Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block \_\_\_\_\_\_ Binder Page # \_\_\_\_\_\_

**Feedback Loops and Climate Notes**

1. Stimulus – a T\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or event that evokes a specific R\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Negative Feedback – when the response D\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 stimulus. System is S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. Positive Feedback – when the response E\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 stimulus. System C\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over time.

4. Feedback Loops

 Positive Feedback-Situation at the S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is in the middle.

 Over time there is either an E\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or Blocking.

 There is no Intermediate S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 Negative Feedback-Situation at the S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are separated.

 Over time the situations cross and C\_\_\_\_\_\_\_\_\_\_\_\_\_ and C\_\_\_\_\_\_\_\_\_\_\_\_

 Eventually they meet at the G\_\_\_\_\_\_\_\_\_\_\_\_.

5. Feedback Loops – Another way to visualize it.

 Negative Feedback – Disturbances are D\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 System remains near it’s S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ point.

 Positive Feedback – Disturbances are A\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 System may E\_\_\_\_\_\_\_ U\_\_\_\_\_\_ far from its S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ point.

6. Positive Feedback is Less Common

 Understandable – most changes to steady state pose a T\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and to enhance them would

 be M\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ U\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. Positive Feedback Loops

 Response S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ initial stimulus

 Response gets G\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and G\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over time or

 S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over time.

 Ex. More cattle run – M\_\_\_\_\_\_\_\_\_\_ panic – more C\_\_\_\_\_\_\_\_\_\_\_\_\_\_ run – more P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Ripe F\_\_\_\_\_\_\_\_\_\_\_\_\_ produces more ethylene 🡨---------🡪 Ethylene makes fruit R\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Negative Feedback is the most common in biological systems.

 Conditions stay within a S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ R\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 Ex. Thermostat / Furnace in a house – How?

 Ex. Plants and CO2 – more CO2 in atmosphere > increase in P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth > Plants

 R\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ CO2 from the A\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 System is stabilized. Amount of CO2 in air R\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the S\_\_\_\_\_\_\_\_\_\_\_\_\_ over time.

9. Predator – Prey Relationship

 More Antelope -------🡪 Cheetah Population G\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Stable Population

 Fewer Antelope ----🡪 Cheetah Population S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. Big Picture – Climate Science is Complicated

 Positive and N\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Feedback Loops are A\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ simultaneously.

 Making Predictions about F\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ climate Conditions is very D\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

11. Permafrost….

 Temperature rise > Permafrost T\_\_\_\_\_\_\_\_\_\_\_\_ > Gases are released > Temperatures R\_\_\_\_\_\_\_\_\_\_\_........

12. Earth’s Carbon Cycle