1. ABSTRACT

The goal of this paper is to teach the reader how to distinguish between stocks and flows. A stock is an accumulation that is changed over time by inflows and outflows. The reader will gain intuition about stocks and flows through an extensive list of different examples and will practice modeling simple systems with constant flows.

2. INTRODUCTION

What is the difference between a stock and a flow? Stocks are accumulations. Stocks hold the current state of the system: what you would see if you were to take a snapshot of the system. If you take a picture of a bathtub, you can easily see the level of the water. Water accumulates in a bathtub. The accumulated volume of water is a stock. Stocks fully describe the condition of the system at any point in time. Stocks, furthermore, do not change instantaneously: they change gradually over a period of time.

Flows do the changing. The faucet pours water into the bathtub and the drain sucks water out. Flows increase or decrease stocks not just once, but every unit of time. The entire time that the faucet is turned on and the drain unplugged, water will flow in and out. All systems that change through time can be represented by using only stocks and flows.

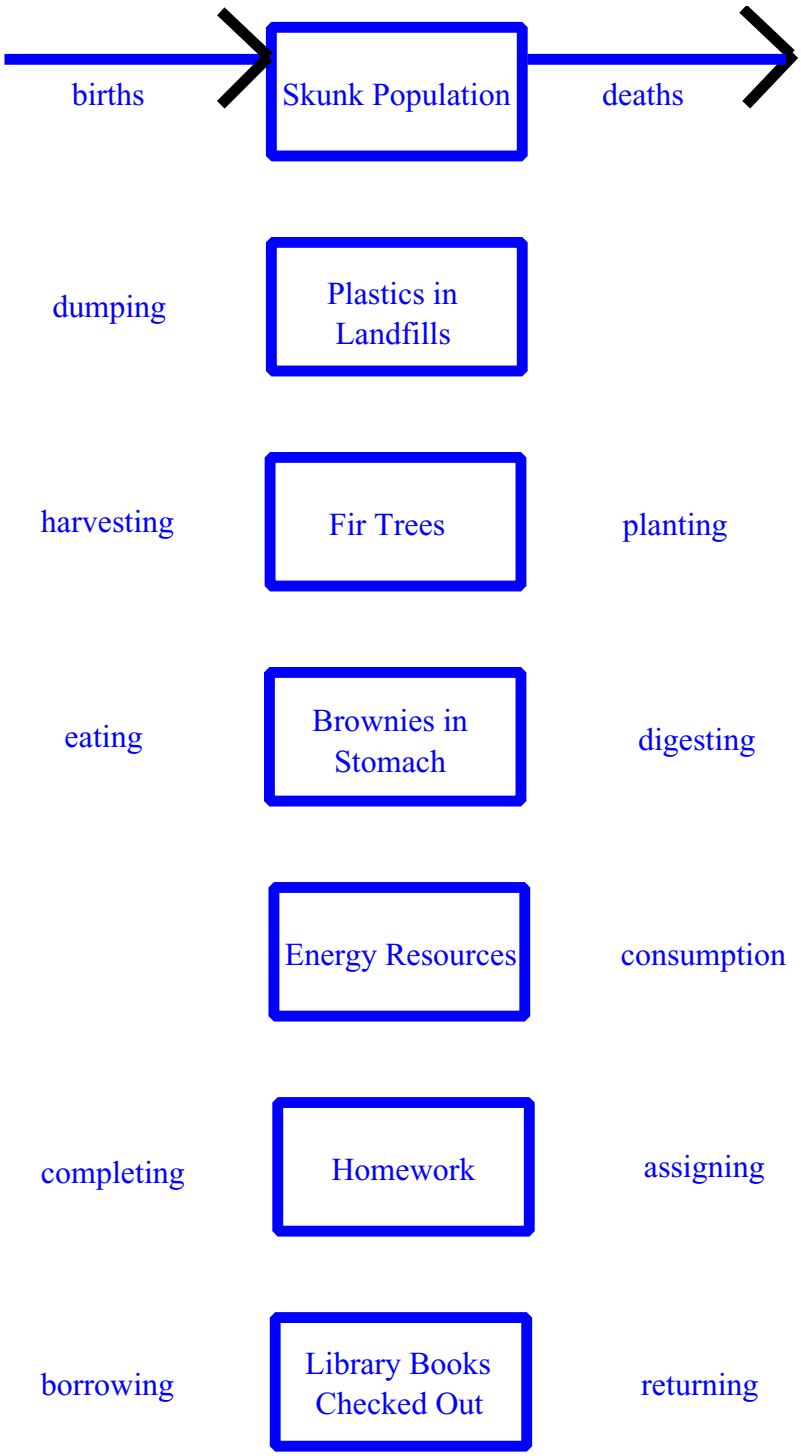
3. STOCKS AND FLOWS

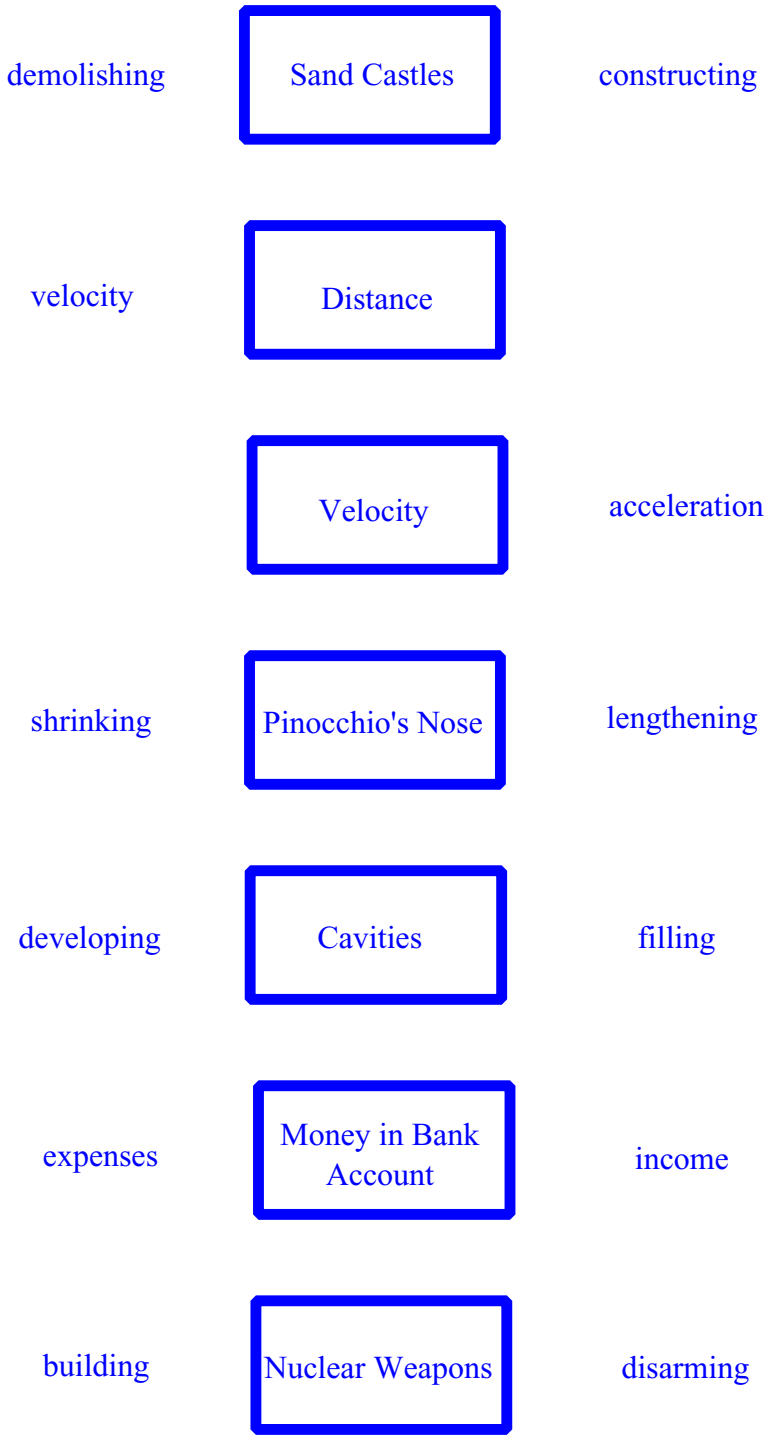
Below are fourteen rows of variables. For each row, identify which variable is a stock and which are the flows that change the stock. Draw a box around the stock. The first row has already been done as an example. The population of skunks is a stock. The size of the skunk population changes with a number of births each year and a number of deaths each year.

