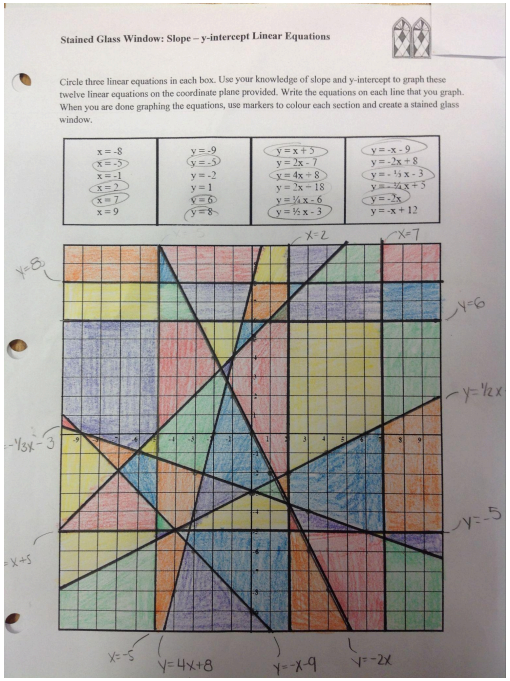
# Linear Equations and Graphs Activities

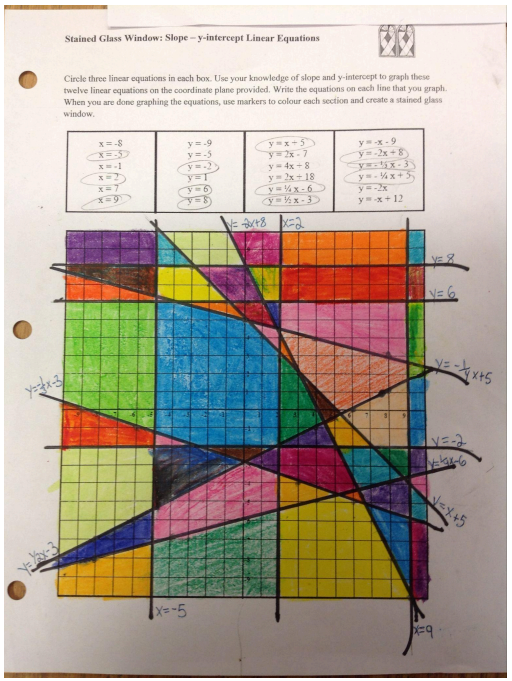
## Paper and Pencil Activities

**Linear Equations and Graphs Activities**
**Stained Glass Window Activity document download**

In this activity, students must choose three linear equations from each column and graph. In the first column are vertical lines, in the second column are horizontal lines, the third column lists positive slope lines and the last column lists negative slope lines. Students can choose which lines they want to graph. Each student is able to create a different stained glass window. This is a nice activity to review slope intercept form.

The TRANSFORM shifts that could align with this activity include shifting from Student as Knowledge Recipient to Student as Creator, shifting from Summative Assessment to Formative Assessment, and shifting from One-size-fits-all to Personalized or Differentiated.

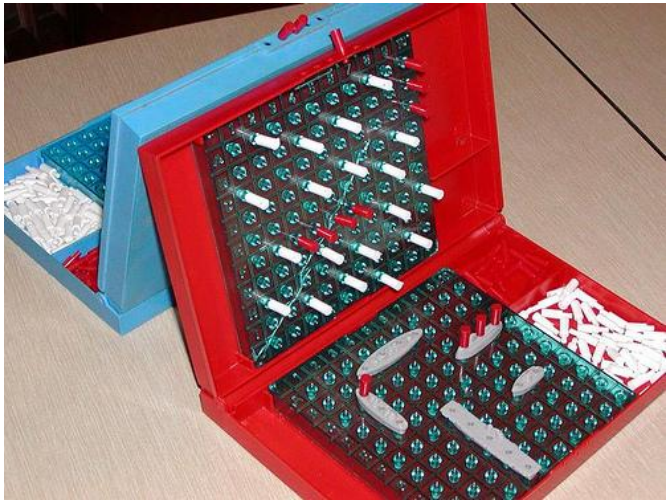


**Matching Graphs and Equations Activity (previous link no longer available)**

In this activity, students must write the equation of a line from a graph and then algebraically manipulate the equation to become the form Ax + By = C. Students may use any personal strategy or method to write the equation of each line. Students could use slope, intercepts, a function table or slope intercept form. Students must also select the correct representation of the equation of the line from a list of four choices. The TRANSFORM shifts that could align with this activity include shifting from Summative Assessment to Formative Assessment, and shifting from One-size-fits-all to Personalized or Differentiated.

