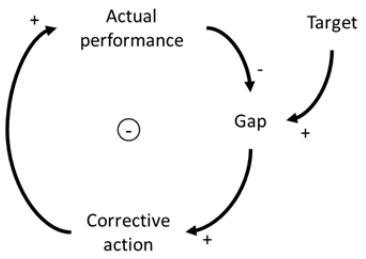
Seeing and drawing balancing feedback

Balancing feedback operates whenever there is a **goal-oriented behavior**. The goal may be explicit or implicit. The goal may be an objective or some desired situation that you want to reach or defend. Whenever you pursue a goal or look to correct or adjust something to a desired state you are engaging in balancing feedback. The goal may also be **a limit or a constraint** such as the amount of an available natural resource. The limit or constraint has the same effect as a goal, allowing activity to continue until it is approached or reached.

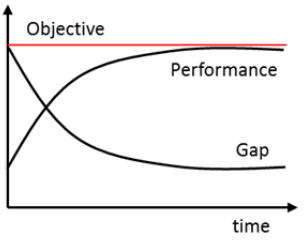
Whenever you are faced with a **situation of slowing growth** or **decline towards a limit or goal**, reinforcing feedback is at work.

A balancing loop always has four elements: a corrective action, a performance variable, a target or goal and a gap between the target and actual performance. The difference between the performance variable and the goal stimulates a corrective action until the gap disappears.

Structure of a balancing loop

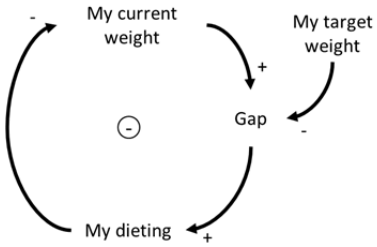


Behavior of balancing feedback



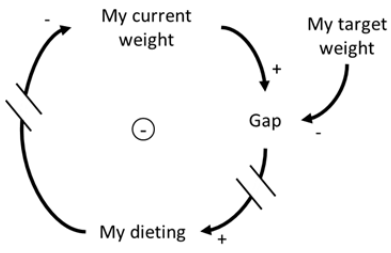
An invisible goal? Sometimes we don't draw the goal in a balancing loop, but it is always there. In the case of the clown attacks, the government's goal was that there be no more attacks and it kept applying repressive and preventive actions until this was the case.

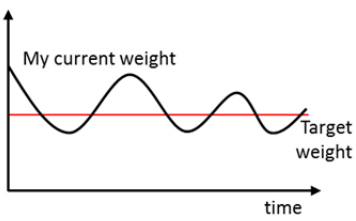
Example: Dieting is a good example of negative feedback at work. Let's say I weigh 110 kg but I'd really like to weigh 100 kg. When I begin dieting I am 10kg above my goal weight. This difference motivates my dieting efforts. The balancing loop keeps turning until my actual weight equals my goal weight.



Can you see that the polarities are different here? An increase in my "actual weight" increases the gap and an increase in my target weight decreases it. My weight drops sharply at first and then more and more slowly as I approach my goal weight. At the end of 6 months I've reached my goal and I stop my corrective action. The shape of this curve is one of **asymptotic decline**.

If there are any **delays** in the causal relationships then goal seeking behavior may be **oscillatory**. For example, there may be delays in collecting the information on the performance variable needed to take goal-seeking action.





Using dated information leads to the system missing or overshooting its goal. Here I may apply an overly strong corrective action such as stricter dieting because I am not aware of my true performance level and the gap to my target weight. This is an **information delay**. Oscillations may also be caused by physiological delays in our corrective action taking effect. In this case the delay is between the variables "my dieting" and "my current weight". This is a **material delay**.