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dutainment is, by definition, an entertaining way of teaching you something you do not already know, or helping you practice something you do know. A good piece of edutainment will keep the user interested in what he/she is doing long enough to let the lesson sink in.

Combining math with sports has been around, in the classroom, ever since professional sports were invented. There is an intrinsic connection between sports and math. Statistics on players and teams, scoring, even rules, all have a mathematical connection. It is only natural that sports are used to teach mathematics.

Sanctuary Woods has capitalized on this connection with a licensing agreement with the NFL™ to produce NFL™ Math. This program is designed with a football fanatic in mind. You use real NFL™ teams to play a game of football. You pick a play to run and the program asks you a math question. If you answer the question correctly you have a substantial chance of running a good play; if you answer a question incorrectly, well, I wouldn't want to be part of the team that tried to run your play.

Play book
The manual of NFL™ Math is a disappointment. It is a CD slip-in and not very informative. Although the manual explains the arcade sequences and the controls of the game it leaves out some VERY important information. The printed manual makes no mention (except for

one line on one page) of the online "manual" that takes the form of the pregame show. The pregame show is very informative and uses the concept of an announcer interviewing the team coach. The coach explains the different controls and gives a basic overview of how to play the game.

Another important element that the printed manual only mentions once is the Coach's Corner. The Coach's Corner is a math tutorial that is an excellent review of the concepts used throughout the game (more on the Corner later in the article). The manual also has no trouble-shooter's guide so if you run into trouble you must call tech support. By the way, the tech support number is not all that easy to find - it is written in small print at the bottom of one page.

Pre-Game

Once you start the program you drop into the main menu, which shows you the different actions that you can do. From the main menu you can; go to the Pre-Game show, go to the game controls, begin a new game, resume an old one, go to the Coach's Corner, or quit.

The Pre-Game show is the animated on-line manual and gives you a basic overview of the controls and how to play the game. It also explains the different "power up" arcade sequences you can play and explains all about the Road to the Super Bowl™. The premise of the pregame show is that the coach of the team has stepped into the broadcast booth and the game announcer is interviewing him.

The game controls allow you to set preferences such as quarter length, sound and music volume, game mode (single game or Road to the Super Bowl™), and math level. The math level ranges from 1 (appropriate for ages 8 to 9) to 4 (appropriate for ages 11 to 12). The single game is exactly that; a single game. The Road to the Super Bowl™ sets up a six game series that you must complete. If you complete the series the computer prints out a certificate which you can mail to Sanctuary Woods for which they will send you your own Math Super Bowl ring. This is a great idea. It gives the student an incentive to work with the program to complete all six games.

The best, and unfortunately almost undocumented, feature is the Coach's Corner. The Coach's Corner is your child's electronic tutor. It is the locker room before the game and the coach is giving lessons on all the math your child will need. Everything from basic division to advanced problem solving is touched on here. The coach reviews the facts in some very spiffy math lessons (take it form a math teacher, these lessons are great). He also breaks the facts down into different levels so as soon as you have mastered the basics, you can move onto more advanced topics. Another great feature of the Coach's Corner is that it can be accessed at any time during the game, including during the question phase (great for some brush up work, in case your child forgets something).

The game is actually quite simple in concept. The format is that of a football game. There are four quarters of varying length (determined in the game controls) in which you attempt to score more points than your opponent. All the football rules are here; four downs, penalties, two point conversions, coin tosses, special teams, field goals, punts, the whole nine yards (oops, ten yards).

 The main section of the game has three phases; pick the play, answer the question, run the play. At the beginning of each quarter there are special arcade sequences called "power up" phases, where you can increase either the running, passing, or tackling power of your team. There is a major flaw in the power up phase. The programmers made the game PPC native but did not put in a speed control. On a PPC, the arcade phases run too fast for you to actually play them effectively. I gave up on the running game ten seconds into the phase because there was no way I could avoid the oncoming men.

