

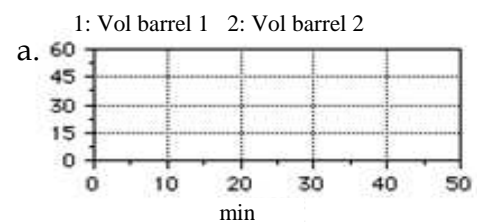
Rain Barrel Activities with STELLA:

Activity 4: Adding a Second Barrel

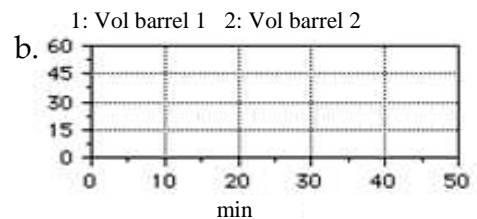
This activity will have two 55-gallon rain barrels. The first barrel will have a faucet inflow and a spigot outflow at the bottom-side. The outflow of the first barrel will flow into the second barrel. The second barrel will have a spigot outflow at the bottom-side, similar to the first barrel. (Set $DT = 0.125$ for all the models in this activity.) Both barrels start out empty.

1. Design a STELLA model with 5 gal/min flowing into the first barrel. Set the outflow of each barrel to 20% of its volume per minute. Set the simulation time to 50 minutes.

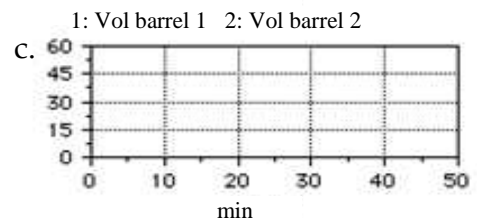
1(a). **Sketch** the curve of the volume of barrel 1 and barrel 2 on the same grid at the right. Be sure to identify each curve on the graph.



1(b). If the input to the first barrel is 5 gal/min and spigot 1 releases 10% of its volume per minute but spigot 2 releases 20% of its volume per minute, **sketch** how the two barrel volume curves will look. Be sure to identify each curve on the graph.



1(c). If the input to the first barrel is 5 gal/min and spigot 1 releases 20% of its volume per minute but spigot 2 releases 10% of its volume per minute, **think and sketch** how the two barrel volume curves will look before you test your hypothesis. (Verify.) Be sure to identify each curve on the graph.

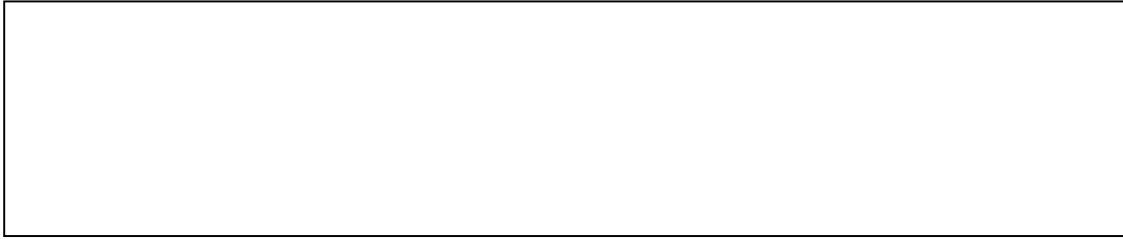


2. Now assume that a 55-gallon bucket dumps water into the first barrel at time 0 and no other water enters the first barrel after that. The two spigots are each set to release 10% of their volume per minute. Run this simulation. (*Hint:* Set the graph vertical axis for both barrel volume curves 0-55.) **Print** out the diagram and the graph. (Make sure the graph shows that the first bucket gets filled to 55 gallons!)

Describe each barrel volume curve.

barrel 1

barrel 2



Describe how the volume of water in barrel 1 affects the volume of barrel 2. Explain using the inflow and outflow amounts from barrel 1 and barrel 2.



About STELLA

Using STELLA modeling and simulation software, students can create models and run simulations of systems over time. The results of simulations are displayed with visual representations to support diverse learning styles.

Thousands of educators and researchers have made STELLA the gold standard; using it to study everything from economics to physics, literature to calculus, chemistry to public policy. K-12, college, and research communities have all recognized STELLA's unique ability to stimulate learning.

For more information, contact isee systems, inc.

www.iseesystems.com

Phone: (603) 448-4990

Toll Free: (800) 987-6758

Fax: (603) 448-4992