Calaboose in the Math Room

By Aaron Bradford Starr

Introduction

Standard card games are all about math, and would be wonderful teaching tools for mathematics, except for one small thing: most people relate them to gambling, and other idle pursuits. And in a classroom situation, math teachers certainly don't need to be seen teaching the finer points of Five-card Stud and Blackjack, no matter how mathematical they may be!

So given that cards are inherently mathematical, what's a math teacher to do?

Play Calaboose!

Real Games and Real Skills

Calaboose has a number of things going for it, from a teacher's perspective. First off, it's an actual, genuine game, not a skill-building exercise. The students will appreciate that. The gameplay is fast, simple, and easy to teach.

But once taught, the students will be using math on a number of levels, some of which they may not even realize. And these are the sorts of habits that can only benefit a student.

Value Estimation: Each type of card has a different series of bounties that count as points at the end of the game, depending on how many the player has captured when you count up the scores. But each also has a value, which shows how easily it can be replaced in your jail cell.

This balance forces players to estimate the true worth of a card. A card that is high-scoring can be worthless if it is replaced too easily. This presents to the player the task of planning their actions based on an expected return. And if they can't score as highly as they want, they have to reverse their thinking, and try to lower their opponent's score by an even greater amount in order to win.

Probability Manipulation: How likely is it that a given card will last in one of your cells without being replaced by a higher-number card? How many bandits are there in the deck? How many outlaws? When is it wise to keep that Huckster in your hand, rather than sending him to someone else's jail?

The skill of estimation is important in math, and to weigh risks in this game, the players will soon realize they need to know some numbers, such as how many of the various cards there are. Even if they never consciously ask these questions, they will begin to watch for the patterns of play, and math is the science of patterns.

Copyright © 2007, Live Oak Games, All Rights Reserved.

Planning and Forethought: Card games are difficult to play strategically, since the situation shifts so often and so drastically. Still, given the point values on the cards, the players will rapidly learn what a good option is, as opposed to a bad one. Later, they will recognize chances for maximizing gain by choosing between two good options, and minimizing the damage from two bad options. In Calaboose, all of these decisions will be based on the point values of the cards.

Translation of numbers and values into a more general awareness of a situation is a key to real-world application of math. "Story problems" and higher math, (even unfamiliar forms of mathematics the student already knows) are also aided by the ability to intuit what the relevant skill is, and what question is actually being asked.

Ways to use Calaboose

Have a rules sheet prepared for each student, and quickly go through the rules as a group. Divide the class into groups of 5 (the most economical division), making sure that at least one student from each group fully understands the rules, and that each group has at least one student who can shuffle a deck of cards (without mangling them). You're job as a teacher will be to arbitrate rules disputes and keep the chaos level down. This is a game about the Wild West!

As this is a card game, have each group count their deck before play begins. Every group should have 74 cards before *and after* the play session! Have each group play a few games, to get a feel for the rules. How does gameplay change if they play three games and add their scores for a total to determine the winner?

When the players are comfortable with the way the game works, give them a few Calaboose related puzzles, and see if they can translate their knowledge into answers. The specific answers aren't as important as the methodologies the students come up with to formulate them. Some possibilities are:

Simple:

- What fraction of the deck is Bandits? Percentage?
- What two types of Outlaw have as close as possible the same percentage of the deck as Hucksters do?
- If you have to have exactly two different types of outlaws in your jail at game end, which two types will give you the highest score? The lowest?

Complex:

- If your jail cells, at the end of the game, had the same percentage of Hucksters as the full decks does, how many Hucksters will you have? What is the highest score possible if you could choose *any other cards* (not Hucksters) to fill the remaining jail cells?
- In a 2-player game, if neither player has the same outlaws in their jail as their opponent, is there any way that two could have a tie score?
- In a 5-player game, how many turns can the game continue before a player is forced to play a Huckster?

Copyright © 2007, Live Oak Games, All Rights Reserved.

- In a game with 5 players, if there were no Hucksters, and no special cards (Jail Break and Bad Whiskey), how many Bandits can survive to be scored at game end, assuming all the players tried to score the most Bandits?

In order to answer these questions, let the students examine the structure of the deck, and formulate the answers in groups. Compare the answers of the groups, and, where they are different (and they will be different… some of these questions are tough!), concentrate on the reasoning process behind the two methods, rather than ferreting out which of the answers is correct. Even when two groups arrive at the same answer, they can often do so using different methodologies, which is another important feature of mathematics: there's always at least two ways to handle a problem.

In conclusion…

Math students aren't going to look at Calaboose and think to themselves, *Gee, another variant on flash cards*. As mathematically sound as the game is, the students will be drawn in to the aspects of it that aren't mathematical. Use that to your advantage, and let them have fun playing it, since fun is a key to using games to teach. The math is there, whether you, as a teacher, choose to emphasize it or not. In order to play the game, they have to use their skills. In order to play *well*, they'll have to sharpen them.

Not bad, for a simple card game, huh?

Live Oak GAMES®

www.liveoakgames.com

Copyright © 2007, Live Oak Games, All Rights Reserved.