Extra Exercises for Chapter 3. Stocks and Flows

1. What Are the Units?

The variable A is measured in calories.
Time is measured in seconds.

What are the units for B? __________
What are the units for C? __________
What are the units for G? __________

2. Acceptable Units

Possible values for T (in Figure 1) are shown below.
1) T = 0.25 calories/hour
2) T = 25 degrees Celsius
3) T = 2.5 hours
4) T = 0.25 per second

Which of the values makes sense for the model in Figure 1? _________________

Which of the following makes sense for E in Figure 1? _________________
1) E = 25 calories
2) E = 25 seconds
3) E = 0.25 (dimensionless)
4) E = 2.5 calories per square meter

3. Write equations: Based on your answers to exercise #2, write equations for B and G that make sense.

   B = ________________
   G = ________________

4. Identifying Stocks & Flows in a Financial System

Figure 2 shows a “pipes and tanks” diagram of the cash flow of an Investor Owned Utility (an IOU). The diagram shows sources of funds on the left, uses of funds on the right. Sources and uses are expressed in millions of dollars per year. The assets and liabilities are expressed in millions of dollars. They will appear at the bottom of the diagram. Chapter 24 explains how system dynamics has been used to study the financial problems of IOUs. You may not have looked at this chapter and you may not know much about utility financing. Nevertheless, you should be able to identify the key stocks and flows based on the imagery in this diagram.

   What are the stocks? ________________________________________________
   What are the flows? ________________________________________________
Figure 2. Pipes and tanks diagram for the cash flow in a regulated, investor owned-utility (an IOU).

5. Flow Diagram for a Financial Model: Draw a flow diagram of a model to simulate the financial situation portrayed in Figure 2. Keep the diagram simple by limiting the model to the stocks and flows.