Homework for Chapters 5-6

1. Let W be the function of Wall-E's total blocks put away versus time, as defined in the Lesson 5 Explorations. *Hint: It may be helpful for this homework problem to put the origin at 9am instead of at noon.*

   (a) Describe a modification to the scenario in which the function of total blocks put away versus time would be $W(3x+1)$.

   (b) Describe a modification to the scenario in which the function of total blocks put away versus time would be $W(3(x+1))$.

   (c) In each of the above scenarios you wrote, highlight in pink where the "3" comes in, and highlight in green where the "+1" comes in.

   (d) On the same pair of axes, graph $y = W(3x+1)$ and $y = W(3(x+1))$. Explain the differences you see in terms of the scenario.

2. Complete the following:

   Principles of graph transformation

   - If you transform the input to move faster per time, the graph of the function will appear to move faster per time. The graph will look as though you took the original graph and you squished the input coordinates of the coordinate plane, because you are moving faster through time.
   - If you transform the input to have a head start, the graph will look as though you pushed the origin forward, because you are effectively starting before the zero mark.
   - If you transform the input to move slower per time:
   - If you transform the input to start later:

3. Read over Section 5.4 on illustrating principles of transformations.

   - Prepare a 7-minute lesson in which you explain the solution to a problem that combines a faster/slower per time transformation with a head start/delayed start transformation.
   - Assume that you had assigned the problem for homework, and most students have done the problem correctly. You are now reviewing the problem so as to reinforce the principles.
   - The problem should use one of the common contexts listed in Section 5.4.
   - Your explanation should adhere to the characteristics of a good explanation listed in that section.
   - Your lesson should include some comprehension questions about the graphs that tie directly into the statement of the principles.

Here is the feedback chart that will be used for the lesson:

Are units and quantities realistic?	Input units and quantities realistic/not realistic Output units and quantities realistic/not realistic
How clear is the problem statement?	Clear / sort-of clear / unclear
How accurate is the solution to the problem? How clear is the solution to the problem?	Accurate / sort-of accurate / not accurate Clear / sort-of clear / unclear
Is the explanation of the graph strictly procedural (e.g., "you move the graph by 1 unit to the right") or does it combine the procedure with explanations both in terms of the definition of graph (in terms of input and output) and the problem context? ("Combine" means "connection is not implied, it is explicit")	Strictly procedural / not strictly procedural Connects explicitly with definition of graph / does not do so Connects explicitly with problem context / does not do so
How accurate are the statement of the principles? How clear are they?	Accurate / sort-of accurate / not accurate Clear / sort-of clear / unclear