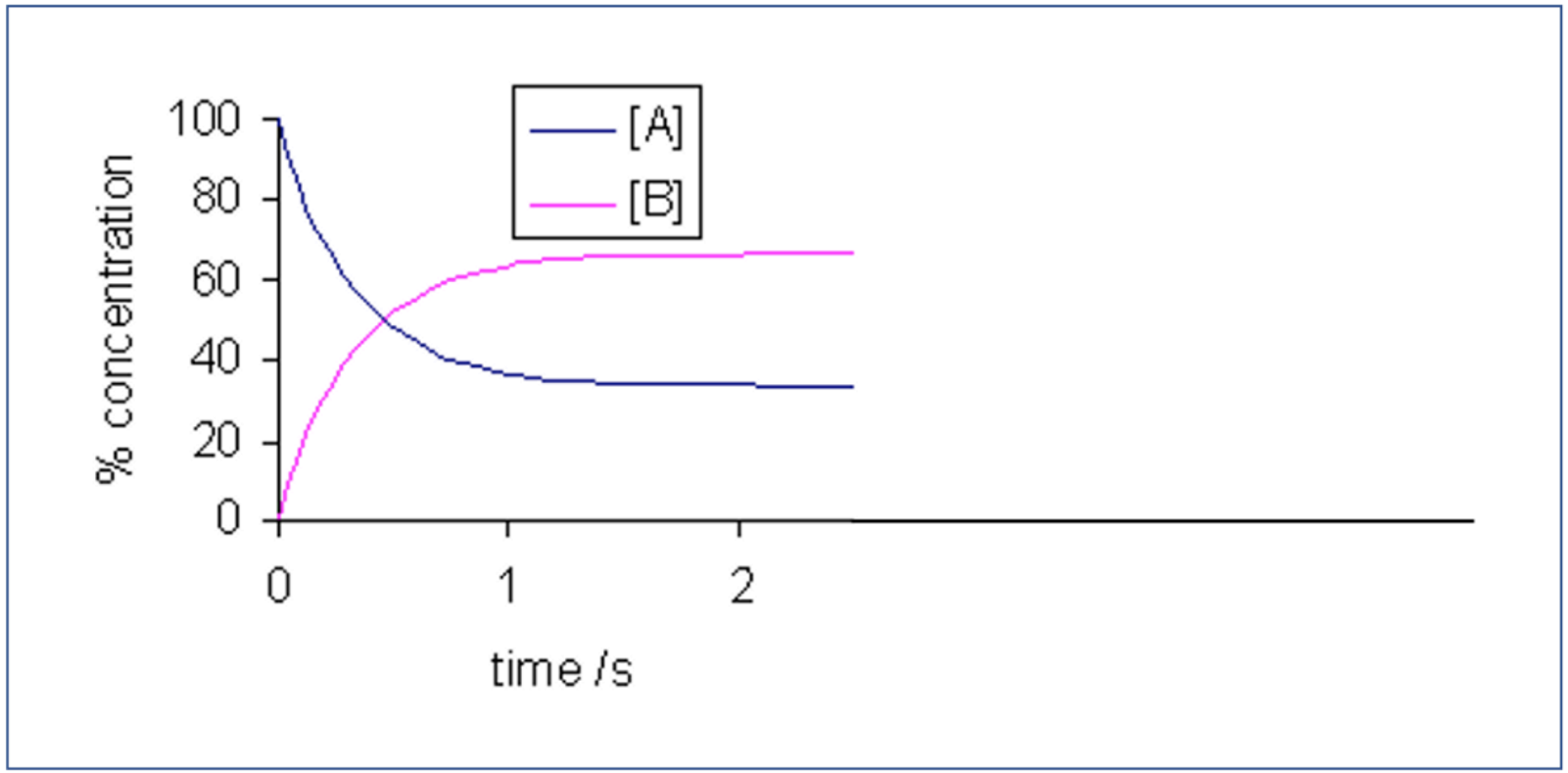
Modeling Equilibrium

Entrance Card - Equilibrium **Name:**

Consider the following graph depicts the changing concentrations of the chemical species, A and B in a chemical reaction. The reaction is represented by the chemical equation:

