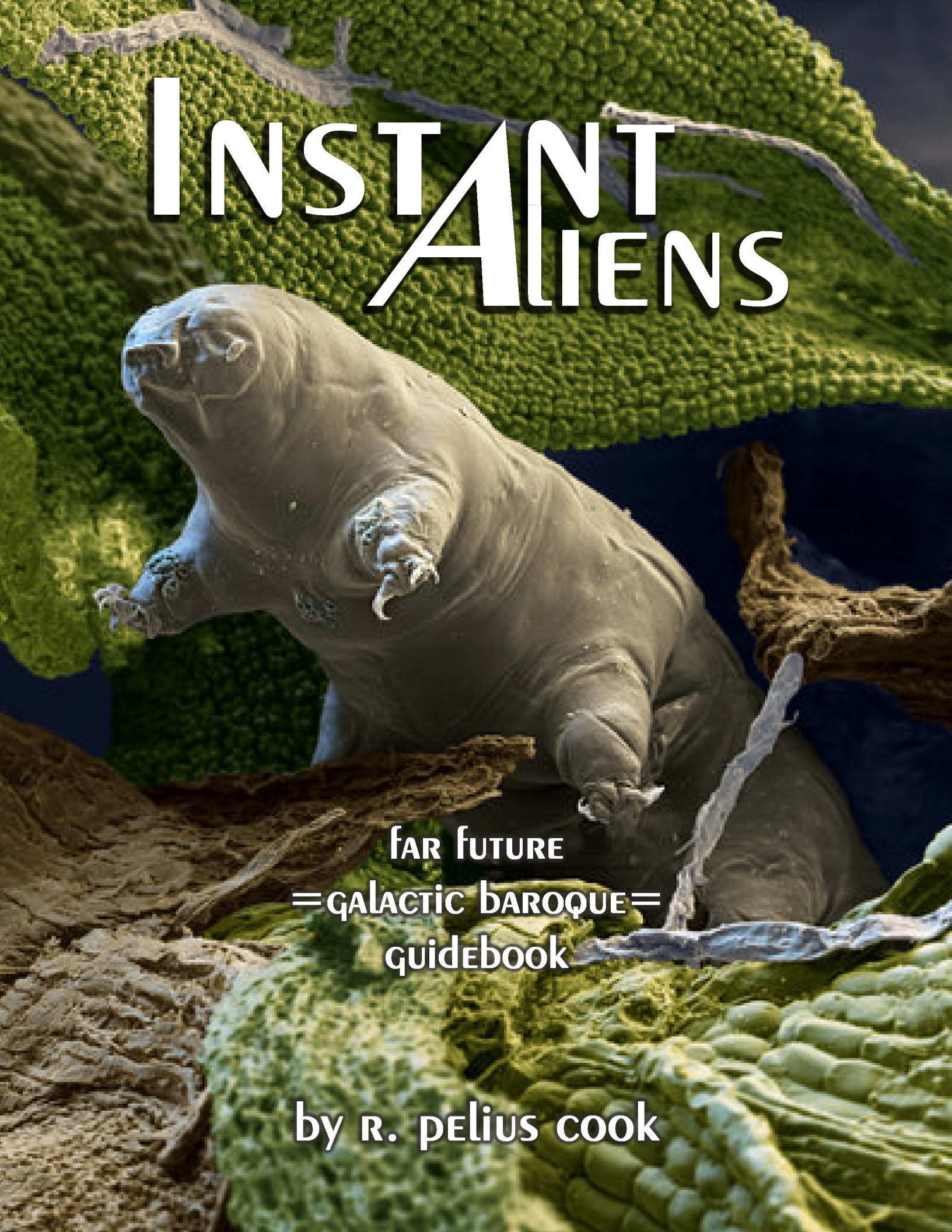
Instant Aliens
far future
=galactic baroque=
guidebook
by r. pelius cook

DEDICATION

To my very own
instant aliens:
Trey and his
brother Wesley,
who is on his way.

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far future roleplaying

Instant Aliens

by r. pelius cook

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thank you all so much for supporting this kickstarter campaign.

Table of contents

Finally! An alien life creator that builds complete, plausible ecosystems from microbes up to plant, animal, and sapient species.

Alien encounters are some of the most exciting aspects of science fiction. In many cases, though, the beings depicted are only slight variations of our own species, often with barely a thought given to the other creatures that populate their native ecosystem.

With =GALACTIC BAROQUE= *INSTANT ALIENS* your horizons will be vastly expanded! Not merely a rulebook for random alien generation, this guide helps you create exotic, plausible extraterrestrial biospheres from kingdom level down to clades and species. All details of races, animals, plants, and microbes are influenced by the initial conditions of the world from which they arose and the organisms from which they descend.

Did intelligent life emerge on this exoplanet? Learn its strengths and weaknesses, determine its technology level, and discover how far from its home (and even out into space) the species has explored. Is your universe filled with humanoid aliens and anthropomorphic beasts? No problem! Our own future will see genetic engineering and directed evolution, where animal species may be uplifted to humanlike sapience. An entire chapter of *INSTANT ALIENS* will help you through this process.

Writers of any genre, gamers, roleplayers, world-builders, extraterrestrial enthusiasts, and more will find this heavily researched book both useful and fascinating. It's a great way to introduce children and novices to the wonders of life, too!

HOW TO CREATE INSTANT ALIENS

Proceeding in order from general Life information to Clades and Groups, then adding Genus and Species details as needed, provides the most accurate and detailed biosphere for a world. If you only need information from a few sections, though, start wherever works best. Always feel free to pick whatever result you prefer from any of the choices. Even if you do not roll dice for this, the number ranges give a clear idea of how often such combinations are found in the universe.

INSTANT ALIENS is designed to work best with a full set of polyhedral dice: 4-side (d4), 6-side (d6), 8-side (d8), 10-side (d10), 12-side (d12), 20-side (d20), and 100-side or percentile dice (d100). To use any table, make a HaVoQ ROLL: **Roll ALL the dice together!** Match each die roll to the applicable table, add or subtract any modifiers, then make any additional rolls as required. Record the indicated results, then move on to the next section. You will find that the results of one table often affect the results of other sections.

If an indicated result is **Special**, feel free to use your imagination! Should you need a hint, though, reroll on that table and consider the new result to be an unusual or special variation of it. Anytime duplicate results occur (such as for certain Peculiarities tables), consider it a more extreme variation.

May you all enjoy exploring with this guide as much as I enjoyed compiling it.

—R. Pelius Cook

"Having gone through the alternative possibilities, I find that carbon is much better suited for making complex molecules and much more abundant than other things you might think of.

I'm not that much of a water chauvinist. I can imagine ammonia, or mixtures of hydrocarbons, which are not all that cosmically rare playing the role of water."
—Carl Sagan

1.1 GENESIS

A stable star, protection from hard radiation, the right mix of volatiles and minerals, and ample time improve the chances for native life to emerge on a world. Starting simple, over billions of years it may potentially grow in complexity, and under rare circumstances produce a species capable of intelligent self direction.

To determine if native life arose on any orbital body, start with the Basic Life table and roll all applicable dice. Should all of them come up as 1's, roll on the Complex Life table to determine if advanced creatures developed on that world.

BASIC LIFE (Roll all applicable dice. If all results are 1, then basic life is native to the world.)

d4	Baseline chance
d6	Not moderate zone
d8	Not main sequence star
d10	Planet less than 500 million years old
d12	No oxygen/carbon dioxide/methane/hydrogen in atmosphere
d20	No liquid water
d100	Insignificant amounts of water (Roll in addition to no liquid water)
d100	No magnetosphere
d100	Insignificant atmosphere
d100	Carbon system
d100	Gas planet
d100	Planet less than 100 million years old (Roll in addition to other previous age factors)
d100	Subdwarf star
d100	Paleodwarf star (Roll in addition to subdwarf star)

COMPLEX LIFE (If basic life is native to a world, roll all applicable dice. If all results are 1, then complex life is also native.)

d10	Baseline chance
d4	Not moderate zone
d6	No magnetic field
d8	Not yellow/orange/red main sequence star
d12	No oxygen/carbon dioxide/methane/hydrogen in atmosphere
d20	No liquid water
d100	Insignificant amounts of water (Roll in addition to no liquid water)
d100	Insignificant atmosphere
d100	Variable/flare star
d100	Carbon system
d100	Gas planet
d100	Planet less than 2 billion years old
d100	Planet less than 500 million years old (Roll in addition to previous age factors)
d100	Planet less than 100 million years old (Roll in addition to previous age factors)
d100	Subdwarf star
d100	Paleodwarf star (Roll in addition to subdwarf star)
d100	Adjacent to belt
d100	High debris density

1.2 COMPLEXITY

Sub-basic forms straddle the line between the inanimate and the living. Where this is the highest evolutionary grade, nanoscopic protocells tend to concentrate around wet, mineral-rich geothermal features such as hydrothermal vents, geysers, mudpots, and fumaroles. In more advanced ecosystems, they are usually symbionts that infect higher organisms to gain the energy and materials they need for self-replication.

ROLL ALL APPLICABLE DICE AND ADD RESULTS TOGETHER.

d4	Baseline chance
d6	Not moderate temperature
d8	Not main sequence star
d10	Insignificant oxygen/halogens in atmosphere
d12	No oxygen/carbon dioxide/methane in atmosphere (Roll in addition to insignificant oxygen/halogens in atmosphere)
d20	No liquid water
d100	Insignificant amounts of water (Roll in addition to no liquid water)
d100	No liquid solvent (Roll in addition to no water & insignificant water)
d100	No magnetosphere
d100	Variable/flare star
d100	Insignificant atmosphere
d100	Planet less than 4 billion years old (Complex only)
d100	Planet less than 2 billion years old
d100	Planet less than 500 million years old (Roll in addition to all previous age factors)
d100	Planet less than 100 million years old (Roll in addition to all previous age factors)
d100	Adjacent to belt
d100	High debris density
d100	Gas planet
d100	Subdwarf star
d100	Paleodwarf star (Roll in addition to subdwarf star)
d100	Carbon system

ROLL TOTAL	MAXIMUM LIFE COMPLEXITY RESULTS BASIC	COMPLEX
1	Proto-Complex (Emergent)	High Complex
2-4	High Basic	Medium Complex
5-9	Medium Basic	Low Complex
10-49	Low Basic	Proto-Complex
50+	Sub-Basic	Proto-Complex (Emergent)

Basic life forms are the smallest self-sustaining units capable of independent replication. Microbes inhabit all hospitable environments as free-living plankton or congregations of cultures, biofilms, and mats. Their simplicity allows species to utilize a wide range of food sources. Low grade clades metabolize with less efficient processes and nutrients, while medium and high basic forms often introduce photosynthesis into the biosphere, which greatly increases energy available in the food chain and can drastically alter the world environment. High basic cells usually form the building blocks of complex life forms.

Complex life forms are made up of many differentiated cells, allowing them to absorb and utilize nutrients more efficiently and in greater quantity. Such organisms increase in size, speed, and capability with evolution. Most complex clades are made up of multicellular individuals, but some naturally band together as colonial organisms, often with several specialized, interdependent forms called zooids.

1.3 MICROBES

SOLVENTS AND AIR CHEMISTRY

Life utilizing **hydrocarbon** solvents appears in the widest variety of temperature ranges: liquefied gases such as methane, ethane, and propane on the coldest worlds; oily compounds of octane, hexane, benzene, and butane in moderate temperature ranges; molten tars like naphthalene and paraffin wax under hot conditions. **Hydrogen** is most often reacted with the more complex hydrocarbons (such as acetylene and ethane) to produce methane, which consumers respire and then exhale hydrogen. On rare worlds, producers convert hydrogen sulfide into methane and accumulate **sulfur** and sulfates as wastes which, when eaten by consumers, is respired with methane for energy, which re-enters the environment as consumers die and decompose. Since all nutrients in this methane/sulfur ecosystem are available only from the atmosphere or through producers, predators often never evolve.

ROLL d20 FOR SOLVENT (ROLL d12 FOR AIR CHEMISTRY).

Below -25	Special
-25 to -10	Hydrocarbon (1-9 Hydrogen, 10-12 Sulfur)
-9 to 1	Ammonia (1-5 Hydrogen, 6-10 Nitrogen, 12 Halogen)
2-24	Water (1-11 Oxygen, 12 Halogen)
25 or more	Sulfur (1-3 Hydrogen, 4-6 Sulfur, 7-12 Halogen)
Natural 20	Special

NOTE: Modify d20 roll as follows:
Frozen or Ultra Cold -20, Super or Very Cold -10, Cold -5,
Moderate/Hot +5, Hot +10, Very Hot +20.
Tenuous +20, Very Thin +10, Thin +5, Thick -5, Very thick -10,
Crushing -20.
Metal Planet +5, Ice Planet -5, Gas Planet -10,
Carbon planet -20.

NOTE: If world is above Very Hot, below Frozen, or is otherwise uniquely exotic, assume Special solvent with unusual chemistry.

ROLL d6 FOR CELL STRUCTURE.

Below -3	Solid
-3 to 0	Shell
1-2	Bubble
3 or more	Membrane

NOTE: Modify d6 roll as follows:
No liquid solvent -5, Rare liquid solvent -2,
Abundant liquid solvent +2.
Hostile environment -5, Extreme environment -2,
Ideal environment +2.

ROLL d8 FOR BASIC PRODUCER (ROLL d4 FOR EFFICIENCY).

Below -10	None
-10 to -5	Lithotroph (1-2 Extremely Poor, 3 Very Poor, 4 Poor)
-4 to 0	Chemosynth (1-2 Very Poor, 3 Poor, 4 Average)
1-4	Phototroph (1 Poor, 2-3 Average, 4 Good)
5-12	Photosynth (1 Average, 2-3 Good, 4 Very Good)
13 or more	Special

NOTE: Modify d12 roll as follows:
Sub-Basic -10, Low Basic -5, Medium Basic -2.
No light -5, Weak light -2, Strong light +2, Constant light +5,
Abundant high energy source +10.
Hydrocarbon solvent -5, Ammonia solvent -2, Water solvent +2..

1.3 MICROBES

SOLVENTS AND AIR CHEMISTRY (continued)

Because hydrocarbons are non-polar solvents, lipids instead of proteins are the usual building blocks of cells and since these are hard to dissolve, the cells are much larger than usual. However, because the chemicals used for energy yield much less energy than aerobic life, it tends to be move and grow much more slowly.

Although its temperature range is nowhere near as wide as the hydrocarbon family, **ammonia** is nonetheless a more common biochemical solvent, especially in cold or high pressure environments. It shares many properties with water, including being a polar solvent that can support protein chemistry. Worlds devoid of oxygen and water, such as carbon planets and gas giants, more commonly host such biospheres. Low energy **hydrogen**-to-methane or **nitrogen**/nitric acid-to-ammonia chemistries are most common, but **halogen** cycles such as chlorine-to-chloramine produce higher energy levels for life to utilize.

Ammonia-based life forms are flammable in aerobic environments and water is an acid to such organisms, so there typically is not much competition with water/oxygen life.

Water is by far the most common solvent used by living systems. Not only does it support complex protein chemistry, it also possesses the unique property of becoming less dense when it freezes, which allows subsurface oceans to exist even beneath the most frigid ice worlds. An **oxygen**/carbon dioxide cycle is most common to water-based life forms, but rare cases where a **halogen** such as chlorine is respired also exist. Chlorine/oxygen breathers tend to be have greater energy reserves than those that breathe just oxygen, but their native environments are lethally noxious to purely aerobic life.

Hot environments tend to produce life that relies on molten **sulfur** or gaseous sulfur compounds. Some producers split hydrogen sulfide into

1.3 MICROBES

SOLVENTS AND CHEMISTRY (continued)

hydrogen and sulfur, while on other worlds hydrogen sulfide and carbon dioxide are photosynthesized into **sulfur**, water, and sulfuric acid, the latter of which is liquid from room temperature up to the melting point of lead. Under the very hottest conditions, a high energy fluorocarbon chemistry may develop, with organisms that produce or breathe fluorine gas.

CELL STRUCTURE

Most life in the universe is comprised of wet cells with an outer gelatinous **membrane** through which all necessary energy, molecules, and wastes pass. These cells are mostly made up of the solvent on which the biosphere relies and related compounds, the abundance of which allows them to develop, act, and reproduce very quickly.

Enzymes float on the outer surface of **bubble** cells and catalyze in the gaseous interior. Such life requires far less solvent to survive and is much less prone to damage from freezing than membranous cells. Aerial floating forms more commonly arise when creatures are made up of this type of cell.

Cells with a solid outer **shell** often develop in hostile environments where conditions favorable to life are limited or infrequent. Although much more durable than most other life, it grows and multiplies much more slowly.

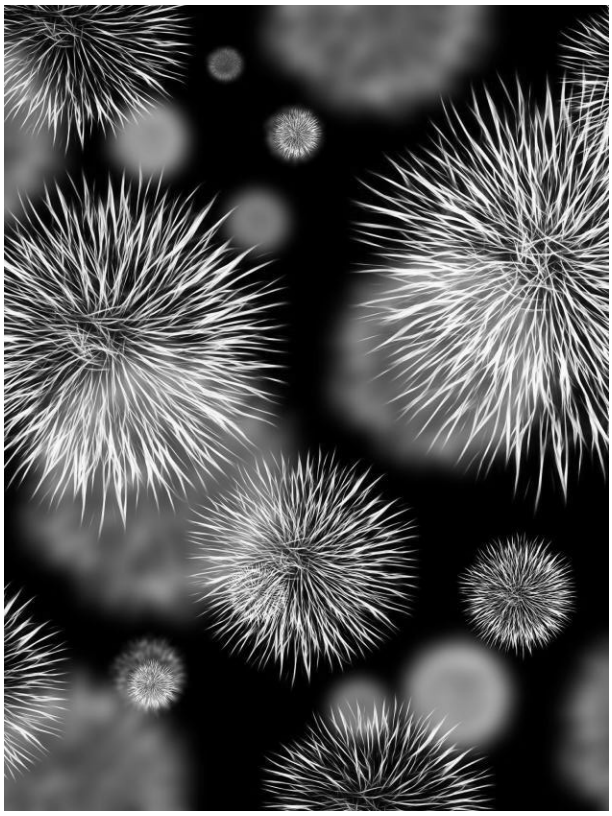
Completely **solid** cells typically evolve in the most extreme environments. Energy from light, radiation, or cosmic rays catalyze chemical reactions that drive all their life functions. Ecosystems based on these types of cells tend to be exotic, where symbionts tap into the electrical energy stored within the producers and in which consumers rarely evolve.

BASIC PRODUCER

Primitive sub-basic life may have not yet developed a food chain. Only those that remain in their ideal environments absorb nutrients and self-replicate, with little interaction with other life.

Lithotrophs utilize low energy or difficult to harvest inorganic substrates, such as iron, ammonia, and sulfur. **Chemosynths** harvest energy from more efficient chemical reactions with hydrogen sulfide, dehalorespiration, denitrification, and manganese reduction.

Phototrophs and **photosynths** use light. Whereas phototrophs utilize light to convert sulfur, hydrogen, fluorine, and other inorganic substances for energy, photosynths split water and reduce carbon dioxide, generating free oxygen in the process. Environments with inadequate light will only support chemosynths; photosynths do not exist on worlds devoid of carbon dioxide, methane, halogens, or oxygen.



Some environments support **special** types of producers. A highly unstable or inhospitable world may only support mixotrophs, organisms not limited to one source of energy and nutrients. Other worlds that have unusually high concentrations of a high energy source, such as organic matter, electromagnetism, radioactivity, heat gradients, wind, cosmic rays, and so on, may base the food chain around it.

"Species co-evolve with the other species they eat, and very often, a relationship of interdependence develops: I'll feed you if you spread around my genes. A gradual process of mutual adaptation transforms something like an apple or a squash into a nutritious and tasty food for a hungry animal."
—Michael Pollan

2.1 KINGDOM

Related creatures that share the same role, such as producers (plants), consumers (animals), or decomposers (fungi) are grouped into a kingdom. One with maximum **basic** complexity has no complex forms. Although the following tables could be used to describe microorganisms relative to the microscopic realm, the 3.4 Peculiarities tables better describe their effects on macroscopic life and the environment.

Proto-complex life is multicellular but very primitive, with simple tissue, organ, and feeding systems. Sponges, jellies, simple plants and the Ediacaran fauna are Earthling examples.

Low complex organisms are the stems from which more advanced creatures often evolve. Their variety and simplicity also allow some to survive and thrive in certain niches long after their time of dominance has passed. Vascular green plants, insects, crustaceans, most molluscs, and Cambrian clades are examples of which you may know.

Life becomes more capable at **medium** complexity, with forms much larger and faster than before. Because of the greater metabolic needs at this level, producers rarely attain it. Amphibians, reptiles, non-avian dinosaurs, cephalopods, and synapsids are medium complex.

Roll all applicable dice once for Low Complex ecosystems, twice for Medium Complex, or three times for High Complex, then compare each die total with the following chart to determine that life kingdom's maximum complexity.

DIE	KINGDOM
d4	Lithotroph
d6	Chemosynth
d8	Phototroph
d12	Decomposer
d20	Photosynth
d100	Consumer

NOTE: If a natural 1 is rolled, stop rolling that die. If the maximum result of a die is rolled naturally, roll again and add to that die total.

DIE TOTAL	MAXIMUM COMPLEXITY
Below 10	Basic
10-19	Proto
20-49	Low
50-99	Medium
100 or more	High

NOTE: If no kingdom total equals the world's highest complexity, raise Consumer to that level. If any kingdom complexity is greater than the world's highest complexity, it is Emergent.

High complex life is energetic and sophisticated. These creatures typically maintain a constant internal temperature and must consume much more nutrients than lesser life forms. Mammals and birds are the native examples of this on Earth.

If a kingdom has an **emergent**, higher complexity than what was originally determined for a world, then a clade, group, or genus at that level has evolved but is not common or dominant. This was the situation with mammals during the age of dinosaurs and birds toward the end.

2.2 CLADE

Branching from each kingdom are families of related organisms called clades. These groups, genera, and species share certain traits inherited from their ancient ancestors. Mammals, birds, reptiles, amphibians, insects, crustaceans, ray-finned fish, molluscs, and sponges are some Terran examples.

2.2 CLADE (continued)

For a general overview of any ecosystem, first determine the dominant producer clade of that habitat, then generate the consumer clade which feeds upon it; both of these will usually be of the highest complexity evolved within their respective kingdoms. Next, flesh out the sub-habitats with less complex clades. Roll or choose the clade details of any other remaining complex kingdoms, such as decomposers. Because symbionts typically have specific targets, it works best to link their creation to the life forms with which they interact.

ROLL d10 FOR ROLE.

1 or less	Symbiont
2	Decomposer
3-4	Producer
5-9	Predator
10 or more	Consumer

NOTE: Certain other factors also affect d10 Role roll.
Proto-Complex -2, Medium Complex +2,
High Complex +5.

ROLL d10 FOR HABITAT.

3 or less	Aquatic
4	Underground
5-9	Terrestrial
10 or more	Aerial or Special

NOTE: Certain other factors also affect d10 Habitat roll.
Proto-Complex -2, Medium Complex +1,
High Complex +2.
Producer -2, Decomposer -1.
No Atmosphere -5, Thin Atmo -2,
Thick Atmo +2, Dense Atmo +5,
Crushing Atmo +10.
Ocean World -10, Hostile Surface -5,
Gas Planet +10.
High Gravity -<g/2>, Low Gravity
+ <inverse g/2>.

