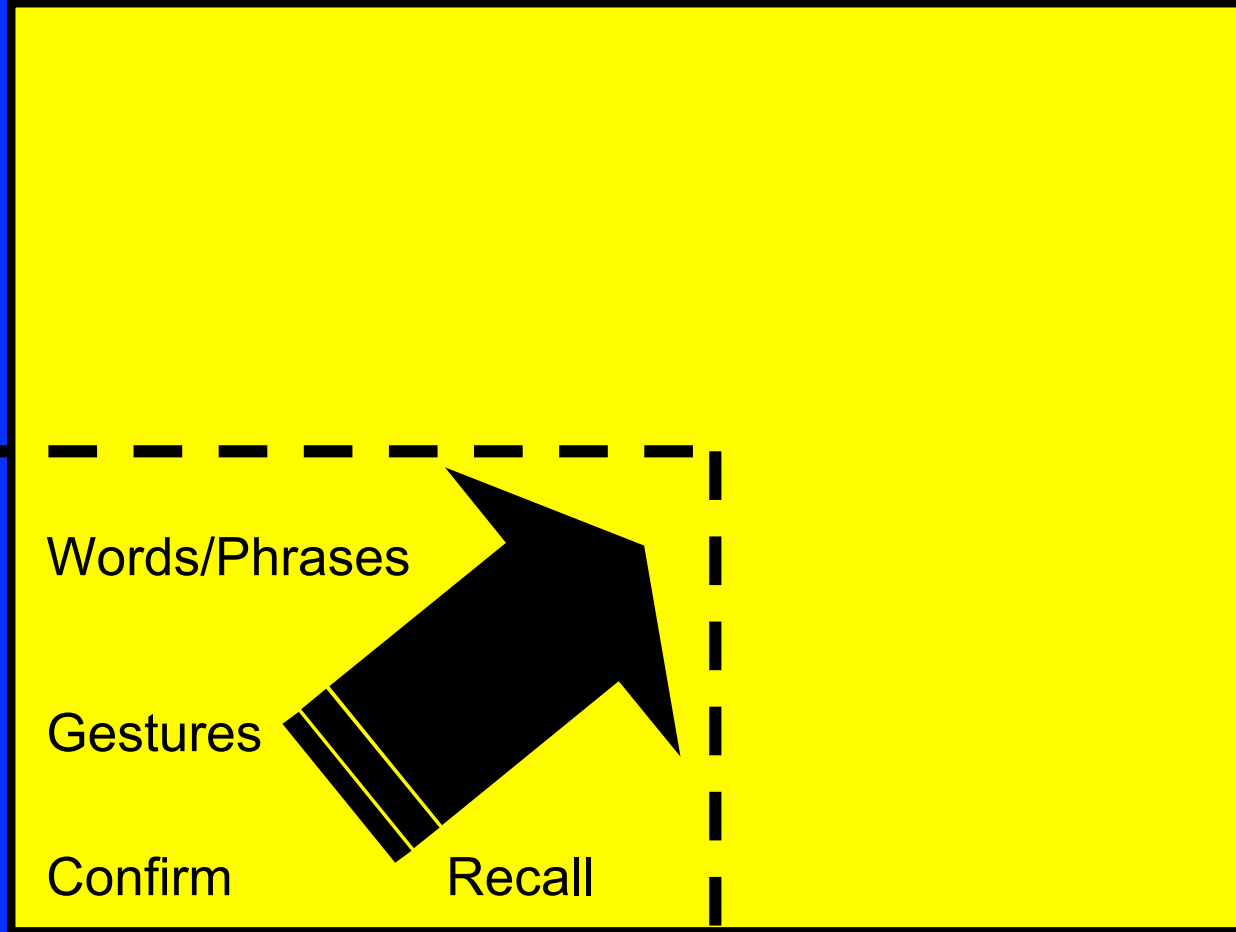
District CST Mathematics



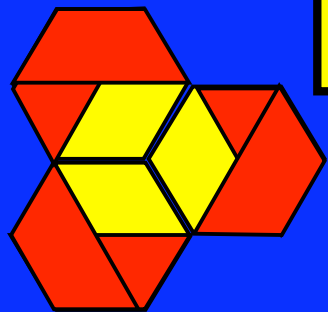
● English Learners
● English Only

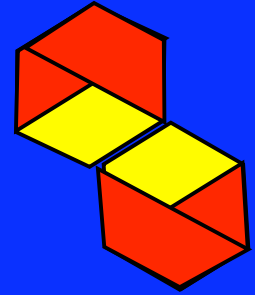


Academic Language



Mathematics





Students will:

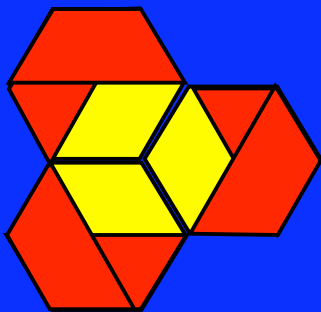
Engage in instructional conversations.

