Algebra 1CP Ball Toss Activity

Objective: To write the equation of the parabola formed by throwing a ball in the classroom
Group size: 8-10 students
Materials needed: a soft ball or similar object, one sticker per student, at least one measuring tape per group, blue tape or masking tape, a wall per group, blank papers to mark starting and end points for the thrower

Directions:

1) Go to your assigned wall.

2) Decide who will be the ball thrower. The rest of the students will be the spotters.

3) The thrower stands on the starting point marked on the floor with a piece of paper.

4) The spotters stand on one of the spots marked in front of the wall with a piece of masking/blue tape with their sticker ready to use.

- The first spotter will represent x=1. The second spotter, x=2; the third spotter, x=3, and so on.

5) The ball thrower will toss the ball between the spotters and the wall **underhand** and try to hit the target specified at the opposite end marked by another piece of paper. The spotters will keep their **eyes on the wall, not on the ball.**

6) The moment they see the ball pass right in front of them, the spotters will mark the spot where they saw the ball pass.

- The group may do a toss or two for practice so that everybody understands where they are supposed to be looking.

7) Once the group performs its final toss and the spotters mark their spots with their stickers, the group will measure the height of every sticker from the floor in centimeters using the measuring tape, and write the coordinates for every point formed.

- The coordinates will be written in the form (x, y), where "x" represents the spot number, and "y" represents the height in centimeters.
- For example, if the height for the first student was 110 cm, his point would be (1, 110). If the height for the 5^{th} student was 212.3 cm, then the point would be (5, 212.3).
    - Note: remember that every tick between whole numbers in the centimeters side of the tape are equal to 0.1 of a centimeter. So, if your height is between two whole numbers, just add the number of ticks from the smaller number to the bigger number. So, if your height is at the 6^{th} tally after 248 centimeters, then your measure will be 248.6 cm.

8) After that, the group will determine where the vertex of the parabola is located.

9) Once the group agrees on the vertex, the group will split into partners, and each set of partners will select a different point from the parabola and complete the response sheet for the ball toss activity – one per set of partners.

10) Using the coordinates of that point and the coordinates of the vertex, each set of partners will find the equation of the parabola that the group developed.

11) At the end, the entire group will reunite, and they will compare equations and try to determine why there were any differences, if any.

Names of partners: _____ Date: _____ Period: _____

Response sheet for Algebra 1CP Ball Toss Activity

Members in the group: Ball thrower: _____

Spotters: _____ _____

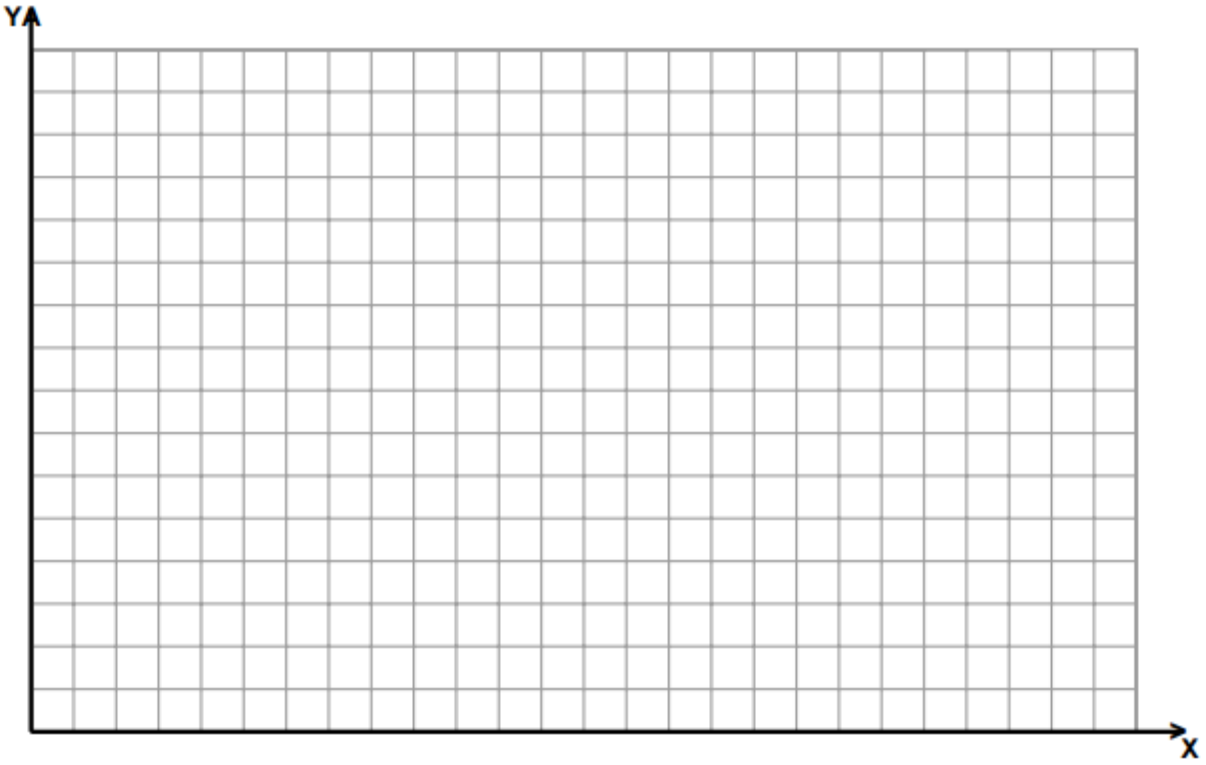
_____ _____

_____ _____

_____ _____

_____ _____

1) Graph your parabola here and label the coordinates of every point:



2) Coordinates of the vertex: _____ 3) Coordinates of the point you and your partner selected:_____

4) Using both points above, find the value of "a". You must show your work below for credit. a=_____

5) What is the equation of your parabola in vertex form?_____

6) How is your equation similar or different to the equations of the rest of your group?

7) If there are any differences, to what do you attribute those differences? Are those differences significant?