HABITAT

Aquatic clades live in bodies of their solvent. Due to the abundance of this vital chemical and the moderating protection it provides, life typically arises and diversifies in aquatic environments first. However, because of the limited solubility of gases in liquid, some creatures eventually emerge from it to better harness the air. Sub-habitats extend from the sunlit **pelagic** and **benthic** down to the eternal darkness of the **aphotic** zone, where no strictly phototrophic organism can exist.

Underground habitats provide protected, stable environments. **Subfossorial** creatures use caves or burrows for shelter, whereas **burrowers** build extensive underground complexes in which they spend most of their lives. **Subterranean** creatures evolve in deep isolation, adapting to the darkness and limited food availability. On the most extremely inhospitable worlds, this may be the only habitat available to populate. In other cases, a shadow biosphere may evolve independent of and unknown by the denizens on the surface.

Terrestrial environments exist on the world's surface, where air is abundant for respiration. Typically, the most complex ecosystems evolve on land after emerging from aquatic or underground habitats. **Wet** and **warm** regions are colonized first, then hardier and more tolerant species expand into the **temperate** and harsher **cool** and **dry** zones. This habitat might not exist on ocean, steam, and gas worlds.

Aerial clades can glide and fly, giving them many advantages for nutrient acquisition and self defense. Such creatures are more common on worlds with thick atmospheres and low gravity. Groups are often additionally adapted to the surfaces above which they soar, such as **aquatic** environments, dry **land**, and the open **sea**.

2.2 CLADE

ROLE

Symbionts have close, long-term biological interactions with another host life form. M**utualist** interactions benefit both the symbiont and the other species, whereas **commensals** benefit themselves without usually causing harm to their hosts. **Parasites** benefit from another species at the host's expense, the defense against which is often a strong driver of evolution. Purely symbiont kingdoms are almost always composed of microbes, but complex symbiotic clades are usually related to existing producers, decomposers, and consumers.

A **producer** uses energy and inorganic matter to create biomass, forming the basis for almost all food chains. Complex producers are almost always **phototrophs** or **photosynths**. Certain types may evolve into **saprophytes** that gain nutrients directly from decomposing organic matter, while others may become **parasitic** and even lose the ability to harness light for energy.

Decomposers break down matter into simpler compounds that other decomposers and producers often utilize, thereby forming a vital link in the circle of life. **Lithotrophs** utilize inorganic substrates, such as iron, ammonia, and sulfur, while **organotrophs** decompose dead and decaying matter.

Consumer species live by consuming other organisms and are often by far the most biodiverse of all life kingdoms. **Grazers** eat producers, **scavengers** scrounge dead organic material, and **predators** kill and feed upon other consumers; **omnivores** eat both producers and consumers. Sessile consumers typically filter feed or trap prey.

CLADE HaVoQ ROLL!

18 Roll d4, d6, d8, d12, and d20, then consult the following tables applicable to each die to create a Clade.

ROLL d12 FOR SYMMETRY.		ROLL d4 FOR SUPPORT.
1 or less	Asymmetric	1 Hydro, 2-3 Exo, 4 Endo
2-4	Radial	1-2 Hydro, 3 Exo, 4 Endo
5	Amoeba	1-3 Hydro, 4 Other
6 or more	Bilateral	1 Hydro, 2 Exo, 3-4 Endo

NOTE: Various factors can affect the d12 Form roll:
Producer -5, Decomposer -2, Consumer +2.
High Complex +1, Aerial +2.

SYMMETRY AND SUPPORT (d12 & d4)

Asymmetrical life displays no obvious symmetry. Almost all forms are sessile, allowing the organism to adapt its growth according to its habit in whatever manner best exploits the surrounding conditions.

Radial bodies are symmetrical about an axis, having top or bottom but no left or right sides. Sessile, floating, and slow moving organisms often take this shape, which facilitates sensation and interaction with the environment. Appendages are arranged around the feeding orifice or oriented toward the food/energy source.

Amoeba can alter their shape and are not limited to protoplasmic forms. They grow or move through body contortions and often by extending pseudopods. Any additional appendages are rarely used for locomotion.

Bilateral organisms have identical left and right halves, typically with paired appendages that are used for locomotion and maneuvering. Motile life predominantly takes this form, since it aids locomotion and streamlining. Sensory organs tend to concentrate at one end of the body (usually the part that encounters objects first while moving, such as the front), as does the feeding orifice for non-absorption consumers.

Three types of body support are found in nature. **Hydroskeletons** support the body through fluid pressure, producing a flexible, semi-rigid structure. Bodies with an **endoskeleton** have rigid internal support structures. **Exoskeletons** enclose the body, providing it protection and form, but at the cost of limited flexibility and growth.

2.2 CLADE (continued)

APPENDAGES (d6 & d8 plus d10)

ROLL d6 FOR APPENDAGES (ROLL d8 FOR MOTILE LIMB COUNT)

1 Myriad (1-2 1d100* pairs, 3-8 2d10* pairs)
2-3 Many (1 Myriad, 2-3 Five pairs, 4-6 Four pairs, 7-8 Three pairs)
4-5 Few (1-2 1d10 Limbs, 3-7 Two pairs, 8 One pair)
6 None (1-3 Many Protolimbs, 4-6 No Limbs, 7-8 Few Vestigal)

NOTE: Certain factors affect d6 and d8 Appendages rolls:
Radial -2, Hydroskeleton -1, Asymmetric +2, Amoeba +5.
Proto-Complex -2, Low Complex -1, High Complex +1.
Aerial +1, Underground +2, Aquatic +3.
Decomposer -2, Producer -1.

ROLL d10 FOR MOVEMENT TYPE.

7 or less Body (1-2 No Tail, 3-10 Tail)
8 or more Limb (1-3 Tail, 4-10 No Tail*)
*Aerial Only: 1 No Tail, 2-10 Tail.

NOTE: Add total limb count to d10 Movement Type roll.

NOTE: Certain other factors also affect d10 Movement roll.
Aquatic -2, Aerial +5.
Proto-Complex -5, Low Complex -2.

ROLL d8 FOR GROWTH (SESSILE ONLY).

1-5 Limb
6-8 Body

Most life forms possess appendages to acquire nutrients they need. Producers branch out to maximize light collection, whereas with sessile consumers an array of tentacles often surrounds the feeding orifice. Both types possess some kind of anchoring system to stay in place.

Creatures that move typically use **limbs** such as legs, flippers, or tentacles to scurry around, or have bodies adapted to propel them. Bilateral **body** movers do this with a **tail**, although more primitive, limbless long forms and motile radial clades usually use less efficient undulations. Aerial life almost always uses a pair or two of wings along with a tail to fly; aerobic floating clades are extremely rare because most biologically producible lifting gases are flammable.

ROLL d20 FOR ASPECT.

1 or less	Wide
2-5	Long
6-14	Prone
15-17	Upright
18 or more	Tall
20 (natural)	Special

NOTE: Certain factors can affect the d20 Aspect roll:

Underground -5, Aquatic -5, Aerial -2.
Symbiont -5, Phototroph +5, Decomposer +10, Photosynth +20.
Amoeba -5, Hydroskeleton -2, Exoskeleton -1.
Proto-Complex -10, Low Complex -5, Dominant Clade +2, Body mover -5.
Gravity above 1g -<g x 2>,
Gravity 0.1-0.5g +5, Gravity below 0.1g +10.

Instead of movement, producers, decomposers, and other sessile life grow out into the environment by either increasing **body** size or lengthening and multiplying their **limbs**.

ASPECT (d20)

Wide aspect creatures are short and squat, often with long limbs and short or nonexistent necks (d10: 1-7 No neck, 8-10 Neck) and tails.

A **long** life form is horizontally oriented. Motile creatures with this body plan often have short limbs but possess extended necks and and tails.

Prone forms have horizontal bodies with orifices and senses oriented toward the forward direction of travel (1 No neck, 2-10 Neck).

Upright life is forward-facing but is also built for height, whether with a (Roll d10: 1-4) long neck, (5-7) longer forelimbs, (8-9) both or vertically-oriented body (10).

Tall creatures are vertically oriented. Common to sessile and especially light-harvesting clades, limbs are often upward-arranged as well.

2.2 CLADE (continued)

ROLL d100 ON THE FOLLOWING TABLES FOR OTHER CLADE CHARACTERISTICS.

ROLL d100 FOR SKIN (ROLL d10 FOR PELAGE).

9 or less Soft (1-5 No pelage, 6-8 Hair, 9-10 Special)
10-19 Thin (1-3 No pelage, 4-8 Hair, 9-10 Special)
20-34 Hide (1-4 No pelage, 6-9 Hair, 10 Special)
35-59 Scaled (1-6 No pelage, 7-9 Hair, 10 Special)
60-74 Plated (1-7 No plage, 8-9 Hair,10 Special)
75-89 Shell (1-8 No pelage, 9-10 Special)
90-95 Test (1-9 No pelage, 10 Special)
96 or more Reroll twice OR Special

NOTE: Certain factors modify d100 Skin roll.
Aerial -20, Aquatic +10, Underground +20.
Hydroskeleton -50, Exoskeleton +20.
High Complex -10, Sessile +50.

NOTE: Certain factors modify d10 Pelage roll.
Aquatic -5, Underground -2, Aerial +2.
Wet -2, Dry -1, Temperate +1, Cool +2.
Proto-Complex -2, Low Complex -1, High Complex +1.

ROLL d100 FOR FEEDING METHOD (ROLL d10 FOR APPARATUS).

Below 45 Absorption (1-3 Internal, 4-9 External, 10 Special)
45 or more Orifice (1 Maw, 2-3 Beak, 4-7 Fangs, 8-9 Teeth, 10 Special)
00 Special (natural 00 only)

NOTE: Certain factors modify d100 roll.
Producer -100, Decomposer -50, Consumer +50.
Amoeba -20, Proto-Complex -20, Low Complex -10.
Soft skin -50.

ROLL d100 FOR SEXES (ROLL d10 FOR REPRODUCTION).

9 or less Asexual (1-3 Fission, 4-9 Budding, 10 Special)
10-24 Hermaphrodite (1-5 Simultaneous, 6-9 Sequential, 10 Special)
25-98 Sexual (1-2 External, 3-7 Internal, 8-9 Viviparous, 10 Special)
99+ Special

NOTE: Certain factors modify d100/d10 rolls.
Proto-Complex -20/-2, Low Complex -10/-1, High Complex +10/+1.
Decomposer -50/-5, Producer -20/-2.

SKIN AND PELAGE

Soft-bodied creatures are extremely vulnerable to damage, but are also extremely flexible and can often absorb air and nutrients through their skin. **Thin** skinned forms are less vulnerable to injury, especially those with **hair**, feathers, spines, or other pelage, but consumers require an orifice to ingest sustenance.

Hide-skinned, **scaly**, and **plated** creatures are tougher still, but not as agile or flexible. Motile plated clades are often segmented or have articulated joints.

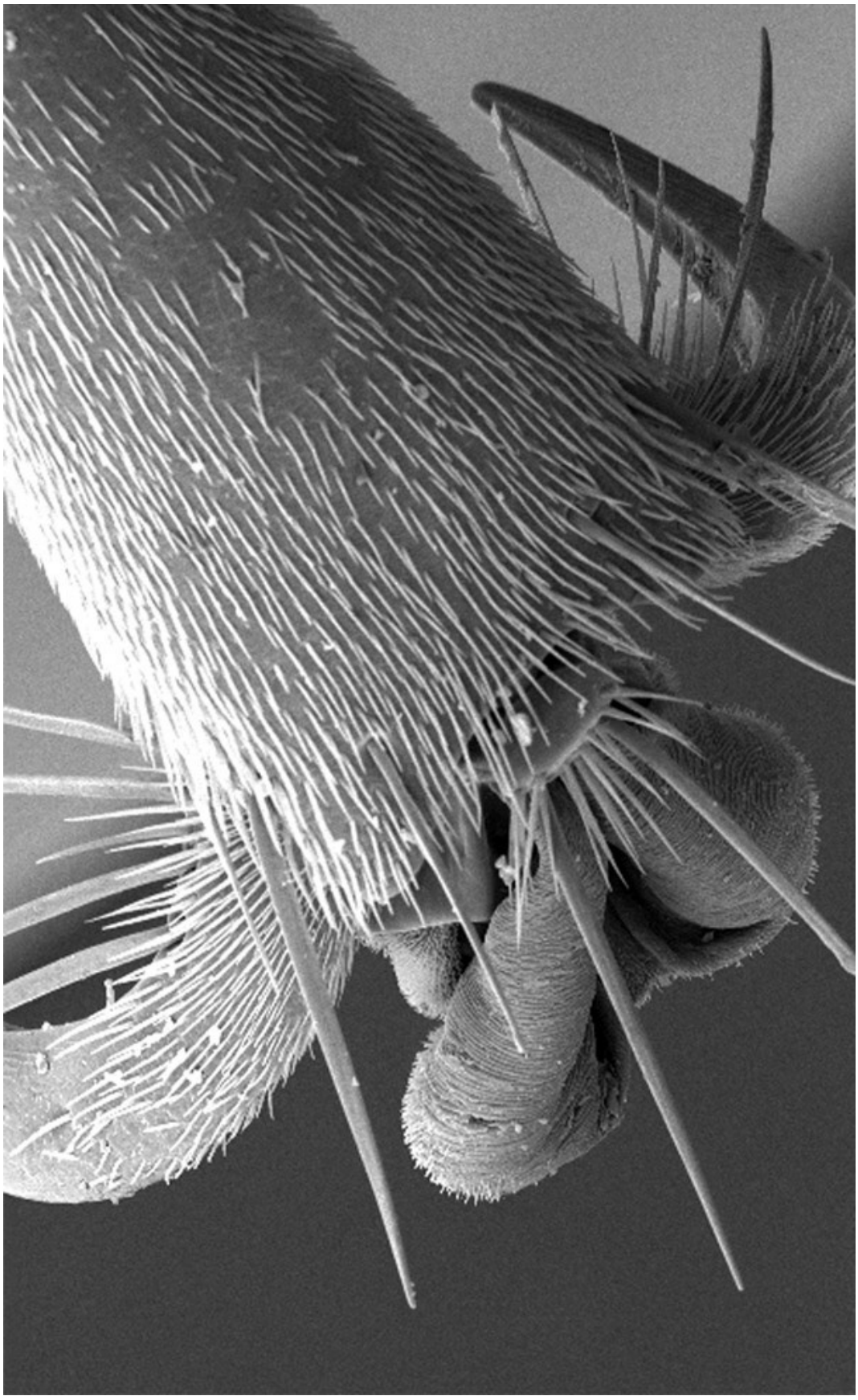
Life forms protected by a **shell** or full-body **test** trade off speed (sometimes movement entirely) for total armor protection. For sessile clades, this is often their primary defense.

FEEDING METHOD/APPARATUS

Clades that gain sustenance through **absorption** include phototrophs that thrive on sunlight and air or soft-bodied consumers that allow (or engulf) nutrients to diffuse through their bodies. These processes can be accomplished with **internal** or **external** organs.

To meet the increased energy needs higher complexity requires, most consumers have an **orifice** through which nutrients are swallowed into the body to be digested. This can be a simple gaping **maw**, a hard **beak**, sharp **fangs**, or a mouth with differentiated **teeth**. This is almost always located depending on the aspect of the clade: forward for most bilaterals or on the main axis for radial and tall life forms.

Other **special** possibilities, such as stylets for strict liquid consumption, mutually beneficial symbiotic feeding relationships, mixotrophic modes that blur the line between producer and consumer, and more are very rare but known.



2.2 CLADE (continued)

REPRODUCTION

Although common to microbes, **asexual** reproduction does occur in a few complex forms. Some may divide by **fission** into two or more individuals, whereas others sprout from the parent through **budding**, eventually falling off and growing independently.

Hermaphrodites are also uncommonly found in complex clades. **Simultaneous** hermaphrodites are both male and female. **Sequential** types alternate between male and female within their lifetimes, often in response to the needs of the population.

Sexual reproduction involves individuals of two genders (or very rarely more) that contribute their genes to produce offspring. This material can be combined in the **external** environment, **internal** within one of the genders and then deposited outside as spores, seeds, or eggs, or gestated within the body and born **viviparous**.

"Infinite diversity in infinite combinations."
—Vulcan proverb

3.1 GROUP

CHOOSE OR ROLL d10 FOR SUB-HABITAT.
Aquatic (1 aphotic, 2-6 benthic, 7-9 pelagic, 10 special)
Underground (1-2 subterranean, 3-7 burrowing, 8-9 subfossorial, 10 special)
Terrestrial (1 wet, 2-3 warm, 4-7 temperate, 8 cool, 9 dry, 10 special)
Aerial (1-2 aquatic, 3-7 land, 8-9 sea, 10 special)

CHOOSE OR ROLL d10 FOR SUB-ROLE.
Symbiont (1-5 parasite, 6-7 commensal, 8-9 mutualist, 10 special)
Decomposer (1 lithotroph, 2-3 symbiotic, 4-9 organotroph, 10 special)
Producer (1 saprophyte, 2 symbiotic, 3-9 photosynth, 10 special)
Consumer (1 symbiotic, 2-6 grazer, 7-9 predator, 10 special)
Predator (1-2 scavenger, 3-4 omnivore, 5-9 true predator, 10 special)

ROLL d10 FOR BODY TYPE.
Wide (1-2 flat, 3-4 thin, 5-6 spherical, 7-9 thick, 10 bulky)
Long (1-2 flat, 3-7 thin, 8-9 thick, 10 bulky)
Prone (1 flat, 2-3 thin, 4-6 compact, 7-9 thick, 10 bulky)
Upright (1 flat, 2-3 thin, 4-6 compact, 7-9 thick, 10 bulky)
Tall (1-3 thin, 4-7 wide, 8-9 thick, 10 bulky)

Groups within clades are typically divided by sub-habitat and sub-role within a world region. If a clade is spread across many isolated regions, different groups may arise that share these factors, but evolved separately.

Dominant clades usually have 5-10 living groups, whereas lesser ones have 5 or fewer. Rodents, bats, shrews, primates, whales, even-toe ungulates, odd-toed ungulates, felines, canines, bears, weasels and seals are all groups of the mammal clade, to use an example from Earth.

NATURE AND ADAPTATIONS

A group's nature reflects the main strategy it adopted to survive. Other adaptations, natural weapons, and defenses can also help it to better thrive in the environment.

Armored creatures use tough defenses to survive attack. Groups from clades that already possess shells or tests have even tougher ones. Less protected forms may roll d10: 1-2 Thinner skin & faster, 3-4 Spines, 5-8 Thicker skin, 9 Shell, 10 Special.

Communal groups find safety in numbers. Simple and very small life forms might clump together into colonies, whereas more advanced ones may display complex social behaviors and communications.

Any life form can develop a **dangerous** nature for either offensive or defensive purposes. Consumers Roll d10: 1 Toxin, 2 Sting, 3-7 Bite, 8-9 Claws, 10 Special. Others Roll d10: 1-4 Toxin, 5-8 Spines, 9-10 Special.

Some groups have unusually more or less genus **diversity**, or are so diverse they are divided into 2-5 sub-clades, each with groups of their own. Roll d10: 1-2 Very few, 3-5 Few, 6-9 Many, 10 Sub-Clades.

Furtive groups seek to avoid detection through smaller size, camouflage, hiding places, nocturnal activity, and/or heightened senses.

Any **generalist** groups are often widespread throughout a region. Roll d10: 1-4 Sub-habitat, 5 Sub-role, 6-7 Climate, 8-9 Diet, 10 Special.

Larger creatures are less vulnerable to predation, but do not hide well.

An alternative take on the safety in numbers strategy, **prolific** life forms rapidly breed offspring that develop quickly.

Smart life forms use sharper senses and adaptive behaviors to survive and thrive.

3.1 GROUP

NATURE AND ADAPTATIONS (continued)

To the **swift**, speed is life, and their lighter bodies and quicker reflexes aid this. For sessile or low energy creatures, this tends to manifest as the capability to initiate a sudden burst of action.

Like generalists, **tolerant** groups can enjoy a wide regional range. Roll d10: 1-4 Sub-habitat, 5-7 Climate, 8 Toxin, 9 Disease, 10 Special.

ROLL d100 FOR GROUP NATURE.

PREDATOR	PRODUCER	CONSUMER	DECOMP.	SYMBIONT	NATURE
01-04	01-09	01-04	01-02	01-04	Extra Roll
05-09	10-34	05-14	03-09	05-14	Armored
10-19	35-49	15-24	10-24	15-29	Communal
20-39	50-54	25-29	25-39	30-39	Dangerous
40-44	55-59	30-34	40-49	40-59	Diverse
45-54	—	35-54	50-64	60-72	Furtive
55-64	60-64	55-64	65-69	73-74	Generalist
65-69	65-74	65-74	70-72	75-77	Larger
70-74	75-84	75-79	73-79	78-84	Prolific
75-79	—	80-84	—	85-86	Smart
80-89	—	85-89	—	87-89	Swift
90-95	85-95	90-95	80-95	90-95	Tolerant
96-00	96-00	96-00	96-00	96-00	Special

ROLL d100 FOR ROLE ADAPTATION (ROLL TWICE IF SESSILE).

SYMBIONT	DECOMPOSER	PRODUCER	CONSUMER	ADAPTATION
01-04	01-04	01-04	01-04	None
05-19	05-14	05-29	05-14	Armored
20-29	15-19	30-34	15-24	Complexity
30-44	20-39	35-44	25-34	Diverse
45-49	40-49	45-54	35-44	Habitat
50-54	—	—	45-54	Limbs
55-64	50-74	55-64	55-64	Reproduction
65-69	75-79	65-79	65-74	Size
70-74	—	—	75-84	Speed
75-94	80-94	80-89	85-94	Weapon
95-98	95-97	90-95	95-99	Reroll twice
99-00	98-00	96-00	00	Special

Over time, some groups of greater **complexity** arise, while earlier forms remain in isolated areas as living fossils and still others may regress. Roll d10: 1 Much lower, 2-5 Lower, 6-9 Higher, 10 Special.

Some clades may have groups with greater or lesser sub-**habitat** ranges than others. In some cases, a group may adapt to live in an entirely different habitat Roll d10: 1-2 Very few, 3-5 Few, 6-9 Many, 10 Extra Habitat or Special.

Number, size, and type of **limbs** can vary between groups. Roll d10: 1-2 More, 3-4 Less, 5-9 Arms, 10 Special. If Arms, roll d10: 1 Extra 1d4 arms OR Special, 2-6 Pair of arms, 7-9 Prehensile tail/proboscis, 10 Special.

At group level, **reproduction** traits can still vary considerably. Some life forms undergo drastic metamorphic changes from birth to maturity. In other groups, one gender is physically or behaviorally dominant over the other, or gender is dual or absent. Even the method of reproduction and delivery can differ. In this aspect of life, nature uses its imagination, so be as creative as you wish in this regard! Roll d10: 1-3 Metamorphosis, 4-7 Gender, 8-9 Delivery, 10 Special.

ROLL d100 FOR HABITAT ADAPTATION.

AQUATIC	UNDERGROUND	TERRESTRIAL	AERIAL	ADAPTATION
01-04	01-04	01-04	01-04	None
05-14	05-09	05-14	05-06	Armored
15-19	10-24	15-24	07-11	Complexity
20-24	25-26	25-34	12-24	Diverse
25-29	27-39	35-44	25-34	Habitat
30-49	40-54	45-54	35-44	Limbs
50-69	55-64	55-64	45-49	Reproduction
70-79	65-79	65-74	50-69	Size
80-89	80-84	75-84	70-79	Speed
90-94	85-94	85-94	80-89	Weapon
95-98	95-99	95-98	90-95	Reroll twice
99-00	00	99-00	96-00	Special

3.1 GROUP

NATURE AND ADAPTATIONS (continued)

Greater or lesser **size** each have advantages and disadvantages for survival. Roll d10: 1 Much smaller (Size -2), 2-4 Smaller (Size -1), 5-6 Uniform, 7-9 Larger (Size +1), 10 Much larger (Size +2).

