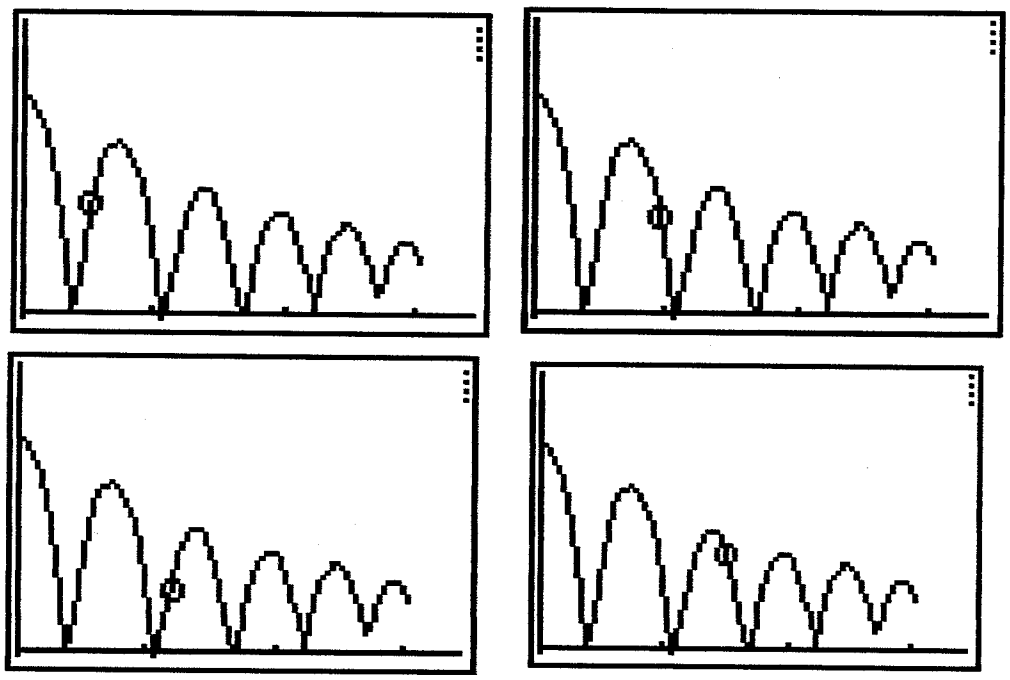
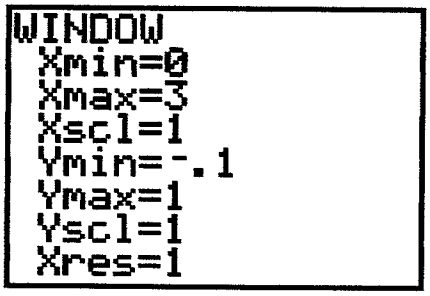
FOLLOW THE BALL BOUNCE

We no longer need the CBR for this activity because the data is stored in our calculator. Our task is to use what we learned about the effects of a, h, and k to trace over the ball bouncing graph in our calculator (see image below and teacher for live demo).



Press window on our calculator and set the values to the following:



Use the DRAW → HORIZONTAL or VERTICAL LINE tool on our calculator to fill in the following tables for each bounce. Then answer the questions that follow.

Bounce 1:
Fill in the following tables for each bounce and answer the questions that follow

	Time	Height
First x – intercept	**N/A**	**N/A**
Vertex		
Second x – intercept		

a. What does the first x – intercept mean in this bounce?

b. What does the second x – intercept mean in this bounce?

c. What does the vertex (h, k) mean in this bounce?

d. What is the maximum height of this bounce?

e. What does the a mean in this bounce?

f. What does h mean in this bounce?

g. What does k mean in this bounce?

h. What equation can be used to describe this bounce?
Hint: Use Vertex form $y = a(x - h)^2 + k$

- Press "y=" on our calculator and enter the equation from question h into y1.
- Change our line type to a thick solid line.
- Press graph and check to see if our equation traces over bounce 1. If not change our answer to question h until it matches before moving one to the next bounce.

Bounce 2:
Fill in the following tables for each bounce and answer the questions that follow

	Time	Height
First x – intercept		0
Vertex		
Second x – intercept		0

a. What does the first x – intercept mean in this bounce?

b. What does the second x – intercept mean in this bounce?

c. What does the vertex mean in this bounce?

d. How far from the origin did this bounce shift from the right?

e. What is the maximum height of this bounce?

f. What equation can be used to describe this bounce?

g. What does the a, h, & k mean in our equation?

- Press "y=" on our calculator and enter the equation from question h into y2.
- Change our line type to a thick solid line.
- Press graph and check to see if our equation traces over bounce 2. If not change our answer to question h until it matches before moving one to the next bounce.'

Bounce 3:
Fill in the following tables for each bounce and answer the questions that follow

	Time	Height
First x – intercept		0
Vertex		
Second x – intercept		0

a. What does the first x – intercept mean in this bounce?

b. What does the second x – intercept mean in this bounce?

c. What does the vertex mean in this bounce?

d. How far from the origin did this bounce shift from the right?

e. What is the maximum height of this bounce?

f. What equation can be used to describe this bounce?

g. What does the a, h, & k mean in our equation?

Bounce 4:
Fill in the following tables for each bounce and answer the questions that follow

	Time	Height
First x – intercept		0
Vertex		
Second x – intercept		

a. What equation can be used to describe this bounce?

Bounce 5:
Fill in the following tables for each bounce and answer the questions that follow

	Time	Height
First x – intercept		0
Vertex		
Second x – intercept		0

a. What equation can be used to describe this bounce?

Bounce 6:
Fill in the following tables for each bounce and answer the questions that follow

	Time	Height
First x – intercept		0
Vertex		
Second x – intercept		0

a. What equation can be used to describe this bounce?

TASK 2: Comprehension

1) Summarize the method we used to determine the equation for each bounce.

TASK 3: Extension

1) Compare the average distance in bounce 1 to the average time in bounce 1 by creating the ratio?

2) What does the ratio of distance and time mean for this problem?

TASK 4: Presentation

1) Introduce the members of the group

2) Describe how the CBR works

3) Pretend to repeat the data collection by dropping the ball under the CBR

4) Discuss what is happening as the ball drops

5) Answer the following questions
   a. What do the x – intercepts mean for each bounce?
   b. What does the y – intercept mean for the first bounce?
   c. What does the vertex mean for each bounce?
   d. When do the bounces have a minimum and when do they have a maximum?
   e. Why is the vertex equation helpful to solve this problem?

6) Bring up our graph on the overhead calculator

7) Summarize the method used to match one parabola

8) Run the completed project on the calculator

9) Discuss the problems our group encountered trying to get it to work

10) Ask for any questions or comments