Go Extinct! Go Fish... Evolved

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Abstract / Introduction

Go Extinct!, a *Go Fish*-style card game, teaches players how to read evolutionary trees as well as land vertebrate natural history. Instead of collecting sets of numbers, however, players collect closely related groups of animals, called clades (def: all of the animals that descended from a common ancestor). Winning requires players to understand the hierarchical structure of evolutionary trees while the game's vocabulary emphasizes traits that scientists use to classify vertebrates in the tree.

Over 200 students, ranging from 5th grade to college undergraduates, have played versions of the game. Afterwards, students are able to define a clade (an important concept in biology) and make evolutionary observations such as, "Chickens are dinosaurs and we've been eating them!" One middle school explored evolution by creating expansion packs for *Go Extinct!* Students successfully incorporated mechanics about catastrophes and geologic ages as well as adapted the game for more specific groups of animals, like the cat family.

Gameplay and Science Pedagogy

Go Extinct! builds off of the basic rules of the traditional card game, *Go Fish* by incorporating an evolutionary tree game board (Figure 1) and a deck of animal cards (Figure 2).

Teaching Players How To Read Evolutionary Trees

In order to gain cards and complete clades, players can ask other players for any category of card on the tree. For example, a player trying to complete the Terrible Lizard clade, could ask for a Stegosaurus specifically, any Terrible Lizard, or an even deeper clade, such as the Toothy Grinners. Since a player gets only one card from the other player, it is often in their best interest to ask for more general categories. If the player has cards in the Terrible Lizard and the Croc clades, they would be more likely to get a useful card if they ask whether the other person has any cards in the deeper clade, Toothy Grinners because it includes both Crocs and Terrible Lizards (see Figure 1). This winning strategy encourages players to search for common ancestors between any two cards in their hand, organically teaching them how to read evolutionary trees and to understand the tree's hierarchical organization.

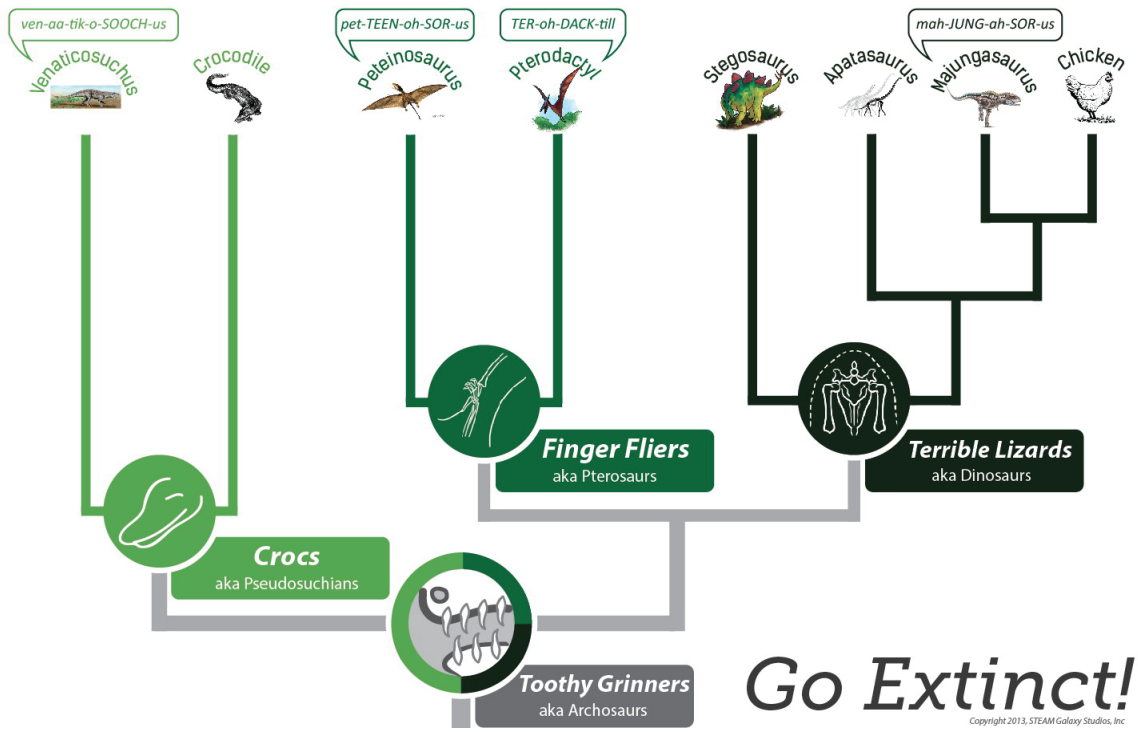

Figure 1: A Portion of the *Go Extinct!* Evolutionary Tree. Teaching Players About Land Vertebrate Natural History