Greater **speed** is an advantage, but requires greater nutrient intake to maintain. Roll d10: 1 Much slower (Speed -2), 2-3 Slower (Speed -1), 4-7 Dash (Short burst Speed +2) OR Run (Long distance Speed +1), 8-9 Faster (Speed +1), 10 Much faster (Speed +2) or Special.

In addition to an orifice-based attack, some consumers possess an additional **weapon** or defense. Sessile life sometimes grows surprising (and sometimes deadly) ways to harm would-be attackers as well. Roll d100 once for each group, with an extra roll each if it has a dangerous nature or a weapon adaptation.

ROLL d100 FOR NATURAL WEAPONS

09 or less	None
10-19	Spines
20-29	Toxin
30-39	Sting
40-54	Gore
55-64	Smash
65-79	Bite
80-97	Claw
98 or more	Reroll twice OR Special

NOTE: Certain factors modify d100 roll.
Producer -50, Decomposer -50,
Grazer -20, Predator +20.
Proto -20, Low Complex -10.
Amoeba -50, Sessile -20.

Sharp **spines** and spikes are an effective defense that makes attacking a creature painful. An internal **toxin** can be deadly to the consumer, which causes most other life to learn to avoid it. A **sting** is a combination of spine and toxin, most typically located on an extremity.

Some creatures possess horns or spikes to **gore** attackers, or adapt their tail, head, or legs to **smash** against threats or rivals. Although almost all consumers can **bite**, that of a predator is usually much more powerful. This can be coupled with **claws**, which allow it to grab onto prey and deliver more attacks at close range.

SENSES

So strong is the impetus for living things to detect light that photoreceptors evolve in nearly every lineage from basic to complex, producer and consumer. For motile taxa, this often manifests as external eyes and is usually the primary sense for all but those living in the eternal darkness of subterranean environments; even aphotic aquatic life forms often possess sensitive eyes, which in some genera point upward toward the surface to detect prey and predators swimming above them. Roll d10 (add Sessile -10, Subterranean -5, Asymmetrical -2, No neck +2, Many/myriad limbs +5, Radial +10): 1 1d6*-2 eyes OR Special, 2-9 Two eyes, 10 1d4* eye pairs per side OR Special.

In aquatic and atmospheric environments, scent detection makes organisms aware of subtle changes in the area that may not be obvious with sight. Linked to this sense is taste, which can indicate the healthiness or danger of substances even in the absence of air or liquid. Many life forms, including producers and even microbes, communicate through chemicals called pheromones which trigger defensive, reproductive, and other responses. These senses are sometimes combined into one organ such as antennae (exoskeleton), tongue or proboscis, linked internally through the respiratory or digestive system, or absorbed externally through the skin or outer membrane (soft).

Touch and hearing are related senses that detect mechanical stimuli. Even the simplest life responds to being touched, often with a fight, flight, or mating behavior depending on what came into contact with it. Since sound is vibration it can also be felt. It is more clearly discerned with dedicated hearing organs, often completely internal for aquatic or underground creatures, whereas terrestrial and aerial groups use external antennae (exoskeleton) or ears. Creatures that hear may also communicate with others through noises, roars, and calls.

Special senses some groups might possess include magnetoception, electroception, echolocation, polarized light, and thermoreception. More unusual methods than these may arise in exotic environments.

3.2 GENUS

At the base of all ecosystems is the genus and its family of closely related species. Although for greatest realism one could detail dozens or hundreds (and even thousands!) of genera per group, let alone species, it may be more practical to figure out the most interesting and important genera of each group common to a locale.

GENUS HaVoQ ROLL!

Roll d4, d6, d8, d12, and d20, then consult the following tables applicable to each die to create a Genus.

ROLL d4 FOR SIZE.	SIZE LEVEL	MASS (pounds)
Nanoscopic	(Size -20 or less)	—
Microscopic	(Size -10 to -19)	—
Fine	(Size -5 to -9)	Below 0.001
Tiny	(Size -4)	0.001 to 0.009
Extremely small	(Size -3)	0.01 to 0.09
Very small	(Size -2)	0.1 to 0.9
1 Small (Size -1) and roll again.	(Size -1)	1 to 9
2-3 Medium	(Size +0)	10 to 90
4 Large (Size +1) and roll again.	(Size +1)	100 to 900
Very Large	(Size +2 to +3)	1000 to 9000
Extremely Large	(Size +4 to +5)	10,000 to 90,000
Giant	(Size +6 to +9)	100,000 to 1 million
Supergiant	(Size +10 to +19)	Above 1 million
Hypergiant	(Size +20 or more)	—

NOTE: If a 1 (Small) is first rolled, reroll d4. If another 1 is rolled, Size is reduced an extra level and another d4 roll may be made with results cumulative; any other result means Size level freezes and no more d4 rolls are made.

NOTE: If a 4 (Large) is first rolled, reroll d4. If another 1 is rolled, Size is increased an extra level and another d4 roll may be made with results cumulative; any other result means Size level freezes and no more d4 rolls are made.

NOTE: Modify Size level with all applicable factors.

Proto-Complex -2, Low Complex -1, Dominant Clade +1.
Decomposer -2, Symbiont -1, Predator -1.
Asexual -2, Prolific -1, Swift -1, Furtive -1, Sessile +1, Larger +1.
Aerial -2, Underground -1, Aquatic (consumer only) +1.
Exoskeleton -2, Hydroskeleton -1.
No Complex producers -2, Anaerobic -1, Bubble cell -1, Hydrocarbon solvent +1.
Gravity above 1g -<g>, between 0.1-0.5g +1, below 0.1g +2.

SIZE AND SPEED (d4 and d6)

Life forms often become larger and faster with increasing complexity. Along with this capability increase comes an ever greater nutrient requirement. This can spell doom for dominant groups during ecological disruption. When food webs break down, the creatures with greater needs often die out, leaving smaller-sized species better equipped to cope with the new environment to evolve and fill the now empty niches.

Sessile organisms are not able to move at full maturity. Many fascinating reproductive adaptations arise to spread offspring over wider areas. For sessile consumers, this often manifests as a motile juvenile larval stage.

ROLL d6 FOR SPEED.	SPEED LEVEL	MOVEMENT (FT/SEC)
Sessile	(Speed -5 or less)	None
Creeping	(Speed -4)	Less than 0.1
Extremely Slow	(Speed -3)	0.1 to 0.4
Very Slow	(Speed -2)	0.5 to 1
1 Slow (Speed -1) and roll again.	(Speed -1)	1 to 2
2 Slow	(Speed -1)	1 to 2
3-5 Moderate	(Speed +0)	3 to 4
6 Fast (Speed +1) and roll again.	(Speed +1)	5 to 9
Very Fast	(Speed +2)	10 to 20
Extremely Fast	(Speed +3)	25 to 40
Super Fast	(Speed +4)	50 to 90
Ultra Fast	(Speed +5)	100 or more

NOTE: If a 1 (Slow) is first rolled, reroll d6. If another 1 is rolled, Speed is reduced an extra level and another d6 roll may be made with results cumulative; any other result means Speed level freezes and no more d6 rolls are made.

NOTE: If a 6 (Fast) is first rolled, reroll d6. If another 6 is rolled, Speed is increased an extra level and another d6 roll may be made with results cumulative; any other result means Speed level freezes and no more d6 rolls are made.

NOTE: Modify Speed level with all applicable factors.
Anaerobic -2, Proto-Complex -2, Low Complex -1, High Complex +1.
Producer -3, Decomposer -2, Symbiont -1.
Asymmetric -3, Radial -2, Amoeba -1.
Underground -1, Aquatic -1, Aerial +1.
Hydrocarbon solvent -2, Anaerobic (non-halogen) -2, Ammonia solvent -1, Halogen chemistry +1.
Test -3, Shell -2, Plated -1, Armored -1, Swift +1.

3.2 GENUS (continued)

TRAITS (d8, d12, and d20)

Certain traits define the **physical** capabilities of a life form. Mighty and weak tell of strength, whereas fragile and tough depict durability against injury and disease.

Sensory traits measure the coordination of senses and reflexes. Alert and oblivious reflect acuity of the senses. Animated and sluggish rate agility.

A life form's **behavioral** traits describe its intelligence. General mental capacity is either clever or dull. Social or hostile express tendencies when interacting with others of its kind.

As on other tables where duplicate results are possible, treat them as more extreme levels of the trait: the same result twice is "Very", three "Extremely", four "Super". Opposite results can cancel each other out or tip the scale in one or the other direction.

ROLL d20 FOR PHYSICAL TRAIT.

Below 4	Sluggish
4-6	Weak
7-9	Fragile
10-12	Tough
13-15	Mighty
Above 16	Animated
20 (natural)	Reroll twice OR Special

NOTE: Certain factors modify d20 roll.
Decomposer -10, Producer -5,
Amoeba +1, Predator +2.
Proto-Complex -5, Low Complex -2,
High Complex +2.
Sessile -5, Armored -5, Tolerant +2.

ROLL d8 FOR SENSORY TRAIT.

Below 3	Oblivious
3-4	Dull
5-7	Clever
Above 7	Alert
8 (natural)	Reroll twice OR Special

NOTE: Certain factors modify d8 roll.
Producer -2, Decomposer -2,
Predator +1.
Proto-Complex -2, Low Complex -1,
High Complex +1.
Underground -1, Aerial +1.
Sessile -1, Upright +1, Smart +1,
Amoeba +1, Radial +2, Furtive +2.

ROLL d12 FOR BEHAVIORAL TRAIT.

Below 1	Oblivious
1-2	Dull
3-5	Hostile
6-7	Alert
8-10	Clever
Above 10	Social
12 (natural)	Reroll twice OR Special

NOTE: Certain factors modify d12 roll.
Producer -5, Decomposer -5,
Grazer -1, Predator +2.
Proto-Complex -5, Low Complex -2,
High Complex +2.
Underground -1, Aerial +2.
Sessile -2, Communal +1, Furtive +1
Smart +2.

VARIATION

Natural selection occurs as life forms adapt to their environment and competition with others within it. Successful changes inherited by offspring can produce noticeable changes that over ages of time or under extraordinary circumstances give rise to new groups and clades.

ROLL d100 FOR VARIATION.

01-09	Reroll twice (Special)
10-24	Body Type (Aspect)
25-39	Habitat Adaptation (Sub-Habitat)
40-59	Role Adaptation (Sub-Role)
60-84	Nature (Habitat)
85-99	Natural Weapon (Skin)
00	Special

NOTE: If a result is duplicated when rolling for genus variation, use the result in parentheses (if any) instead.

ROLL d100 FOR SPECIATION.

01-09	Reroll twice
10-19	Generalist
20-49	Specialist
50-64	Size
65-79	Speed
80-96	Trait
97-99	Variation
00	Special

3.3 SPECIES

Clans within each genus adapt to survive in the circumstances peculiar to their environment, forming the numerous species that inhabit every inhabitable region of a world.

3.3 SPECIES (continued)

A **generalist** is average within its niche and poor outside it, but most creatures adopt a **specialist** strategy, being good at their particular role and habitat, but very poor in others. Duplicate specialist results are considered super specialist, which further focuses on being very good within its sub-role or sub-habitat while suffering extremely poor capabilities outside it. Duplicate generalist results reflect a super generalist, which is average under all niches.

Many species vary by **speed** (Roll d10: 1-2 Much slower, 3-5 Slower, 6-8 Faster, 9-10 Much faster or Special) or **size** (Roll d10: 1-2 Much smaller, 3-5 Smaller, 6 Uniform, 7-9 Larger, 10 Much larger).

Others develop new **traits**. Roll d10: 1-4 Physical, 5-8 Sensory, 9-10 Behavioral; then reroll on the appropriate Genus Trait table. Unless this

ARMOR RATING

SKIN	RATING
—	None (—)
—	Sub-Poor (pppp)
Soft	Extremely poor (ppp)
Thin	Very poor (pp)
Thick	Poor (p)
Scaly	Average (A)
Plated	Good (AA)
Shell	Very Good (AAA)
Test	Extremely good (X)
—	Super good (XX)
—	Ultra good (XXX)
—	Hyper good (XXXX)

NOTE: Certain factors raise or lower Armor rating.
Hydroskeleton -1, Exoskeleton +1.
Pelage/spines/hide +1, Armored (existing shell/test only) +2.
Microscopic (—), Fine -2, Tiny -1, Giant +1, Supergiant +2, Hypergiant +3.

PHYSICAL AND DAMAGE RATINGS

SIZE	RATING
Fine or less	—
Tiny	Sub-poor (pppp)
Extremely small	Extremely poor (ppp)
Very small	Very poor (pp)
Small	Poor (p)
Medium	Average (A)
Large	Good (AA)
Very large	Very good (AAA)
Extremely large	Extremely good (X)
Giant	Super good (XX)
Supergiant	Ultra good (XXX)
Hypergiant	Hyper good (XXXX)

NOTE: Certain factors raise or lower weapon damage rating.
Maw -3, Smash -2, Spines -1, Teeth -1, Claws -1, Fangs +1.
Dangerous +1, Predator +1.
NOTE: Certain factors raise or lower physical attribute rating.
Weak -1, Sluggish -1, Animated +1, Mighty +1.

new result indicates an extra roll, the new good trait replaces a good trait of its genus for this species.

In rare cases, deeper changes occur that warrant a new roll on the genus **variation** table for the species.

ATTRIBUTES

By this point, all requisite information is available to rate the main attributes of a species.

Modify genus **size** or **speed** -2 if much less, -1 if less, +1 if more, or +2 if much more from adaptations.

Armor is based on skin type, then modified by additional factors. Spines, whether evolved as armor or weapon, usually apply to this rating.

SENSORY RATING

COMPLEXITY	RATING
—	Nil
—	Sub-Poor (pppp)
Proto	Extremely poor (ppp)
Low	Very poor (pp)
Medium	Poor (p)
High	Average (A)
—	Good (AA)
—	Very good (AAA)
—	Extremely good (X)
	etc.

NOTE: Certain factors raise or lower Sensory rating.
Producer -2, Decomposer -1.
Subterranean -2, Aphotic -1.
Oblivious -1, Dull -1, Alert +1, Furtive +2.

BEHAVIORAL RATING

COMPLEXITY	RATING
Proto	Nil
Low	Sub-Poor (pppp)
Medium	Extremely poor (ppp)
High	Very poor (pp)
—	Poor (p)
—	Average (A)
—	Good (AA)
—	Very good (AAA)
—	Extremely good (X)
	etc.

NOTE: Certain factors raise or lower Behavioral rating.
Producer -2, Decomposer -1.
Subterranean -2, Aphotic -1.
Oblivious -2, Hostile -1, Dull -1, Clever +1, Alert +1, Furtive+1, Smart +1, Communal +1, Social +2.

3.3 SPECIES

ATTRIBUTES (continued)

Damage rating primarily depends on the attack type and the creature's size. Rate each natural weapon separately. Toxins are special attacks; use the Peculiarity table to determine the negative effect it inflicts.

Physical rating is also based upon size and uses the same table as attack rating, just with different applied factors.

Sensory and behavioral traits are based on life form complexity.

A rule of thumb when comparing these ratings is to consider each level to be twice as good as the previous one OR that each level above average confers a +1 higher bonus and each level below average suffers a -1 lower penalty. (Example: Very poor -2, Poor -1, Average +0, Good +1, Very good +2, and so on.)

3.4 PECULIARITIES

Life finds a way to surprise even the most seasoned xenobiologists. Truly unusual and unique adaptations appear in many species, genera, even groups and clades.

This optional section may be used in a few ways. Probably the best way is to consider any **Special** result made during clade, group, genus, and species creation to be a peculiarity roll; in this case, the peculiarity type can be based on whatever attribute about which the Special was indicated. Alternately, give every clade, group, genus, and species a peculiarity roll; each result is inherited by the descendent life forms.

To what extent and power level any peculiarity affects a life form depends on the setting and your imagination. These can be interpreted as stemming from scientifically plausible capabilities, supernatural or magical powers, and anything in between.

d100	PECULIARITY
01-09	Reroll d100 Peculiarity twice; first result is a weakness, second is normal.
10-24	Health
25-44	Reproduction
45-59	Size
60-74	Shape
75-84	Sense
85-89	State
90-98	Reroll d100 Peculiarity twice.
99-00	Roll d100 for Unusual Peculiarity.

d100	UNUSUAL PECULIARITY
01-19	Reroll d100 Unusual Peculiarity twice; first result is a weakness, second is normal.
20-39	Will
40-59	Chaos
60-64	Order
65-79	Ray
80-94	Flux
95-99	Reroll d100 Unusual Peculiarity twice.
00	Roll d100 for Super Peculiarity.

d100	SUPER PECULIARITY
01-29	Reroll d100 Super Peculiarity; result is a weakness.
30-44	Field
45-69	Chemical
70-89	Cross
90-94	Warp
95-97	Jump
98-00	Reroll d100 Super Peculiarity twice or choose a Special Peculiarity.

ROLL d10 FOR PECULIARITY DEGREE	
1	Insignificant
2-3	Minor
4-7	Moderate
8-9	Major
10	Extreme

ROLL d10 FOR PECULIARITY TYPE	
1-4	Physical
5-7	Sensory
8-9	Behavioral
10	Special

Choose what makes sense or roll d10 to randomly determine the specific effect of the peculiarity.

Health affects the well-being of the life form, such as (1) *regeneration*, (2-3) *boosting* abilities, (4) berserker *rage*, (5-6) *enamoring* appearance, (7) emotional *soothing*, (8-9) extreme *durability*, and (10) *rejuvenation*.

Reproduction, an already greatly variable aspect of life, can verge on the bizarre in some cases. Possibilities include (1) *protection* of mates or offspring, (2) unusual *nesting* practices, (3) spirited *competition*, (4-5) strange *mating* practices, (6) *courtship* rituals, (7) *nurturing* adaptations, and (8-10) extreme *multiplication* of progeny.

3.4 PECULIARITIES (continued)

Although **size** seems straightforward, many interesting ways have evolved to use this to further advantage. Extreme *growth* rates (1-2), (3-4) *shrinking*, (5) *bulking*, or (6) *slimming* ability, (7-8) special *armor* types, (9) ability *leveraging*, and (10) *bluffing* are some possibilities.

Shape peculiarities can prove interesting and dangerous. *Transformation* (1), (2-3) *mimicry*, (4-5) *mutations*, (6) astounding *beauty*, (7-8) extremely effective *camouflage*, (9) skill at *veiling* intentions, or (10) *reversion* to another form are some known adaptations.

Special **sense** gifts include (1-3) enhanced overt *perception* or (4-5) instinctual *detection*, (6) ability to *converse* within or beyond species, (7) preternatural *empathy*, (8) abnormal *comprehension*, (9) acute *analysis* skills, or (10) quick and accurate *assessments*.

A creature might be able to maintain or alter the **state** of its (1) *coolness* or (2-5) *warmth*, (6) cause *chemical reactions,* (7-8) *conduct* or be (9) *insulated* from electricity, or even (10) *shift* between solid, liquid or gas.

Will powers can be used to (1-2) *terrify*, (3-4) *compel* or (5-6) *resist* compulsion, (7) *evoke* a feeling or memory, (8-9) enhance capabilities through *focusing*, or to (10) *control* another creature.

Life itself evolved from **chaos**, which often manifests as unusual luck. *Winning* (1), (2-3) *hindering* opponents, (4) *gambling* knack, (5) *inflaming* passions, (6-7) excellent *guessing* ability, (8-9) uncanny *anticipation*, or (10) *dispelling* metaphysical effects are just some of the mysterious possibilities.

Related to chaos, **order** peculiarities aid the stability of a life form, helping it to (1-2) *prosper*, (3) *retire* in peace, (4-6) correctly *judge*, (7) *bless* with good luck, (8) *predict* the future, or even (9) *grant* or (10) *obstruct* wishes.

Electrical currents flow through most every living thing, but those with a **ray** capacity can powerfully (1-2) *jolt*, (3) *zap* from a distance, (4) destructively *blast*, (5-7) gently *radiate*, (8-9) strongly *emit*, or (10) t*ransceive* electromagnetic radiation.

Flux seems to control time, allowing the creature to (1-2) *rush*, (3) *dally*, (4) *complete* tasks on time, (5) long *endure*, (6-7) *dream* meaningfully, (8-9) *concentrate*, or (10) even *stop* time.

Field powers bend space with a variety of effects on light, gravity, and matter, possibly including (1) *telekinetic* pushing or (2) *levitation*, (3-5) inducing *magnetism*, (6-8) *shrouding*, mirroring and vanishing effects, and (9-10) *shielding*.

Biological ability to create or break molecular and even atomic bonds or harness that energy are **chemical** super peculiarities. Such powers include (1) *fusing*, (2) *splitting*, and (3-5) *transmuting* molecules, (6-7) superficially *embellishing* or (8) *imbuing* new properties to materials, and (9-10) *producing* matter.

Extreme ability to **cross** time could include (1) *prophesy*, (2) *linking* objects or (3) beings as if by *fate*, (4-5) *flashbacks*, (6-9) *hibernation*, or (10) *time travel* (if that is even possible).

Something that can **warp** space might have a power to (1-2) *contract*, (3-4) *expand*, (5) *fold*, (6-8) *resist* and dispel warp effects, (9) *slip* through dimensions, or even (10) violently *tear* spacetime open for horrific results.

Jump capability could be metaphysical, such as (1-2) *scrying*, (3-5) *divining* answers, (6-7) *invoking* or (8-9) *projecting* a presence, or even (10) physical *teleportation*.

"I believe alien life is quite common in the universe, although intelligent life less so. Some say it has yet to appear on planet Earth."
—Stephen Hawking

4.1 CONSCIOUSNESS

Intelligent life is capable of self-direction, usually as individuals, but sometimes working together as a collective superorganism. Very rare and typically evolved from the most advanced high complex clades and groups, such species often grow to completely dominate their environment.

To determine if native intelligent life arose on any orbital body, roll all applicable dice on the following table. Should all of them come up as 1's, a sapient species exists (or once existed) on that world.

For a world with a well-detailed ecosystem, choose the high complex group that seems most likely to evolve higher behavioral capacity, has natural engineering skills, or is unusually empathic. This will often be a terrestrial predator with arms and a smart or generalist nature. If no existing groups fit this guideline, pick the most interesting one or create a new one. Consciousness sometimes sparks in highly unlikely places.

NATIVE INTELLIGENT LIFE (If complex life is native to a world, roll all applicable dice. If all results are 1, then intelligent life also arose.)

d100	Baseline chance
d100	Not moderate zone
d100	No magnetic field
d100	No liquid water
d100	Not yellow main sequence star
d100	Carbon system
d100	No oxygen/carbon dioxide/methane in atmosphere
d100	High debris density
d100	Adjacent to belt
d100	Gas planet
d100	Insignificant amounts of water (Roll in addition to no liquid water)
d100	Insignificant atmosphere
d100	Variable/flare star
d100	Planet less than 4 billion years old
d100	Planet less than 2 billion years old (Roll in addition to all previous age factors)
d100	Planet less than 500 million years old (Roll in addition to all previous age factors)
d100	Planet less than 100 million years old (Roll in addition to all previous age factors)
d100	Subdwarf star
d100	Paleodwarf star (Roll in addition to subdwarf star.)

