

Two strains of bacteria – *Calcul S. Coli*, denoted C , and *Life S. Eyencus*, denoted L – are dissolved in a solution of Sprite, denoted S . Below, is a verbal description of the interactions among the two types of bacteria and the Sprite.

- C grows logistically, with carrying capacity proportional to the amount of L present.
- Sprite consumes C at a rate proportional to the amount of C present.
- A pair of C bacteria can spontaneously join to form an L bacterium; the overall rate at which this occurs is proportional to the number of possible C -to- C interactions;
- L grows at a rate that is, in the absence of other factors, proportional to the amount of L present, but that is inhibited by S : the more S there is present, the more slowly L grows;
- An L bacterium can spontaneously split into two C bacteria; the overall rate at which this occurs is proportional to the amount of L present;
- S grows at a rate proportional to the amount of C present times the amount of L present;
- Each *individual* C bacterium consumes S at a rate proportional to the amount of S present;
- L consumes Sprite at a rate proportional to the amount of L present.

	$+tL$	$-eS$
	$+d(L + eS)$	$+aC \left(1 - \frac{CL}{b}\right)$
	$C' = +aC \left(1 - \frac{C}{bL}\right) -wC -2\ell C^2$	$+2tL$
	$L' = +\ell C^2 + \frac{dL}{1 + eS}$	$-tL$
	$S' = +gCL -vCS -hL$	