Pick the Play: After your team goes into the huddle, you choose the play. The computer will give you a list off all the different plays you can choose, from running to passing, to special teams plays (punting or field goals). The computer will also give you a rating of the play from good to bad. The computer rates the play based on it's chance of success (a screen pass will work more often than a long bomb), your field position (don't run a goal line defense at the 30 yard line), and power up status (passing plays work better if you played the passing game well). After you pick the play (BTW you only have 30 seconds to think about is or you get a delay of game penalty), you move onto the next phase.

Answer the question: The computer then reaches into its bag of tricks and pulls out a question based on the math level you set at the beginning of the game. Level one questions are usually easy addition while level 4 questions can range from difficult averaging to NFL™ trivia. There is also a module called Rapid Fire Math. This game throws questions at you for 30 seconds. The more you answer correctly, the better your play will work (maybe, but we'll discuss that in a moment). There is a five level graph on the left of the screen that will show you how well you are doing. As you answer more question the bar goes up. If you get a question wrong, the bar drops down a level.

Don't worry, you have tools to help you. There is a calculator you can call up for the arithmetic, and a trivia section with a basic search engine for help with those obscure player references. These tools have some flaws. The calculator does not stay on the screen when you need to type in your answer. This means the player must remember the result he/she

has calculated and that may cause some problems for children with dysnomia (numerical dyslexia) and other perceptual difficulties. The problem with the search engine is that it is too basic and cannot look up some of the facts that you may need (we had a problem looking up which player tore a hamstring).

After you answer the question, you get feedback; either an enthusiastic "YES!" from the coach or the correct answer with flash. The flashing answer is a good feature because you can see the correct answer to the question but there is no way to find out where you made the mistake.

Run the Play: After you answer the question, the Jumbotron (A "giant" diamond-vision screen on your monitor) shows you how the play worked out. This is great, but it is also a very frustrating feature. The graphics on the Jumbotron are fantastic. They are smooth and, if not life-like, pretty darn close. You will see the players, dressed in team colors, running the plays. As the play runs you may find yourself jumping up and cheering your team. There are changing "camera" angles, "cameras" that follow the ball, and even a "camera" that follows the helmet your defense just knocked off the running back. You can watch your players do a victory dance after a great play or watch your bench throw up their hands as the opposing team scores.

The frustrating part is that the programmers built in a randomizer so that, as in real life, the perfect play may not always work perfectly. Quite honestly, I think that the randomizer is set too high. More often than not, I picked the perfect play (according to the computer), answered the question correctly, and watched as my quarterback got smeared all over the astro-turf. It quickly became frustrating, and I eventually stopped playing.

Another slight quibble (and this is only for the football fanatics) is occasionally, the computer got the team colors wrong. I played as the Giants against the Cowboys. For some reason the Cowboys were in blue and the Giants were in silver.

Post Game

NFL™ Math is a valiant effort by Sanctuary Woods to create an entertaining piece of software, unfortunately it falls short in too many areas to get very high marks. The game is entertaining (for the most part), educational, and very nice to look at. I think that Sanctuary Woods need to tweak the program a bit before we can wholeheartedly recommend it.

Note: My contact at Sanctuary Woods informed me that, by the time you read this article, they will be very close to releasing Major League Math. Sanctuary Woods has a licensing agreement with Major League Baseball also, so keep your eyes open for that one, coming soon to a computer near you. With the way things are going, can Rugby Math be far behind?

Pros
• Great graphics
• The Coach's Corner
• Entertaining (for the most part)
• Great questions, some real thought provokers

Cons
• The relationship between a correct answer and how the play turns out is too erratic.
• The calculator does not stay on the screen when you type in the answer. You must

remember the numbers (not good for numerical dyslexics).
• The arcade portions ran entirely too fast on my PPC to be played with any kind of

accuracy.
- Had trouble looking up answers in the trivia section.