4.2 BEINGS

Except under extraordinary circumstances, only one genus of sapients initially arises on a world that bears native intelligence. From this, species are born and evolve or die out, just as with all other life forms. To randomly determine when this genus first arose, decide how many millions of years ago the clade to which it belongs first became dominant (age of dominance), roll d100, and divide the age of dominance by the result. Each species usually lasts 1d100*/20 million years before either (Roll d10: 1-5) diversifying into more new species, (6-7) evolving into one new species, or (8-10) becoming extinct.

From the time of its rising and every million years of its existence afterward, roll d100: on a 1 (stable world), 2 (typical world), 5 (unstable world), or 10 (hostile world), a natural or cosmic biotic crisis shakes up the environment. (See 5.1 Technology: Global to determine effects.)

4.2 BEINGS (continued)

BEINGS HaVoQ ROLL!

Roll d4, d6, d8, d12, d20, and d100, then consult the following tables applicable to each die to create an intelligent species.

SIZE AND SPEED (d4 & d6)

There are no differences for determining sapient genus size and speed compared to any other form of life. Consider sapient beings High Complex wherever that is a factor.

ROLL d4 FOR SIZE.	SIZE LEVEL	MASS (pounds)
Nanoscopic	(Size -20 or less)	—
Microscopic	(Size -10 to -19)	—
Fine	(Size -5 to -9)	Below 0.001
Tiny	(Size -4)	0.001 to 0.009
Extremely small	(Size -3)	0.01 to 0.09
Very small	(Size -2)	0.1 to 0.9
1 Small (Size -1) and roll again.	(Size -1)	1 to 9
2-3 Medium	(Size +0)	10 to 90
4 Large (Size +1) and roll again.	(Size +1)	100 to 900
Very Large	(Size +2 to +3)	1000 to 9000
Extremely Large	(Size +4 to +5)	10,000 to 90,000
Giant	(Size +6 to +9)	100,000 to 1 million
Supergiant	(Size +10 to +19)	Above 1 million
Hypergiant	(Size +20 or more)	—

NOTE: If a 1 (Small) is first rolled, reroll d4. If another 1 is rolled, Size is reduced an extra level and another d4 roll may be made with results cumulative; any other result means Size level freezes and no more d4 rolls are made.

NOTE: If a 4 (Large) is first rolled, reroll d4. If another 1 is rolled, Size is increased an extra level and another d4 roll may be made with results cumulative; any other result means Size level freezes and no more d4 rolls are made.

NOTE: Modify Size level with all applicable factors.

Proto-Complex -2, Low Complex -1, Dominant Clade +1.
Decomposer -2, Symbiont -1, Predator -1.
Asexual -2, Prolific -1, Swift -1, Furtive -1, Sessile +1, Larger +1.
Aerial -2, Underground -1, Aquatic (consumer only) +1.
Exoskeleton -2, Hydroskeleton -1.
No Complex producers -2, Anaerobic -1, Bubble cell -1, Hydrocarbon solvent +1.
Gravity above 1g -<g>, between 0.1-0.5g +1, below 0.1g +2.

MANIPULATORS (d8 plus d10)

Although not all sapients possess arms or other fine manipulators, those that lack them may suffer serious impediments to developing technological civilizations. Paired appendages are more effective than single ones and multiple pairs can be even more useful. Sapient species without any manipulating limbs might possibly utilize the mouth, legs, tail, and/or body instead.

When indicated, choose a proboscis for creatures with an orifice that either lack a tail or already possess a prehensile one.

ROLL d6 FOR SPEED.	SPEED LEVEL	MOVEMENT (FT/SEC)
Sessile	(Speed -5 or less)	None
Creeping	(Speed -4)	Less than 0.1
Extremely Slow	(Speed -3)	0.1 to 0.4
Very Slow	(Speed -2)	0.5 to 1
1 Slow (Speed -1) and roll again.	(Speed -1)	1 to 2
2 Slow	(Speed -1)	1 to 2
3-5 Moderate	(Speed +0)	3 to 4
6 Fast (Speed +1) and roll again.	(Speed +1)	5 to 9
Very Fast	(Speed +2)	10 to 20
Extremely Fast	(Speed +3)	25 to 40
Super Fast	(Speed +4)	50 to 90
Ultra Fast	(Speed +5)	100 or more

NOTE: If a 1 (Slow) is first rolled, reroll d6. If another 1 is rolled, Speed is reduced an extra level and another d6 roll may be made with results cumulative; any other result means Speed level freezes and no more d6 rolls are made.

NOTE: If a 6 (Fast) is first rolled, reroll d6. If another 6 is rolled, Speed is increased an extra level and another d6 roll may be made with results cumulative; any other result means Speed level freezes and no more d6 rolls are made.

NOTE: Modify Speed level with all applicable factors.
Proto-Complex -2, Low Complex -1, High Complex +1.
Producer -3, Decomposer -2, Symbiont -1.
Asymmetric -3, Radial -2, Amoeba -1.
Underground -1, Aquatic -1, Aerial +1.
Hydrocarbon solvent -2, Anaerobic (non-halogen) -2, Ammonia solvent -1, Halogen chemistry +1.
Test -3, Shell -2, Plated -1, Armored -1, Swift +1.

4.2 BEINGS

ATTRIBUTES (d12 & d20 plus d10)

Sapient beings have physical, sensory, and behavioral capabilities beyond those possessed by other creatures. These greater capabilities are measured as **Might** (physical strength and power), **Resolve** (physical toughness and constitution), **Animation** (physical dexterity and agility), **Vision** (acuity of perception and wisdom), **Charm** (social adroitness and charisma), and **Intellect** (mental reasoning and memory).

ROLL d8 FOR MANIPULATORS.

2 or less	None
3-4	Prehensile tail or proboscis
5 or more	Arms (Arm Fraction d10: 1 Single, 2-3 Tenth, 4-6 Fifth, 7-9 Half, 10 All)
8 (natural)	Reroll twice or Special

NOTE: For bilateral creatures with paired limbs, unless Arm Fraction result is Single (just one arm), minimum arm count is one pair.

NOTE: Modify d8 rolls with following factors.
No limbs -5, Tail -2, Many Limbs +1, Myriad Limbs +2, Upright +5.
Exoskeleton +1, Hydroskeleton +2.
Producer -10, Decomposer -5, Aquatic -2, Aerial -1.

ROLL d12 GOOD ATTRIBUTE.

1-2	None
3-5	Physical (d10: 1-5 Might, 6-10 Resolve)
6-8	Sensory (d10: 1-5 Animation, 6-10 Vision)
9-11	Behavioral (d10: 1-5 Intellect, 6-10 Charm)
12	Reroll twice

NOTE: Modify d12 and d10 rolls with following factors.
Armored -1, Generalist -1, Larger -1, Furtive +1, Communal +1, Smart +1, Swift +1.

ROLL d20 POOR ATTRIBUTE (Use column corresponding to Good Attribute.)

NONE	PHYSICAL	SENSORY	BEHAVIOR	POOR TRAIT
—	1	1-2	1-3	Reroll twice
1	—	3-12	4-13	Physical (1-5 Resolve, 6-10 Might)
2-3	2-7	—	14-19	Sensory (1-5 Vision, 6-10 Animation)
4-8	8-17	13-18	—	Behavioral (1-5 Charm, 6-10 Intellect)
9-20	18-20	19-20	20	None

NOTE: Modify d20 and d10 rolls with following factors.
Furtive -2, Communal -2, Smart -2, Swift -2, Armored +2, Generalist +2, Larger +2.

VARIATION AND SPECIATION

Due to the unusual nature of intelligent life forms, make one extra roll each for variation and speciation for the first sapient species. All descendants of this initial sapient roll only for speciation, unless otherwise indicated by the d100 result.

If the Peculiarities tables are being used, a free roll for the genus and an additional one for each species helps set them apart even further.

ROLL d100 FOR VARIATION.

01-09	Reroll twice (Special)
10-24	Body Type (Aspect)
25-39	Habitat Adaptation (Sub-Habitat)
40-59	Role Adaptation (Sub-Role)
60-84	Nature (Habitat)
85-99	Natural Weapon
00	Special

NOTE: If a result is duplicated when rolling for genus variation, use the result in parentheses (if any) instead.

ROLL d100 FOR SPECIATION.

01-09	Reroll twice
10-19	Generalist
20-49	Specialist
50-64	Size
65-79	Speed
80-96	Trait
97-99	Variation
00	Special

4.3 STATISTICS

Determining Size, Speed, Damage, and Armor ratings for intelligent life is the same as any other species.

All attribute ratings start at average for sapients. Good attributes are one level higher (good) and poor attributes are one level lower (poor); two good results would be two levels higher than average (very good), whereas two poor results would be two levels lower (very poor), and so forth.

When translating these ratings into player character races, consider each level above average as a +1 to the initial (3d6/d20) roll for that relevant stat and each level below as a -1. (Example: Very poor -2, Poor -1, Average +0, Good +1, Very Good +2, etc.)

ATTRIBUTE RATINGS

LEVEL	RATING
-5	Nil
-4	Sub-poor (pppp)
-3	Extremely poor (ppp)
-2	Very poor (pp)
-1	Poor (p)
0	Average (A)
+1	Good (AA)
+2	Very good (AAA)
+3	Extremely good (X)
+4	Super good (XX)
+5	Ultra good (XXX)
+6	Hyper good (XXXX)

4.3 STATISTICS (continued)

Add the following factors to the rating of each relevant attribute.

Might: Size level minus Speed level, Bulky +1, Dangerous +1, Flat -1, Wide -1, Thin -1.

Resolve: Asexual +2, Bulky +1, Dangerous +2, Exoskeleton +1, Flat -1, Furtive -2, Hermaphrodite +1, Thick +1, Thin -1, Tolerant +1.

Animation: Speed level minus Size level, No arms -2, One arm -1, Two arm pairs +1, Each arm pair above two +1, Bulky -2, Thin +2.

Vision: Dangerous -1, Flat +2, Furtive +2, Wide +1.

Charm: Asexual -2, Dangerous -1, Hermaphrodite -1.

Intellect: Dangerous -1.

"Either it's going to become multiplanetary, or its going to remain confined to one planet and eventually there's going to be an extinction event."
—Elon Musk

5.1 TECHNOLOGY

Sapient species use their great capabilities to understand the world around them and better utilize the resources at hand. Those that arise on resource-poor worlds or habitats, especially ones without oxygen (where fire is impossible) are at extreme disadvantages to building advanced civilizations, as are those beings without arms or with other impediments.

Use the Technology table to determine an intelligent species' scale of influence, starting at its birth (less than 100,000 years old), then make additional rolls through each age factor until the level reaches Local.

TECHNOLOGY (Roll ALL dice equal to and less than the world's resource level.)

d100	Rare (Gas world)
d20	Poor (Ice world)
d12	Average (Rock world)
d8	Rich (Metal world)
d6	Abundant (Carbon world)
d4	Special (Spacefaring trade, fallen world, unusual peculiarity, etc.)
(d3)	Very Special
(d2)	Super Special

NOTE: Roll one die higher for each of the following factors. If the higher die rolled is already d100, roll an additional d100 for each die higher and add to the total.

- Less than 200,000 years old (two dice if less than 100,000 years old)
- Less than one arm pair (two dice if none)
- Poor intellect (two dice if very poor, three if extremely poor, etc.)
- Poor or less animation, vision, and/or charm (one die each)
- Aquatic species
- Dangerous nature
- Poor in resources
- No terrestrial habitat on world
- Anaerobic environment (two dice)
- No atmosphere (two dice in addition to above)
- Gravity 2-4g (two dice if 5g or more)

NOTE: Roll one die lower for each of the following factors.

- More than 1 million years old (two dice if more than 2 million years old)
- Descended from technological species
- Two or more pairs of manipulators
- Good intellect (two lower if very good, three if extremely good, etc.)
- Good or better animation, vision, and/or charm (one die each)
- Underground species
- Communal nature
- Rich in resources
- Gravity less than 0.5g (two lower if less than 0.2g)

NOTE: Use d3 or d2 only if lowest die is below d4;d2 is the minimum.

DIE TOTAL	**SCALE OF TECHNOLOGY**
100+	NONE
10-99	LOCAL
5-9	REGIONAL
3-4	GLOBAL
2	INTERPLANETARY
1	PRE-STELLAR
**	STELLAR
***	GALACTIC

**Two consecutive ALL-1 results (if tech is possible).

***Five consecutive ALL-1 results (if tech is possible).

5.1 TECHNOLOGY (continued)

LOCAL

Limited by their natural movement type, primitive sapients often must wander far and wide to acquire the sustenance and raw materials they need to survive. Populations settle wherever bountiful lands are discovered, where some members start to specialize in tasks beyond hunting or gathering, and increasingly complex societies develop

Information travels slowly, so innovations are often unknown outside of the clans that discovered them and can be easily lost to the ravages of conflict and time. Check for technological advancement every 2-10 thousand years, depending on the potential capability and particular circumstances of the species.

REGIONAL

Contact between cultures increases when faster and more cargo-capable transport is developed, which helps knowledge grow and spread. Trade routes allow easier exchange of goods that are not locally common, catalyzing new industries. As a result tools, technology, and scientific understanding advance faster; roll to determine if the next level is reached every 500-2000 years as you see fit.

GLOBAL

Machines significantly leverage the capabilities of an intelligent species, allowing populations to quickly travel across the world and exploit resources on an industrial scale. Manufacturing advances allow items to be produced in ever greater quantity and quality. Science and technology leap forward, possibly advancing every 100-500 years.

At this point, though, most intelligent life forms start to over-exploit and damage their world, altering the environment so drastically that it disrupts the ecosystems that sustain it. Roll d10, adding +1 for every

century spent at this technology level to determine the stress on the world's ecology: 1-2 No stress, 3-7 Minor stress (extra +1 to next roll), 8-9 Major stress (extra +2 to next roll), 10+ Crisis!

In addition to this, aggressive races may learn enough about matter and energy to create weapons of mass destruction that can destroy the environment in ways not easily recoverable. Roll d10, adding +1 for every century spent at this technology level to determine if a war of this magnitude occurs: 1-7 No war of destruction, 8-9 War causes regional destruction, 10+ War causes global destruction. Should such a war break out, immediately reroll d10 to determine world ecological stress as before, but also add +5 if regional or +10 if global destruction.

Should disaster befall the world, a biotic crisis ensues, causing a rapid decrease in the biodiversity of complex life. Check each clade or group that is affected by the crisis for possible extinction, adding the following factors to the roll:

Basic life -5, Medium complex +1, High complex +2
Decomposer -2, Consumer +1, Symbiont +2.
Underground -2, Aquatic -1, Aerial +1.
Dominant clade +1, Dominant group +1, Dominant species +1.

Roll d10 for clade exctinctions: 1-2 Few species lost, 3-7 Many species lost, 8-9 Many groups lost, 10+ Entire clade lost.

After a mass extinction, the biosphere recovers over millions of years. Some previously minor groups, especially those best adapted to the new conditions, diversify and fill the empty niches. Many worlds are the sepulcher of sapience. If the intelligent species survived this disaster, recovering civilization may prove very difficult and their evolution may be sharply affected.

DEVELOPMENT INDEX

None: No orbiters or landers, but possible flybys of places of interest.

Minimal: Minor robotic presence throughout system, orbiters and landers at places of interest, inhabited stations at very important nearby areas, and flybys of most other areas.

Light: Major robotic presence throughout system and all areas visited. Permanent settlement of very important nearby areas, inhabited stations at very important distant areas.

Moderate: Fully settled, industrialized, and some megaengineering of nearby valuable areas. Stations established at most other valuable areas and there is an ubiquitous robotic presence throughout system.

Heavy: All valuable nearby areas fully settled, industrialized, and optimized through megaengineering as needed. Most other areas colonized and/or exploited. Minor exhaustion of asteroids, comets, moons, and other resources.

Extreme: Most of the system is settled with best areas heavily megaengineered and exploited. Major exhaustion of asteroids, comets, moons, and other system resources.

Ultimate: Entire system is megaengineered for habitation and/or industrialization. System resources exhausted, including non-ideal worlds. Possible solar engineering.

5.2 COLONIZATION

INTERPLANETARY

In time, a native intelligent species may master science well enough to become a spacefaring civilization. Objects and passengers are first sent into orbit around the homeworld, then launched out to the other worlds of the star system. With the vast resources and territories of the star system available, increasing numbers of settlements, space stations, and habitats are constructed to meet the demands of an ever-growing interplanetary population. Rings of artificial satellites, space habitats, and megastructures eventually orbit the star, growing into a circumstellar, spheroidal swarm in the oldest, richest, and most heavily developed systems.

Add +1 to total Development roll per century of Interplanetary capability.

Using the Interplanetary table can also determine level of development for each orbital body and zone in a system. Roll one die higher if the civilization is Stellar or two dice higher if Galactic. Assume description applies to the zone or planet, any of its moons, and the nearby space around it.

PRE-STELLAR

Starting from the home system, every star surrounding it will steadily be colonized, with successive waves of colonization reaching outward from the younger settlements. Though travel between star systems often takes decades with sub-lightspeed technology, a determined species can still completely populate a major galaxy within a few million years. Isolated by the impracticality of interstellar travel, each population will largely develop on its own, adapting to its surroundings and eventually evolving into new species.

Moderate Expansion: 1-2 parsecs/century.
(Maximum = 25 parsecs/century).

STELLAR

Should a spacefaring society discover a physics loophole that allows faster than light transport, travel between star systems becomes practical. With the resources of multiple star systems and nebulae within practical reach, monolithic artificial worlds and gargantuan interstellar starships become home for the majority of life. Colonies could spread across an entire galaxy within millennia, with sectors and regions maintaining social, economic, and political ties or rivalries.

Moderate Expansion: 20-50 parsecs/century.
(Maximum = 200+ parsecs/century)

5.2 COLONIZATION (continued)

GALACTIC

Any civilization with true galactic reach likely discovered a method of instantaneous travel between points. Massive quantities of material and energy can be transferred to and from any region in short order, so much so that the resources of whole sectors could be rapidly exhausted.

SYSTEM DEVELOPMENT INDEX (Roll all dice equal to and less than highest indicated and add together.)

DICE*	INTERPLANETARY	PRE-STELLAR	STELLAR	GALACTIC
(1d4-3)	Interstellar	Unknown	—	—
d4	Deep Orbit	Wild	Unknown	Intergalactic
d6	Other Worlds	Frontier	Wild	Unknown
d8	Distant resources	Middle	Frontier	Wild
d10	Close resources	Inner	Middle	Frontier
d12	Main World	Core	Inner	Middle
d20	—	—	Core	Inner
d100	—	—	—	Core

*For each die that rolls its highest number, reroll it and add the results together.

NOTE: Add one higher die for each of the following factors. If highest die rolled is already d100, roll another d100 (or more) and add to total.

Home system	Superdwarf
Large system	Hyperdwarf (two dice higher)
Circumstellar disk	Frontier covers entire galaxy (two dice higher)
Frontier covers galaxy quadrant	

NOTE: Roll one die lower for each of the following factors.

Empty system	Intergalactic
Subdwarf	Paleodwarf (two dice lower).
First century of colonization	Dawn of spaceflight (two dice lower)

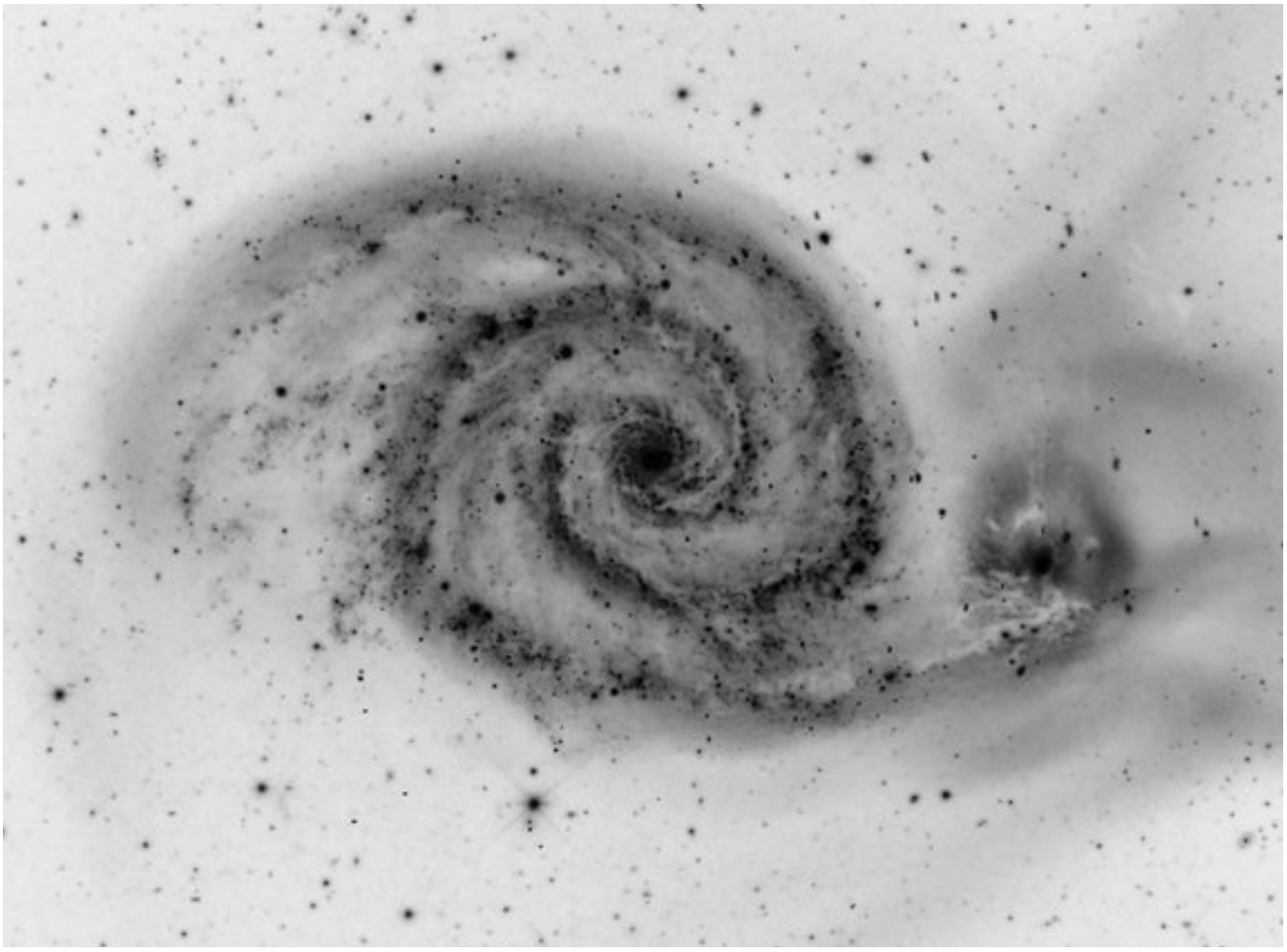
NOTE: Use 1d4-3 only if the lowest die indicated is below d4.

DEVELOPMENT INDEX RESULTS TOTALS for outer radius.)	DEVELOPMENT
0-9	None
10-19	Minimal
20-49	Light
50-99	Moderate
100-199	Heavy
200-499	Extreme
500+	Ultimate

SPHERES OF COLONIZATION (Multiply by total expansion distance	
Core	x1/10
Inner	x1/5
Middle	x1/2
Frontier	x1
Wild	x2
Unknown	x5

Aggressive cultures often burn out the galaxy and themselves if they reach this point. Some civilizations may form into a galactic collective, eternally managed by godlike superintelligences, while others fracture into countless domains, enclaves, clans, and individuals scattered throughout the galaxy and beyond.

Moderate Expansion: 100-1000 parsecs/century.
(Maximum: ???).