The names of the clades, such as “Terrible Lizard” for Dinosaurs or “Warm Fuzzies” for Mammals (see Figure 2) either translates the scientific name into English or captures an important trait unifying that group (i.e. Dinosaur means Terrible Lizard from Greek roots; Mammals are both warm-blooded and have fur/hair). By using these fun nicknames to ask each other for cards, players associate certain traits with certain animals. For example, many middle school students who played *Go Extinct!*, were surprised to learn that “Fur Scrambles” are mammals that still lay eggs.

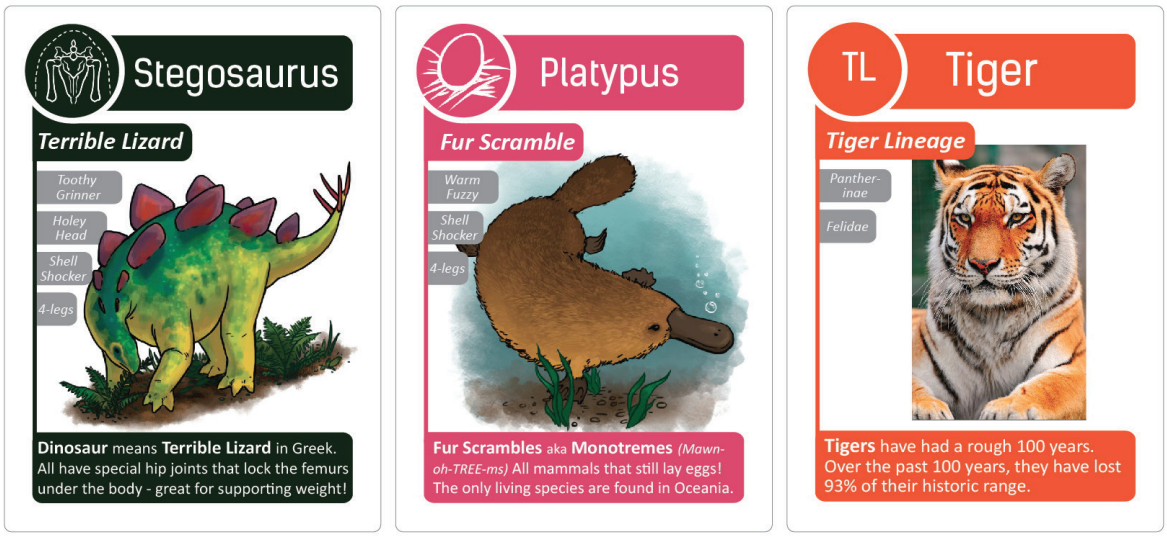

Figure 2: Examples of *Go Extinct!* Animal Cards; the Tiger card is student-created.

Incorporation in the Classroom

Over 200 students, ranging from 5th grade to college undergraduates, have played versions of the game. The most successful implementations used the game to introduce an evolution unit. We worked with one middle school, San Francisco Brightworks Academy, over the past two months to challenge students to create expansion packs as a long-term project on evolution. Students created expansion packs that added onto to the basic *Go Extinct!* deck with Geologic Age cards that limited the clades you could play based on when they evolved, as well as catastrophe cards that caused special events to happen. The mechanics they chose for these cards reflected knowledge they gained about how different geologic time eras impacted animal evolution and how catastrophes might impact one group of animals more strongly than others. Another student created an entirely new *Go Extinct!* game based on the phylogenetic tree of the cat family, Felidae. She used a scientific paper and chose cats that best represented the lineages specified by the paper’s genetic analysis and then researched facts and creative commons images to complete each card (See the Tiger card in Figure 2).

Links to More Information and a Playable Demo

Go Extinct!’s Facebook page: http://www.facebook.com/GoExtinct
Go Extinct!’s successful Kickstarter Page: https://www.kickstarter.com/projects/aemarcy/go-extinct-go-fish-evolved
Go Extinct! Next Generation Science Standards Alignment documentaton: http://bit.ly/QnJOrG
A blog post written by middle school students about playing *Go Extinct!* for the first time: http://www.sfbrightworks.org/2013/12/siphon-go-extinct-timeline/
The Google folder containing the rules as well as the print-and-play files for the most recent version of *Go Extinct!* (May 2014): https://drive.google.com/folderview?id=0B49HnPtCPjlzakNLUmc2dGF2V00&usp=drive_web

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