

Paper 3

How do we know why we act as we do?

The root causation of civilization eludes me.

(Earliest recorded wall inscription, Progenitor's chamber, Haven)

Survival p 1

Alien Presentation

Make an Alien species that would be interesting characters in a science fiction story. Your report will be a fifteen-minute presentation using either PowerPoint or a series of movie clips. In your presentation you should discuss alien's biology, its society, and how the two are related. The power point or movie file that you use will be due by 11:20 PM the night before the presentations.

The Project

For this paper, you will work in groups of 3-4 people and develop an intelligent alien species whose basic behaviors are rooted in its evolutionary history—as are ours. The more different your species is from us, the better. Humanoids with bumps on their faces will get low score for originality. Barbie with wings will get low scores for both originality and plausibility—what muscles power those wings?

Use the principles of evolution we've been discussing in class and ideas from the aliens of the stories we're read to make a believable alien civilization.

You can think of this project as presenting a hypothesis that answers the question: How does biology affect culture?

Group membership is due Nov 2nd, and the chosen planet is due November 6th.

Important details of alien biology

Evolution:

This is the most important aspect of your alien. How is its behavior influenced by the instincts it inherited from its animal ancestor? Show the current or extinct creatures that share a common ancestor, and which aspects have been carried forward to your creature. Show how similar features are spread thought the animal kingdom on this world.

Reproduction:

How do this creature's sexual strategies play out in your culture? There are a lot of ways of to reproduce on Earth. Even if you stick with sperm and eggs, there are a lot of variations. Fertilization doesn't always take place inside the body. Male sea horses keep the eggs in a pouch until they hatch. Flowers use insects to spread their DNA. Conifers use the wind.

Do your creatures have lots of offspring, most of which don't survive (r-strategy), or do they have a small number, which they protect fiercely (K-Strategy)?

Where do the babies get their food? Hatch on the right food (be it leaf or dead or living animal)? Does the mother produce food (mammal) or do the parents partially digest it for them

first (birds) or do they just have to figure out how to hunt fast (reptiles) or something else?

How frequent is mating? Is it a continuous behavior, or does it occur annually, or for a limited number of times in a life? Does mating involve some form of cannibalism?

Ecosystem

How does your creature's position in the ecosystem affect its culture? There are two aspects of the ecosystem to consider: The web of life and the climate. Is your creature (and its ancestors) primarily predator, prey, or scavengers? What type of climate does it prefer? How do it and its ancestors handle the changing seasons? Hibernation? Migration? Endospores?

Anatomy

How is your creature's culture affected by its anatomy?

Body shape. Two aspects are important to think about. Volume/area. Spheres keep their heat best. Flat objects cool fast. Something with lots of spines cools the fastest (your computer's CPU has fins to help it cool faster) Related to this is the strength-to-mass ratio. If you scale up a small object, the strength doesn't increase as fast as the mass does, and you'll end up with the equivalent of a beached whale.

Senses: What are the important senses to this creature? Does it have anything unusual? Is it lacking any senses? What range of light and sound can it see and hear? Where are its sense organs located? How would you view the world differently if you were radially symmetric, had eyes facing in all directions, and could move in any direction? How would you "Face" someone? How could anyone tell what you were looking at?

Blood and Guts: How/where does food go in and waste go out? Breathing doesn't have to be in and out of lungs. It could be through the skin, or air passing through a tube.

Muscles and skeleton. Make sure all your moving parts have clear musculature associated with them. Fairly wings are not plausible. Show how your creature's skeleton has changed since its ancestral form. What kind of skeletal structure does it have? An exoskeleton, internal skeleton, or something different?

If you are working in a group of two, you need to concentrate on three of the major aspects—Evolution, reproduction, ecosystem and anatomy. A group of three should have all four of these aspects fleshed out.

Describe the Alien Culture

For the sake of the project, let's assume that we've found an alien civilization with technological development of roughly the 1700s—clearly intelligent creatures, but without much technological sophistication. Things get complicated otherwise.

How is the alien society organized? Are their strict casts or are they flexible in their leaderships roles? Do they even have a hierarchy? Do they even form groups, or are they solitary individuals only coming together at certain times of year?

What are some of the common sayings and aphorisms of the culture? What are the major taboos? What are common group activities? How aggressive are they? Do they have frequent battles or wars? What rituals have developed around the mating process?

How did their technology develop? What was the main driver of technological innovation? How do they use the natural cycles of their planet (if there are any)? What is their attitude towards nature—is it something feared, respected or dominated?

The Planets

Gleise 667 C c, 3.8 times the mass of Earth, has gravity 56 percent stronger than ours, is tidally locked to a red dwarf star, and has a year that is only 62 days long. Being tidally locked, it has no day/night cycle and no seasons, so there is no natural unit of time. One hemisphere is in constant sunshine, while the opposite hemisphere has never seen the sun. In the location directly under the sun, the temperature is a nearly constant 160°F, and at the far side it is -25°F.

This planet a single landmass with many large lakes scattered across the surface and one sea, which stretches from the rain zone across the frozen night side of the planet. This sea is covered in Sea ice on the night side, but is still liquid beneath the ice. The land directly under the sun, is an inhospitable desert, and has no seas or lakes. Several thousand miles from there, where the sun sits 45° above the horizon is a zone of hot, steady rain. In the Twilight Zone, where the sun sits near the horizon, never moving, is a region of highly variable, highly unpredictable weather.

There are other objects in the sky to see, even on the daytime side. There are two other nearby stars, but they are too far away to affect the weather. There are 6 other planets—four are always visible in the daylight (unless they are behind the sun or in front of it) and two can be glimpsed from the night side of the planet.

Planet **Kepler 452 b** is the nearly the opposite of Gleise 667 C c. It orbits a sun-like star in 384 days, but instead of having a 23° tilt, with its widely separated tropics, arctic and temperate zones, this planet has a 90° tilt. The arctic, which has constant daylight in the summer and constant darkness in the winter, extends from the poles down to the equator. The tropics, where the sun passes directly overhead twice a year, extend all the way from the equator to the poles. There is no Temperate Zone. The summer temperatures can get up to 140°F, and the winter temperatures can drop to -100°F.

The poles have the most extreme weather with the sun sitting still directly overhead on the Summer Solstice, and 6 months of total Darkness in winter. The equatorial region is more steady but still like nothing on Earth. In the Spring and Fall, when the sun gets directly overhead, there is a cooling off period at night, but then there is a short period of total darkness around the Winter Solstice, and a period around the Summer Solstice when the sun is above the horizon (but not very high) for weeks on end.

One hemisphere has two small isolated continents, one straddles the equator and the other at from 30 - 60° North. The other hemisphere has a huge landmass stretching almost pole to pole. Gravity on this planet is only 80% of earth's gravity, and a year is 350 days.

Planet **HD 40307 g** is weird one. This planet is in a highly elliptical 200 day orbit. This planet's seasons are not caused by the tilt of the planet (as on Earth, Mars, and Saturn). The whole planet has winter when it is farthest from the sun, and the whole planet has summer when it is closer to the sun. Summers are brutal since the planet skirts the inner edge of the habitable zone. Large lakes can completely evaporate, and the ocean levels drop by hundreds of meters. The weather is hot and humid and full of thunderstorms, but the rain evaporates back into the air before it ever hits the ground. In winter the rain is heavy and steady. Ocean levels rise, rivers rage, and lakes form all over the planet. It snows in the mountains, and the more northern Latitudes. This is a very massive planet—7 times more massive, twice the radius, and almost twice the gravity of Earth.