Steps to Word Problem Unpacking

Purpose of the Task

Unpacking word problems comprised of sentences densely packed with information needed to solve the problem helps students to understand the complex information they are presented with and gives them ideas and resources to use as they solve the problem and explain their answer.

Preparation

Choose a word problem that has complex sentences, multiple pieces of information, and/or multiple sentences that students must understand in order to organize their mathematical approach to solving the problem. You can write the word problem on chart paper and bullet point the ideas as you unpack them or use a grid to highlight the meaning of different grammatical and mathematical “chunks” of the sentence.

Steps

1. Model, through thinking aloud and using natural language, how you unpack the meanings of the sentences and “chunks” in the word problem, teasing apart the information that’s densely packed into each sentence. Talk about the language resources used in the sentence and how they convey particular meanings.
   a) Focus on meaning: Show students how to unpack the meanings in the sentence by writing a list of simple sentences below it that express the meanings of the sentence.

Some Guiding Questions to Ask as you Work through the Word Problem

- Why is this sentence difficult?
- Who or what is this sentence about?
- What new information does this sentence add?
- What are your ‘math wonderings’?

b) Focus on structure (Part II of the CA ELD Standards): Show students important features of the sentence (e.g., how conjunctions are used to connect two ideas in a complex sentence, how propositional phrases are used to add details, vocabulary). Talk about how the sentence is structured and how this structure affects meaning (e.g., connects, condenses, combines, enriches, or expands ideas).

Some Guiding Questions to Ask as you Unpack Sentences

- How many “chunks” of information can we pull out of this sentence?
- How do the chunks work together or add details and information?
- What does the word/phrase _____ mean or do?
- Is this a context sentence or an “ask or task” sentence?

2. Guided practice: Guide the students to help you with steps a) and b) with additional sentences.

3. Return to the core meaning of the sentences and the word problem to make sure students don’t lose the central focus.

From 2012 California ELD Standards, Ch. 5, p. 169; 2014 CA ELA/ELD Framework, Ch.2, p. 112
Teacher Planning Tips

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<th>Some Guiding Questions for Analyzing Word Problems</th>
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<tr>
<td>1. What is the problem to be solved?</td>
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<td>2. What relevant information is provided in the text?</td>
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<td>3. What mathematical concepts are indicated or signaled in the information?</td>
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<td>4. What are the mathematical principles needed for solving the type of problem?</td>
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<td>5. What procedures does the student follow to use those principles in solving the problem?</td>
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<td>6. As a result of the procedure, what is the solution?</td>
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<td>7. How can students justify the solution? Does the solution make sense?</td>
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*What linguistic knowledge is necessary for students to understand and solve the problem?*

*What specialized ways are mathematical concepts constructed in language?*

_Fang and Schleppegrell, 2008_