$$A \rightleftharpoons B$$



1. Extend the lines on the graph to 4 seconds. At what time would you say that equilibrium has been achieved?

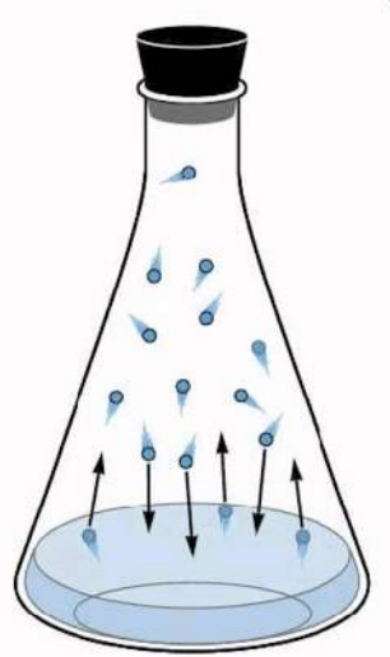
2. In your own words, how would you define the term “chemical equilibrium”?

3. Write the equilibrium expression for this reaction.

Scientific Modeling of Dynamic Equilibrium

A scientific model is...

“A representation of a phenomena that is difficult to observe.”

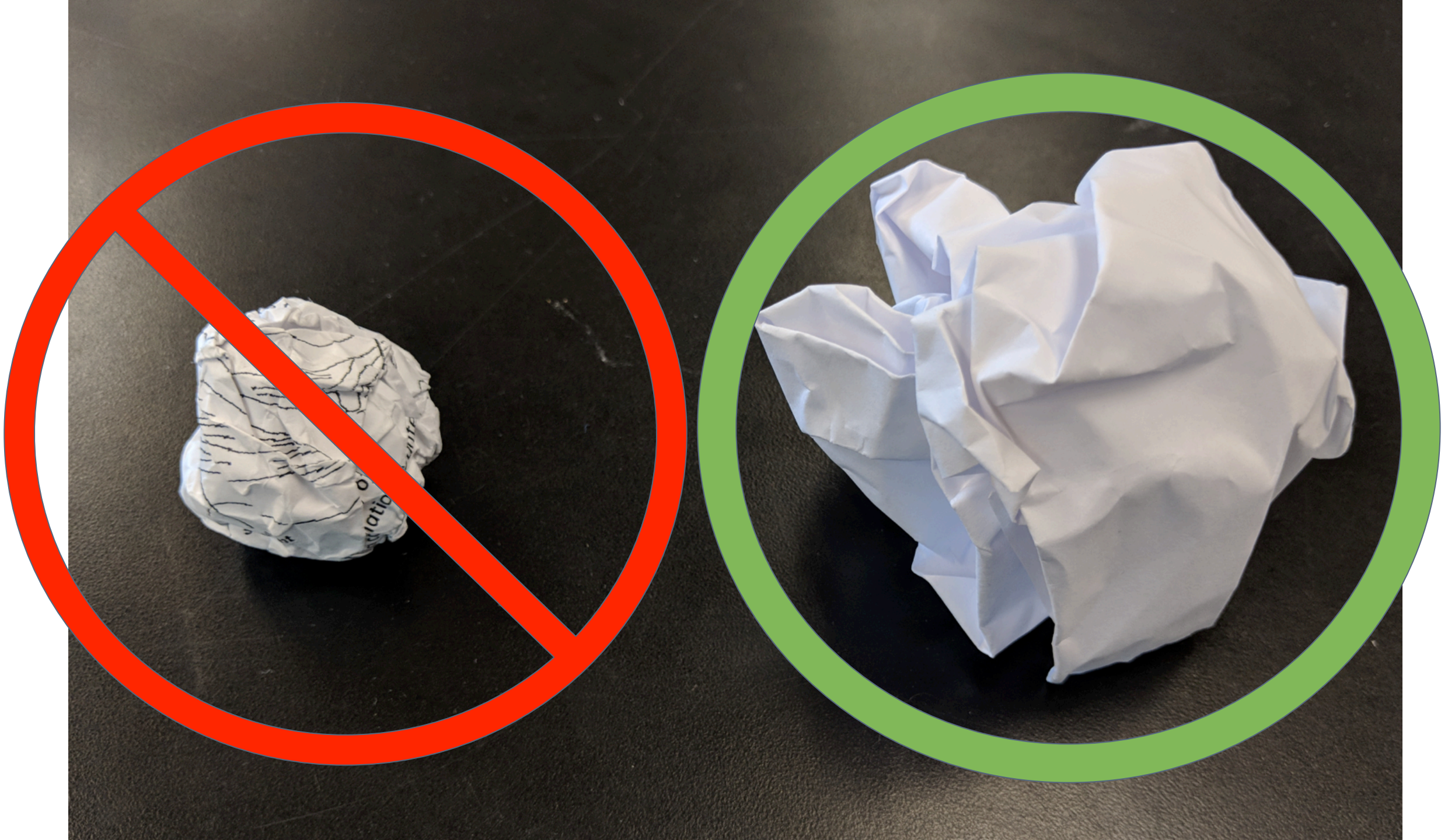


The process of evaporation and condensation is reversible. At equilibrium, the number of liquid and gas particles do not change, even though evaporation and condensation still occurs.

Every time a particle evaporates, another condenses.

“Snowball Fight”