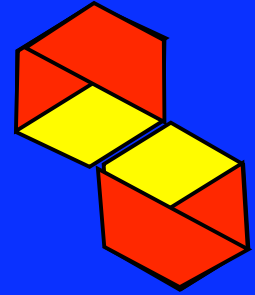
Listen attentively.

Elaborate and build on other's ideas.

Ask questions that clarify or expand.

Explain their thinking.





For mathematics students will:

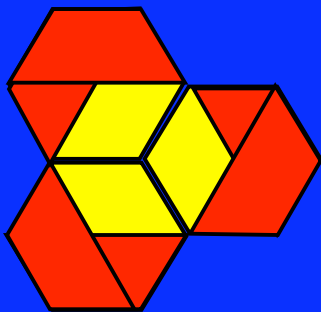
Make use of information.

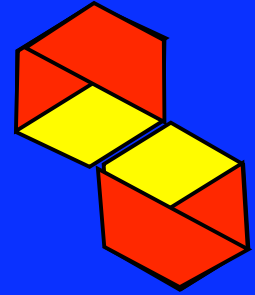
Make claims based on evidence.

Construct explanations and test them.

Formulate conjectures and hypotheses.

Justify and generalize.





Taxonomy of Questions

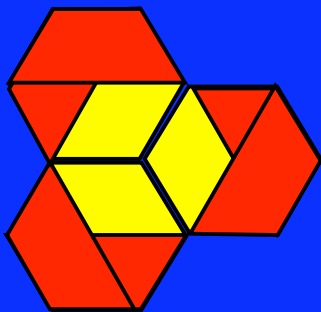
Generalize: Why will it always work?

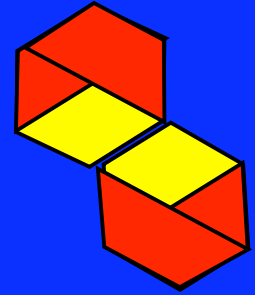
Justify: Why does it work?

Explain: What is it that works?

Recall: What is it?

Confirm: Yes? No? Maybe?





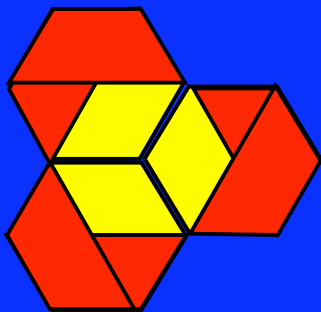
Try the Questions on For Size!

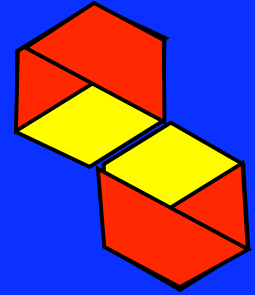
Tell your partner how you figure out a restaurant tip for \$27.89.

Partner A shares.

Partner B records language used.

Then switch roles





Recall - Transcript

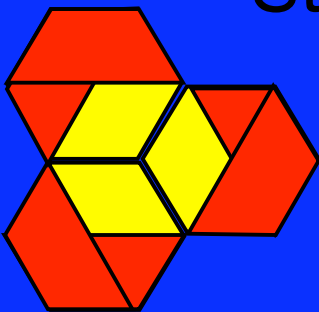
Teacher: So what is 4 times 9?

Student: 36.

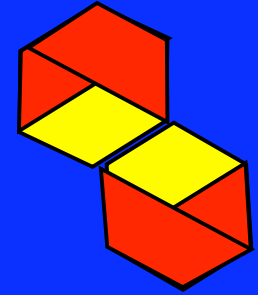
.....

Teacher: Is it actually 9 times 2?

Student: 90 times 2.

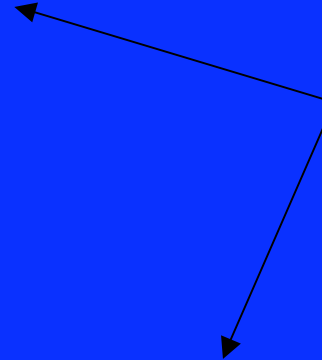


Recall - Language Used

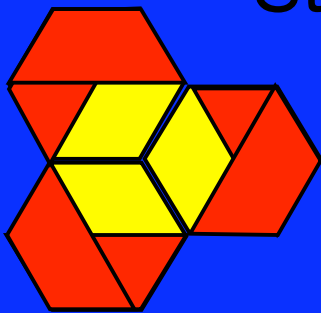


Student: 36

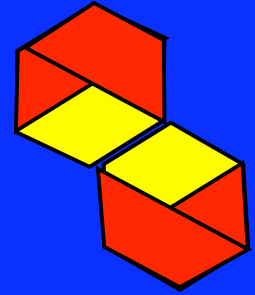
Numbers
Words
Phrases



Student: 90 times 2.