births	deaths	skunk population
dumping	plastics in landfills	
harvesting	fir trees	planting
brownies in stomach	eating	digesting
consumption	energy resources	
completing	assigning	homework
returning	borrowing	library books checked out

velocity	distance	
velocity	acceleration	
sand castles	demolishing	constructing
shrinking	Pinocchio's nose	lengthening
cavities	developing	filling
expenses	income	money in bank account
building	nuclear weapons	disarming

The solution is pictured below. The stocks are in the center, boxed, and the flows are on the outside. Now determine which flows are inflows and which are outflows by drawing arrows into or out of the stocks. The first row has been done as an example. The skunk population is *increased* by births and *decreased* by deaths.




demolishing
Sand Castles
constructing
velocity
Distance
Velocity
acceleration
shrinking
Pinocchio's Nose
lengthening
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Cavities
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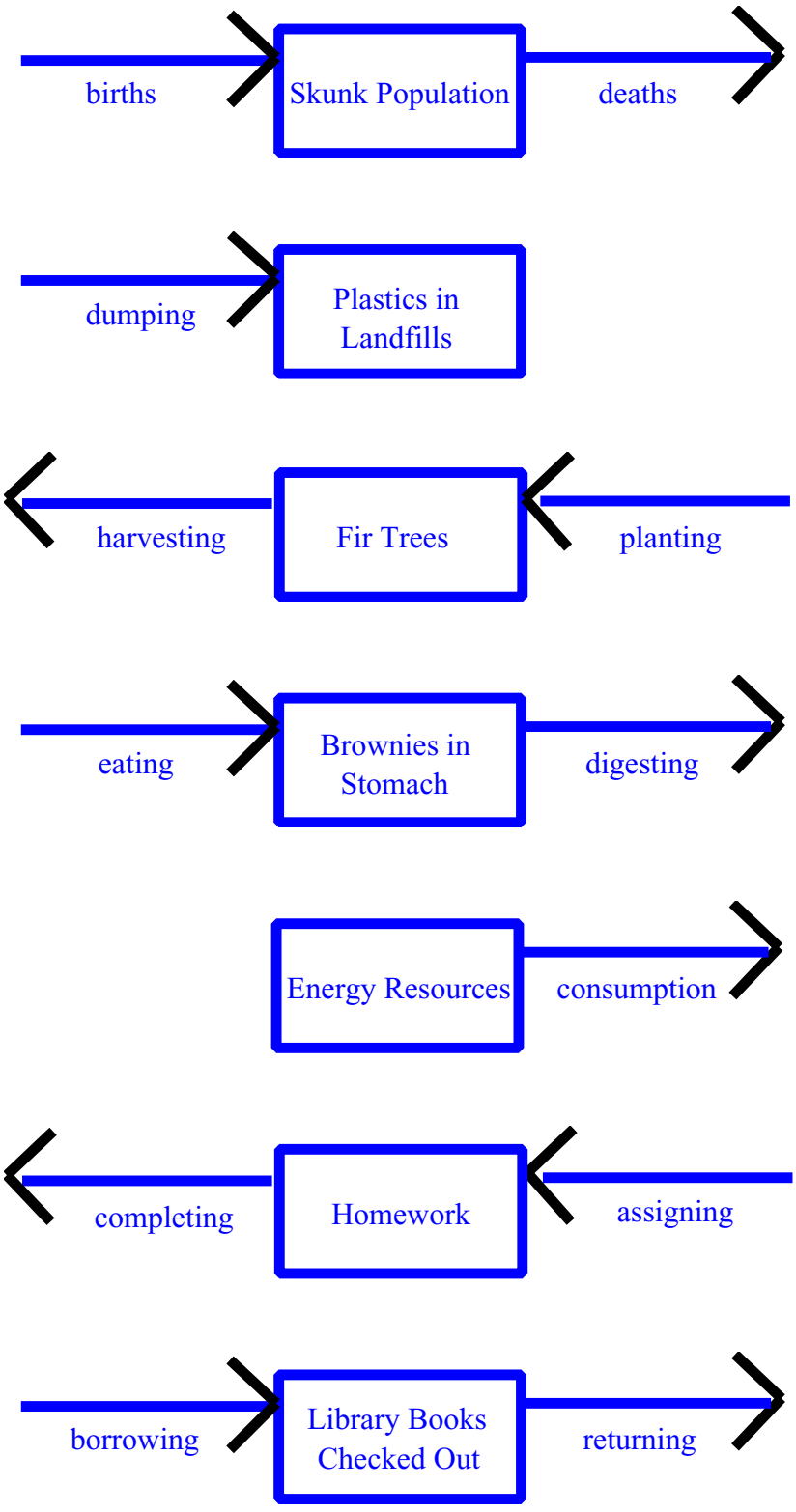
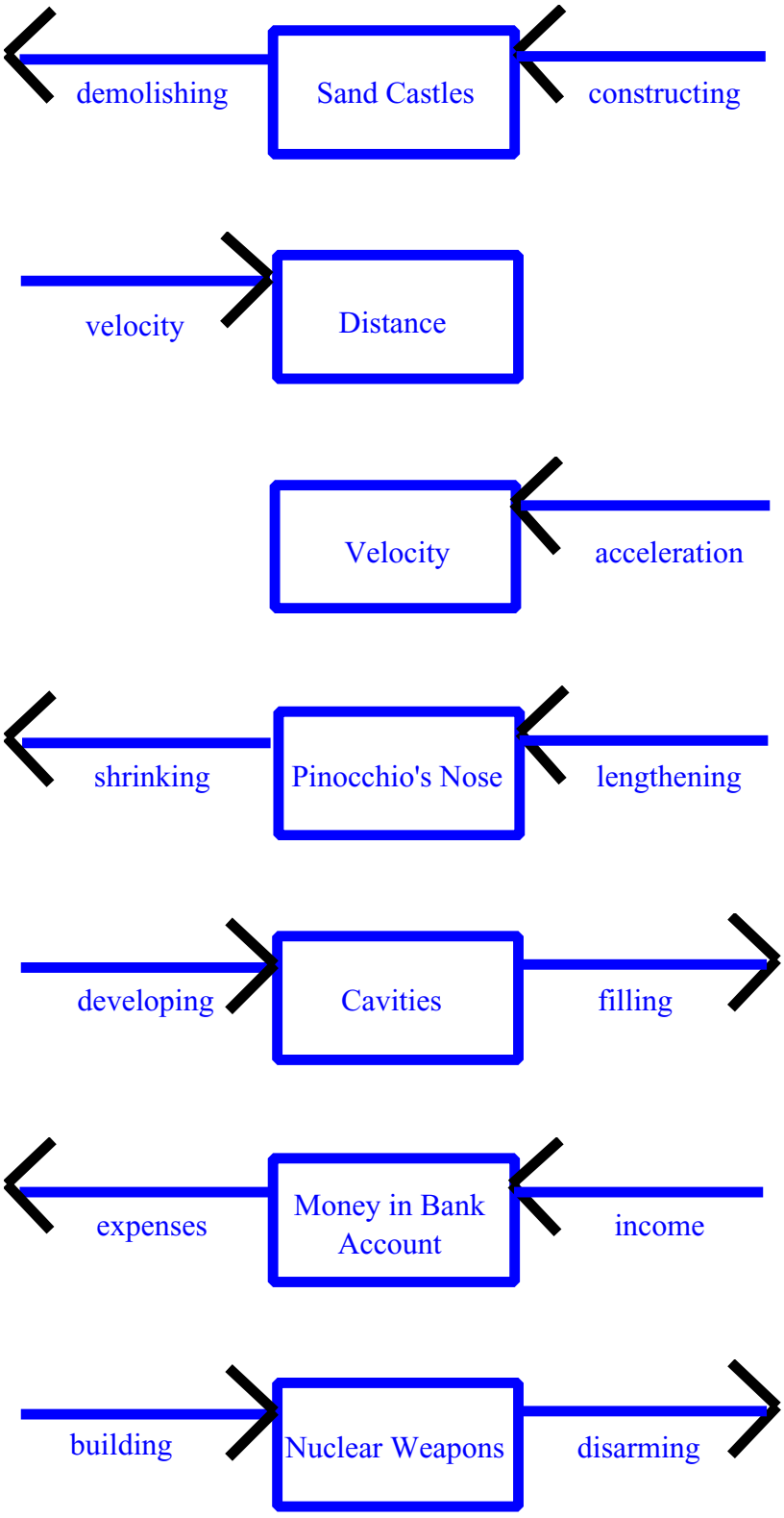
Money in Bank Account
income
building
Nuclear Weapons
disarming

The solution is depicted below:

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