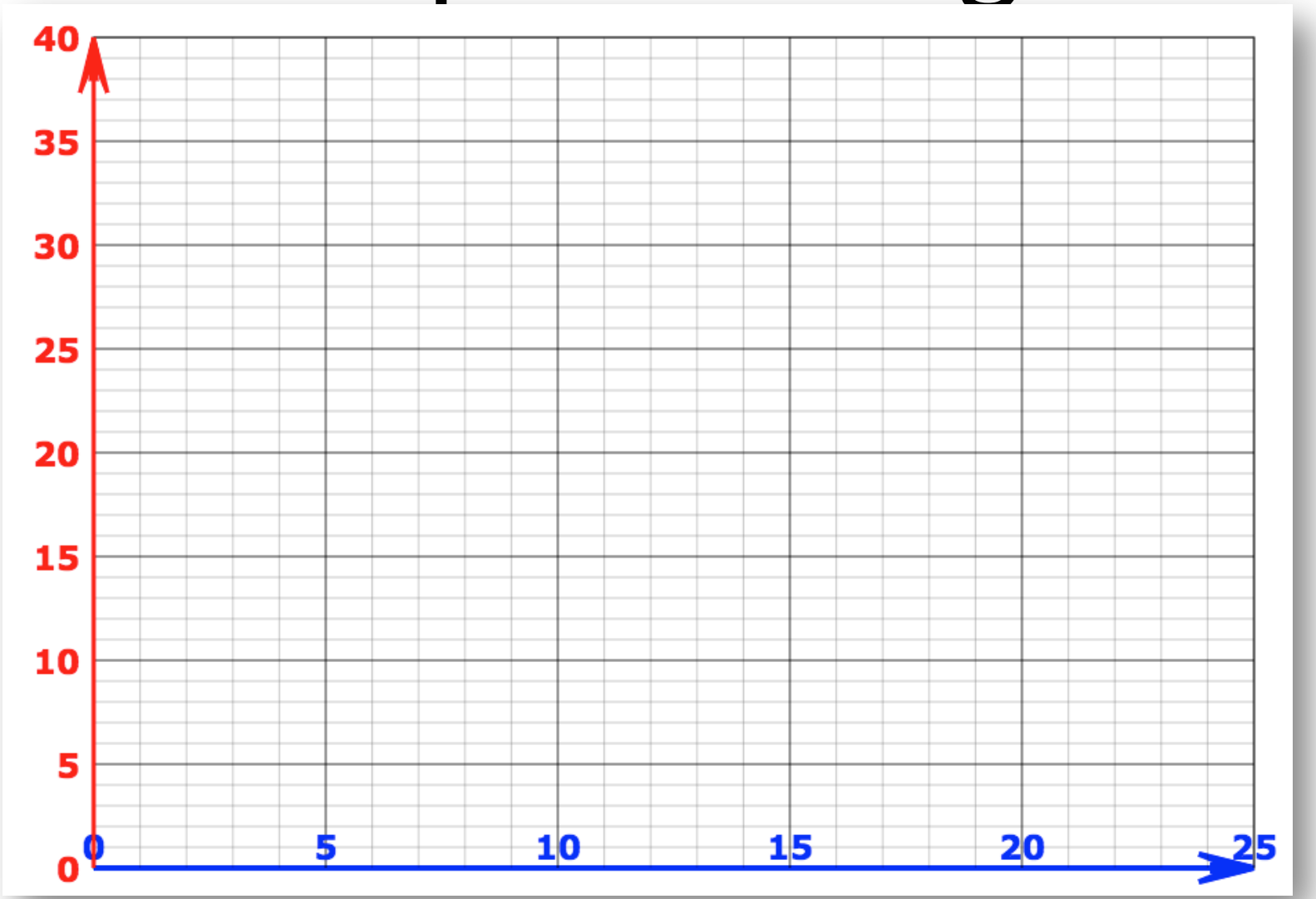
Reactants	Products



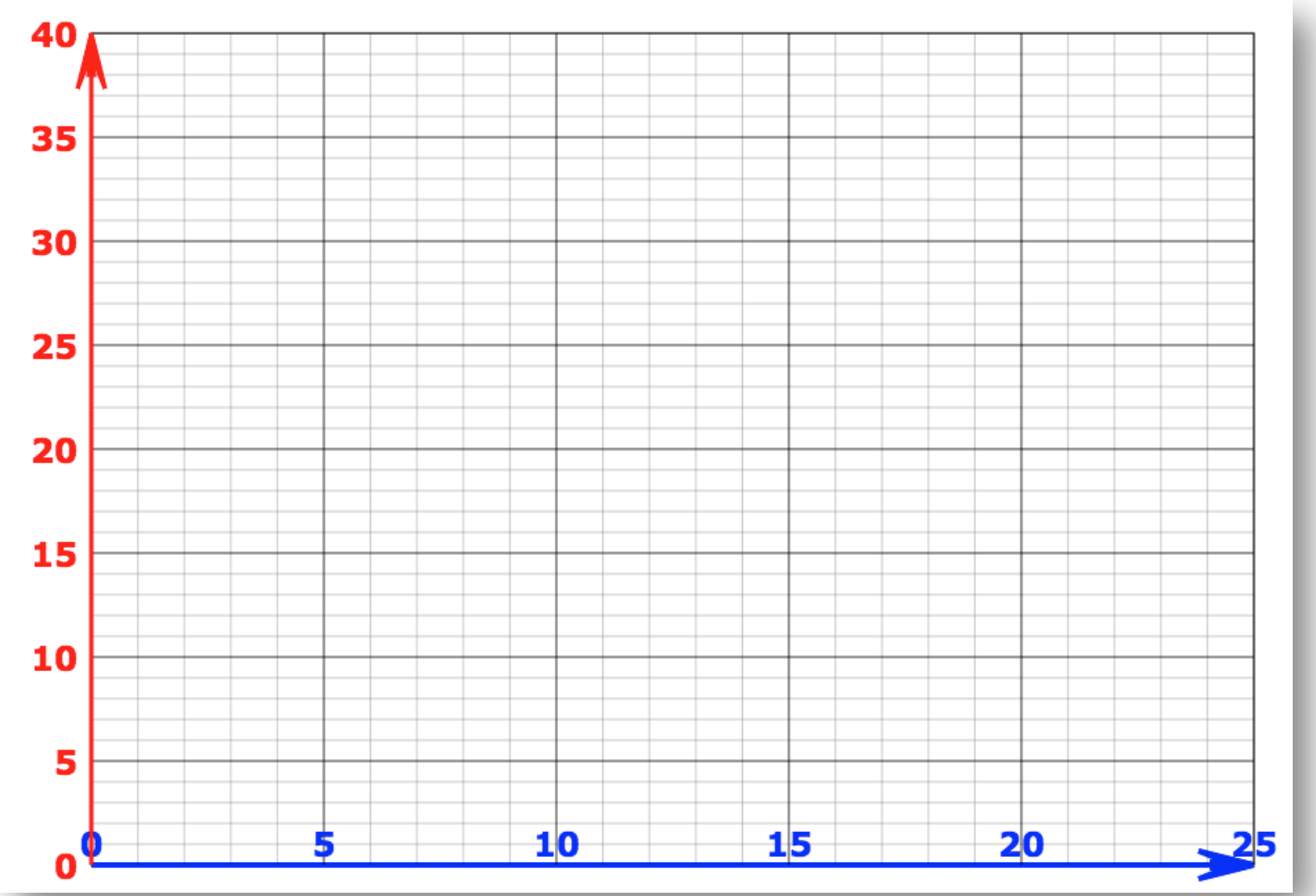
“Snowball Fight” RULES

- Only throw one “snowball” at a time.
- When a “snowball” lands near/or hits you, pick it up and toss it back.
- When the timekeeper yells “Stop,” all activity ceases. **(FREEZE)**