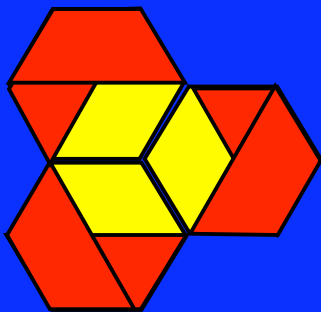


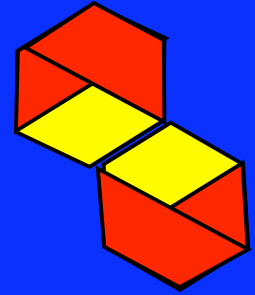
Explain - Transcript



Teacher: When you multiplied 97 times 2 in your head, how did you do it?

Student: Um, first I multiplied the 7 by the 2, and it equaled 14. And then I equaled, then I multiplied the 90 by 2 and it equaled 180. And, then I added it up.



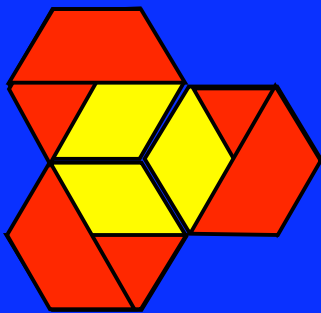
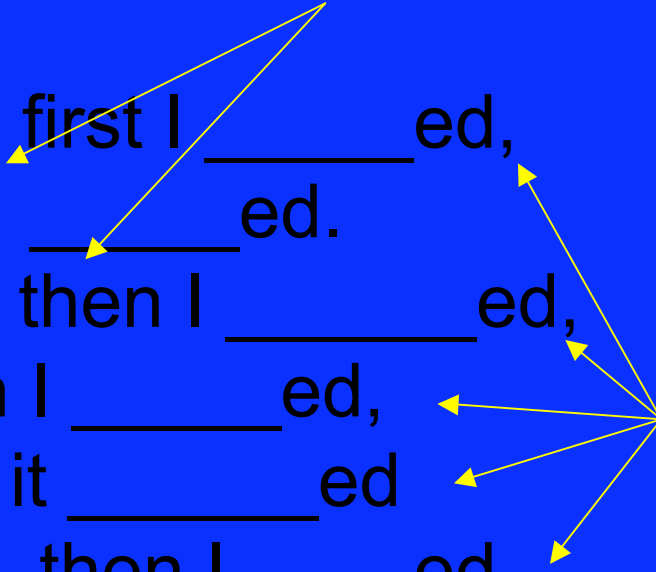


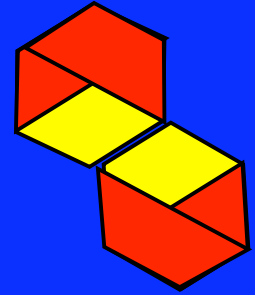
Explain - Language Used

Sequence..first, then
and, and then, and...

Student: Um, first I _____ ed,
and _____ ed.
And then I _____ ed,
then I _____ ed,
and it _____ ed
And, then I _____ ed.

Past tense





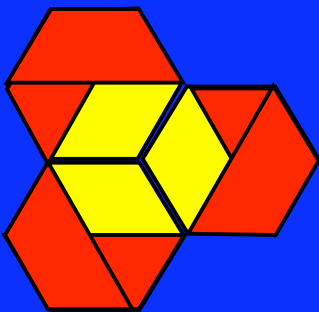
Justify - Transcript

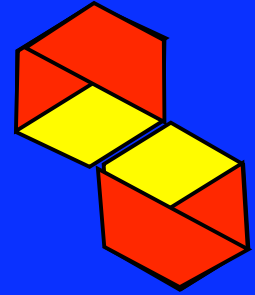
Teacher: You multiplied 97 by 2? Why would you do that?

Student: So it would be like, be more easier.

Teacher: Okay, why was it easier?

Student: Because like, um, like if some people don't know the answer of 4 times 7 or 4 times 9, you could just multiply it by 2.





Justify - Transcript

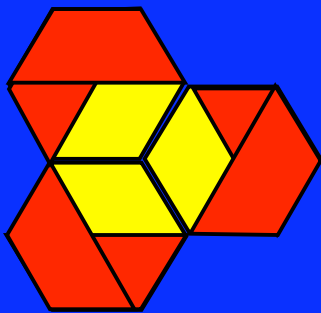
Modals: would, will be, could, should, must

Student: So it would be _____.

If..then....

Student: Because if _____,

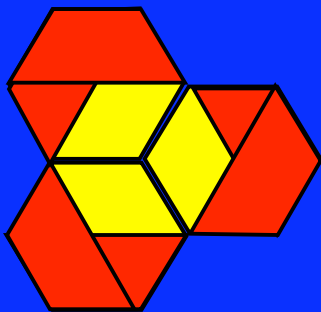
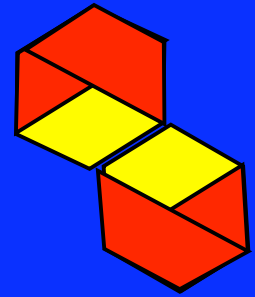
(then) you could just _____.

