Polymer Properties **Name(s)**_____

A. The Glass Transition

Instructor Demonstration

1. Describe the behavior of the rubber ball in its cold "rubber" phase

2. Describe the ball in its "glass" phase

3. Describe the behavior of the ball in its warm "rubber" phase

4. What happened to the molecules in the polymer as it warmed up? Which phase do they move more freely in?

Observations below T_g

1. Describe the change in the behavior of the polymer on the tape as it warms

2. Record the bounce-height data every 30 sec for 6 min

Time (s)	Bounce height (cm)	Time (s)	Bounce height (cm)	Time (s)	Bounce height (cm)

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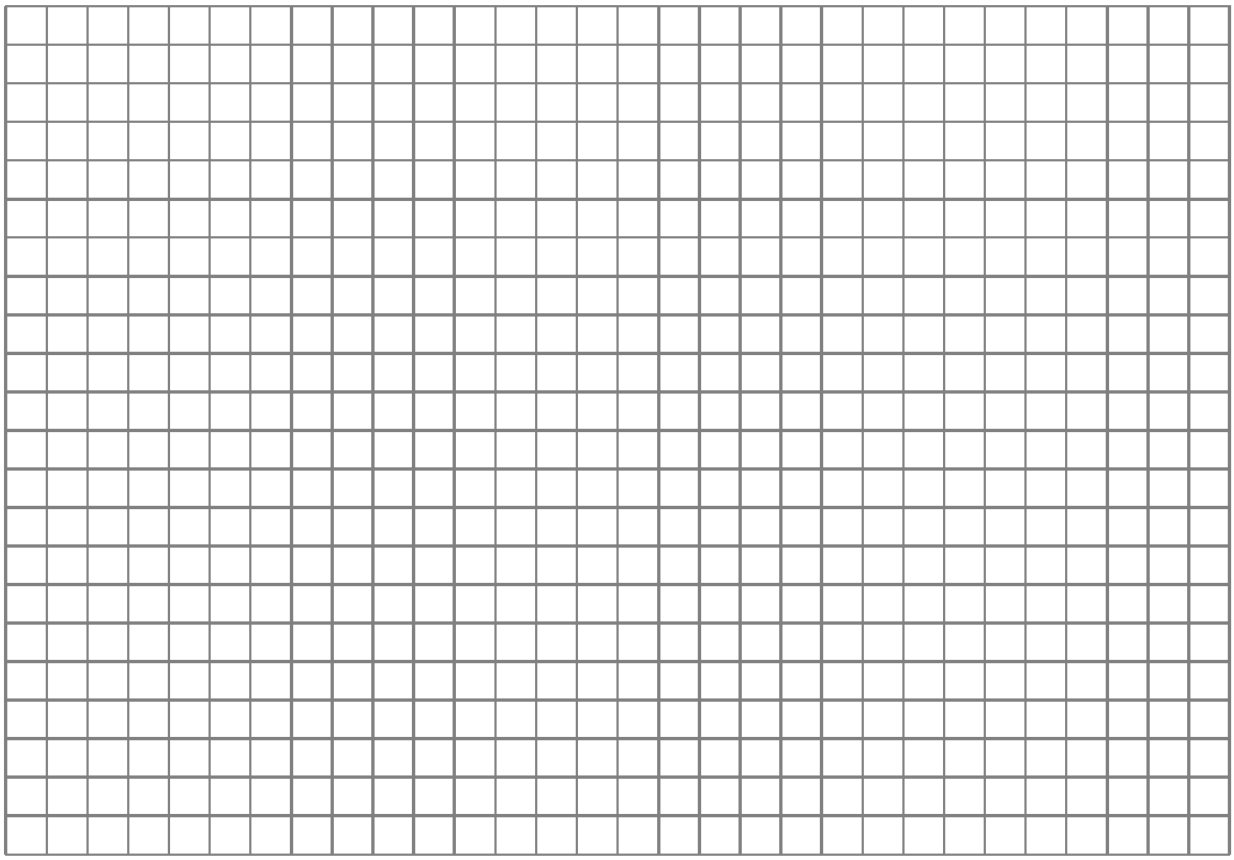
3. Make a graph of bounce height (Y axis) versus time (X axis). Remember to put numbers and units on the axes and make the graph as large as you can.



4. From the graph, about what time is the glass-transition temperature (T_g) of the rubber ball reached? How can you tell?

5. In which phase are the molecules in the ball locked into place? How can you tell?

6. Should T_g for an automobile tire be below or above room temperature? Why?

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B. Dilatancy

1. Describe the starch before putting it into suspension. What does it look like and how does it behave?

2. Describe the starch in suspension. What does it look like, act like, with no external forces applied?

3. How does the suspension act when a rubber ball is dropped on it or it is tapped with a glass rod?

4. How does the suspension act when the same ball or rod is set gently upon it?

5. How does the behavior of the starch suspension demonstrate dilatancy? Under which conditions do the molecules in the suspension move more freely? How can you tell?