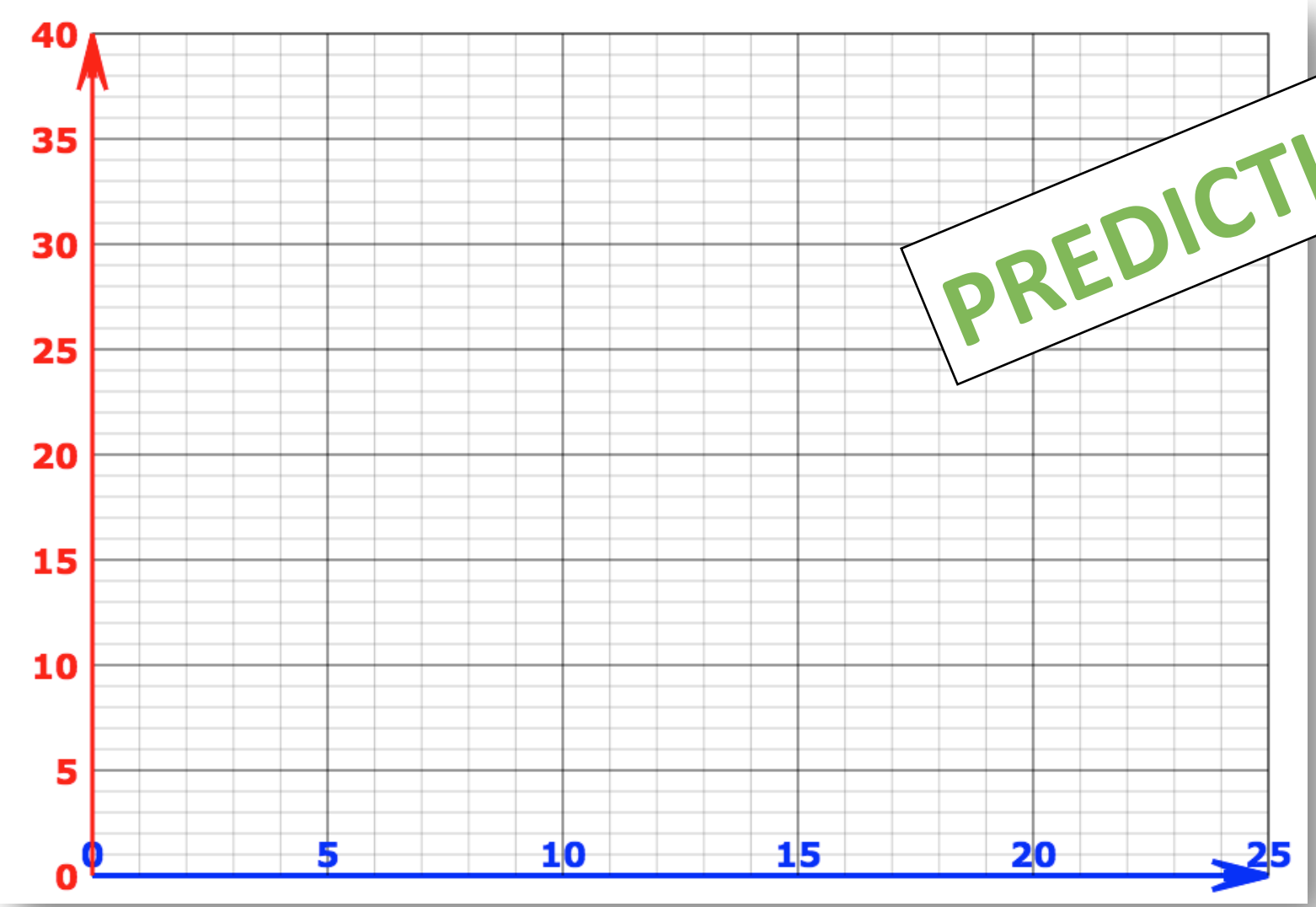
Round 1 – Equal driving force



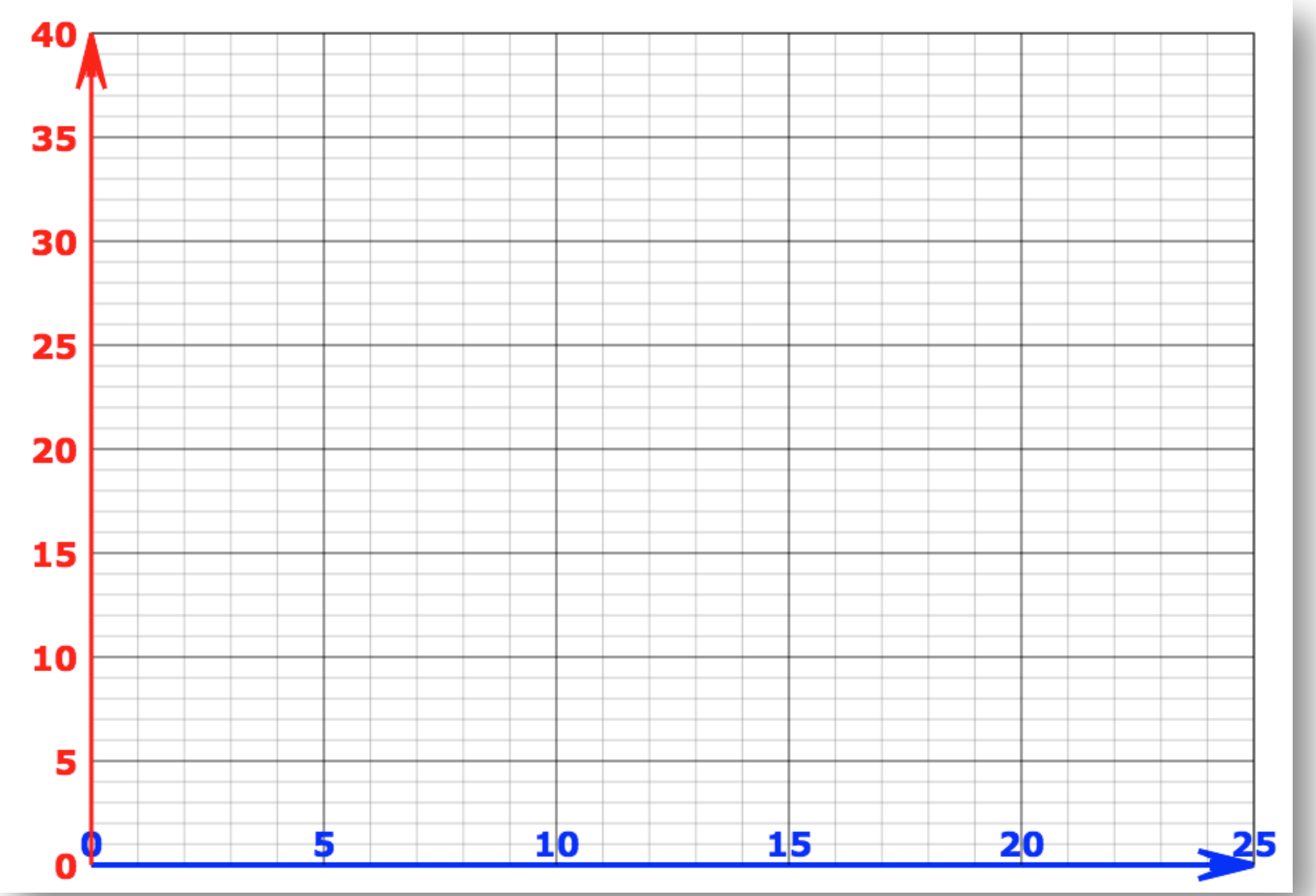
Round 2 – Greater reverse force



Round 3 – Greater forward force



Round 3 – Greater forward force



Equilibrium Constant

$$Keq = \frac{[PRODUCTS]}{[REACTANTS]}$$

Calculating Equilibrium Constants

Equal Driving Force

$$Keq =$$

Greater Forward Driving Force

$$Keq =$$

Greater Reverse Driving Force

$$Keq =$$

What are the positive aspects of our model?

- What parts of dynamic equilibrium did our model represent well?
- How did our model help you understand dynamic equilibrium better?

What are the negative aspects of our model?

- What does our model fail to explain?
- How could our model be improved to more completely explain dynamic equilibrium?

What are alternative models?

- In your group, come up with your own model to describe dynamic equilibrium.