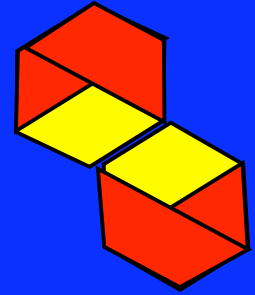


Generalize - Transcript

Student:

I've noticed something. When you're doing, when you're dividing fractions with whole numbers, you always, it's 'cause, 4 divided by $1/2$. If you multiply 4 times 2, um that equals 8. And that's what, what I'm wondering if it happens most of the time. 3 and yeah, 3 divided by $1/2$ also. It equals 6. Um.. 4 divided by $1/4$ is 16 too.





Generalize - Transcript

Student:

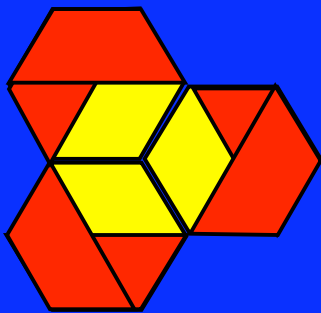
Always

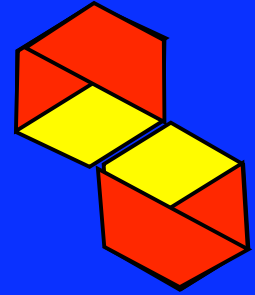
I've noticed something. When you're _____, you always _____.

If... then... → If _____, um that (then) _____.

And that's what, what I'm wondering if it happens most of the time. (*Gives*

3 tests) If _____, then _____. If _____, then _____.



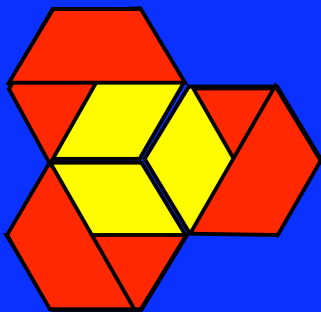


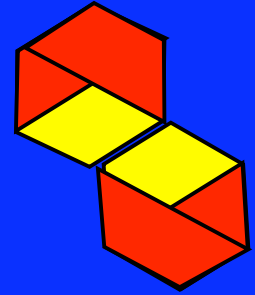
Generalize - Transcript

Student:

The UMMM factor

_____ . When you're doing,
when you're _____
_____, it's 'cause, _____
_____ um that _____
_____. And that's what, what _____
_____. _____ yeah,
_____. _____ Um..
_____.



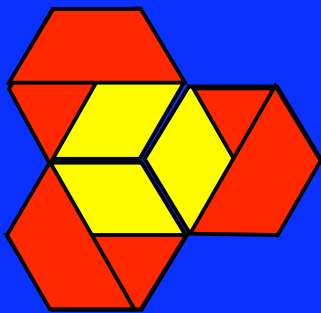


Ana's Representation & Kristina's Explanation

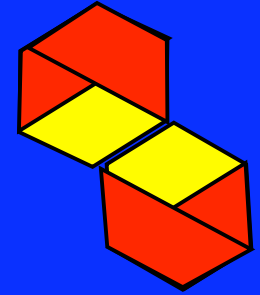
Try a card sort!

A teacher has 32 students. She wants to put them into table groups of 5. How many tables does she need?

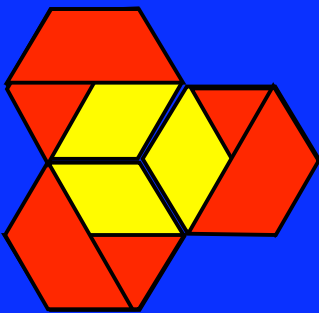
What are levels of question/responses?
What language is Kristina using?



Ramon's Solution

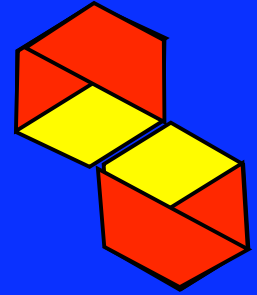


Mental Math: $46 \div 7$

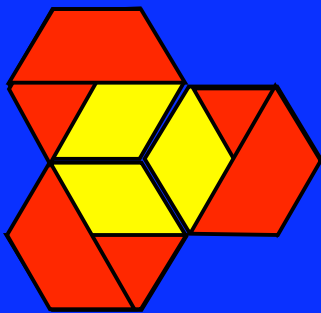


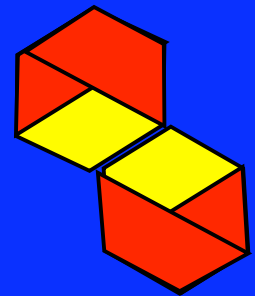


Sonoma County Office of Education



Try Ramon's Card Sort!