**Battleship Game download**



Have you ever played the game "You sunk my Battleship!"? Most of my students recognized the game.

The Battleship linear Game is a variation of this popular kids game.

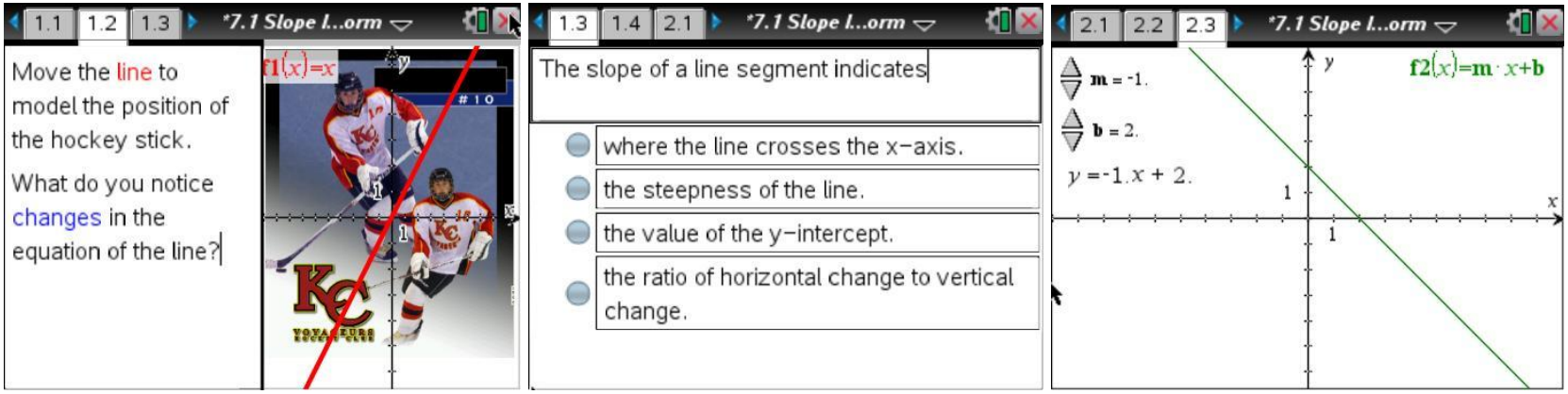
Each person draws three ships on the grid. Ships may be placed horizontally or vertically but not diagonally. To get a hit, write an equation in slope intercept form that crosses through a point that an enemy ship occupies. You may not use vertical or horizontal lines. The winner is the player who sinks the opponents ships first. The Mathematical Processes that apply to the Battleship Game include Communication, Problem Solving, Reasoning and Mental Math and Estimation.

# Digital Resources

**Interactive TI-Nspire Files to differentiate teaching and learning.**

## 7.1 Slope Intercept Form

I used this interactive activity to introduce the equation of a line in slope intercept form. On page 1.2, students moved the red line to model the hockey stick. I took a screen capture of all student TI Nspire CX handhelds and used the images to compare the equations of the lines and introduce the significance of the coefficient of the x variable and the constant term. By comparing the equations of the two lines, students were able to determine that the parameters affect the position of a line on a graph. The next couple of pages include multiple choice questions that review vocabulary (as formative assessment) associated with lines. Pages 2.1 and 2.2 contain interactive sliders that allow students to explore the effect of parameters m and b individually. On page 2.3, both parameters are included with the equation of the line and can be manipulated.

