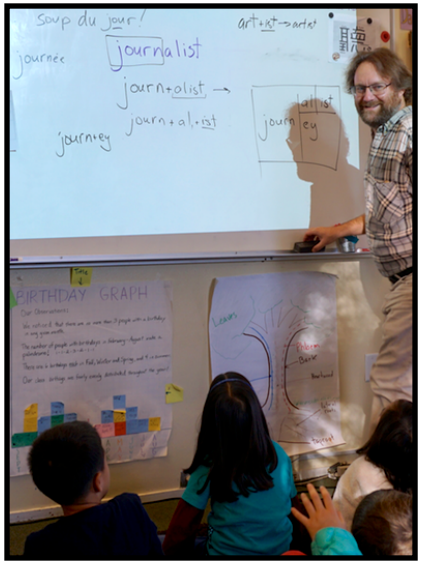
Grade 1s at Nueva take a learning journey by investigating <multiply> and <multiplication>

This year at Nueva, I get to visit Diana's Grade 1 class at the end of the school day once a week. This class always generates great questions for me to take on.

See this image from early in the year when an investigation of the word <journal> led us to connections to the words <journey> and <journalist> which share the base <journ> for "day". We even noticed connections to French with "soup du jour" for "soup of the day". As we learned, writing in our "journal" is about writing about the "journey through the day".



Recently, they were taking their leap into multiplication. Diana asked if I might be able to help them by analyzing this word and <multiply>. I happen to know that these words have a fascinating complex non-obvious relationship that often confuses teachers and students. I had never taken this one on in Grade 1, but that is not a reason to avoid it! I was curious to see what would happen.

The thing that often confuses people is that they begin from the assumption that <multiplication> *must* be built on <multiply>. It's a very reasonable assumption and one which is not hard to test with a word sum. I was excited to have a rich opportunity to model a scientific inquiry that celebrates the experience of a word sum proving what we thought was obvious can't be true. How great to offer this rich scientific learning experience in Grade 1!

With that key concept in mind, I started the lesson by writing the word sum for <multiply> out loud.

multi + ply ➔ multiply

I explained that the base <ply> comes from a Latin verb *plic(are)* that means "fold"? So in a sense "multiply" is about "many folds".

I started building a little matrix and word sums for words like <pliers>, <comply>, <reply> always drawing links to the ida of "fold". We then tried to make a word sum with a <ply> base to get to the word <multiplication>.

com multi re	**ply** *"fold"*	ed er s

Taking suggestions from the group, we started to see the problem…

*multi + ply/i + cat + ion ➔ multiplication

We realized we had no evidence of a <-cat> suffix, and this word certainly has nothing to do with the free base <cat>!

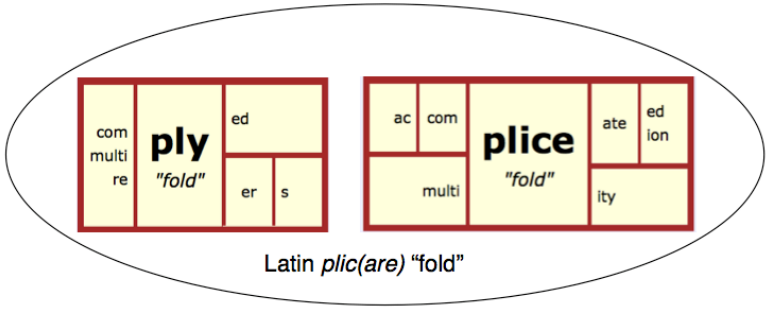
I didn't spend much time looking for other suggestions, I just showed them that since our word sum is not working, we should look for a different solution. I just told them that I happen to know the base of multiplication is <plice> with this word sum:

multi + plice/ + ate/ + ion ➔ multiplication

We then had a fascinating discussion about the words <complicated>, <multiplicity> and <accomplice> tying each word to the idea of "fold"!

This may seem as though it is way too advanced for first graders, but I only kept going down this path *because* they were showing me how interested they were in the conversation. The kids kept shouting out ideas, so it was easy to keep going. I learned later that the other Grade 1 class did a similar investigation without me.

After 30 minutes on the carpet at the end of a day, we ran out of time, so the page I had created for them would be something they could work on with Diana on another day. The only part of this document that they had to complete was marking any suffixing changes. They already had lots of practice with marking the replacing final non-syllabic <e>s. Marking the change for <y> / <i> changes was fairly new, but this gave them a chance to refine that convention as well.



Can you show the suffixing change?

Where does a <y> change to an <i>?
Where is a final, non-syllabic <e> replaced by a vowel suffix?

multi + ply ➔ multiply
com + ply ➔ comply
re + ply + ed ➔ replied
ply + er + s ➔ pliers

multi + plice + ate + ion ➔ multiplication
multi + plice + ity ➔ multiplicity
ac + com + plice ➔ accomplice
com + plice + ate + ed ➔ complicated

With some groups, I might have let them investigate these words and matrices on their own more. For this group, I chose to give them the morphological structures in the matrices and word sums and let that be the context to investigate how these words work.

It's so exciting to get to go this far with Grade 1 students who keep asking for more!

Pete Bowers,
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