$$46 \div 7$$

Day 4, Mental Math

Ramon, Whole Class Conversation

Generalize

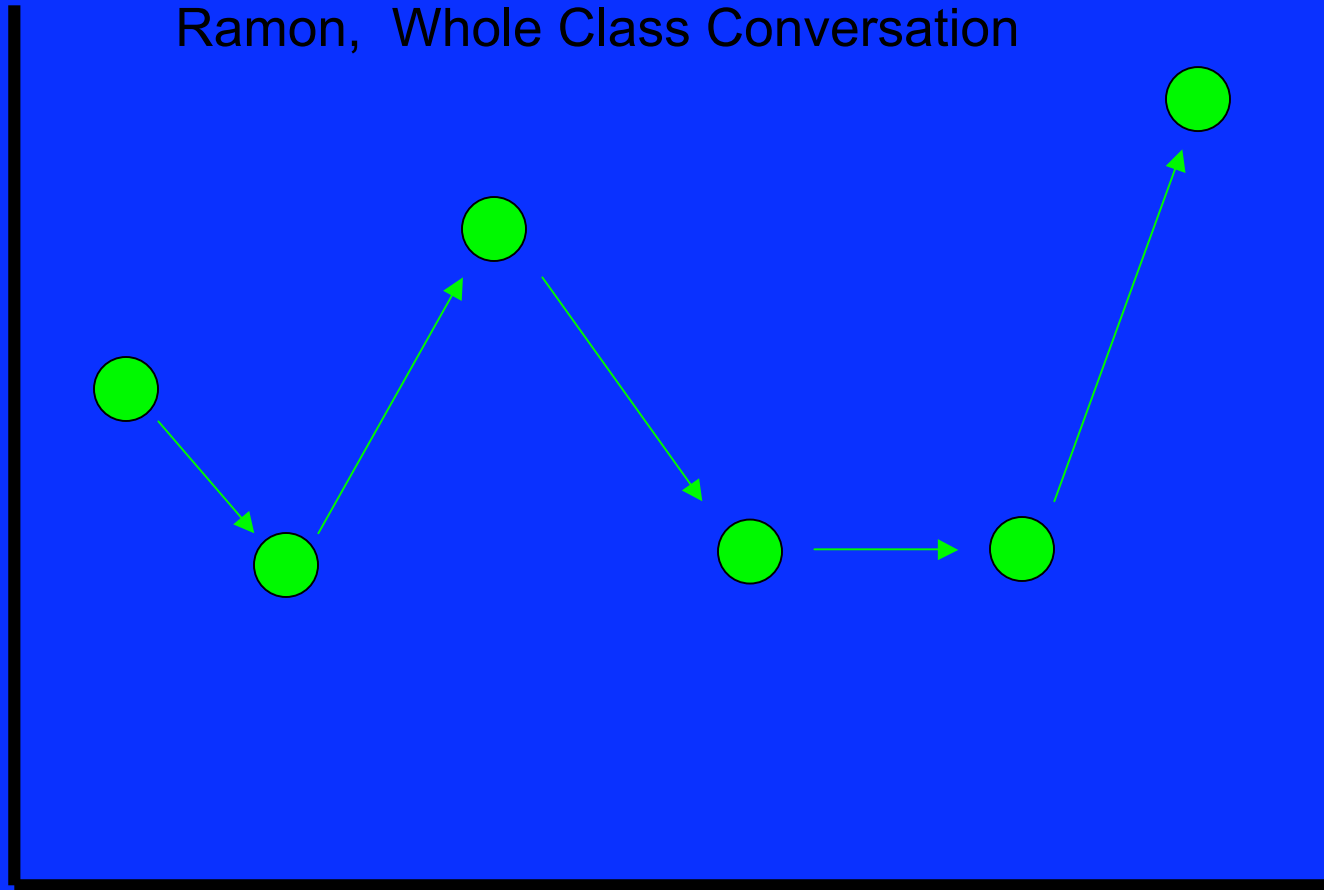
Justify

Explain

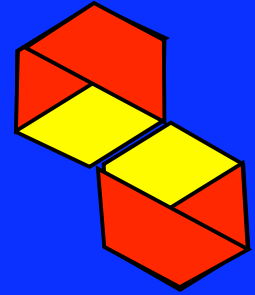
Recall

Confirm

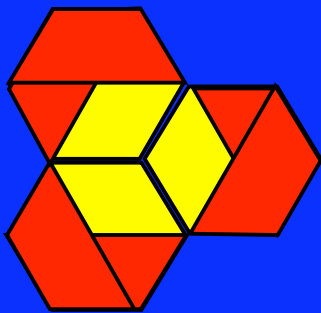
External



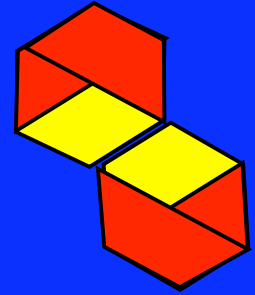
Sequence of Responses



What language
would you like
Ramon to use?