5.3 MEGAENGINEERING

HABITATS

Although the vast majority of star systems lack orbital bodies suitable for naturally-evolved, carbon-based lifeforms to inhabit without genetic engineering, environmental modification through terraforming, or both, almost all possess enough asteroid and comet material to construct dozens (if not hundreds or even thousands) of megascale habitats.

Most common of all such space habitats are ringworlds, where centripetal force on the inside of the rotating band produces artificial gravity. Along with high walls on either side, this force is sufficient to retain an atmosphere while also leaving the sky open to space. Whatever environments and landscapes desired can be installed.

Material strength is the limiting factor on ringworld size. For earth gravity, a radius of up to 1000 kilometers (620 miles) and width of 500 km (310 mi) is possible if constructed of graphene, providing living area equivalent to a small moon for a fraction of the material. To simulate a standard planetary day/night cycle, the axis rotates perpendicular to the plane of orbit and mirrors (for inner orbits) or artificial lighting (for middle orbits and beyond) is used for illumination. Such structures are within the realm of even Interplanetary-level technology.

Exotic matter with tensile strength stronger than molecular bonds could allow far larger ringworlds to be built. An ideal size can be calculated to provide comfortable gravity while also rotating once per day, which combined with an axial tilt creates a natural day/night cycle without need for mirrors or artificial illumination. For Earth-standard parameters, this is a radius of about 1.9 million km (1.15 million mi), which gives a circumference of 12 million km (7.2 million miles) and around 12-120 times Earth's surface area depending on width. These usually orbit around a star at a distance optimized for temperature, with seasons dependent on orbital eccentricity.

Without demolishing planets, the standard orbital debris of most dwarf star systems can provide enough material for one or two of these colossal space habitats. However, even if such impossibly strong matter is possible, these megastructures are very rarely built by Interplanetary or Pre-Stellar societies due to economic impracticality.

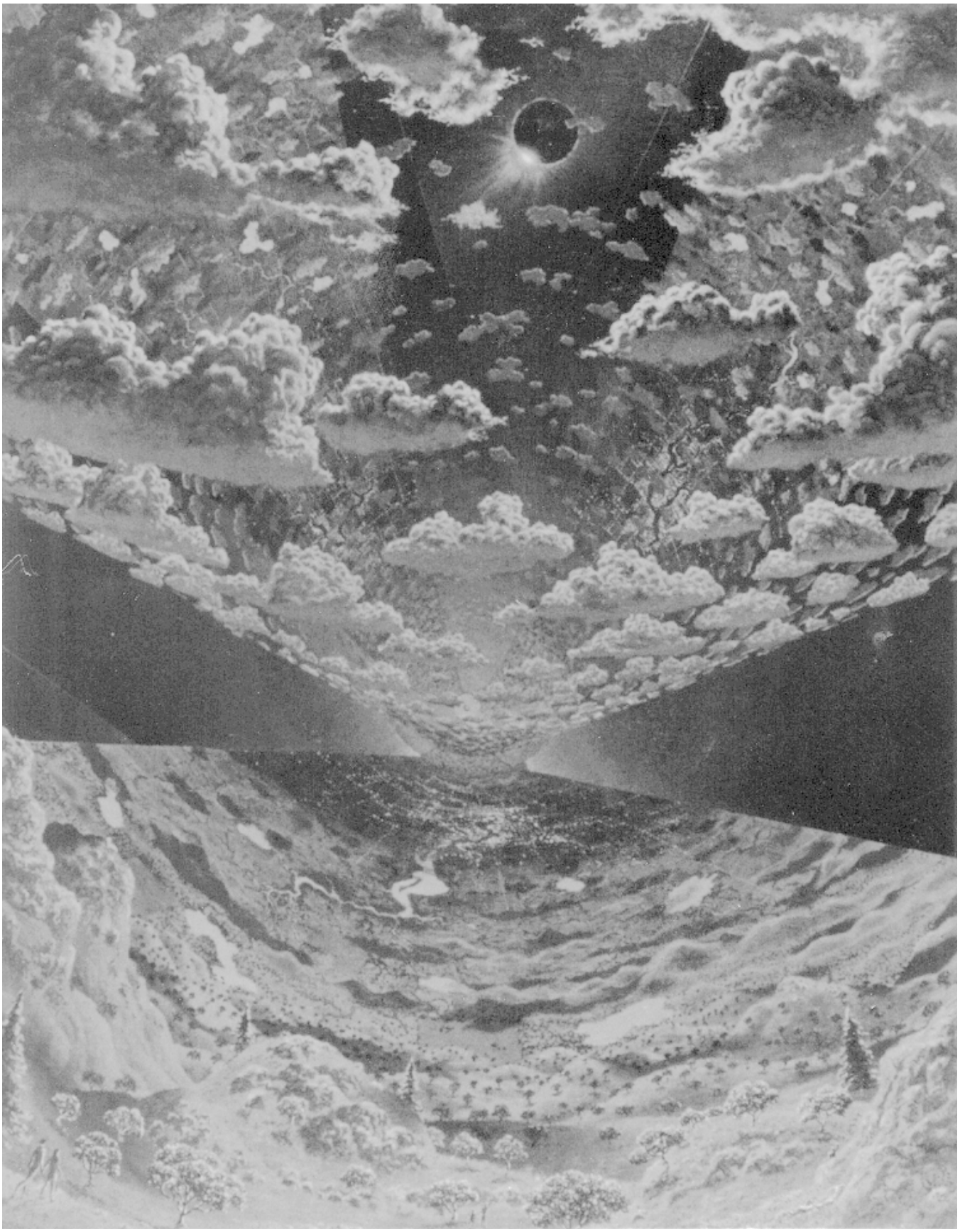
POWER

With practically limitless supply, solar energy is an obvious and easy source of power. To more effectively harvest this resource, satellites are placed in orbit around a star to collect the energy and beam it throughout the system. Using solar sails to remain suspended in place by the star's radiation pressure, statites allow an ever-increasing swarm of these collectors to surround the star and capture a greater fraction of its output without complex orbital mechanics, even to the point of dimming its light as seen from interplanetary and interstellar distances.

Aside from power collection, these swarms can also be designed as a stellar-scale information processor of immense capacity. This type of computing super object is only practical to Stellar or Galactic civilizations that can circumvent the limitations of light speed. Swarms arranged in an asymmetric bubble can even be used as a stellar engine to produce a very slight thrust to propel a star system over millions of years in a given direction.

STARGATES

Jumping instantaneously from one point to another is the ultimate form of travel imaginable. If jump-capable starships are the method employed by a starfaring civilization, the entire galaxy (and beyond) can be within reach.



5.3 MEGAENGINEERING

STARGATES (continued)

If space-based stargates are utilized, consider what kind of placement the requirements and limitations of the technology imply. When jump range is limited or normal space travel is required to build two linkage points before activation, then stargates will be in any conveniently close star system. Should they need to be located far away from strong gravity fields, deep orbits or even empty interstellar space might be necessary.

If it proves possible to locate teleportation portals so that a being can simply step through one to go from one world into another, the nature of interstellar travel drastically changes. Such portals will be located in places that the builders (or species they built the portals for) find naturally tolerable, but also defensible, such as a waystation located at the center of a ringworld or on its outer rim.

STELLAR ENGINEERING

By lifting off substantial portions of a star's matter, useful materials could be harvested. Adjusting mass, rotation, and metallicity can alter the characteristics of the star, too, which through careful stellar husbandry can moderate its activity and extend main sequence lifespan.

"I have called this principle, by which each slight variation, if useful, is preserved, by the term Natural Selection."
—Charles Darwin

6.1 EVOLUTION

All existing life is the product of millions of years of incremental changes in response to environmental pressures. Over time, creatures can grow more complex and radiate into diverse forms, even forming the basis of new groups and clades.

EVOLUTION HaVoQ ROLL!

Roll d4, d6, d8, d12, and d20 for every two million years on the following tables to determine the fate of a genus. To determine evolution and extinction at species level, each HaVoQ roll represents one million years. At group level, the timeline is five million years for each roll.

ROLL d20 FOR SELECTIVE PRESSURE.

1 (natural)	Cosmic (Roll d10: 1-2 Solar, 3-4 Other, 5-9 Meteor, 10 Special)
1 or less	Cosmic (Roll d10: 1-2 Solar, 3-4 Other, 5-9 Meteor, 10 Special)
2-9	Environmental (Roll d10: 1-2 Habitat, 3-4 Other, 5-9 Climate, 10 Special)
10-14	Stable (Roll d4: 1-3 No extra effect, 4 Modify d12 Stress roll by -2)
15 or more	Biologic (Roll d10: 1-2 Imbalance, 3-4 Other, 5-9 Competition, 10 Special)
20 (natural)	Special

NOTE: Modify d20 roll by these factors.
Basic life -5, Medium complex +2, Low complex +5, Intelligent +10.
Group level -5, Species level +5.
Not main sequence star -10, High debris density -5,
No magnetic field -5, Flare star -5, Adjacent to belt -2.
Less than 200 million years old -20, 200-500 million years old -10,
500-1000 million years old -5, Over 5 billion years old +5.
Geologically active -5, Geologically dead +5.

ENVIRONMENTAL PRESSURE & SEVERITY (d20 & d4 plus d10)

ROLL d4 FOR PRESSURE SEVERITY (IGNORE IF STABLE).

1	Minor (Reroll d4: 1 Insignificant, 2-4 Minor)
2-3	Moderate
4	Severe (Reroll d4: 1-3 Severe, 4 Extreme)

Continual interplay between life forms and their surroundings exert pressure on populations to adapt or perish. Those that thrive might eventually dominate their habitats and radiate into new groups or clades.

When determining this result, **other** is used to either skew the balance toward one of the regular results on the table OR used to indicate a unique factor common to that particular world. With d20 table Special results, rerolling the d20 and considering the result a level higher in severity OR rerolling twice for multiple pressure types are two possibilities, but feel free to use your imagination!

ROLL d12 FOR STRESS LEVEL.

2 or less	No stress
3-7	Minor stress (+2 next d12 stress roll)
8-9	Major stress (+5 next d12 stress roll)
10-14	Crisis (-2 next d12 stress rolls)
15 or more	Catastrophe (-5 next d12 stress roll)
12 (natural)	Catastrophe

NOTE: Modify d12 roll by these factors.
Stable -5, Environmental +2, Cosmic +5.
Habitat +1, Solar +1, Imbalance +2, Special +5.
Insignificant -5, Minor -2, Severe +2, Extreme +5.
High complex -2, Low complex +1, Intelligent life +2, Emergent complexity +2.

ROLL d8 FOR EXTINCTION RATE.

0 or less	Some species lost
1-2	Many species lost
3-7	Many genera lost
8-9	Many groups lost
10 or more	Most groups lost

ROLL d6 FOR POPULATION LOSS.

1	One level less & reroll d6, 2-6 None
1-2	One level less & reroll d6, 3-6 None
1-3	One level less & reroll d6, 4-6 None
1-4	One level less & reroll d6, 5-6 None
1-5	One level less & reroll d6, 6 None

NOTE: Modify d8 roll by these factors.
No stress -5, Minor stress -2, Crisis +2, Catastrophe +5.
Basic life -2, Medium complex +1, High complex +2.
Underground -2, Aquatic -1, Aerial +1.
Solid cells -2, Shell cells -1, Bubble cells +2.
NOTE: Modify d6 roll by these factors.
Parasite -2, Omnivore +1, Producer +2, Decomposer +3.
Dominant clade -1, Dominant group -1, Dominant genus -1.
Super Specialist -3, Specialist -2, Much larger -2, Larger -1,
Much smaller +1, Furtive +1, Tolerant +1, Generalist +1, Smart +1,
Intelligent +2, Specialist ideal for new ecosystem +2 and ignore all penalties.
Species -1, Group +1.

6.1 EVOLUTION

ENVIRONMENTAL PRESSURE & SEVERITY (continued)

Cosmic pressures are the most random and devastating threats to life in the universe. **Solar** fluctuations, such as changes in energy output or strong/frequent flares, and **meteor** strikes can disrupt otherwise thriving biospheres. **Special** results could include the explosion of a nearby supernova, axial or orbital changes, stellar instability, or a direct strike from a gamma ray burst, any of which could doom all life on a world.

Environmental changes in **habitat**, such as elevation, desertification, or permanent flooding, and **climate**, which inclides temperature and weather, are powerful drivers of evolution. These factors usually occur over timescales long enough for some taxa to adapt. **Special** possibilities, such as abrupt change, major volcanic events, weakening of the magnetic field, or alteration of atmospheric, hydrospheric, or cryospheric composition can cause major extinctions. When a new taxon evolves after environmental crisis or catastrophe, change its sub-habitat to reflect its new surroundings or gain a roll on the d100 Habitat Adaptation table.

Stable periods are free from extreme ecological pressures. In some cases, this also relieves mounting stress to the biosphere.

Constantly varying **biologic** factors, such as the rise of new taxa that **imbalance** the previous order or the constant stress of interspecies **competition**, spell the rise, success, and fall of all species, genera, and groups over time. Every so often a **special** factor greatly alters the ecosystem, such as invasion of unfamiliar creatures, the evolution of flight, or the emergence of higher complexity clades. Any new taxon that arises after a biologic crisis or catastrophe gains a roll on the d100 Role Adaptation table.

Severity is measured from insignificant all the way to extreme; a double-rolled (or more) result on the d10 sub-table implies a higher severity level event. In the rare case of severity exceeding extreme, add an additional +5 for every level higher to the d12 Stress table roll.

STRESS & EXTINCTION (d12, d8 & d6)

Species die out even in periods of relative stablity. Over time, though, ecological stresses can build up and lead to mass extinctions. This is measured by the d8 Extinction Rate table and its d6 sub-table, which determine how many population levels an individual taxon lost. After a crisis passes, the next several million years see new taxa emerge as populations strive to reach equilibrium again.

6.1 EVOLUTION

POPULATION LEVEL (d10)

A taxon's population level reflects how likely it is encountered at random in an ecosystem. Lower populations are at greater risk of becoming extinct, whereas the largest populations can stagnate genetically and struggle to maintain their numbers. Initially extremely rare, Communal and Prolific traits increase this starting population by one level each, whereas Specialist reduces it by one level.

Once post-extinction rate population levels are determined, roll d10 to determine the fate of that taxon. When a **new taxon** is indicated, roll d100 on the appropriate table for new adaptations and start its population level at extremely rare (with any previously mentioned applicable modifiers); reduce the parent taxon's population one level and reroll d10 to determine its fate. **Rise** increases population by one level, **loss** decreases it by one level, and **stasis** reflects no change at all. If this brings the taxon down to None, reroll d10 to determine if it becomes extinct. **Extinct** taxa die out with no further descendants. For **Special** results, reroll d10: 1 (1d4+1) New taxa, 2-5 (1d2) New taxa, 6-7 Rise +2 levels, 8-9 Lose -2 levels, 10 New higher level taxon.

POPULATION LEVEL (ROLL d10 FOR TAXON FATE).

None	1-9 Extinct, 10 Special
Unique	1-2 Rise, 3-4 Stasis, 5-9 Extinct, 10 Special
Extremely rare	1-2 New taxon, 3-4 Rise, 5 Stasis, 6-7 Loss, 8-9 Extinct, 10 Special
Very rare	1-2 New taxon, 2-3 Rise, 4-5 Stasis, 6-8 Loss, 9 Extinct, 10 Special
Rare	1 New taxon, 2-3 Rise, 4-7 Stasis, 8-9 Loss, 10 Special
Uncommon	1 New taxon, 2 Rise, 3-5 Stasis, 6-9 Loss, 10 Special
Common	1-4 Stasis, 5-9 Loss, 10 Special
Ubiquitous	1-9 Loss, 10 Special

NOTE: Modify d10 roll by these factors.
Viviparous -1, Hermaphrodite +1, Asexual +2.
Diversity -2, Many sub-habitats -1.
Low complex -1, High complex +1.
0-2 mya after crisis -2, 3-5 mya after crisis -1.
0-9 mya after catastrophe -2, 10-19 mya after catastrophe -1.

ENCOUNTER CHANCE (%)	POPULATION LEVEL
0	None
1	Unique
2-4	Extremely rare
5-9	Very rare
10-19	Rare
20-49	Uncommon
50-74	Common
75-100	Ubiquitous

6.2 CLADISTICS

To trace the lineage of a taxon, make a d100 roll every 1d4 million years into the past for Speciation (species), 2d4 million years for Variation (genus), or 3d4 million years for Radiation (group).

When a result duplicates a nature or adaptation the taxon already has, reroll on the appropriate table and replace it with the new result; if the new result is the same, keep it. Change any lower/higher, more/less, few/many, smaller/larger, faster/slower, and other similar choices to the opposite (lower to higher, less to more, many to few, etc.). As you go back in time, you will find the ancestors become smaller and simpler, but also very different!

ROLL d100 FOR SPECIATION (NEW SPECIES).

01-09	Reroll twice
10-19	Generalist
20-49	Specialist
50-64	Size
65-79	Speed
80-89	Trait
90-99	Variation
00	Special

ROLL d100 FOR VARIATION (NEW GENUS).

01-09	Radiation
10-24	Body Type
25-39	Habitat Adaptation
40-59	Role Adaptation
60-84	Nature
85-99	Natural Weapon
00	Special

ROLL d100 FOR RADIATION (NEW GROUP).

01-09	Complexity
10-24	Aspect
25-39	Sub-Habitat
40-59	Sub-Role
60-84	Habitat
85-99	Skin
00	Special

BREEDING

Early technological societies often learn to domesticate and cultivate other life forms to harvest as food and to assist with tasks. Over time, specimens with useful characteristics are selectively chosen, sometimes producing breeds that diverge widely from the original species.

Breeding is a time-intensive process. Assuming successful practices for speciation-level changes, 5-20 generations may pass before a characteristic is set or 50-200 generations for variation-level; radiation-level changes are not practical with this technique.

GENGINEERING

As understanding of biology and genetics expands, techniques are developed to alter the characteristics of a life form at the most fundamental levels. Not only does this extend the realm of possibilities to include radiation-level changes, it also considerably cuts development time: decades for global, years for interplanetary, months for pre-stellar, weeks for stellar, and mere days for galactic technology level.

Due to the incredible complexity involved, though, gengineering can produce peculiar weaknesses if sufficient care is not taken.

SYNTHETIC LIFE

Complete mastery of gengineering brings the capability of designing and creating artificial living creatures from inanimate matter. This is mostly used to create microbes, creatures, and beings with characteristics in combinations that can neither plausibly be found in nature nor practically engineered from existing life, including life forms with unusual peculiarities and exotic chemistries. This requires exacting research and development, so if the roll total is one or more levels below minimum, consider the attempt a complete failure.

TECHNOLOGY (Roll ALL dice equal to and less than the civilization's level.)

DICE	TECHNOLOGY	TIMEFRAME (d10)	CHANGES (MAX)
d100	Galactic	Days	50
d20	Stellar	Weeks	20
d12	Pre-Stellar	Months	10
d8	Interplanetary	Years	5
d6	Global	Decades	2
d4	Regional	Breeding only (Centuries)	1
(d2)	Local	Breeding only (Millennia)	0
(0)	None	—	—

NOTE: Roll one die higher for each of the following factors. If the higher die rolled is already d100, roll an additional d100 for each die higher and add to the total.

Method: Breeding, Traits only, Each timeframe level slower, Half or less than maximum changes.

Original species: Sub/low basic, Nano/microscopic, Prolific.

Skill: Specialty (two dice if mastery).

NOTE: Roll one die lower for each of the following factors.

Method: Synthetic (two dice), each change above max, Each higher Complexity level (two dice per level beyond Intelligent), Each timeframe level faster, Each change above maximum.

Original species: Complex (two dice if Intelligent), Giant (two dice if Supergiant), Viviparous.

Skill: New field, Inherent handicap.

NOTE: Roll d2 only if lowest die is below d4; roll = 0 is the minimum.

MIN ROLL	CHANGE LEVEL
2	Speciation (Generalist, Specialist, Size, Speed, Trait)
5	Variation (Body Type, Habitat or Role Adaptation, Nature, Weapon)
10	Radiation (Complexity, Aspect, Sub-Habitat, Sub-Role, Skin)
20	Extreme (Role, Habitat, Symmetry, Skeleton, Appendages, Peculiarity)
50	Synthetic (Artificial life, Unusual Peculiarity)
100	Super (Exotic characteristic, Super Peculiarity)

TOTAL	RESULT
Minimum or more	Successful change.
Below minimum	Successful change; roll d100 Peculiarity for weakness.
One level below min.	Unsuccessful change; roll d100 Peculiarity for weakness.
Two or more levels below minimum	Complete failure; either non-viable offspring OR unsuccessful change AND roll d100 Peculiarity twice.

EUGENICS

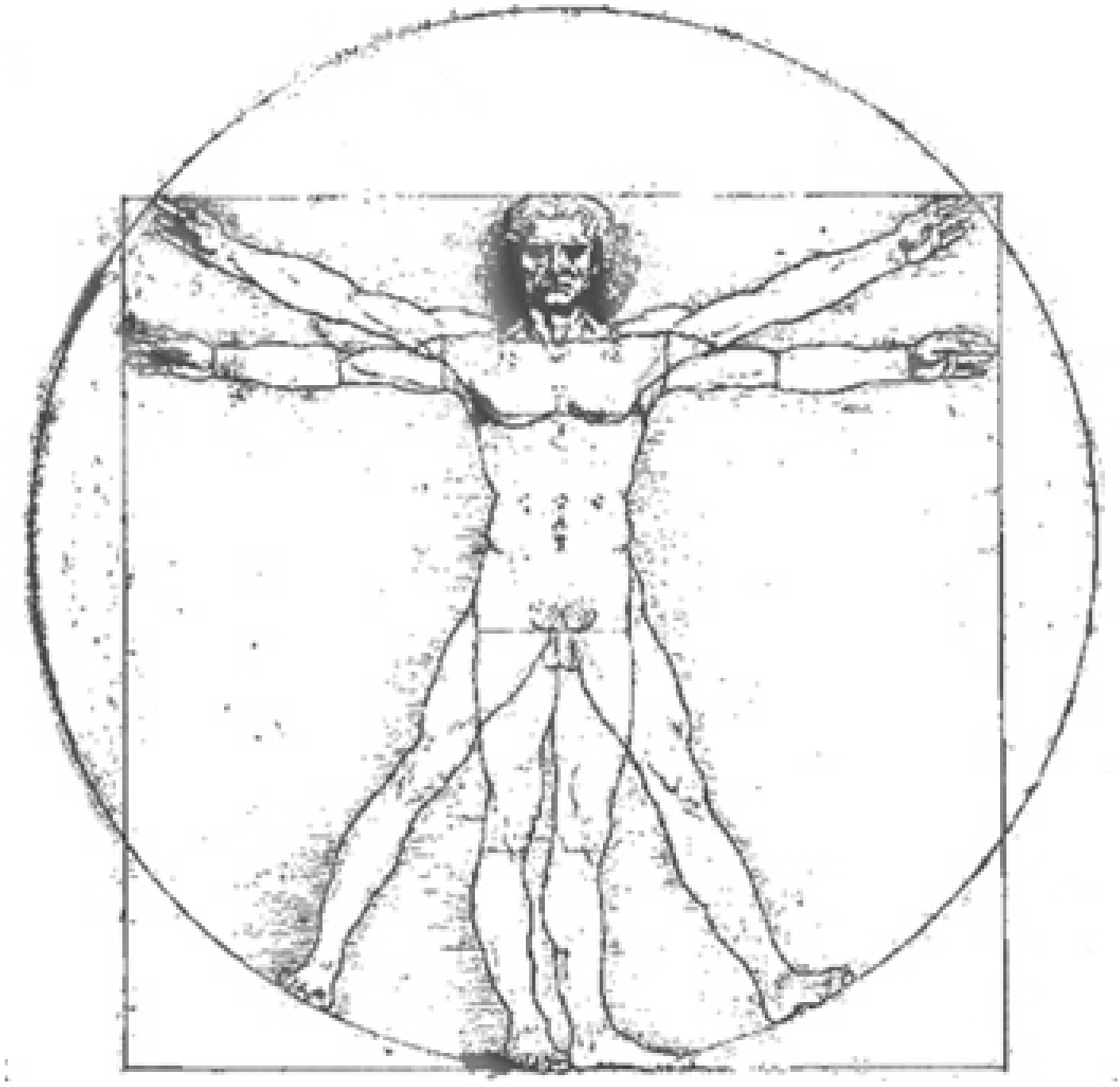
Most beings capable of self-direction will use these sciences to improve their own abilities and choose how their progeny will evolve. Along with optimizing appearance, eliminating defects, and adding new capabilities, more extreme modifications may be made to adapt to conditions the baseline species would never tolerate. In time, an intelligent species may become the root of an entire group or clade of life.

