TI-*nspire*™

9 Ball
By Lauren Jensen

Time required
45 minutes

Activity Overview
Students are to find the linear equations that go through pool balls on a 9 ball pool table using the 'cue' ball and the 'pockets' of the pool table to line up the linear equations. They are to use linear functions in the point-slope form of $y=m(x - x_1) \pm y_1$.

Concepts
Graphing representation and interpretation, modeling of linear functions, transformation of linear functions

Teacher Preparation
This investigation offers opportunities for review and consolidation of key concepts related to linear functions. This is a follow up activity to the Pool! activity. As such, care should be taken to provide ample time for ALL students to engage actively with the requirements of the task, allowing some who may have missed aspects of earlier work the opportunity to build a new and deeper understanding.

- *At the Algebra 1 level, this activity can serve to consolidate earlier work on linear functions. It offers a suitable introduction to exploring transformation of linear functions and interpretation of graphs.*

- *Begin by reviewing with students the point-slope form of a linear equation.*

- *Refer to the screenshots at the end of this document for a preview of the student .tns file.*

Classroom Management
- *This activity is intended to be **student centered with students in small cooperative groups**. You should seat your students in pairs so they can work cooperatively on their handhelds. Students will use the file provided by you on their handhelds, although the majority of the ideas and concepts are only presented in **this** document; be sure to cover all the material necessary for students' total comprehension.*

TI-Nspire™ Applications
*Graphs & Geometry, Notes, and Lists and Spreadsheets*

This activity provides a '9 Ball Pool Table' on a graph page. Students are to begin the game by clicking on the 'play' button to start the animation of the pool balls. Students are then to move their 'cue' ball to line it up with the other pool balls and the pool table pockets. They are to use whatever methods or strategies to find the values for the slope and the coordinates of the points that form the 'pool balls' coordinates. Using these values, they are to create the linear equation in the form of $y=m(x - x_1) \pm y_1$ to create equations that go through the cue ball, pool ball(s), and pool table pocket.

Once the students find the linear equations to go through the pool balls, emphasize a discussion on what methods or strategies they used to create the equations. You will have to indicate to the students how you want them to record their answers whether it is in the document itself using the pages provided on the handheld or on a piece of paper. This is up to your discretion.

Students begin on page 1.1 with the objective of the game as shown to the right.
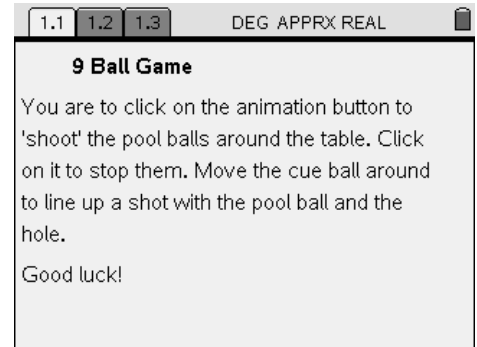