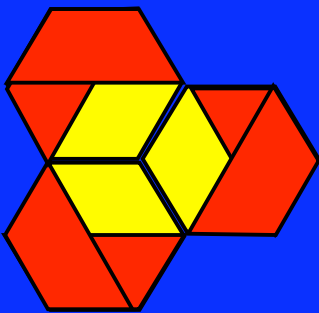


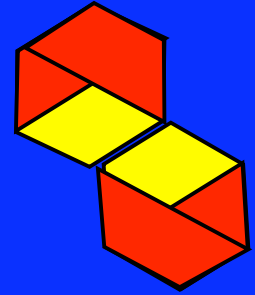
Daniel's Solutions



$$4 \div \frac{1}{3}$$

*Show with pattern blocks.
Show with number line.*

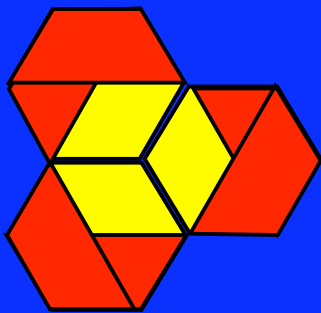


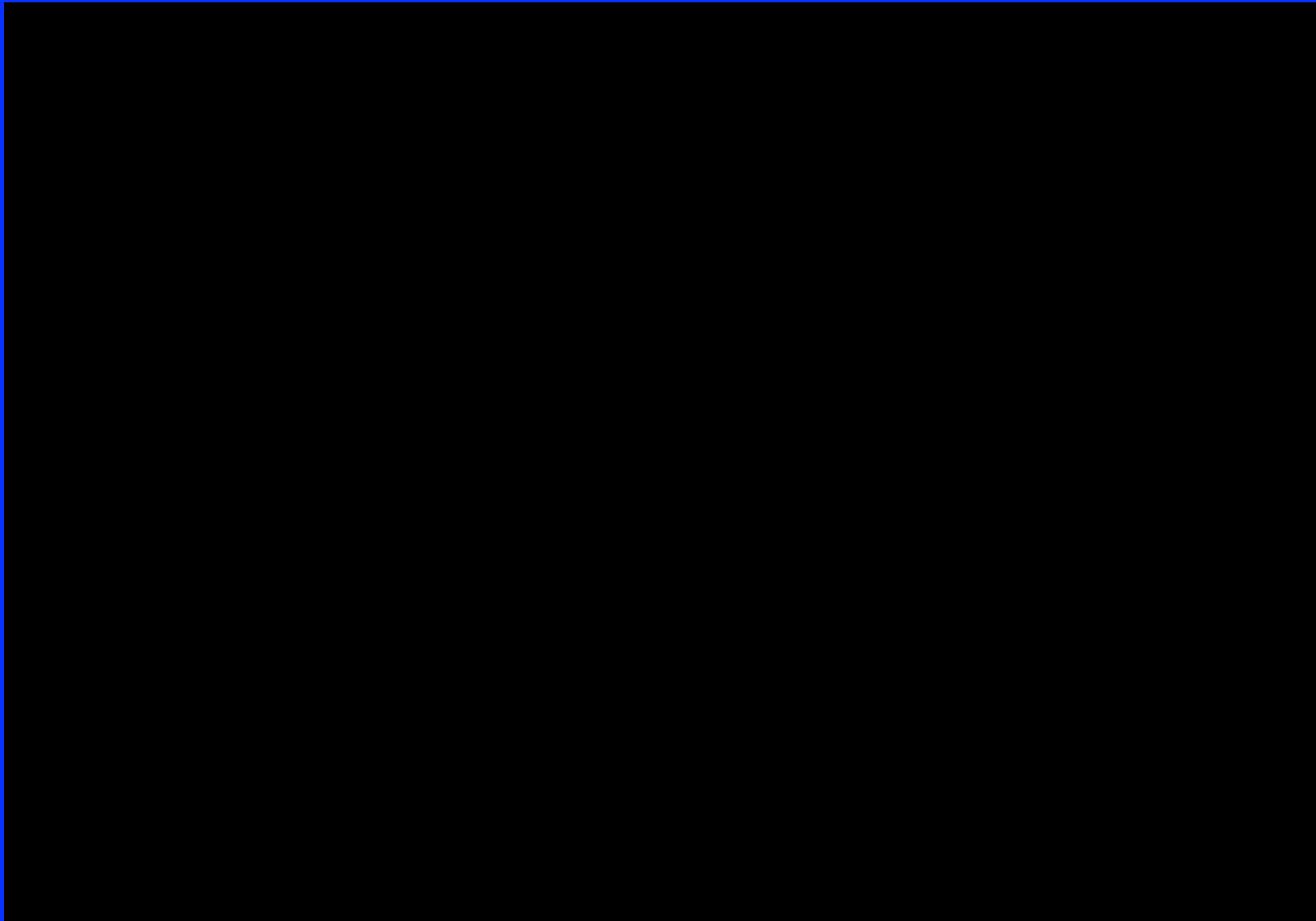


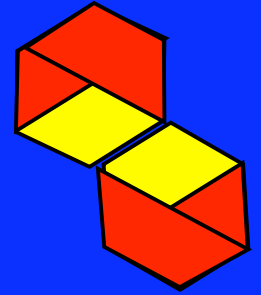
Daniel's Solutions

What are the teacher moves
& scaffolding that support
Daniel achieving
higher levels in

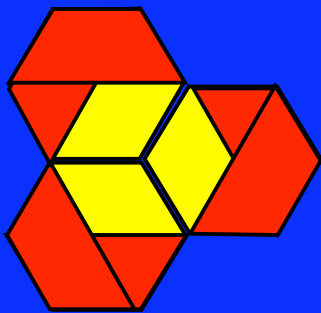
language and mathematics?

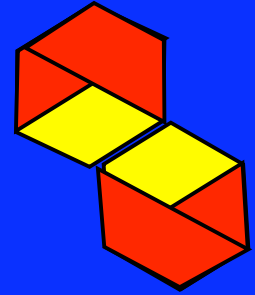






Try Daniel's Card Sort!





