Coordinate Planes

Interactive Math Strategy Game

Contents

- System Requirements 2
- Mathematical Topics 3
- How to Play 4

Coordinate Planes

Interactive Math Strategy Game

Coordinate Planes is an interactive software application for students of Mathematics to display and exercise various concepts of the Cartesian coordinate system in an interesting and entertaining way. Gameplay consists of a Cartesian coordinate plane with various objects positioned in random locations on the grid. opponents are shot down or destroyed by utilizing and performing essential Mathematical skills such as ***Plotting Points***, ***Slope***, calculating the ***Equation of a Line***, and the ***Pythagorean Theorem*** (or Distance Formula). Classroom use can utilize both single and multiplayer modes.

I really this game can help enhance your classroom and students' learning experience. I know mine love it! This has been a 10 project of passion, lots of snow days and summer evening learning to program so I could offer this game.

System Requirements

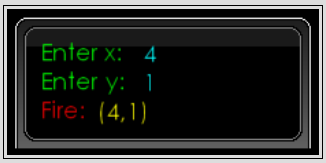
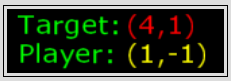
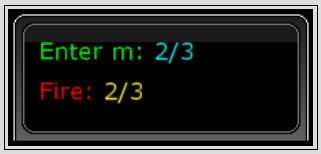
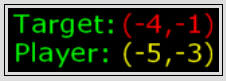
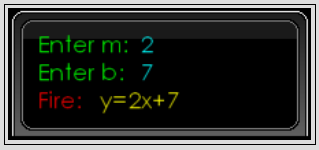
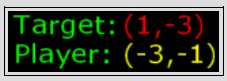
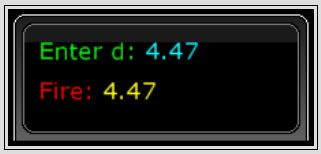
Coordinate Planes requires:

- A reasonably modern PC running ***Windows XP, Vista, 7***, or later.
- A **DirectX9** (or later) compatible graphics card with at least 32MB of memory.
- Also a **DirectX9** compatible sound card, or integrated sound chip, is required.
- It requires a screen resolution of at least 1024x768 and 65536 (16-bit) colors (but preferably 32-bit true color).
- It is always recommended that you make sure you have the most recent drivers installed for your system.
- **HTML5** compatible browser such as ***Google Chrome***.
  - Web browser version is too big to run on a iPad or iPhone browser and should be played on a personal computer.

Coordinate Planes disk options:

- **Single User License**
  - Coordinate Planes is loaded on to a copy protected **USB drive**. Game memory does not use the whole disk storage, so the remaining partition can be used as a normal flash drive. Flash drive must be plugged in as a dongle to play.

- **School District License**
  - Contact for information on purchasing a District License: http://www.cplanes.com/contact/

Topics	Gameplay
Plot Points 	Destroy opposing teams' objects by entering the correct ***x*** and ***y coordinates*** of the target's location. This mode may be played with <u>one</u> or <u>four quadrants</u>.
Slope  	Destroy opposing teams' objects by entering the correct ***slope*** of the line connecting the attack plane to the target. Coordinates will be given to aid student calculations. This mode can also be played with <u>one</u> or <u>four quadrants</u>.
y = mx + b  	Destroy opposing teams' objects by calculating the ***equation of the line*** connecting the attack plane to the target. This line would model the 2-dimensional trajectory of the bullet. Coordinates will be given to aid student calculations. The equation of the line must be entered in **slope-intercept** form *(**y=mx + b**)* and any fractions must entered as <u>improper</u> when necessary (no mixed numbers).
Distance  	Destroy opposing teams' objects by calculating the ***distance*** between the attack plane to the target. Once a target is selected, a triangle will appear to aid students' calculation. Can be solved use **Pythagorean Theorem** or the **Distance Formula**. Coordinates will also be given to aid student calculations. Answer must be rounded to the <u>nearest hundredth</u> whenever necessary.
Arithmetic Operations  	Allows for extra modes of play for students of all ages: ***Addition***, ***Subtraction***, ***Multiplication***, and ***Division***. Players destroy opposing teams' objects by calculating the ***solution*** to the given arithmetic problem *(all solutions will be whole numbers)*. During setup, teacher can assign numbers to the set used in the operations by clicking on each number (remove number by clicking again). During setup a single operator must be chosen: **+, –, x, /** *(if none is chosen game will <u>default</u> to x and 1-12)*.

