

Your mission (should you choose to accept it) – is to design the perfect animal that is adapted to live in an Everglades ecosystem. You will be given an ecosystem to work with. Find three aspects of your ecosystem that an animal would have to adapt to and for each - one at a time - follow the steps of the engineering process to design the solution – an adaptation the animal could have to overcome. When you have all three solutions, combine them and make a sketch of your animal – the perfect beast!

Step 1 - Define The Problem

First, choose Features of the Ecosystem that an animal living in it would have to adapt to. For example – wetlands have wet, marshy terrain, so a wetland animal would have to be able to walk through water and/or mud, or pine flatwoods have occasional natural fires, so a pine flatwood animal would have to be able to escape or protect itself from fire.

Then, choose your Criteria for Success – what is it you want your animal to be able to do? How will you know you have achieved it? For example, if you choose the wet, marshy terrain of wetlands for your feature to adapt to, then a criteria for success might be that the animal is able to travel through the wetland, say 95% of the time.

Consider and list the Constraints and Limitations – Are there any features of your ecosystem that you have to consider in your design, or work around? For example, in the wetlands, water levels may vary depending on the amount of rain and the season, so a constraint may be that the animal would have to be able to get through deep water as well as shallow.

Step 2 - Design the solution

First – do some Research about your ecosystem – either read the cards or look it up on the internet. Think about animals that already live in your ecosystem – what are the adaptations that they have to help them live there? Can any of their characteristics be adapted for your animal?

Then, brainstorm Possible Solutions – think outside the box – write down as many ways the problem could be solved as you can. In this phase, the sky is the limit, so don't think about the constraints and limitations here, just let your creative juices flow!

Step 3 - Optimize the solution (figure out which solution from your list is best)

First, Evaluate Potential Solutions – of the list generated above, which one is the best? Start by eliminating the ones that don't work because of the constraints and limitations. As a group, pick the solution you think is best.

Testing – Plan a test to see if your design works. How would you know if your design was successful? (Hint – look at your criteria for success.) How would you gather the data? For example, if your wetland animal needed to get through the wetlands successfully 95% of the time, you might design a tracking system so you can see how easily it gets around.



Design the Perfect Beast Work Sheet

Write your answers to the steps above in the tables.

Step 1 Define the Problem

Answers will vary – but typical answers will be similar to the following example:

Assigned Ecosystem _____	Adaptation 1	Adaptation 2	Adaptation 3
Features of the Ecosystem that will require Adaptation	Deep Marshes to walk through	Has lots of sharp Sawgrass	Main routes of moving water
Criteria For Successful Adaptations	Can get through marsh to hunt for food – finds food	Can protect self from sharp sawgrass – does not get cut.	Tolerates moving water – can float
Constraints and Limitations	Must eat food that lives in marsh	Must have thick skin but still be light enough to float	Must be light enough to float or swim

	Adaptation 1	Adaptation 2	Adaptation 3
Research (Identify animals that live there successfully and their special features.)	Alligator – low, thin to get through thick marsh, sharp claws.	Tough thick skin	Good swimmer. Can stay underwater for periods of time.
Possible Solutions (Brainstorm a few.)	Snake shaped, Could fly, long legs	Armor – like coating. Be a quick healer – regrow skin easily	Webbed feet
Best Solution (Pick one from above.)	Long Legs	Thick, tough skin	Webbed feet