$$4 \div 1/3$$

Day 5, Teacher / Student Conversation

Generalize

Justify

Explain

Recall

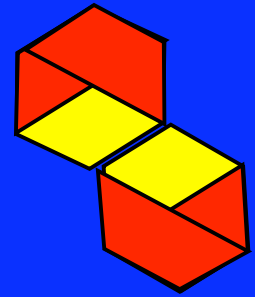
Confirm

External

Please graph
Daniel's Responses

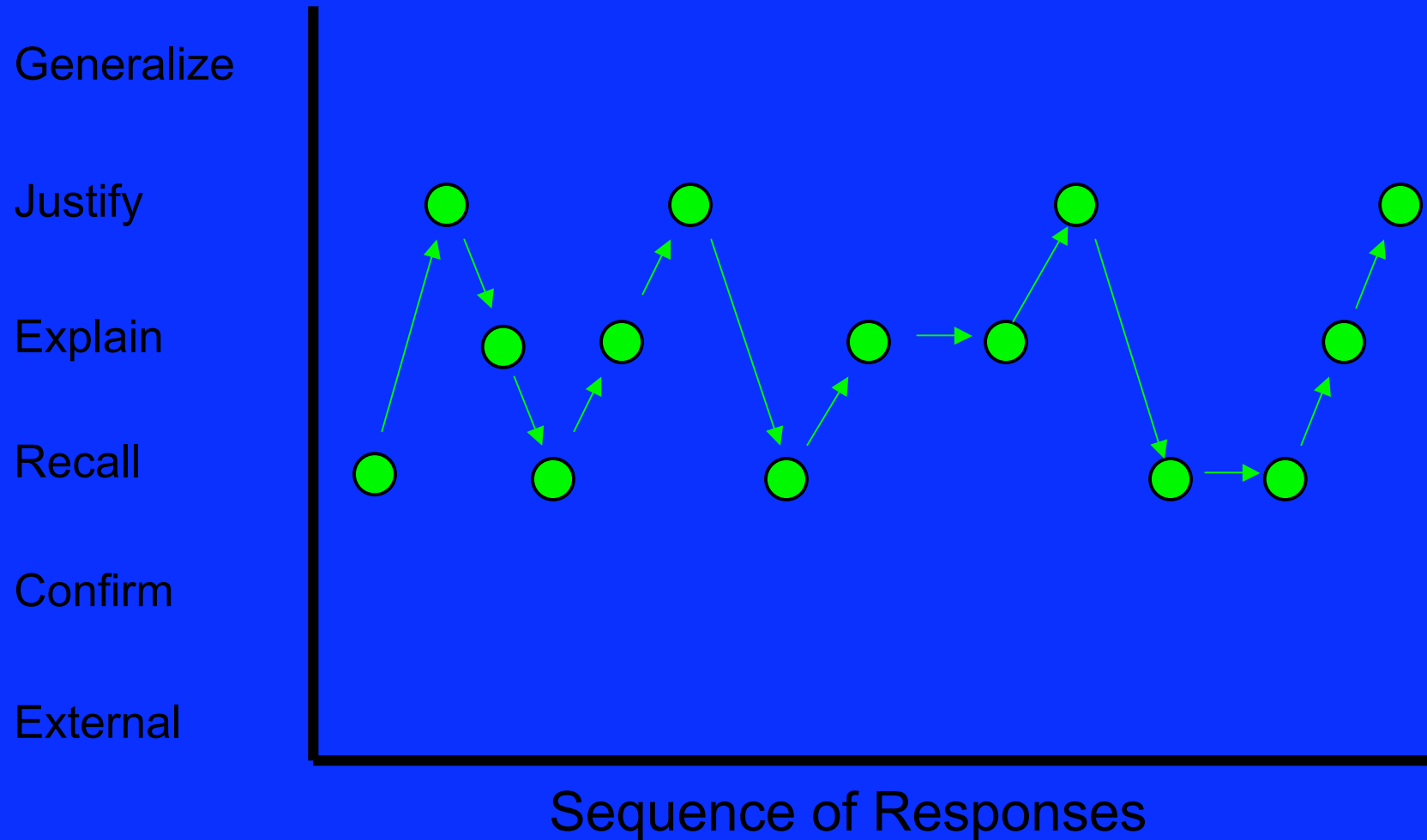
Sequence of Responses

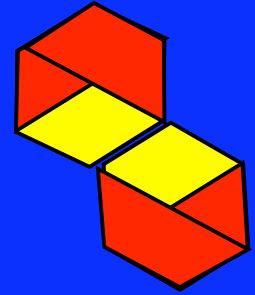
Sonoma County Office of Education



$$4 \div 1/3$$

Day 5, Teacher / Student Conversation





Teacher Moves and Scaffolding:

Focus on one key problem for lesson.

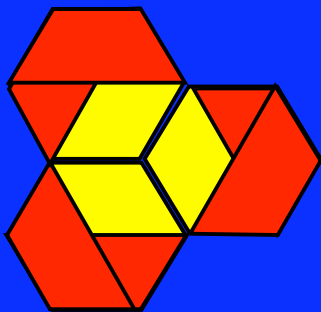
Connecting number line and blocks.

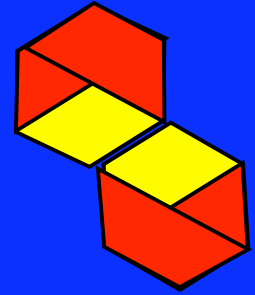
Connecting problem and representations.

Using sentence frames.

Questioning.

Wait time.





**N
E
X
T**

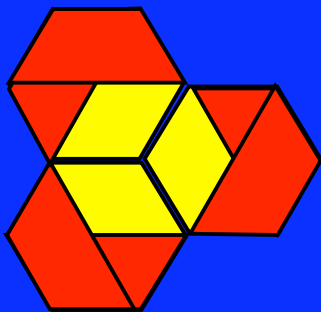
Given this is time for textbook adoption,
and with the urgency for closing the gap,
what are your needs?

What are your site/district needs for universal access?