Instructions are on pages 1.1 with the actual pool table on page 1.2. Instruct the students to move their cursor to the 'play' button and click on it to start the animation of the pool balls. The students should click again to stop the motion of the pool balls.
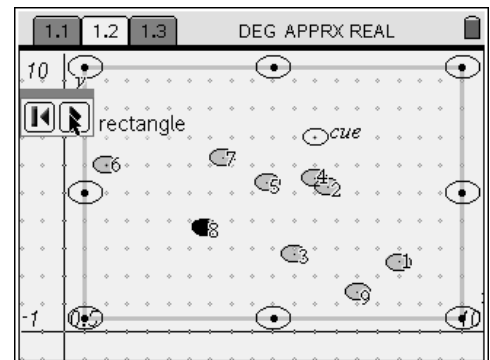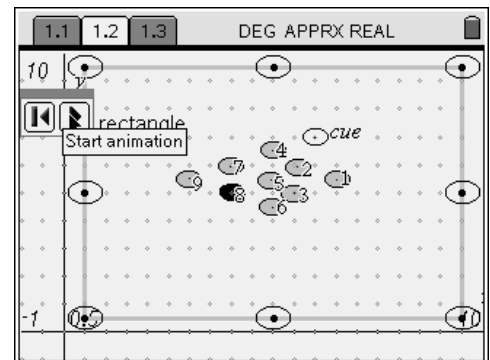
Instruct the students to move the cursor to the center of the 'cue' ball and press **ctrl click** key to grab the 'cue' ball. They are to move the 'cue' ball to line up with any of the other pool balls and a pocket.
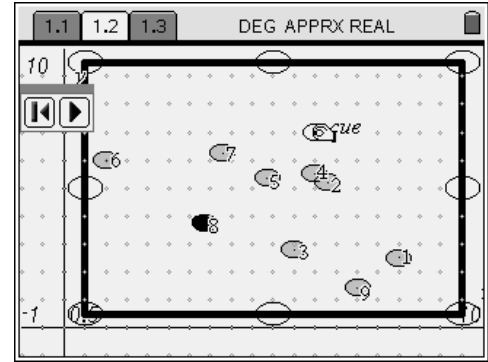
To find the coordinates of the pool balls, instruct the students to press **menu>Actions>Coordinates and Equations.** This tool will show each coordinate of the center of the pool ball. Students should move their cursor over the center of the pool ball and they will see the coordinates faintly shown. They are to press **enter** twice to see the coordinates on the screen.
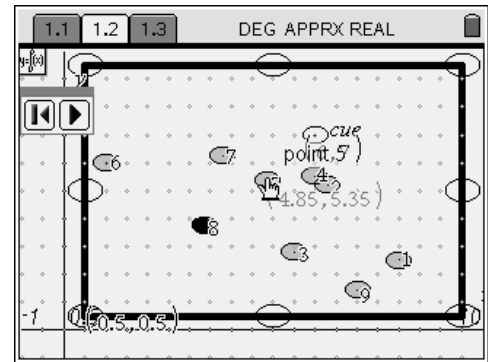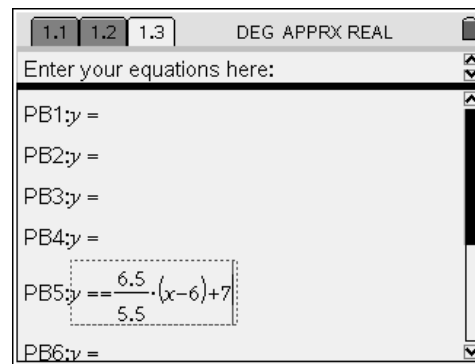
Instruct students to use the **Text** tool to enter in the equation. To do this, instruct them to press **menu>Actions >Text** and press **enter**. This will create a textbox in which they enter in their equation.
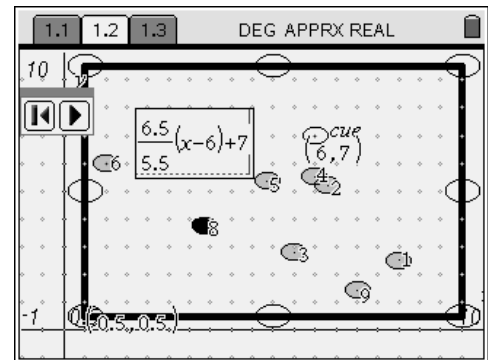
They are to then press **enter** and **esc** to get out of the text tool. They are then to grab the equation and move it down to the x axis until the graph appears. The function will now change to read **y=**.
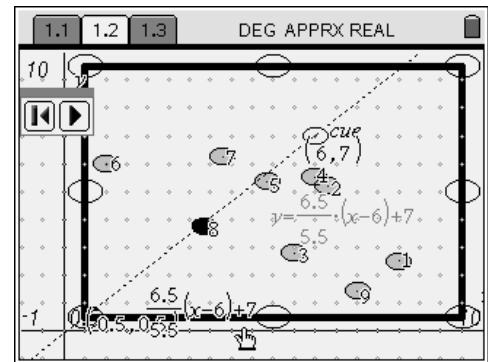
Page 1.3 is where they can record the equations they
found.

1.1	1.2	1.3	DEG APPRX REAL

Enter your equations here:

PB1:$y =$

PB2:$y =$

PB3:$y =$

PB4:$y =$

PB5:$y == \dfrac{6.5}{5.5} \cdot (x-6)+7$

PB6:$y =$

The solutions to the pool table are going to vary depending on which pool balls the students
choose.

9 ball

(Student)TI-Nspire File: *9 ball.tns*