Additionally, higher levels of complexity are possible beyond Intelligent. When determining how many changes are required to reach these higher levels, there are six trait changes in addition to the complexity increase; the extra peculiarities shown below are free.

***Super Intelligent**: All attributes one level higher than baseline plus two extra peculiarities.*
***Transapient**: All attributes two levels higher than baseline plus five extra peculiarities.*
***Postsapient**: All attributes three levels higher than baseline plus ten extra peculiarities.*

UPLIFT

For diverse reasons, many highly advanced civilizations make uplift—the directed evolution and modification of lesser life forms into sapience—a cultural priority. Creatures of high complex clades related to the intelligent species are often raised up first, but with time and mastery of the sciences nearly any multicellular life form can be advanced in this fashion, although it can involve significant changes, tradeoffs, and potential unintended weaknesses. Ethical societies may choose to impose limitations and restrictions on such work, whereas others without such morals may push forward, leaving monstrosities in their wake.



A1 GENESIS TABLES

BASIC LIFE (Roll all applicable dice. If all results are 1, then basic life is native to the world.)

d4	Baseline chance
d6	Not moderate zone
d8	Not main sequence star
d10	Planet less than 500 million years old
d12	No oxygen/carbon dioxide/methane/hydrogen in atmosphere
d20	No liquid water
d100	Insignificant amounts of water (Roll in addition to no liquid water)
d100	No magnetosphere
d100	Insignificant atmosphere
d100	Carbon system
d100	Gas planet
d100	Planet less than 100 million years old (Roll in addition to other age factor)
d100	Subdwarf star
d100	Paleodwarf star (Roll in addition to subdwarf star)

COMPLEX LIFE (If basic life is native to a world, roll all applicable dice. If all results are 1, then complex life is also native.)

d10	Baseline chance
d4	Not moderate zone
d6	No magnetic field
d8	Not yellow/orange/red main sequence star
d12	No oxygen/carbon dioxide/methane/hydrogen in atmosphere
d20	No liquid water
d100	Insignificant amounts of water (Roll in addition to no liquid water)
d100	Insignificant atmosphere
d100	Variable/flare star
d100	Carbon system
d100	Gas planet
d100	Planet less than 2 billion years old
d100	Planet less than 500 million years old (Roll in addition to previous age factors)
d100	Planet less than 100 million years old (Roll in addition to previous age factors)
d100	Subdwarf star
d100	Paleodwarf star (Roll in addition to subdwarf star)
d100	Adjacent to belt
d100	High debris density

ROLL ALL APPLICABLE DICE AND ADD RESULTS TOGETHER.

d4	Baseline chance
d6	Not moderate temperature
d8	Not main sequence star
d10	Insignificant oxygen or halogens in atmosphere
d12	No oxygen/carbon dioxide/methane in atmosphere (Roll in addition to insignificant oxygen/halogens in atmosphere)
d20	No liquid water
d100	Insignificant amounts of water (Roll in addition to no liquid water)
d100	No liquid solvent (Roll in addition to no water & insignificant water)
d100	No magnetosphere
d100	Variable/flare star
d100	Insignificant atmosphere
d100	Planet less than 4 billion years old (Complex only)
d100	Planet less than 2 billion years old
d100	Planet less than 500 million years old (Roll in addition to all previous age factors)
d100	Planet less than 100 million years old (Roll in addition to all previous age factors)
d100	Adjacent to belt
d100	High debris density
d100	Gas planet
d100	Subdwarf star
d100	Paleodwarf star (Roll in addition to subdwarf star)
d100	Carbon system

ROLL TOTAL	LIFE COMPLEXITY RESULTS BASIC	COMPLEX
1	Proto-Complex (Emergent)	High Complex
2-4	High Basic	Medium Complex
5-9	Medium Basic	Low Complex
10-49	Low Basic	Proto-Complex
50+	Sub-Basic	Proto-Complex (Emergent)

A1 GENESIS TABLES (continued)

ROLL d20 FOR SOLVENT (ROLL d12 FOR AIR CHEMISTRY).

Below -25	Special
-25 to -10	Hydrocarbon (1-9 Hydrogen, 10-12 Sulfur)
-9 to 1	Ammonia (1-5 Hydrogen, 6-10 Nitrogen, 12 Halogen)
2-24	Water (1-11 Oxygen, 12 Halogen)
25 or more	Sulfur (1-3 Hydrogen, 4-6 Sulfur, 7-12 Halogen)
Natural 20	Special

NOTE: Modify d20 roll as follows:
Frozen or Ultra cold -20, Super or Very cold -10, Cold -5,
Moderate/Hot +5, Hot +10, Very hot +20.
Tenuous +20, Very thin +10, Thin +5, Thick -5, Very thick -10,Crushing -20.
Metal planet +5, Ice planet -5, Gas planet -10, Carbon planet -20.
NOTE: If world is above Very hot, below Frozen, or is otherwise uniquely exotic, assume Special solvent and unusual chemistry.

ROLL d6 FOR CELL STRUCTURE.

Below -3	Solid
-3 to 0	Shell
1-2	Bubble
3 or more	Membrane

NOTE: Modify d6 roll as follows:
No liquid solvent -5, Rare liquid solvent -2, Abundant liquid solvent +2.
Hostile environment -5, Extreme environment -2, Ideal environment +2.

ROLL d8 FOR BASIC PRODUCER (ROLL d4 FOR EFFICIENCY).

Below -10	None
-10 to -5	Lithotroph (1-2 Extremely Poor, 3 Very Poor, 4 Poor)
-4 to 0	Chemosynth (1-2 Very Poor, 3 Poor, 4 Average)
1-4	Phototroph (1 Poor, 2-3 Average, 4 Good)
5-12	Photosynth (1 Average, 2-3 Good, 4 Very Good)
13 or more	Special

NOTE: Modify d12 roll as follows:
Sub-Basic -10, Low Basic -5, Medium Basic -2.
No light -5, Weak light -2, Strong light +2, Constant light +5,
Abundant high energy source +10.
Hydrocarbon solvent -5, Ammonia solvent -2, Water solvent +2.

A2 ECOSYSTEM TABLES

Roll all applicable dice once for Low Complex ecosystems, twice for Medium Complex, or three times for High Complex, then compare each die total with the following chart to determine that life kingdom's maximum complexity.

DIE	KINGDOM
d4	Lithotroph
d6	Chemosynth
d8	Phototroph
d12	Decomposer
d20	Photosynth
d100	Consumer

NOTE: If a natural 1 is rolled, stop rolling that die. If the maximum result of a die is rolled naturally, roll again and add to that die total.

DIE TOTAL	MAXIMUM COMPLEXITY
Below 10	Basic
10-19	Proto
20-49	Low
50-99	Medium
100 or more	High

NOTE: If no kingdom total equals the world's highest complexity, raise Consumer to that level. If any kingdom complexity is greater than the world's highest complexity, it is Emergent.

ROLL d10 FOR CLADE ROLE.

1 or less	Symbiont
2	Decomposer
3-4	Producer
5-9	Predator
10 or more	Consumer

NOTE: Certain other factors also affect d10 Role roll.
Proto-Complex -2, Medium Complex +2, High Complex +5.

A2 ECOSYSTEM TABLES (continued)

ROLL d10 FOR CLADE HABITAT.

3 or less	Aquatic
4	Underground
5-9	Terrestrial
10 or more	Aerial or Special

NOTE: Certain other factors also affect d10 Habitat roll.
Proto-Complex -2, Medium Complex +1, High Complex +2.
Producer -2, Decomposer -1.
No Atmo -5, Thin Atmo -2, Thick Atmo +2, Dense Atmo +5, Crushing Atmo +10.
Ocean World -10, Hostile Surface -5, Gas Planet +10.
High Gravity -<g/2>, Low Gravity +<inverse g/2>.

CLADE HaVoQ ROLL!
Roll d4, d6, d8, d12, and d20, then consult the following tables applicable to each die to create a Clade.

ROLL d12 FOR SYMMETRY.

1 or less	Asymmetric
2-4	Radial
5	Amoeba
6 or more	Bilateral

ROLL d4 FOR SUPPORT.

1 Hydro, 2-3 Exo, 4 Endo
1-2 Hydro, 3 Exo, 4 Endo
1-3 Hydro, 4 Other
1 Hydro, 2 Exo, 3-4 Endo

NOTE: Various factors can affect the d12 Form roll:
Producer -5, Decomposer -2, Consumer +2.
High Complex +1, Aerial +2.

ROLL d6 FOR APPENDAGES (ROLL d8 FOR MOTILE LIMB COUNT)

1	Myriad (1-2 1d100* pairs, 3-8 2d10* pairs)
2-3	Many (1 Myriad, 2-3 Five pairs, 4-6 Four pairs, 7-8 Three pairs)
4-5	Few (1-2 1d10 Limbs, 3-7 Two pairs, 8 One pair)
6	None (1-3 Many Protolimbs, 4-6 No Limbs, 7-8 Few Vestigal)

NOTE: Certain factors affect d6 and d8 Appendages rolls:
Radial -2, Hydroskeleton -1, Asymmetric +2, Amoeba +5.
Proto-Complex -2, Low Complex -1, High Complex +1.
Aerial +1, Underground +2, Aquatic +3.
Decomposer -2, Producer -1.

ROLL d10 FOR MOVEMENT TYPE.

7 or less Body (1-2 No Tail, 3-10 Tail)
8 or more Limb (1-3 Tail, 4-10 No Tail*)
*Aerial Only: 1 No Tail, 2-10 Tail.

NOTE: Add total limb count to d10 Movement Type roll.
NOTE: Certain other factors also affect d10 Movement roll.
Aquatic -2, Aerial +5. Proto-Complex -5, Low Complex -2.

ROLL d8 FOR GROWTH
(SESSILE ONLY).

1-5 Limb
6-8 Body

ROLL d20 FOR ASPECT.

1 or less Wide
2-5 Long
6-14 Prone
15-17 Upright
18 or more Tall
20 (natural) Special

NOTE: Certain factors can affect the d20 Aspect roll:
Underground -10, Aquatic -5, Aerial -2.
Symbiont -5, Phototroph +5, Decomposer +10, Photosynth +20.
Amoeba -5, Radial -2, Hydroskeleton -1.
Proto-Complex -2, Low Complex -1, Dominant Clade +2, Body mover -5.
Gravity above 1g -<g x 2>, Gravity 0.1-0.5g +5, Gravity below 0.1g +10.

ROLL d100 FOR SKIN (ROLL d10 FOR PELAGE).

9 or less Soft (1-5 No pelage, 6-8 Hair, 9-10 Special)
10-19 Thin (1-3 No pelage, 4-8 Hair, 9-10 Special)
20-34 Hide (1-4 No pelage, 6-9 Hair, 10 Special)
35-59 Scaled (1-6 No pelage, 7-9 Hair, 10 Special)
60-74 Plated (1-7 No plage, 8-9 Hair,10 Special)
75-89 Shell (1-8 No pelage, 9-10 Special)
90-95 Test (1-9 No pelage, 10 Special)
96 or more Reroll twice OR Special

NOTE: Certain factors modify d100 Skin roll.
Aerial -20, Aquatic +10, Underground +20.
Hydroskeleton -50, Exoskeleton +20. High Complex -10, Sessile +50.
NOTE: Certain factors modify d10 Pelage roll.
Aquatic -5, Underground -2, Aerial +2. Wet -2, Dry -1, Temperate +1, Cool +2.
Proto-Complex -2, Low Complex -1, High Complex +1.

A2 ECOSYSTEM TABLES (continued)

ROLL d100 FOR FEEDING METHOD (ROLL d10 FOR APPARATUS).

44 or less Absorption (1-3 Internal, 4-9 External, 10 Special)
45 or more Orifice (1 Maw, 2-3 Beak, 4-7 Fangs, 8-9 Teeth, 10 Special)
00 Special (natural 00 only)

NOTE: Certain factors modify d100 roll.
Producer -100, Decomposer -50, Consumer +50.
Amoeba -20, Proto-Complex -20, Low Complex -10.
Soft skin -50.

ROLL d100 FOR SEXES (ROLL d10 FOR REPRODUCTION).

Below 10 Asexual (1-3 Fission, 4-9 Budding, 10 Special)
10-24 Hermaphrodite (1-5 Simultaneous, 6-9 Sequential, 10 Special)
25-98 Sexual (1-2 External, 3-7 Internal, 8-9 Viviparous, 10 Special)
Above 98 Special

NOTE: Certain factors modify d100/d10 rolls.
Proto-Complex -20/-2, Low Complex -10/-1, High Complex +10/+1.
Decomposer -50/-5, Producer -20/-2.
Underground -20/-2, Aquatic -10/-1.

A3 TAXA TABLES

CHOOSE OR ROLL d10 FOR GROUP SUB-HABITAT.

Aquatic (1 aphotic, 2-6 benthic, 7-9 pelagic, 10 special)
Underground (1-2 subterranean, 3-7 burrowing, 8-9 subfossorial, 10 special)
Terrestrial (1 wet, 2-3 warm, 4-7 temperate, 8 cool, 9 dry, 10 special)
Aerial (1-2 aquatic, 3-7 land, 8-9 sea, 10 special)

CHOOSE OR ROLL d10 FOR GROUP SUB-ROLE.

Symbiont (1-2 mutualist, 3-4 commensal, 5-9 parasite, 10 special)
Decomposer (1 lithotroph, 2-3 parasitic, 4-9 organotroph, 10 special)
Producer (1 saprophyte, 2 parasitic, 3-9 photosynth, 10 special)
Consumer (1 parasitic, 2-6 grazer, 7-9 predator, 10 special)
Predator (1-2 scavenger, 3-4 omnivore, 5-9 true predator, 10 special)

ROLL d10 FOR BODY TYPE.
Wide (1-2 flat, 3-4 thin, 5-6 spherical, 7-9 thick, 10 bulky)
Long (1-2 flat, 3-7 thin, 8-9 thick, 10 bulky)
Prone (1 flat, 2-3 thin, 4-6 compact, 7-9 thick, 10 bulky)
Upright (1 flat, 2-3 thin, 4-6 compact, 7-9 thick, 10 bulky)
Tall (1-3 thin, 4-7 wide, 8-9 thick, 10 bulky)

ROLL d100 FOR GROUP NATURE.

PREDATOR	PRODUCER	CONSUMER	DECOMP.	SYMBIONT	NATURE
01-04	01-09	01-04	01-02	01-04	Extra Roll
05-09	10-34	05-14	03-09	05-14	Armored
10-19	35-49	15-24	10-24	15-29	Communal
20-39	50-54	25-29	25-39	30-39	Dangerous
40-44	55-59	30-34	40-49	40-59	Diverse
45-54	—	35-54	50-64	60-72	Furtive
55-64	60-64	55-64	65-69	73-74	Generalist
65-69	65-74	65-74	70-72	75-77	Larger
70-74	75-84	75-79	73-79	78-84	Prolific
75-79	—	80-84	—	85-86	Smart
80-89	—	85-89	—	87-89	Swift
90-95	85-95	90-95	80-95	90-95	Tolerant
96-00	96-00	96-00	96-00	96-00	Special

ROLL d100 FOR ROLE ADAPTATION (ROLL TWICE IF SESSILE).

SYMBIONT	DECOMPOSER	PRODUCER	CONSUMER	ADAPTATION
01-04	01-04	01-04	01-04	None
05-19	05-14	05-29	05-14	Armored
20-29	15-19	30-34	15-24	Complexity
30-44	20-39	35-44	25-34	Diverse
45-49	40-49	45-54	35-44	Habitat
50-54	—	—	45-54	Limbs
55-64	50-74	55-64	55-64	Reproduction
65-69	75-79	65-79	65-74	Size
70-74	—	—	75-84	Speed
75-94	80-94	80-89	85-94	Weapon
95-98	95-97	90-95	95-99	Reroll twice
99-00	98-00	96-00	00	Special

A3 TAXA TABLES (continued)

ROLL d100 FOR HABITAT ADAPTATION.

AQUATIC	UNDERGROUND	TERRESTRIAL	AERIAL	ADAPTATION
01-04	01-04	01-04	01-04	None
05-14	05-09	05-14	05-06	Armored
15-19	10-24	15-24	07-11	Complexity
20-24	25-26	25-34	12-24	Diverse
25-29	27-39	35-44	25-34	Habitat
30-49	40-54	45-54	35-44	Limbs
50-69	55-64	55-64	45-49	Reproduction
70-79	65-79	65-74	50-69	Size
80-89	80-84	75-84	70-79	Speed
90-94	85-94	85-94	80-89	Weapon
95-98	95-99	95-98	90-95	Reroll twice
99-00	00	99-00	96-00	Special

ROLL d100 FOR NATURAL WEAPONS

09 or less	None
10-19	Spines
20-29	Toxin
30-39	Sting
40-54	Gore
55-64	Smash
65-79	Bite
80-97	Claw
98 or more	Reroll twice OR Special

NOTE: Certain factors modify d100 roll.
Producer -50, Decomposer -50, Grazer -20, Predator +20.
Proto -20, Low Complex -10.
Amoeba -50, Sessile -20.

GENUS HaVoQ ROLL!
Roll d4, d6, d8, d12, and d20, then consult the following tables applicable to each die to create a Genus.

ROLL d4 FOR SIZE.	SIZE LEVEL	MASS (pounds)
Nanoscopic	(Size -20 or less)	—
Microscopic	(Size -10 to -19)	—
Fine	(Size -5 to -9)	Below 0.001
Tiny	(Size -4)	0.001 to 0.009
Extremely small	(Size -3)	0.01 to 0.09
Very small	(Size -2)	0.1 to 0.9
1 Small (Size -1) and roll again.	(Size -1)	1 to 9
2-3 Medium	(Size +0)	10 to 90
4 Large (Size +1) and roll again.	(Size +1)	100 to 900
Very Large	(Size +2 to +3)	1000 to 9000
Extremely Large	(Size +4 to +5)	10,000 to 90,000
Giant	(Size +6 to +9)	100,000 to 1 million
Supergiant	(Size +10 to +19)	Above 1 million
Hypergiant	(Size +20 or more)	—

NOTE: If a 1 (Small) is first rolled, reroll d4. If another 1 is rolled, Size is reduced an extra level and another d4 roll may be made with results cumulative; any other result means Size level freezes and no more d4 rolls are made.

NOTE: If a 4 (Large) is first rolled, reroll d4. If another 1 is rolled, Size is increased an extra level and another d4 roll may be made with results cumulative; any other result means Size level freezes and no more d4 rolls are made.

NOTE: Modify Size level with all applicable factors.

Proto-Complex -2, Low Complex -1, Dominant Clade +1.
Decomposer -2, Symbiont -1, Predator -1.
Asexual -2, Prolific -1, Swift -1, Furtive -1, Sessile +1, Larger +1.
Aerial -2, Underground -1, Aquatic (consumer only) +1.
Exoskeleton -2, Hydroskeleton -1.
No complex producers -2, Anaerobic -1, Bubble cell -1,
Hydrocarbon solvent +1.
Gravity above 1g -<g>, between 0.1-0.5g +1, below 0.1g +2.

A3 TAXA TABLES (continued)

ROLL d6 FOR SPEED.	SPEED LEVEL	MOVEMENT (FT/SEC)
Sessile	(Speed -5 or less)	None
Creeping	(Speed -4)	Less than 0.1
Extremely Slow	(Speed -3)	0.1 to 0.4
Very Slow	(Speed -2)	0.5 to 1
1 Slow (Speed -1) and roll again.	(Speed -1)	1 to 2
2 Slow	(Speed -1)	1 to 2
3-5 Moderate	(Speed +0)	3 to 4
6 Fast (Speed +1) and roll again.	(Speed +1)	5 to 9
Very Fast	(Speed +2)	10 to 20
Extremely Fast	(Speed +3)	25 to 40
Super Fast	(Speed +4)	50 to 90
Ultra Fast	(Speed +5)	100 or more

NOTE: If a 1 (Slow) is first rolled, reroll d6. If another 1 is rolled, Speed is reduced an extra level and another d6 roll may be made with results cumulative; any other result means Speed level freezes and no more d6 rolls are made.

NOTE: If a 6 (Fast) is first rolled, reroll d6. If another 6 is rolled, Speed is Increased an extra level and another d6 roll may be made with results cumulative; any other result means Speed level freezes and no more d6 rolls are made.

NOTE: Modify Speed level with all applicable factors.

Anaerobic -2, Proto-Complex -2, Low Complex -1, High Complex +1.
Producer -3, Decomposer -2, Symbiont -1.
Asymmetric -3, Radial -2, Amoeba -1.
Underground -1, Aquatic -1, Aerial +1.
Hydrocarbon solvent -2, Anaerobic (non-halogen) -2, Ammonia solvent -1, Halogen chemistry +1.
Test -3, Shell -2, Plated -1, Armored -1, Swift +1.

ROLL d20 FOR PHYSICAL TRAIT.

Below 4	Sluggish
4-6	Weak
7-9	Fragile
10-12	Tough
13-15	Mighty
Above 16	Animated
20 (natural)	Reroll twice OR Special

NOTE: Certain factors modify d20 roll.
Decomposer -10, Producer -5, Amoeba +1, Predator +2.
Proto-Complex -5, Low Complex -2, High Complex +2.
Sessile -5, Armored -5, Tolerant +2.

ROLL d8 FOR SENSORY TRAIT.

Below 3	Oblivious
3-4	Dull
5-7	Clever
Above 7	Alert
8 (natural)	Reroll twice OR Special

NOTE: Certain factors modify d8 roll.
Proto-Complex -2, Low Complex -1, High Complex +1.
Producer -2, Decomposer -2, Predator +1. Underground -1, Aerial +1.
Sessile -1, Upright +1, Smart +1, Amoeba +1, Radial +2, Furtive +2.

ROLL d12 FOR BEHAVIORAL TRAIT.

Below 1	Oblivious
1-2	Dull
3-5	Hostile
6-7	Alert
8-10	Clever
Above 10	Social
12 (natural)	Reroll twice OR Special

NOTE: Certain factors modify d12 roll.
Producer -5, Decomposer -5, Grazer -1, Predator +2.
Proto-Complex -5, Low Complex -2, High Complex +2.
Underground -1, Aerial +2. Sessile -2, Communal +1, Furtive +1, Smart +2.

A3 TAXA TABLES (continued)

ROLL d100 FOR GENUS VARIATION.