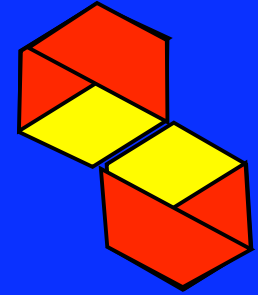
**S
T
E
P
S**

- An awareness of universal access strategies?
- Agreement to implement one strategy well,
e.g., discourse for language? Math? Assessment?

What are different starting points?



SB 472, student interviews, questioning skills,
lesson study????



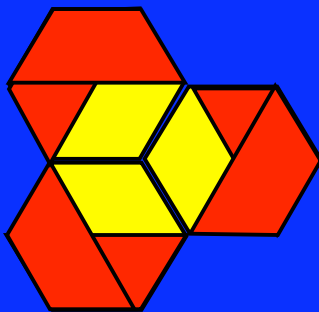
The videos are available at the
Sonoma County Office of Education
website: www.scoe.org

- > Get Services (pull down menu)
- > Departments
- > Mathematics
- > R.A.A.F.A. Grant

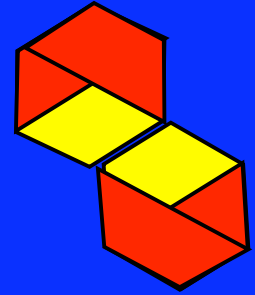
Scroll to Videos:

Division, Ramon

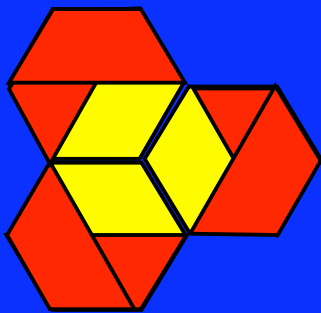
Division of Fractions, Daniel



Or..iTunes > R.A.A.F.A



“Instructional conversation (*e.g.*,
Tharp & Gallimore, 1997) plays an
important role in discourse-oriented
classrooms, because it helps
scaffold students’ access to higher
levels of cognitive processing.”



Nathan, Kim (2006)