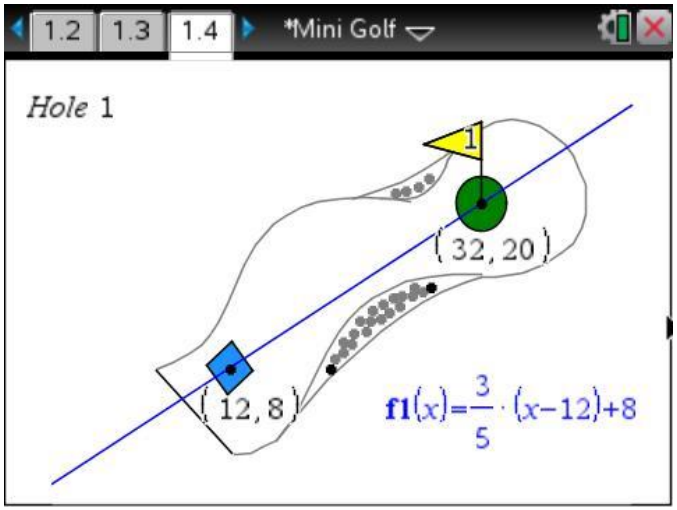


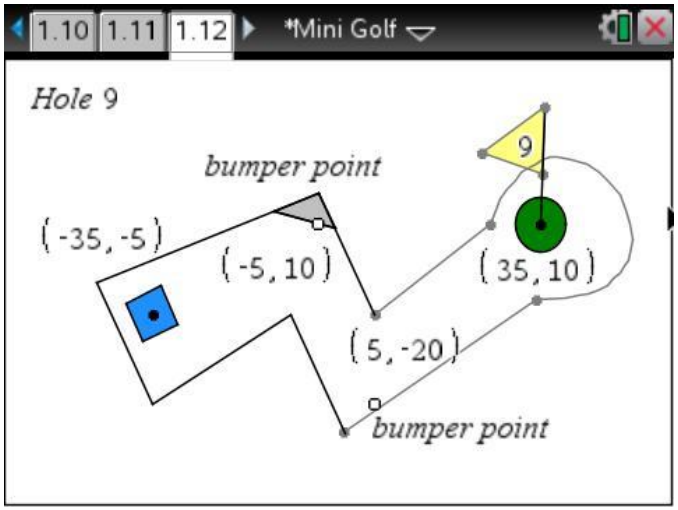

The Slope Intercept Form TI Nspire Activity supports the Mathematical Processes of **Communication**, **Connections**, **Visualization**, and **Technology**.

The **TRANSFORM** pedagogical shifts that are supported by this activity include shifting from Student as Knowledge Recipient to Student as Inquirer and Creator, shifting from Memorization to Higher -level Thinking, shifting from Competitive to Collaborative learning, and Shifting from Print-based to Multimodal representation.

## Mini Golf

I used this activity as a Formative Assessment Activity with my students. The file was downloaded to the student TI Nspire CX handhelds so students could complete the activity after school hours. Each hole on the mini golf course listed the coordinates of two points representing the golf ball and the hole. Students used the point-slope form of a linear equation to write the equation of the line that modeled the path of the ball to go in the hole. Notice that on hole 9, students needed to write the equations of three lines to display the path of the ball to go in the hole. I like this activity as formative assessment since it gives instant feedback to students.



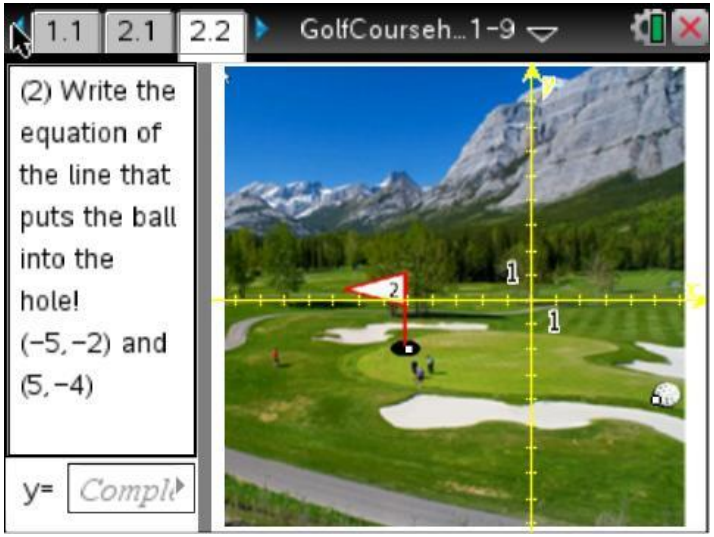

The next day, as students entered class, they were persistent in showing me that something was wrong... their line didn't go through the two points. It was interesting to me that students believed that there was something wrong with the technology before they believed that their equation was incorrect. After we reviewed their work and discovered the error in their equations, students worked on their own to fix the other holes that did not work. In my opinion, this was a great formative assessment activity since students were very persistent in fixing their errors and making sure each path was correct. I was also impressed that most of my students were not interested in copying the equation from another student, but rather, wanted to make the equation work themselves.

The **TRANSFORM** pedagogical shifts that are evident in this activity include shifting from Summative to Formative Assessment, and shifting from Print-based to Multimodal representation.

The Mathematical Processes that are supported by this activity include **Communication**, **Reasoning**, and **Technology**.

## Golf Course holes 1 - 9

This activity is similar to the Mini Golf activity above. The pictures used are from actual golf courses. Notice in the lower left corner of the screen, students are able to input the equation. This activity would work well for formative assessment as the results of the linear equation graphed are given to the students instantly.

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## Formative Assessment Idea

Near the end of class, I distributed a blank "Ticket outta here" for students to complete. The intention is for students to identify what they have learned and what topics they may need more help with. Here are some student exemplars. I provide a written response to student questions or comment about what they have written and return the tickets to the students the next day. As we do more of these types of formative assessment on the concepts presented in class, I hope to have a more descriptive or detailed response from students so they can identify exactly what they do not yet understand.