01-09	Reroll twice (Special)
10-24	Body Type (Aspect)
25-39	Habitat Adaptation (Sub-Habitat)
40-59	Role Adaptation (Sub-Role)
60-84	Nature (Habitat)
85-99	Natural Weapon (Skin)
00	Special

NOTE: If a result is duplicated when rolling for genus variation, use the result in parentheses (if any) instead.

ROLL d100 FOR SPECIATION.

01-09	Reroll twice
10-19	Generalist
20-49	Specialist
50-64	Size
65-79	Speed
80-96	Trait
97-99	Variation
00	Special

ARMOR RATING

SKIN	RATING	(ABBREVIATION)
—	None	(—)
—	Sub-Poor	(pppp)
Soft	Extremely poor	(ppp)
Thin	Very poor	(pp)
Thick	Poor	(p)
Scaly	Average	(A)
Plated	Good	(AA)
Shell	Very Good	(AAA)
Test	Extremely good	(X)
—	Super good	(XX)
—	Ultra good	(XXX)
—	Hyper good	(XXXX)

NOTE: Certain factors raise or lower Armor rating.
Hydroskeleton -1, Exoskeleton +1.
Pelage/spines/hide +1, Armored (existing shell/test only) +2.
Microscopic (—), Fine -2, Tiny -1, Giant +1, Supergiant +2, Hypergiant +3.

PHYSICAL AND DAMAGE RATINGS

SIZE	RATING	(ABBREVIATION)
Fine or less	—	(—)
Tiny	Sub-poor	(pppp)
Extremely small	Extremely poor	(ppp)
Very small	Very poor	(pp)
Small	Poor	(p)
Medium	Average	(A)
Large	Good	(AA)
Very large	Very good	(AAA)
Extremely large	Extremely good	(X)
Giant	Super good	(XX)
Supergiant	Ultra good	(XXX)
Hypergiant	Hyper good	(XXXX)

NOTE: Certain factors raise or lower weapon damage rating.
Maw -3, Smash -2, Spines -1, Teeth -1, Claws -1, Fangs +1.
Dangerous +1, Predator +1.

NOTE: Certain factors raise or lower physical attribute rating.
Weak -1, Sluggish -1, Animated +1, Mighty +1.

SENSORY RATING

COMPLEXITY	RATING	(ABBREVIATION)
—	Nil	(—)
—	Sub-Poor	(pppp)
Proto	Extremely poor	(ppp)
Low	Very poor	(pp)
Medium	Poor	(p)
High	Average	(A)
—	Good	(AA)
—	Very good	(AAA)
—	Extremely good	(X)
	etc.	

NOTE: Certain factors raise or lower Sensory rating.
Producer -2, Decomposer -1.
Subterranean -2, Aphotic -1.
Oblivious -1, Dull -1, Alert +1, Furtive +2..

A3 TAXA TABLES (continued)

BEHAVIORAL RATING

COMPLEXITY	RATING	(ABBREVIATION)
Proto	Nil	(—)
Low	Sub-Poor	(pppp)
Medium	Extremely poor	(ppp)
High	Very poor	(pp)
—	Poor	(p)
—	Average	(A)
—	Good	(AA)
—	Very good	(AAA)
—	Extremely good	(X)
	etc.	

NOTE: Certain factors raise or lower Behavioral rating.
Producer -2, Decomposer -1.
Subterranean -2, Aphotic -1.
Oblivious -2, Hostile -1, Dull -1, Clever +1, Alert +1, Furtive +1, Smart +1, Communal +1, Social +2.

ROLL d10 FOR PECULIARITY DEGREE

1	Insignificant
2-3	Minor
4-7	Moderate
8-9	Major
10	Extreme

ROLL d10 FOR PECULIARITY TYPE

1-4	Physical
5-7	Sensory
8-9	Behavioral
10	Special

d100	PECULIARITY
01-09	Reroll d100 Peculiarity twice; first result is a weakness, second is normal.
10-24	Health
25-44	Reproduction
45-59	Size
60-74	Shape
75-84	Sense
85-89	State
90-98	Reroll d100 Peculiarity twice.
99-00	Roll d100 for Unusual Peculiarity.

d100	UNUSUAL PECULIARITY
01-19	Reroll d100 Unusual Peculiarity twice; first result is a weakness, second is normal.
20-39	Will
40-59	Chaos
60-64	Order
65-79	Ray
80-94	Flux
95-99	Reroll d100 Unusual Peculiarity twice.
00	Roll d100 for Super Peculiarity.

d100	SUPER PECULIARITY
01-29	Reroll d100 Super Peculiarity; result is a weakness.
30-44	Field
45-69	Chemical
70-89	Cross
90-94	Warp
95-97	Jump
98-00	Reroll d100 Super Peculiarity twice or choose a Special Peculiarity.

A4 SAPIENTS TABLES

NATIVE INTELLIGENT LIFE (If complex life is native to a world, roll all applicable dice. If all results are 1, then intelligent life also arose.)

d100 Baseline chance
d100 Not moderate zone
d100 No magnetic field
d100 No liquid water
d100 Not yellow main sequence star
d100 Carbon system
d100 No oxygen/carbon dioxide/methane in atmosphere
d100 High debris density
d100 Adjacent to belt
d100 Gas planet
d100 Insignificant amounts of water (Roll in addition to no liquid water)
d100 Insignificant atmosphere
d100 Variable/flare star
d100 Planet less than 4 billion years old
d100 Planet less than 2 billion years old
(Roll in addition to all previous age factors)
d100 Planet less than 500 million years old
(Roll in addition to all previous age factors)
d100 Planet less than 100 million years old
Roll in addition to all previous age factors)
d100 Subdwarf star
d100 Paleodwarf star (Roll in addition to subdwarf star.)

BEINGS HaVoQ ROLL!
Roll d4, d6, d8, d12, d20, and d100 then consult the following tables applicable to each die to create an intelligent species.

ROLL d4 FOR SIZE.
See d4 Size Table in A3 Taxa Tables.

ROLL d6 FOR SPEED.
See d4 Speed Table in A3 Taxa Tables.

ROLL d8 FOR MANIPULATORS.

2 or less	None
3-4	Prehensile tail or proboscis
5 or more	Arms (Arm Fraction d10: 1 Single, 2-3 Tenth, 4-6 Fifth, 7-9 Half, 10 All)
8 (natural)	Reroll twice or Special

NOTE: Unless Arm Fraction result is Single (just one arm), minimum arm count for bilateral creatures with paired limbs is one pair.

NOTE: Modify d8 rolls with following factors.

No limbs -5, Tail -2, Many Limbs +1, Myriad Limbs +2, Upright +5.
Exoskeleton +1, Hydroskeleton +2.
Producer -10, Decomposer -5, Aquatic -2, Aerial -1.

ROLL d12 GOOD ATTRIBUTE.

1-2	None
3-5	Physical (d10: 1-5 Might, 6-10 Resolve)
6-8	Sensory (d10: 1-5 Animation, 6-10 Vision)
9-11	Behavioral (d10: 1-5 Intellect, 6-10 Charm)
12	Reroll twice

NOTE: Modify d12 and d10 rolls with following factors.

Armored -1, Generalist -1, Larger -1, Furtive +1, Communal +1, Smart +1, Swift +1.

ROLL d20 POOR ATTRIBUTE (Use column corresponding to good attribute.)

NONE	PHYSICAL	SENSORY	BEHAVIOR	POOR ATTRIBUTE
—	1	1-2	1-3	Reroll twice
1	—	3-12	4-13	Physical (1-5 Resolve, 6-10 Might)
2-3	2-7	—	14-19	Sensory (1-5 Vision, 6-10 Animation)
4-8	8-17	13-18	—	Behavioral (1-5 Charm, 6-10 Intellect)
9-20	18-20	19-20	20	None

NOTE: Modify d20 and d10 rolls with following factors.

Furtive -2, Communal -2, Smart -2, Swift -2, Armored +2, Generalist +2, Larger +2.

A4 SAPIENTS TABLES (continued)

ROLL d100 FOR VARIATION.

See d100 Variation in A3 Taxa Tables.

ROLL d100 FOR SPECIATION.

See d100 Speciation in A3 Taxa Tables.

ATTRIBUTE RATINGS

LEVEL	RATING	(ABBREVIATION)
-5	Nil	(—)
-4	Sub-poor	(pppp)
-3	Extremely poor	(ppp)
-2	Very poor	(pp)
-1	Poor	(p)
0	Average	(A)
+1	Good	(AA)
+2	Very good	(AAA)
+3	Extremely good	(X)
+4	Super good	(XX)
+5	Ultra good	(XXX)
+6	Hyper good	(XXXX)

NOTE: Add the following factors to the rating of each relevant attribute.

Might: Size level minus Speed level, Bulky +1, Dangerous +1, Flat -1, Wide -1, Thin -1.

Resolve: Asexual +2, Bulky +1, Dangerous +2, Exoskeleton +1, Flat -1, Furtive -2, Hermaphrodite +1, Thick +1, Thin -1, Tolerant +1.

Animation: Speed level minus Size level, No arms -2, One arm -1, Two arm pairs +1, Each arm pair above two +1, Bulky -2, Thin +2.

Vision: Dangerous -1, Flat +2, Furtive +2, Wide +1.

Charm: Asexual -2, Dangerous -1, Hermaphrodite -1.

Intellect: Dangerous -1.

A5 CIVILIZATION TABLES

TECHNOLOGY (Roll ALL dice equal to and less than the world's resource level.)

d100 Rare (Gas world)
d20 Poor (Ice world)
d12 Average (Rock world)
d8 Rich (Metal world)
d6 Abundant (Carbon world)
d4 Special (Spacefaring trade, fallen world, unusual peculiarity, etc.)
(d3) Very Special
(d2) Super Special

NOTE: Roll one die higher for each of the following factors. If the higher die rolled is already d100, roll an additional d100 for each die higher and add to the total.

Less than 200,000 years old (two dice if less than 100,000 years old)
Less than one arm pair (two dice if none)
Poor intellect (two dice if very poor, three if extremely poor, etc.)
Poor or less animation, vision, and/or charm (one die each)
Aquatic species
Dangerous nature
Poor in resources
No terrestrial habitat on world
Anaerobic environment (two dice)
No atmosphere (two dice in addition to above)
Gravity 2-4g (two dice if 5g or more)

NOTE: Roll one die lower for each of the following factors.

More than 1 million years old (two dice if more than 2 million years old)
Descended from technological species
Two or more pairs of manipulators
Rich in resources
Good intellect (two lower if very good, three if extremely good, etc.)
Good or better animation, vision, and/or charm (one die each)
Underground species
Communal nature
Gravity less than 0.5g (two lower if less than 0.2g)

NOTE: Use d3 or d2 only if lowest die is below d4;d2 is the minimum.

DIE TOTAL	SCALE OF TECHNOLOGY
100+	NONE
10-99	LOCAL
5-9	REGIONAL
3-4	GLOBAL
2	INTERPLANETARY
1	PRE-STELLAR
1 (two in a row)	STELLAR
1 (five in a row)	GALACTIC

A5 CIVILIZATION TABLES (continued)

SYSTEM DEVELOPMENT INDEX (Roll all dice equal to and less than highest indicated and add together.)

DICE*	INTERPLANETARY	PRE-STELLAR	STELLAR	GALACTIC
(1d4-3)	Interstellar	Unknown	—	—
d4	Deep Orbit	Wild	Unknown	Intergalactic
d6	Other Worlds	Frontier	Wild	Unknown
d8	Distant resources	Middle	Frontier	Wild
d10	Close resources	Inner	Middle	Frontier
d12	Main World	Core	Inner	Middle
d20	—	—	Core	Inner
d100	—	—	—	Core

*For each die that rolls its highest number, reroll it and add the results together.

NOTE: Add one higher die for each of the following factors. If highest die rolled is already d100, roll another d100 (or more) and add to total.

Home system	Superdwarf
Large system	Hyperdwarf (two dice higher)
Circumstellar disk	Frontier covers galaxy quadrant
Frontier covers entire galaxy (two dice higher)	

NOTE: Roll one die lower for each of the following factors.

Empty system	Intergalactic
Subdwarf	Paleodwarf (two dice lower).
First century of colonization	Dawn of spaceflight (two dice lower)

NOTE: Use 1d4-3 only if the lowest die indicated is below d4.

DEVELOPMENT INDEX RESULTS

TOTALS	DEVELOPMENT
0-9	None
10-19	Minimal
20-49	Light
50-99	Moderate
100-199	Heavy
200-499	Extreme
500+	Ultimate

SPHERES OF COLONIZATION
(Multiply by total expansion distance for outer radius):
Core (x1/10), Inner (x1/5), Middle (x1/2), Frontier (x1), Wild (x2), Unknown (x5).

A6 SELECTION TABLES

EVOLUTION HaVoQ ROLL!
Roll d4, d6, d8, d12, and d20 for every two million years on the following tables to determine the fate of a genus. To determine evolution and extinction at species level, each HaVoQ roll represents one million years. At group level, the timeline is five million years for each roll.

ROLL d20 FOR SELECTIVE PRESSURE.

1 (natural)	Cosmic (Roll d10: 1-2 Solar, 3-4 Other, 5-9 Meteor, 10 Special)
1 or less	Cosmic (Roll d10: 1-2 Solar, 3-4 Other, 5-9 Meteor, 10 Special)
2-9	Environmental (Roll d10: 1-2 Habitat, 3-4 Other, 5-9 Climate, 10 Special)
10-14	Stable (Roll d4: 1-3 No extra effect, 4 Modify d12 Stress roll by -2)
15 or more	Biologic (Roll d10: 1-2 Imbalance, 3-4 Other, 5-9 Competition, 10 Special)
20 (natural)	Special

NOTE: Modify d20 roll by these factors.
Basic life -5, Medium complex +2, Low complex +5, Intelligent +10.
Group level -5, Species level +5. Geologically active -5, Geologically dead +5.
Not main sequence star -10, High debris density -5,
No magnetic field -5, Flare star -5, Adjacent to belt -2.
Less than 200 million years old -20, 200-500 million years old -10,
500-1000 million years old -5, Over 5 billion years old +5.

ROLL d4 FOR PRESSURE SEVERITY (IGNORE IF STABLE).

1	Minor (Reroll d4: 1 Insignificant, 2-4 Minor)
2-3	Moderate
4	Severe (Reroll d4: 1-3 Severe, 4 Extreme)

ROLL d12 FOR STRESS LEVEL.

2 or less	No stress
3-7	Minor stress (+2 next d12 stress roll)
8-9	Major stress (+5 next d12 stress roll)
10-14	Crisis (-2 next d12 stress rolls)
15 or more	Catastrophe (-5 next d12 stress roll)
12 (natural)	Catastrophe

NOTE: Modify d12 roll by these factors.
Stable -5, Environmental +2, Cosmic +5. Habitat +1, Solar +1, Imbalance +2.
Insignificant -5, Minor -2, Severe +2, Extreme +5. Special +5.
High complex -2, Low complex +1, Intelligent +2, Emergent complexity +2.

A6 SELECTION TABLES (continued)

ROLL d8 FOR EXTINCTION RATE.		ROLL d6 FOR POPULATION LOSS.
0 or less	Some species lost	1 One level less & reroll d6, 2-6 None
1-2	Many species lost	1-2 One level less & reroll d6, 3-6 None
3-7	Many genera lost	1-3 One level less & reroll d6, 4-6 None
8-9	Many groups lost	1-4 One level less & reroll d6, 5-6 None
10 or more	Most groups lost	1-5 One level less & reroll d6, 6 None

NOTE: Modify d8 roll by these factors.
No stress -5, Minor stress -2, Crisis +2, Catastrophe +5.
Basic life -2, Medium complex +1, High complex +2.
Underground -2, Aquatic -1, Aerial +1.
Solid cells -2, Shell cells -1, Bubble cells +2.

NOTE: Modify d6 roll by these factors.
Symbiont -2, Omnivore +1, Producer +2, Decomposer +3.
Dominant clade -1, Dominant group -1, Dominant genus -1.
Super Specialist -3, Specialist -2, Much larger -2, Larger -1,
Much smaller +1, Furtive +1, Tolerant +1, Generalist +1, Smart +1,
Intelligent +2, Specialist ideal for new ecosystem +2 and ignore all penalties.
Species -1, Group +1.

POPULATION LEVEL (ROLL d10 FOR TAXON FATE).

None	1-9 Extinct, 10 Special
Unique	1-2 Rise, 3-4 Stasis, 5-9 Extinct, 10 Special
Extremely rare	1-2 New taxon, 3-4 Rise, 5 Stasis, 6-7 Loss, 8-9 Extinct, 10 Special
Very rare	1-2 New taxon, 2-3 Rise, 4-5 Stasis, 6-8 Loss, 9 Extinct, 10 Special
Rare	1 New taxon, 2-3 Rise, 4-7 Stasis, 8-9 Loss, 10 Special
Uncommon	1 New taxon, 2 Rise, 3-5 Stasis, 6-9 Loss, 10 Special
Common	1-4 Stasis, 5-9 Loss, 10 Special
Ubiquitous	1-9 Loss, 10 Special

NOTE: Modify d10 roll by these factors.
Viviparous -1, Hermaphrodite +1, Asexual +2.
Diversity -2, Many sub-habitats -1.
Low complex -1, High complex +1.
0-2 mya after crisis -2, 3-5 mya after crisis -1.
0-9 mya after catastrophe -2, 10-19 mya after catastrophe -1.

A7 DESIGN TABLES

ROLL d100 FOR SPECIATION (NEW SPECIES).

01-09	Reroll twice
10-19	Generalist
20-49	Specialist
50-64	Size
65-79	Speed
80-89	Trait
90-99	Variation
00	Special

ROLL d100 FOR VARIATION (NEW GENUS).

01-09	Radiation
10-24	Body Type
25-39	Habitat Adaptation
40-59	Role Adaptation
60-84	Nature
85-99	Natural Weapon
00	Special

ROLL d100 FOR RADIATION (NEW GROUP).

01-09	Complexity
10-24	Aspect
25-39	Sub-Habitat
40-59	Sub-Role
60-84	Habitat
85-99	Skin
00	Special

A7 DESIGN TABLES

TECHNOLOGY (Roll ALL dice equal to and less than the civilization's level.)

DICE	TECHNOLOGY	TIMEFRAME (d10)	CHANGES (MAX)
d100	Galactic	Days	50
d20	Stellar	Weeks	20
d12	Pre-Stellar	Months	10
d8	Interplanetary	Years	5
d6	Global	Decades	2
d4	Regional	Breeding only (Centuries)	1
(d2)	Local	Breeding only (Millennia)	0
(0)	None	—	—

NOTE: Roll one die higher for each of the following factors. If the higher die rolled is already d100, roll an additional d100 for each die higher and addto the total.

Method: Breeding, Traits only, Each timeframe level slower, Half or less than maximum changes.
Original species: Sub/low basic, Nano/microscopic, Prolific.
Skill: Specialty (two dice if mastery).

NOTE: Roll one die lower for each of the following factors.

Method: Synthetic (two dice), each change above max,
Each higher Complexity level (two dice per level beyond Intelligent),
Each timeframe level faster, Each change above maximum.
Original species: Complex (two dice if Intelligent), Giant
(two dice if Supergiant), Viviparous.
Skill: New field, Inherent handicap.

NOTE: Roll d2 only if lowest die is below d4; roll = 0 is the minimum.

MIN ROLL CHANGE LEVEL

2	Speciation (Generalist, Specialist, Size, Speed, Trait)
5	Variation (Body Type, Habitat or Role Adaptation, Nature, Weapon)
10	Radiation (Complexity, Aspect, Sub-Habitat, Sub-Role, Skin)
20	Extreme (Role, Habitat, Symmetry, Skeleton, Appendages, Peculiarity)
50	Synthetic (Artificial life, Unusual Peculiarity)
100	Super (Exotic characteristic, Super Peculiarity)

TOTAL	RESULT
Minimum or more	Successful change.
Below minimum	Successful change; roll d100 Peculiarity for weakness.
One level below min.	Unsuccessful change; roll d100 Peculiarity for weakness.
Two or more levels	Complete failure; either non-viable offspring OR unsuccessful

A8 BIOCHEMISTRY NOTES

RESPIRATION GASES

CHEMISTRY	PRODUCER	CONSUMER
Hydrocarbon/Hydrogen	Hydrogen-to-Methane	Methane-to-Hydrogen
Hydrocarbon/Sulfur	Hydrogen Sulfide-to-Methane & Sulfur/Sulfates	Methane-to-Hydrogen Sulfide
Ammonia/Hydrogen	Hydrogen-to-Methane	Methane-to-Hydrogen
Ammonia/Nitrogen	Ammonia-to-Nitric Acid	Nitric Acid-to-Ammonia
Ammonia/Halogen	Chloramine-to-Chlorine	Chlorine-to-Chloramine
Water/Oxygen	Carbon Dioxide-to-Oxygen	Oxygen-to-Carbon Dx.
Water/Halogen	Chloramine-to-Chlorine	Chlorine-to-Chloramine
Sulfur/Hydrogen	Hydrogen Sulfide-to-Hydrogen & Sulfur	Hydrogen & Sulfure-to-Hydrogen Sulfide
Sulfur/Sulfur	Hydrogen Sulfide & Carbon Dioxide-to-Sulfur, Water & Sulfuric Acid	Sulfuric Acid-to-Hydrogen Sulfide & Carbon Dioxide

COMMON LITHOTROPHIC SUBSTRATES

Manganese Reduction = Manganese(IV)* to Manganese(II)*
Iron Reduction = Iron(III)* to Iron(II)*
Cobalt Reduction = Cobalt(III)* to Cobalt(II)*
Uranium Reduction = Uranium(VI)* to Uranium(IV)*
Sulfate Respiration = Sulfate to Sulfide
Sulfur Respiration = Sulfur to Sulfide
Denitrification = Nitrate to Nitrite
Fumarate Respiration = Fumarate to Succinate
Acetogenesis = Carbon Dioxide to Acetate

*Oxide (oxygen), chloride/fluoride (halogen), sulfide (sulfur), nitride (nitrogen), or hydride (hydrogen) depending on air chemistry.

CHEMOSYNTHETIC REACTIONS

Methanogenesis = Hydrogen and Carbon Dioxide to Methane
Dehalorespiration = Halogenated Organic Compounds to Halides and dehalogenated compounds
Annamox Chemosynthesis = Ammonium and Nitrite to Nitrogen and Water
Hydrogen Sulfide Chemosynthesis = Hydrogen Sulfide and Carbon Dioxide to Water and Sulfur

Daniel decides to generate an ecosystem for a four billion year old, moderate temperature, one earth gravity rock planet with moderately thick nitrogen/oxygen atmosphere, moderately thick water hydrosphere, moderate magnetosphere, orbited by one giant moon, that orbits a solitary, high metallicity, main sequence yellow dwarf.

GENESIS

To determine if native life arose on this world, he consults the 1.1 Genesis Basic Life table. Since no other factors apply, he rolls d4 (baseline chance) and gets a 1 result. Native life exists, so he makes another roll on the Complex Life table (baseline chance again, which in this case uses d10) and gets another 1!

On the 1.2 Complexity table, Daniel sees a list of conditions similar to the previous tables, but in this case all dice rolled are totaled together to determine the result. This planet seems to be ideal for life to thrive, so only the baseline die (d4 here) applies. He rolls a 3, which under the Complex result chart indicates Medium, but Daniel chooses to change it to High complexity instead.

