

What is the difference between a positive and negative feedback loop?

Positive:

In a positive feedback loop, a system responds to disturbance in the same direction as the disturbance.

Put more simply, change accelerates and the system becomes unstable.

Some climate change examples of a positive feedback loop:

Global warming causes permafrost* to melt in places like Siberia, so frozen organic soils release CO₂ and methane (a powerful greenhouse gas) which increase the greenhouse effect and make the world warmer...

Melting polar icecaps change the albedo (reflectance) of the Earth's surface. White (ice) reflects heat, whilst darker colours (i.e. soils) absorb more heat, so warming takes place and more ice melts...

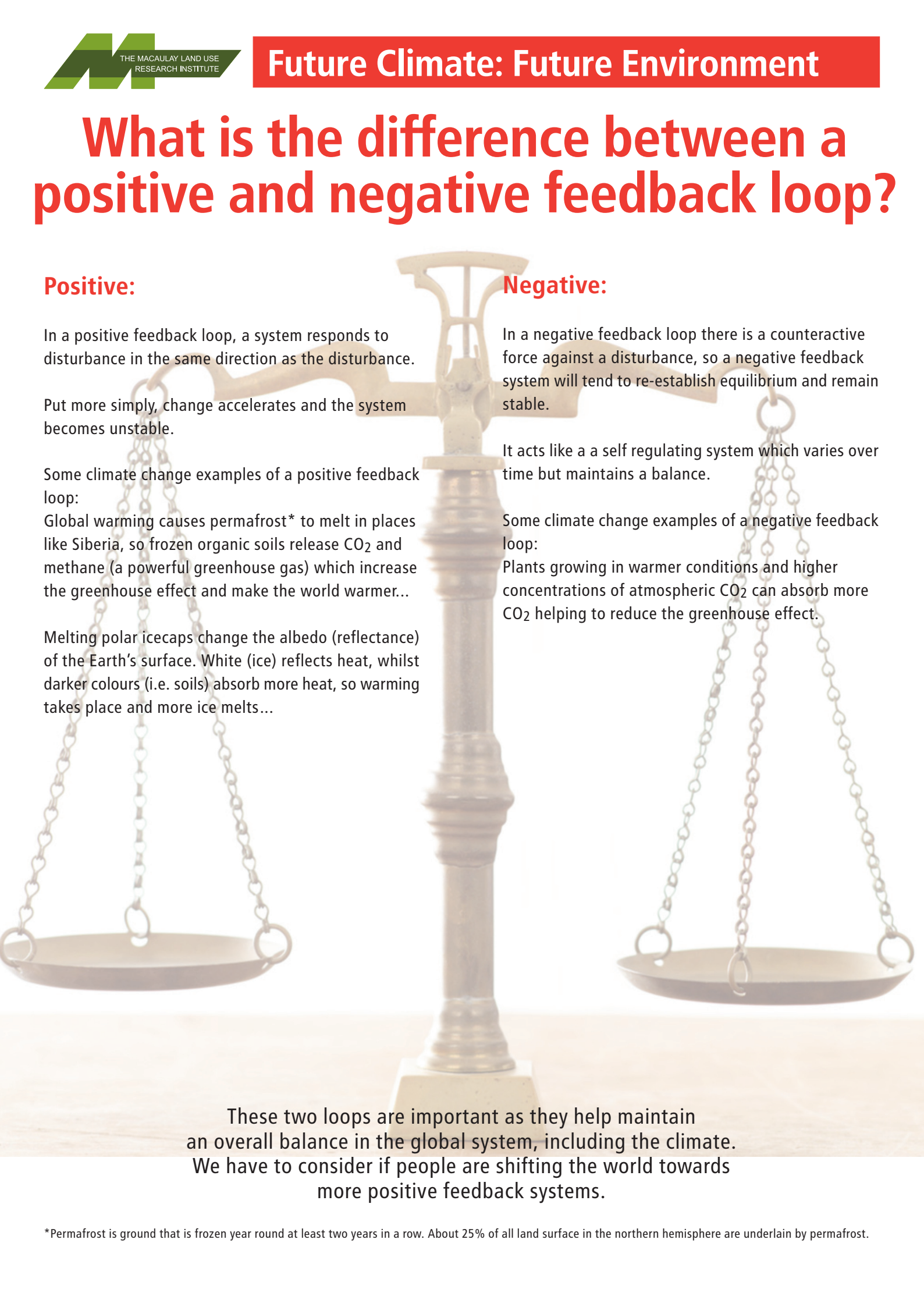
Negative:

In a negative feedback loop there is a counteractive force against a disturbance, so a negative feedback system will tend to re-establish equilibrium and remain stable.

It acts like a self regulating system which varies over time but maintains a balance.

Some climate change examples of a negative feedback loop:

Plants growing in warmer conditions and higher concentrations of atmospheric CO₂ can absorb more CO₂ helping to reduce the greenhouse effect.



These two loops are important as they help maintain an overall balance in the global system, including the climate. We have to consider if people are shifting the world towards more positive feedback systems.

*Permafrost is ground that is frozen year round at least two years in a row. About 25% of all land surface in the northern hemisphere are underlain by permafrost.