

TWO-DAY LESSON Quick Reference

	<i>To DO</i>	<i>To SAY/ASK</i>
2 min.	Pose problem: How many 7-unit-long trains can be made?	Yesterday we looked at some interesting mathematical patterns... Today we are focusing on a new problem...
2 min.	Explain rules of trains problems. List all 3-unit-long trains.	Trains are made by putting integer-length cars end to end. Because they have engine and caboose and travel in a particular direction, order matters.
2 min.	Solicit help listing a few examples of 4-unit-long trains. Clarify issue of whether or not order matters.	Is someone willing to come up here and build a 4-unit-long train? Why is it ok that we have a 1-3 train up here and a 3-1 train?
9 min.	Hand out <i>Building Trains: Part I</i>. Set students to work. Provide mini-posters/pens.	When you think you're done, spend a few minutes comparing your list with your partner. Once you and your partner are done, talk about how you organized your original lists. Be ready to explain how you know your lists are complete.
9 min.	Solicit volunteer to share poster with class. Post different list and ask how lists compare/contrast. Continue with sharing until ≥ 3 lists have been shared. Class decides on one, organized listing method. Teacher posts/projects 3- and 4-unit trains listed with chosen listing method.	Can I get a volunteer to share the list they have so far? Does anyone have a different list? Or did anyone make the same list in a different way? How are these lists different? Which one is "right?" For each list, how do you know all possible trains are shown? Which list would be good to use with a train of longer length? Why?
15 min.	Hand out <i>Building Trains: Part II</i>. Set students to work.	
<i>OPTION #1 FOR DAY 1/DAY 2 BREAK</i>		
15 min.	Create or post list of 5-unit-long trains. Facilitate discussion of how students know they have them all. Ask for the total number of 5-unit-long trains.	According to our listing method, what would be the first train I'd start with? How do we know we have them all? How can we "check" our lists mathematically?
<i>OPTION #2 FOR DAY 1/DAY 2 BREAK</i>		
10 min.	Begin construction of data table. Hand out <i>Building Trains: Part III</i>. Set students to work.	One way to organize the data we've collected so far is with a table... How we can use our data so far to predict how many trains we could make of lengths 6, 7, or longer?
10 min.	Hand out <i>Building Trains: Part IV</i>.	How do you know you have them all? How can you "check" your lists mathematically?
6 min.	Solicit volunteer pairs/groups to share. Solicit predictions for trains of length 7, without listing any.	So were there 32? Were we right? What would you guess the total number of trains of length 7 would be? Why?
5 min.	Summarize the class' findings.	