How to Play

Getting Started:

1. *Select a **game mode** (top 5 are played in all 4 quadrants, bottom 2 are single quadrant only).*
2. *Select **single player** or the **number of teams** you would like.*
3. *Press "**Play Game**" button (it will appear after game mode and players have been selected).*

Coordinate Planes Main Menu

Options: the options button will alter the ingame timers, utilize saving options, and turn on revenge mode.

Webpage: the webpage button will link you to www.cplanes.com for new information and a post to let you play ***Coordinate Planes*** *(HTML5 version)* in your web browser. Your web browser must be HTML5 compatible.

How to Play

Options:

4. *Click the clock to change **Game Timers**. The current Shot Timer and Target Timer will be displayed.*

5. *Select **Revenge Mode** to toggle **ON** and **OFF**. **Revenge Mode** allows players to still attack (and be engaged in the classroom) even after all their units are destroyed.*

6. *Click the **Save Disk** to enter save options. **Note:** Saving is not supported in the web browser version. Check out the Windows version for save state options.*

Coordinate Planes Options Menu

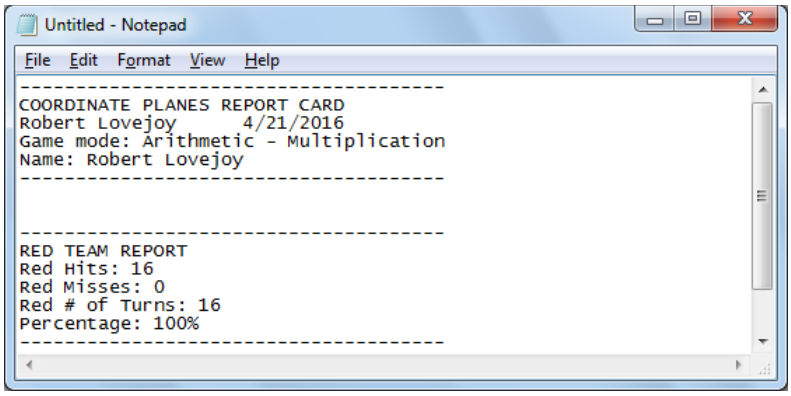
Note: the attack plane is very stealthy. It only shows up when it is attacking, and it cannot be destroyed. Once a team's units are destroyed, the team is out of the game and cannot attack... unless you have Revenge Mode turned **ON** in the options menu.

7. *After pressing **Start Game**, a random team will become active. It's time to attack.*

8. *The **input device** (resembles a calculator, but has no computing power), is where student will enter their calculations. Buttons can be clicked with mouse, interactive whiteboard, or number pad on the computer keyboard.*

   a) *As game begins a random team will become active.*
   b) *Active team will be prompted to select a target.*
   c) *Click on any of the opposing units (not your team color) or press the random button to randomly and unbiasedly select a target.*
   d) *Using the input device, enter the correct solution to the given prompt.*
   e) *Double check solution and hit Fire.*

9. ***Game Over** condition.*
   a) *Gameplay continues until only a **single team** remains.*
   b) *Number of remaining units is displayed at the top right of screen.*
   c) *A report card is kept for each team.*
   d) *At the **endgame**, remaining team will be declared the winner.*
      - *A percentage of correct shot will be displayed for each team.*
      - *If playing the Windows version, a more detailed report is copied to the clipboard. Simple paste into a text file or word processor for your records.*
   e) *If playing single player, press next round to continue playing and build your score.*



Sample 1 player report

Note: The input device has a blue special character pad. These buttons are limited to their specific needs. The decimal point **(.)** is only active for distance. The fraction bar **(/)** is only active entering slope and y-int. The undefined symbol **(Ø)** is used to input an undefined slope. The negative symbol **(-)** toggles the last entered number between **(+/-)**.