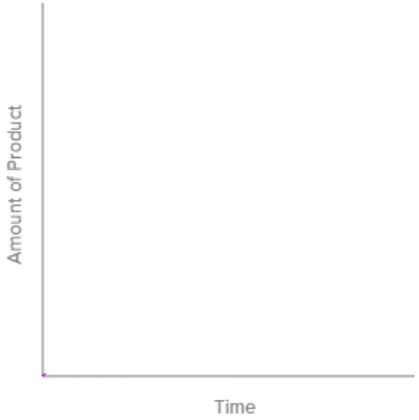
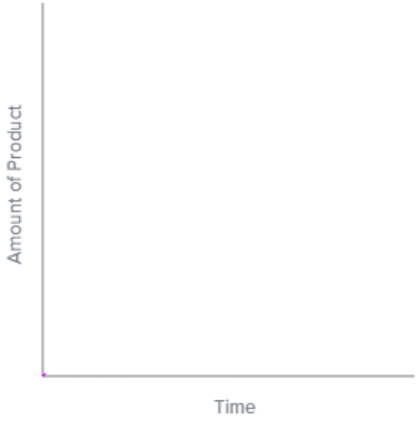
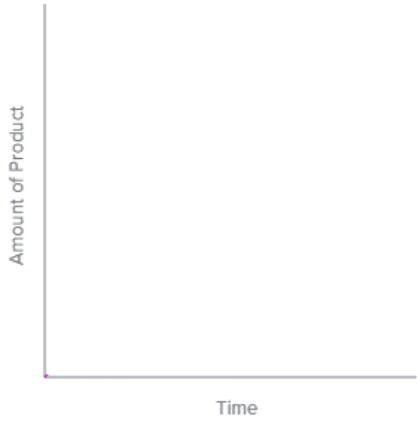
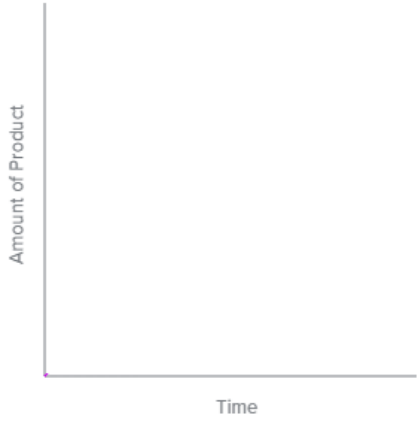
Classroom Resources: Reaction Rates Simulation Worksheet

https://teachchemistry.org/classroom-resources/reaction-rates-simulation

- In this simulation of reaction rates, you will watch the **reactants** (A- blue dots and B- red dots) mix together to form the **products** (C- purple dots) and how fast they are made. $A + B \rightarrow C$
- The X-axis of the graph will also tell you how fast it went. The closer to the **left** the **faster/quicker**, the farther to the **right** the **slower/longer** the reaction occurs.
- Look at the beaker on the left and fill out "Start" with the number of reactants (blue and red dots. Then click on the green "Run Reaction". Once the reaction is completed, fill in the number of products (purple dots). Look at your numbers and the chemical equation ($A + B \rightarrow C$) Do these numbers make sense?
- Continue on to the next page to see what happens to the reaction when you change the independent variable (catalyst, concentration, surface area, temperature). As you complete each step, draw the graph and return to this page and fill out the data table. On the graph, the original control is a solid line and the change is shown with a dashed line.

Reaction		**Blue Dots** (reactant A)	**Red Dots** (reactant B)	**Purple Dots at the end** (product)
Control				
Catalyst				
Concentration	Decrease			
	Increase			
Surface Area	Decrease			
	Increase			
Temperature	Decrease			
	Increase			

Directions	Graph
Click on “Select Variables” and change the drop down menu to “Catalyst”. Fill in the data table on the first page before and after clicking “Run Reaction”. For the number of reactant and product molecules. Sketch the graph to the right. Remember, the solid line represents control (original) and the dashed line represents how it changed when the addition of the “catalyst”. **Answer**: Did the reaction occur faster or slower? _____ Did you end up with more, less, or the same amount of product compared to the original control?_____	
Change the variable to concentration then “decrease” the concentration. Complete the data table before and after running the simulation of red, blue, and purple dots.	Sketch the graph with decreased and increase concentration. Be sure to label each line.
Click “Start Over” and choose “increase” concentration. Complete the data table before and after the reaction. **Answer:** Why does it take less time to complete the reaction in terms of molecule movement? Which one (increase or decrease) had more product (y-axis)? _____ Which one occurred more quickly (closer to the left)? _____	

Change the variable to surface area and increase it. **Explain below what happens to the blue and red dots in the beaker.** Run the reaction and sketch on the graph. **Explain:**	
Change the variable to surface area and decrease it. **Explain below what happens to the blue and red dots in the beaker compared to increased surface area**. Run the reaction and sketch on the graph. **Explain:**	
When you decrease the surface area, not all the blue and red dots change to purple. Explain why.	**Answer**:
Change the variable to temperature. Run the reaction with increased temperature and decreased temperature. Fill in the data table and sketch the graph. Notice with decreased temperature, not all the reactants turned to purple. **How would the graph change if ALL of the red and blue dots changed to purple if given an infinite amount of time?** **Answer:**	
Why does the reaction time go faster with higher temperatures (as seen by the line closer to the left on the graph)? Use your knowledge of reaction rates and collision theory in your answer. (Hint: When you add heat, you're really adding what? What type of energy heats and what type of energy is it changing into the beaker?)	Answer: