GUIDE TO MAKING YOUR OWN PHYLO DECK (BASED ON ECOSYSTEM BUILDING RULESET)

By David Ng, Last edited June 20th, 2015

It's really exciting to see that the Phylo card game has come along so far over the last few years, and more so, since one of the most frequent questions the project gets asked is: "How can I make my own deck?" We get this from educational institutions, museums, teachers, scientists, wildlife buffs, and (best of all) from kids of all ages. Anyway, over the years, we've been lucky enough to release a few different decks, so we do have a good sense of what needs to be done. In that respect, this document will attempt to provide a good framework of the steps you need to think about to produce your very own deck.

STEP 1: PLAY THE GAME

We found that making your DIY deck is greatly helped if you are already somewhat familiar with the game. Consequently, you should spend some time playing with an existing starter deck and familiarizing yourself with the rules. A variety of decks can be purchased and many can also be downloaded for free. Do check out http://phylogame.org for these resources, as well as links to game rules.

STEP 2: THINK ABOUT THE THEME OF YOUR DECK.

It's really good to start this process by thinking a little of what exactly you want your deck to be all about. Doing this will generally help make your deck constructing efforts more efficient, because it gives you specific directions that you can focus on. To help with this, we've listed some of the most common themes you can consider, and for each of these, we have also made mention of a number of nuances that arise if choosing that particular route.

ONE: The theme is going to focus on your own local habitat, your town, your country:

This is probably the most common theme that folks are interested in. In other words, they'd like to make a deck that showcases the living world close to them. This is usually the most straightforward of themes out there, because in many ways, the organisms you choose naturally connect to each other. However, do note that these connections will be easier to figure out, if you (i) focus on a smaller locale - i.e. a specific area, say a park, as oppose to an entire country; and (ii) focus on a more narrow range of habitat – in other words, having a deck that includes organisms in both water and land habitats will be a little trickier to work out, then just having one or the other. As a bonus, for you educators, this type of deck often nicely doubles as a sort of card based wilderness guide. Along the same lines, you can apply this thinking to themes that encompass other ecosystems that aren't necessarily local, although sometimes finding information of those non-local connections can be a little harder, especially if the ecosystem you've chosen is not well studied.

TWO: The theme is inspired by a favourite organism or type of organism:

This is another common request. For example, something to the effect of "I love sharks, and I'd like to make a shark deck!" In this case, there are a few important things to consider here as well. To begin with, if you want to make an organism-centric deck, then making it "playable" can be a challenge. This is because the ecosystem game mechanic is dependent on having a good mix of cards where organisms can connect together well – i.e. their food chain interactions are based on reality (or if we want to be scientific about it, we say that their trophic strategies, habitat, and geographical needs all mesh).   As you can easily see, a deck of just sharks would be problematic here, because they are all carnivorous, and so the playable game would also need all the extra cards that can provide the trophic support they need (say aquatic plant cards, herbivore fish card, etc). This is potentially doable, especially if you choose to focus on specific organisms that belong to the same location (i.e. it's the Hawaiian Shark Deck!), but hopefully you see that it does becomes more challenging to make a playable game, and almost impossible if you want to have sharks from all over the world. For the latter, you would need a wide variety of different food chain level cards that come from all over the world, or ones that happen to be found in many different places. Again, this is potentially possible, but the research you would need to do, to make it all work *and* be

scientifically realistic would be significant - more so when you remember that a deck tends to have a limited number of cards. Because of these considerations, I find the best way to tackle this is to simply call your deck an "Expansion Deck." This way, you worry less about it being playable as a stand alone entity, and that it is something that can support a "Starter Deck" or usable as an additional set, if you choose to also print/purchase a bunch of other cards from the game.

Interestingly some folks have elected to go this route, and to sort of turn it into a game by including two cards of each organism in the final deck. This way, the deck (whilst not playable as a stand alone in the Phylo game sense) can still double as a deck usable with matching games like "Go Fish" or "Memory."

THREE: The theme is less about a location or about organisms, and more about a specific environmental issue; or possibly some other social science angle; or even about a non-ecosystem related subject:

This type of deck is a cool and interesting option, and we have had some folks inquired about this. It basically makes use of the fact that the Phylo game has been designed with two core card types. That is: "species" cards and "event" cards. One way to think about this, is to realize that the "event card" is really just a card that allows you to introduce specific rules by way of including custom text and instructions. In most Phylo decks, this is seen as cards that explain some sort of environmental effect (like protected habitat, pollution, or oil spill for example), which in turn affects how players can modify the game in progress. For example, these cards when played may help build ecosystems, or help hurt ecosystems. Because of the flexibility found in the "event cards", focusing the deck on something like an environmental issue should be relatively straight forward. You would still need a list of organisms that represent a playable ecosystem, but then there would be more thought involved in determining the range and type of "event cards" you can include, as well as thinking about how the card instructions would mimic real world outcomes. Where this becomes tricky is to find that sweet spot where these event type cards are not too powerful in terms of game play. For instance, if one of these event cards has such a significant effect that you can essentially guarantee your winning if you happen to pick it up, then that introduces a game design flaw.

Sometimes, event cards might not even be "environmental" in nature, but rather just a card that introduces a new rule. For instance, we have a "Linnaeus Card," which basically rewards the ability to rummage through a discard pile by fostering learning of an organism's latin name. We also have an example of a deck that uses these "Event" cards to highlight historical information, as seen in the Voyage of the Beagle Darwin Deck. Overall, the point is that there is a lot of inherent flexibility in the Phylo set up, and a lot will probably depend on how much time you want to spend on the design. As another example, we have a chemistry flavoured expansion pack (botanicals and their chemicals), which is a nice example of the designer attempting to bring in another science subject into the fold. Here, the mechanic is the inclusion of special plant species cards, which also have a corresponding chemistry card (i.e. a chemical compound derived from that particular plant species). Players can earn more points if they happen to play the chemical card underneath the plant card.

A couple of other pointers:

Note that these theme ideas are not mutually exclusive. For instance, one group is currently thinking about a Salmon ecosystem deck. In effect, it does have a focus on a subset of salmon species, a specific locale, as well as a variety of environmental factors that play into the health of that ecosystem. Another example, is that some museums have been interested in creating a deck that focuses on some of their exhibits. Here, the theme is primarily inspired by the specimens they have, but the designers have worked to pick specimens that still fit in terms of realistic food chain interactions. As a result, these decks are good as a playable game, but can also be used as a checklist of things to see in the museum.

Overall, however, we do feel that the first deck you make should be the one you spend the most time on. Think of it as your primary "starter" deck. If you take the effort to make this starter deck a good one, then future Phylo related decks can be a lot easier to produce, because you have the option of just making an "expansion pack" that feeds into this starter set-up. Expansion packs are great in that playability is less of an issue, and therefore getting on the business of creating these cards is much simpler. In fact, for museums, we've been

advising this scenario, because this way, a museum can entertain the idea of small expansion packs being produced with relative frequency and ease, where the content revolves around new exhibits as they come to fruition. Elementary teachers have also benefited from this model, in that it can be quite difficult to work out a playable list of species with their students (unless, of course, that happens to be the primary learning objective), but if a starter deck already exists, then simpler learning objectives can focus on producing cards that end up being part of an expansion pack scenario.

Finally, we have had the odd question around creating a deck that really doesn't have anything to do with ecosystems. Because the Phylo project is ultimately based on crowdsourcing and openness, the bottom line is that you're welcome to try and figure out new game rules so that your particular objective is met. In fact, this has led to one other set of rules which seems to work quite well if you want to explore "process of science" type topics. However, we won't go into detail about this "process of science" rule set here: we'll focus on the ecosystem game mechanic for now, but will hope to have another document that looks at this other game mechanic in the near future.

STEP 3: CREATE A LIST OF CARDS FOR YOUR DECK.

Anyway, once you've determined the general theme of your deck, the next thing you need to think about is the makeup of the deck. Usually, this starts with making a list of species that make up your particular ecosystem.

Here, it's really handy to consider the following:

(i) For a 20 to 30 minute game that can be played on an average sized coffee table, you need a deck of about 50 cards. As well, if you plan on printing the cards professionally, it helps to remember that cards are generally printed at 9 per page. For the purposes of this document section, let's assume that all numbers mentioned are aiming towards creating a final deck of 54 cards, which includes a few extra cards for instructions, branding, etc.

(ii) 2 of these cards need to be HOME cards (see rules). This is kind of a wild card that is placed on the table right at the beginning of the game. HOME

cards tend to be a great way to brand the deck (i.e. it's kind of like the TITLE card if you like), but we've seen folks play around with this idea as well. For example, the Voyage of the Beagle Deck has a set up where the cards showcase a map of Darwin's voyage: we've also had other folks suggest replacing the HOME cards with AVATAR cards, which allow the player to have special skills when playing (say the card is an ornithologist and therefore the player gets special abilities when playing bird cards).

(iii) Next is the list of species. This tends to be the part of the process that takes the most work. In general, you'll need about 35 of the cards being species cards. We suggest making a big list highlighting at least 50 or so possible organisms could be in the deck's ecosystem, noting down specific species that are "must haves."

With this list, in a classroom scenario, you can give each student a PhyloCard Worksheet, and let them begin doing the research required to fill the data on the card. If you're working as an organization, then it will probably be best to create a spreadsheet that includes columns that highlights the following stats.

Name, Latin Name, Size*, Terrain*, Climate*, Food Chain requirements (i.e. photosynthetic, herbivore, etc). Geographical location (if your deck includes species from different places).

From here, next comes the step where you want to edit it down to a workable and manageable smaller list. We often suggest aiming for a final species count of about 20 to 25 different cards (or one per student if in a classroom). This means that in the final printed deck of 54 cards, there will be repeats of certain cards (i.e. multiples of specific cards), but this smaller number usually works well for a few different reasons.

First, working with fewer cards is generally going to make things much easier, especially in later stages when one is play testing the deck: it's relatively simple to adjust the playability of your deck by just adding extra copies of existing cards, as oppose to having to tweak, edit, or possibly cut out from a larger list. Second, limiting it to 20/25 means that the opportunities for future expansion decks are optimized: in other words, if you create a deck that has almost

"everything" from the get go, then ideas for future expansion sets become more limited. Third, if you do plan on releasing a professionally printed deck, where art needs to be commissioned, then limiting this to a smaller number will end up being cheaper in the long run. Finally, going for 35 different species may not be convenient for a classroom scenario where ideally each student gets to work on one card (i.e. your species numbers are equal to the number of students in your class – unless of course, you have 35 students!)

So, in terms of what those final 35 species cards are in the final deck of 54, the following recipe seems to work well. And again, **note that these ratios do not necessarily represent the ratios required of the final list of 20 to 25 species that you're actually producing individually, because you always have the option of having duplicate cards to hit the suggested ratios.**

In terms of the 35 cards needed:

Just under half of the cards (~15) are primary producers and/or decomposers (Food Chain 1);

Just over a third of the cards (~11) are primary consumers. Here, about half could be herbivore types (Food Chain 2) and half omnivore types (Food Chain 2/3).

Just below a quarter of the cards (~9) are 2°+ consumers, such as the traditional carnivore type (Food Chain 3).   Don't forget that meat eating interactions (unless otherwise stated) can only occur between organism smaller or equal in size/scale.

This recipe will work well if all cards are inherently compatible with each other in terms of having at least one single matching terrain, and one single matching climate value (for instance if you're making a deck of a small area where terrain and climate is essentially equivalent throughout, then your list is likely going to work really well). However, the reality of most ecosystems, is that there will be a variety of species with diverse and/or limited terrain and climate needs. Consequently, one also needs to keep an eye out for these outlier cards.

For instance, if most of the cards are forest or grassland, but you have some marine specific cards, the playability of the game becomes trickier to predict, because ultimately, those fewer marine cards become more difficult to play. As a result, the simplest scenario is to focus on a deck where the ecosystem being examined is restricted to a very small set of habitat. That being said, the prototype Beaty Biodiversity Museum deck is a good example of a localized habitat where marine, coastal and terrestrial organisms are provided.

For reference sakes, the Beaty deck contains the following (FC=food chain number, x=multiples):

Terrestrial*	Food Chain #	Total cards/multiples	Notes
4 different plants	FC1 yellow	7 cards total (x3, x2, x1, x1)	
1 fungi	FC1 black	1 card total	
2 different herbivores	FC2 green	3 cards total (x2, x1)	
5 different omnivores	FC3 brown	5 cards total (x1 each)	
3 different carnivores	FC3 red	3 cards total (x1 each)	
Marine			
3 different autotrophs	FC1 yellow and black	7 cards total (x2, x2, x3)	Includes phytoplankton and zooplankton (x3)
1 herbivore	FC2 green	1 card total	
1 special FC2	FC2 brown	2 cards total (x2)	Krill
5 carnivore cards	FC3 red	5 cards total (x1 each)	3 able to feed directly off zooplankton. Blue whale can also feed off krill
25 different cards		**34 total cards**	

Note that the game also has a way to calculate the approximate point value of each card. In essence, it follows the below schematic:

Base score:	Terrain modifier:	Climate modifier:	Other:
Carnivore: 7	3 diff. terrains -1	3+ diff. climates -1	Move/Flight/Spread
Herbivore: 4	2 diff. terrains 0	2 diff. climates 0	of 3 or higher -1
Omnivore: 3	1 terrain +1	1 climate +1	"Invasive" -1
Autotroph: 2			

(iv) After the species cards, you'll need to think of "event cards" next. A deck needs about 15 total of these cards. Of these, about three quarters need to be negative, one quarter positive, and perhaps 1 card that is intentionally more powerful (negative or positive) card.

Again, the Beaty deck provides a good example of what this might look like:

Wildfire x4	Negative	Playable on forest and grassland	Discard species it's played on.
Oil Spill x3	Negative	Playable on ocean or freshwater	Discard species it's played on.
Habitat Loss x3	Negative	Playable on any terrain.	Discard species. Card is left on table and now represents "urban" space to reflect human consequences.
Climate Change x1	Negative (Strong)	Playable anywhere	Discard species. Opportunities to continually discard adjacent species (one at a time) if able to win in rock-paper-scissor battles.
Species Protection x2	Positive	Playable when any event card is played.	Prevents event card from happening. Both event card and species protection go into discard pile.
5 different, 13 total			

STEP 4: MAKING YOUR BETA DECK.

Now that you've done the hard work of figuring out what cards will be involved in your deck, the next important step is to simply make a do-it-yourself beta deck. There's two common ways to do this:

The first is to simply make a deck with cue cards. These cards should have all the information, but don't really need the pictures yet. Or, you can use the blank card templates found in the MAKE section of the website.

The second is to ask for the DIY account at http://phylogame.org. Here you can email me (db@mail.ubc.ca) and inquire about this option. Essentially, this allows you to quickly make cards on the website, with the option of uploading images either from public domain or those drawn by yourself or your students. Overall, having this account will let you save your cards and also make things easier for printing. Note that if you're a teacher, these accounts even provide two layers of permissions, so that you can give your students access, and then be able (as the teacher) to view and delete (if necessary) all of their cards.

STEP 5: PLAY TEST, PLAY TEST, PLAY TEST!

Finally, the most important (but also fun) part! With your beta deck, you will need to play the game over and over and over again. It is here that you'll actually work out the kinks in your cards. You may find that some cards are unplayable, some cards skew the competition too much, some cards are too rare, etc. Although the above section on species lists attempts to give you the information to make the game work well, the reality is that you never really know until you start playing it.

Any issues you find will need some tweaking with the deck card list. And from here, it's play testing all over again. In general, if this is for the classroom scenario, the thoroughness of this step is less important than a project that aims to be representing an organization or one that will be purchasable down the road.
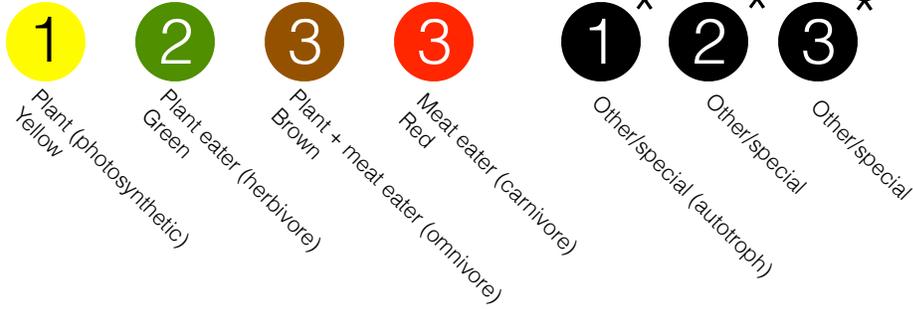
Your Name: _____   School/Organization: _____

Organism Name: _____

Latin (scientific) Name: _____

Scale (circle closest one below)

| 1 virus | single celled | 3 multi-celled | insect | small animal small plant | 6 | | large | tree/whale |

Foodchain (circle best one below)

1 Plant (photosynthetic) Yellow

2 Plant eater (herbivore) Green

3 Plant + meat eater (omnivore) Brown

3 Meat eater (carnivore) Red

1 * Other/special (autotroph)

2 * Other/special

3 * Other/special

Card Text:

1st line – "PLAY" MOVE/FLIGHT details, special instructions

2nd line – "FACT" An interesting piece of information about the organism

* In general, a black circle signals the player to pay closer attention to special instructions on the card. For instance, organisms with very specific diets, or autotrophs that take in nutrients from soil, or directly from the water in aquatic systems.
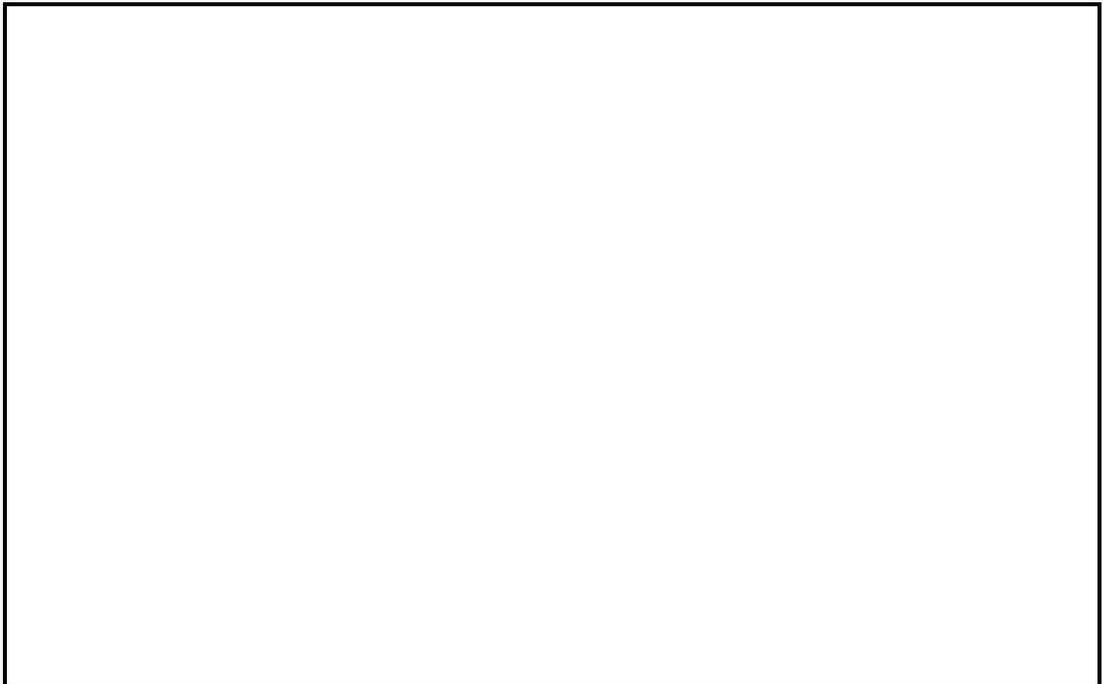
Terrain (choose up to three): ☐ Urban/City ☐ Forest ☐ Desert ☐ Marine (fresh) ☐ Grasslands ☐ Tundra/Rocky ☐ Marine (ocean)

Climate (choose at least 1): ☐ Hot/desert ☐ Warm/temperate ☐ Cool/temperate ☐ Cold/Arctic

Card Points:
Base score dependant on diet: Carnivore **7** | Herbivore **4** | Omnivore **3** | Autotroph/Photo **2**
Terrain modifier: 3 terrains **-1** | 2 terrains **0** | 1 terrain **+1**
Climate modifer: 3+ climates **-1** | 2 climates **0** | 1 climate **+1**
Other: Move/Flight spread of 3 or higher **-1**

Your card's points ☐

Image:

You can draw your image in the box provided, then take a picture and upload to the site. Alternatively, you can find a picture on the web that you can use for your card. Wikipedia and the Encyclopedia of Life are great places to look for creative commons images of biodiversity.

North American Beaver 6 ②
Castor canadensis

Animalia, Chordata, Mammalia
5 POINTS
• *Castor canadensis* has a **MOVE** of 2.
• *Castor canadensis* is a national symbol for Canada.

Graphic by *Adam Smith*
rupted.deviantart.com/

Cool, Warm

Phylo THE TRADING CARD GAME BETA

Tag: Blank