So what are the building blocks of life on this planet? Daniel rolls the d4, d6, d8, d12, and d20 dice together and consults the 1.3 Microbes tables, checking the d20 and d12 results first since they will determine any modifiers that apply to the other rolls.

d20 Solvent = 17 (water solvent)
d12 Chemistry = 4 (oxygen chemistry)

This corresponds favorably to this world's conditions, so for the next tables, Daniel applies +2 (ideal environment) to the d6 roll and +2 (water solvent) to the d8 roll.

d6 Cells = [1 + 2] 3 (membrane cells)
d8 Basic Producer = [6 + 2] 8 (photosynth basic producers)
d4 Producer Efficiency = 3 (good photosynthesis)

"High complex ecosystem with water/oxygen biochemistry, membrane cells, and good basic photosynth producers."

ECOSYSTEM

Since high complex life arose on this planet, Daniel rolls all dice together three times on 2.1 Kingdom table to see what types have complex forms. Totals for all

d4 rolls apply to lithotrophs, d6 totals to chemosynths, d8 totals to phototrophs, d12 to decomposers, d20 to photosynths, and d100 rolls to consumers. He notes that he stops rolling a die if the result is 1 and gains an extra roll if the result is the maximum possible for that die (4 for d4, 6 for d6, etc.).

d4 Lithotrophs = [2 + 3 + 2] 7 (basic)
d6 Chemosynths = [3 + 1] 4 (basic)
d8 Phototrophs = [1] 1 (basic)
d12 Decomposers = [4 + 5 + 7] 16 (proto)
d20 Photosynths = [15 + 10 + 5] 30 (low)
d100 Consumers = [5 + 55 + 2] 62 (medium)

Wait a second. This is a high complexity world, but no kingdoms reach that level? Upon further inspection, Daniel sees that the table directs him to raise consumers to the maximum world complexity in this case.

For a general overview of the planet's terrestrial ecosystem, Daniel first determines the dominant complex producer clade. Since he already determined the role and habitat, he goes directly to the Clade HaVoQ roll.

d12 Symmetry = [6 - 5] 1 (asymmetric)
d4 Skeleton = 1 (hydroskeleton)
d6 Appendages = [2 + 2 - 1 - 1 - 1] 1 (myriad)
d8 Sessile Growth = 5 (limb growth)
d20 Aspect = [14 + 20 - 1 - 2 + 2] 33 (tall)

This is a producer, so the d12 Symmetry roll is modified by -5. Several factors apply to the d6 Appendages roll: +2 (asymmetric), -1 (low complex), -1 (hydroskeleton), and -1 (producer). Aspect d20 roll is modified by +20 (photosynth), -1 (low complex), -2 (hydroskeleton), and +2 (dominant clade).

Other clade characteristics are determined with a few d100 and d10 rolls. First, the Skin table roll is modified by +50 for sessile, but -50 for hydroskeleton; Daniel doesn't bother to roll d10 since the -2 modifier all but ensures it will not have pelage. Factors modifying the d100 Feeding Method roll include -100 (producer) and -10 (low complex). Sexes d100/Reproduction d10 are modified by both -10/-1 (low complex) and -20/-2 (producer).

d100 Skin = [41 + 50 - 50] 41 (scaly skin)
d100 Feeding Method = [24 - 100 - 10] -86 (absorption feeder)
d10 Feeding Apparatus = 5 (external absorption)

d100 Sexes = [50 -10 -20] 20 (hermaphrodite)
d10 Reproduction = 10 (special hermaphrodite)

Daniel decides that since the last d10 roll is a natural 10, he will ignore modifiers and choose the Special result. To determine what this means, he jumps ahead to 3.4 Peculiarities d100 and d10 tables.

d100 Peculiarity = 68 (shape)
d10 Shape Peculiarity = 10 (veiling)

Hmmmm. *Veiling* intent doesn't seem to be necessary against other sessile life forms. Maybe this implies that these producers trick consumers to help them reproduce, perhaps through tempting offerings the consumers can eat? If they use motile creatures to spread their seed around for them, it might explain why this clade is the dominant producer on the planet.

"Terrestrial Photosynth Clade (Dominant): Low complex, asymmetric hydroskeleton, myriad limbs, limb growth, tall aspect, scaly skin, external absorption feeder, special hermaphrodite reproduction (flowers and fruit)."

Now what life forms dominate this world? Daniel decides to roll d10 for both Role and Habitat, adding to the Role result +5 (high complex) and +2 to the Habitat roll for the same reason.

d10 Role = [4 + 5] 9 (consumer)
d10 Habitat = [6 + 2] 8 (terrestrial)

No big surprise there, so on to another Clade HaVoQ roll. Applicable factors in this case include: +2 (consumer) and +1 (high complex) to d12 Symmetry roll; +1 (high complex) to both d6 Appendages and d8 limb count rolls; add limb count to d10 movement type (in this case +4); and +2 (dominant clade) to the d20 Aspect table.

d12 Symmetry = [3 + 2 + 1] 6 (bilateral)
d4 Skeleton = 4 (endoskeleton)
d6 Appendages = [3 + 1] 4 (few appendages)
d8 Limb Count= [5 + 1] 6 (two pairs of limbs)
d10 Movement Type = [3 + 4] 7 (limb movement)
d10 Tail? = 1 (tail)
d20 Aspect = [11 + 2] 13 (prone aspect)
d10 Neck? = 4 (neck)

When Daniel rolls for Other Clade Characteristics, the d100 Skin roll is modified by -10 (high complex), d10 Pelage roll +1 (high complex), d100 Feeding Method +50 (consumer), and d100/d10 Sexes/Reproduction roll by +10/+1 (high complex).

d100 Skin = [29 - 10] 19 (thin)
d10 Pelage = [7 + 1] 8 (hair)
d100 Feeding Method = [9 + 50] 59 (orifice)
d10 Feeding Apparatus = 8 (teeth)
d100 Sexes = [16 + 10] 26 (sexual)
d10 Reproduction = [8 + 1] 9 (viviparous)

Since this is the dominant terrestrial consumer clade, Daniel feels a Peculiarity table roll is in order. In addition to the d100 roll, he rolls d10 for Peculiarity Type to more clearly determine how the result manifests.

d100 Peculiarity = 33 (reproduction)
d10 Reproduction Peculiarity = 7 (nurturing)
d10 Peculiarity Type = 1 (physical)

A physical reproduction *nurturing* peculiarity? This reminds Daniel of the peculiarity the dominant producer clade adapted to spread its seed through edible fruits. In this case, since these are motile life forms that give birth to live offspring, he decides that the mothers secrete a food substance on which the young feed.

"Terrestrial Consumer Clade (Dominant): High complex, bilateral endoskeleton, four limbs, limb movement, prone aspect, neck and tail, thin skin, orifice with teeth, viviparous sexual reproduction, physical nurturing peculiarity (milk)."

TAXA

So what type of creatures feed off the fruit of the producers? Daniel rolls on the d10 Sub-Habitat, d10 Sub-Role, and d10 Body Type tables.

d10 Terrestrial Sub-Habitat = 2 (warm)
d10 Consumer Sub-Role = 7 (predator)
d10 Prone Body Type = 5 (compact)

Predator is another d10 table.

d10 = 3 (omnivore)

All right, that makes sense. Next come the d100 Nature, d100 Role Adaptation, d100 Habitat Adaptation, and d100 Natural Weapons tables. On the latter table, +20 (Predator) is added to the roll.

d100 Predator Nature = 78 (smart)
d100 Consumer Role Adaptation = 17 (communal)
d100 Terrestrial Habitat Adaptation = 52 (limbs)
d100 Natural Weapons = [47 + 20] 67 (bite)

There is an additional d10 roll (two if Arms are indicated) for the Limb result.

d10 Limbs = 6 (arms)
d10 Arms = 10 (special)

For the special Arms result, Daniel chooses to reroll the d10 twice.

d10 Arms = 8 (prehensile tail/proboscis)
d10 Arms = 5 (pair of arms)

Since the clade has tails, it makes more sense to Daniel for this group to possess a prehensile tail instead of a proboscis, especially after reading over the Senses section. He concludes that life forms related to this group (and probably to the clade in general) have two eyes, scent detection organs linked internally through the respiratory system, external ears, and the capability to make sounds and calls.

Daniel thinks that each major clade, group, and genus should have a Peculiarity to add an extra dimension to the reason for their ecological success.

d100 Peculiarity = 23 (health)
d10 Health Peculiarity = 4 (rage)
d10 Peculiarity Type = 9 (behavioral)

"Warm Terrestrial Omnivore Group: Compact prone body with two legs and two arms (h), prehensile tail (h), bite, smart nature, communal (r), rage behavioral peculiarity."

This group is smart, communal, has arms and a prehensile tail, plus a *rage* behavior that implies aggressiveness, a combination that not only implies complex social behaviors, but also potential for tool use. Daniel is curious to see what one of its species might look like, so he makes a Genus HaVoQ roll, including the d100 Variation table, plus another d100 Peculiarity roll. Among the modifiers used: Size

level (the result, not the roll directly) is modified by +1 (dominant clade), -1 (predator); Speed level (also the result, not the roll) +1 (high complex); d20 Physical Trait roll +2 (predator), +2 (high complex); d8 Sensory Trait roll +1 (predator), +1 (high complex), +1 (smart); d12 Behavioral Trait roll +2 (predator), +2 (high complex), +1 (communal), +2 (smart).

d4 Size = 3 [medium + 1 level - 1 level] (medium)
d6 Speed = 2 [slow + 1 level] (moderate)
d20 Physical Trait = [9 + 2 + 2] 13 (mighty)
d8 Sensory Trait = [2 + 1 + 1 + 1] 5 (clever)
d12 Behavioral Trait = [11 + 2 + 2 + 1 + 2] 18 (social)
d100 Variation = 33 (habitat adaptation)
d100 Peculiarity = 83 (sense)
d10 Sense Peculiarity = 6 (converse)

Every genus differentiates from the group in some aspect, in this case its Habitat Adaptation. This result will replace the previous Habitat Adaptation.

d100 Terrestrial Habitat Adaptation = 46 (limbs)
d10 Limbs = 4 (less)

Less limbs? Daniel decides that the genus evolved to be completely tailless. He now rolls d100 Speciation to generate a species of this genus.

d100 Speciation = 12 (generalist)

He now has enough information to use the 3.3 Species Ratings tables calculate the attributes of this species. Base Armor Rating for thin skin is Very Poor, which is raised by the +1 level hair modifier. Damage Rating for the bite is Average since the -1 (teeth) and +1 (predator) factors cancel each other; Daniel adds a double smash attack since the group has two arms, of which each strike is also rated Average (-2 smash canceled by +1 predator and +1 mighty). Physical Rating for a medium size creature is Average, but this is modified by +1 (mighty) to Good. Sensory is rated Average (high complex with no modifiers) and Behavioral Extremely Good (base of very poor modified by +1 clever, +1 smart, +1 communal, and +2 social).

"Generalist species of a tailless, mighty, clever, social genus with conversing peculiarity. Size: Medium; Speed: Moderate; Armor: Poor; Damage: Average (bite)/Average (smash)/Average (smash); Physical: Good; Sensory: Average; Behavioral: Extremely Good."

SAPIENTS

These results have Daniel thinking that a sapient species could plausibly descend from the clade, group, and genus he generated. To randomly determine if Intelligent life naturally evolved on this particular planet, he would need to roll 1 on d100 (baseline chance).

d100 Intelligent Life = 34, 80, 95, 22, 1

Awesome! (Daniel was going to create an intelligent species anyway, but he was curious how long it would take for him to roll a 1.) Before he makes the Sapient Species HaVoQ roll, though, he rolls d100 Variation and d100 Speciation (with additional rolls as indicated) to see what (aside from consciousness) is different.

d100 Variation = 37 (habitat adaptation)
d100 Habitat Adaptation = 50 (limbs)
d10 Limbs = 4 (less)
d100 Speciation = 98 (variation)
d100 Variation = 62 (generalist nature)
d10 Generalist Type = 10 (special)

Yet another less limbs result? Daniel doesn't want to lose this group's arms and doesn't want to handicap the species ability to walk, either. Perhaps these beings adopted an upright aspect, walking on two legs instead of all fours, and have weaker arms than their prone cousins as a consequence? The arms would now be full time manipulators. As for the special generalist nature change, Daniel thinks that since this is an intelligent species, it would not be a stretch to make the species highly adaptable to other sub-roles, sub-habitats, climates, and diets; he calls this "universalist". To balance this out, he decides that they are essentially hairless and have a weaker bite than normal.

Now, on to the Beings HaVoQ roll! Size level: +1 (dominant clade), -1 (predator); Speed level: +1 (high complex); d8 Manipulators: +5 (upright); d12 Good Attribute and d10 Good Trait: -1 (generalist), +1 (communal), +1 (smart); d20 Poor Attribute and d10 Poor Trait: -2 (communal), -2 (smart), +2 (generalist).

d4 Size = 4, 2 [large + 1 - 1] (large)
d6 Speed = 2 [slow + 1] (moderate)
d8 Manipulators = [7 + 5] 13 (arms)
d10 Arm Fraction = 3 (tenth)
d12 Good Attribute = [7 - 1 + 1 + 1] 8 (sensory)

d10 Sensory Trait = [4 - 1 + 1 + 1] 5 (animation)
d20 Poor Attribute (Sensory Column) = [8 - 2 - 2 + 2] 6 (physical)
d10 Physical Trait = [9 - 2 - 2 + 2] 8 (might)

Most of these results are straightforward, with one exception. The arm fraction indicated is a tenth of the total limbs the being possesses: 4/10 = less than 1; this table notes that in this case, the minimum number of arms for bilateral creatures is one pair, so this species possesses two arms.

Intelligent genera and species are extraordinarily rare, so Daniel rolls once for each on the d100 Peculiarities table.

d100 Genus Peculiarity = 87 (state)
d10 State Peculiarity = 5 (warmth)
d10 Peculiarity Type = 9 (behavioral)
d100 Species Peculiarity = 99 (unusual peculiarity)
d100 Species Unusual Peculiarity = 34 (will)
d10 Will Peculiarity = 4 (compel)

What to make of the *warmth* behavioral peculiarity? Considering that this genus became hairless, but is intelligent, perhaps it learned to start fires to keep itself warm? That is a great start toward developing technology, too. This particular species also has an unusual peculiarity, *compel*, that Daniel feels is related to the group's *rage* behavior. As his imagination flows, he sees these beings using tools, fire, and their inborn aggression to not only overexploit food sources, but to also domesticate them for easier utilization and harvest. A species with an urge to dominate over everything, even to learn to control the environment, with orderly civilizations that regularly erupt into wars seeking to subjugate each other, ultimately capable of both expanding as far as possible and destroying themselves in the process.

Daniel is ready to stat out the species. Applicable modifiers include Damage: -2 (weak teeth), -3 (weak smash), +1 (predator); Might: -1 (poor might), +1 (+1 size level - 0 speed level); Animation: +1 (good), -1 (0 speed level - 1 size level).

"Intelligent universalist natured species with compel peculiarity (domination) of a tailless, hairless, upright, good sensory, poor physical genus with warmth peculiarity (fire starting). Size: Large; Speed: Moderate; Armor: Very Poor; Attacks: Average (bite)/Poor (smash)/Poor (smash); All traits: Average."

CIVILIZATION

Earlier, in 4.2 Beings, Daniel read about a method to randomly determine when the sapients evolved on a planet, which depends on when the "age of dominance" for its clade began. Arbitrarily rolling d100 to figure out how many millions of years before present this occured, he gets 65. That result is further divided to calculate when the genus came to be by d100 [65 million years / 36 = 1.8], so the genus arose 1.8 million years ago. Each species of a genus continues for 1d100*/20 million years before evolving or going extinct, so Daniel will roll until either the genus goes extinct or the timeline reaches/exceeds the present.

d100*/20 First Species Lifespan = [24 / 20] 1.2 million years
d10 First Species Fate = 4 (evolves into many new species)
d100*/20 Second Species Lifespan = [8/20] 0.4 millions years
d10 Second Species Fate = 7 (evolves into one new species)
d100*/20 Third Species Lifespan = [64 / 20] 3.2 million years

Daniel chooses this third species to be the one he created earlier, so it evolved around 200,000 years before present. How far has it advanced in that span of time? Reviewing the 5.1 Technology table, a sapient species' reach is determined by rolling all dice equal to and less than the world's resource level, with some modifications, from the dawn of the species through 100,000 years, 200,000 years, 1 million years, and 2 million years of age until its scale reaches Local. After that threshold is met, advancement proceeds at increasingly faster rates depending on the technology level. This is an otherwise typical rock planet, so the base highest die is d12. The first roll occurs when the species is less than 100,000 years old, so this would be increased by two dice, but it is also reduced by one die because a technological species is assumed to have existed before and another die because of the group's communal adaptations, canceling it all out. Daniel rolls d4, d6, d8, and d12 initially and totals the results.

d12 Scale of Technology roll = [1 + 6 + 4 + 3] 13

At local level, additional rolls are made every 2,000 to 10,000 years until another level is reached. This young species would need a roll of all 1's and 2's to reach regional influence (or all 1's to jump to global), so for the first 100,000 years Daniel just makes a few quick rolls to see if he gets extremely lucky and does not. After that time has passed, he no longer needs to roll the d12, which makes the next technology level more plausible to reach. He decides to roll for every 10,000 years until either the species advances or present time is reached.

d8 Scale of Technology rolls (10K years) = 17, 17, 18, 22, 15, 15, 19, 21, 9 (regional 10K years before present)

Ten thousand years before present, this species can transport themselves and goods faster over longer distances, allowing larger civilizations and large scale trade to arise. Daniel chooses to roll every 2000 years the first three times, every 1000 years for the next three times, and every 500 years after that, with the last roll one die less (d4, d6, d8 only) since the species will no longer be less than 200,000 years old. If the rolled result is regional or lower on the scale, he will just assume it stays at regional.

d8 Scale of Technology rolls (2K years) = 25, 12, 17
d8 Scale of Technology rolls (1K years) = 14, 9, 5
d8 Scale of Technology rolls (500 years) = 9
d6 Scale of Technology roll (500 years) = 3 (global 500 years before present)

In the last five hundred years, the species reach has gone global through the development of industry, machines, and science. It also seems that ecological stress is possible through overexploitation of resources AND wars of mass destruction. Since the likelihood of these disasters increases every century, Daniel will make the final scale rolls every 100 years until either another level is attained, present time is reached, or a crisis happens.

d6 Scale of Technology rolls (100 years) = 9, 7, 5, 4, 2 (interplanetary)
d10 Ecological Stress (+1 per century) = 1 (no stress), 4 (minor stress), 8 (major stress), 9 (major stress), 9 (major stress)
d10 Mass Destruction (+1 per century) = 4, 2, 7, 7, 5 (no wars of destruction)

Wow. This species is incredibly lucky that it didn't destroy its environment or civilization before it attained interplanetary scope! However, the planet is still under major ecological stress and it’s not likely space travel has advanced far enough yet for practical interplanetary mass colonization. He's really curious, so he goes to 5.2 Colonization and makes rolls to determine main world (base d12 and lower), close resources (base d10 and lower), distant resources (base d8 and lower), other worlds (base d6 and lower), and deep orbit development (d4 and lower), modified [one die higher (home system) and two dice lower (dawn of spaceflight)] adjusted one die lower by applicable factors. If any die result is the highest possible, it can be rerolled and the results totaled.

d10* Main World Development = 24 (light)
d8* Close Resource Development (Moon) = 10 (minimal)
d6* Distant Resource Development (Inner System) = 11 (minimal)
d4* Other Worlds Development (Middle System) = 2 (none)
d4*-3 Deep Orbit Development (Beyond Middle System) = -2 (none)

This world's civilization is poised at the brink of a grand new adventure or a self-made disaster that could end everything! There's more work to do to flesh out the rest of the ecosystem's other clades and groups, but for now Daniel sits back and imagines the kind of stories this setting will inspire.

WORLD
EARTH (SOL III)

PLANET
A four billion year old, moderate temperature, one earth gravity rock planet with moderately thick nitrogen/oxygen atmosphere, moderately thick water hydrosphere, moderate magnetosphere, and orbited by one giant moon, that orbits a solitary, high metallicity, main sequence yellow dwarf.

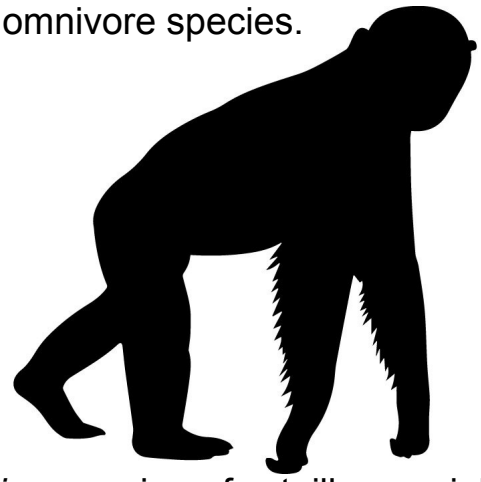
BIOSPHERE
High complex ecosystem with water/oxygen biochemistry, membrane cells, and good photosynth producers. Native ecosystem including an intelligent species, high complex consumers, low complex producers, and proto-complex decomposers, including:

Angiosperma (Dominant Terrestrial Photosynth Clade): Low complex, asymmetric hydroskeleton, myriad limbs, limb growth, tall aspect, scaly skin, external absorption feeder, special hermaphrodite reproduction (flowers and fruit).

Mammalia (Dominant Terrestrial Consumer Clade): High complex, bilateral endoskeleton, four limbs, limb movement, prone aspect, neck and tail, thin hairy skin, two eyes, orifice with teeth, viviparous sexual reproduction, physical nurturing peculiarity (milk).

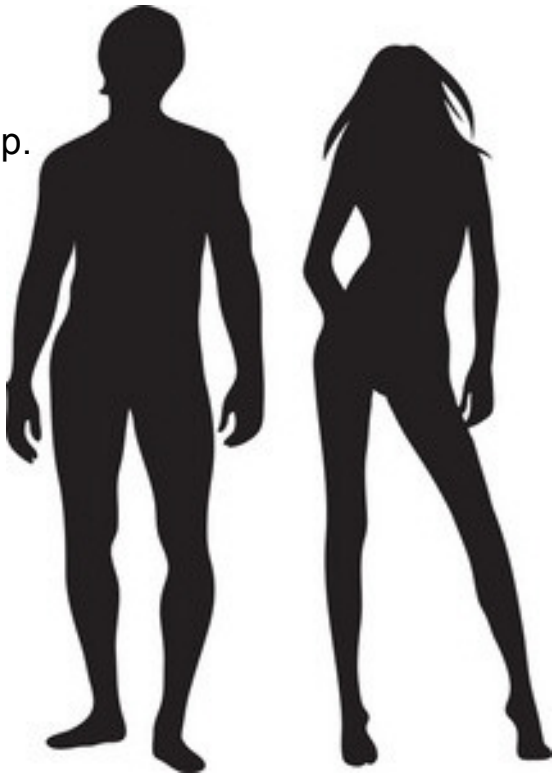
CIVILIZATION
Interplanetary scale (first century of space flight). System Development: Main world (light; major ecological stress), Moon (minimal), inner system (minimal).

CHIMPANZEE *(Pan troglodytes)*
TAXONOMY: Clade Mammalia, Primate Group.
TYPE: High complex warm terrestrial generalist omnivore species.
NATURE: Smart
SIZE: Medium
SPEED: Moderate
ARMOR: Poor
ATTACKS: Bash/Bash/Bite
DAMAGE: Average/Average/Average
PHYSICAL: Good
SENSORY: Average
BEHAVIORAL: Extremely good



DESCRIPTION: Generalist, communal, *conversing* species of a tailless, mighty, clever, social, *raging* genus. Compact, prone body with two legs and two arms, a head with two eyes, two external ears, a neck, and a toothy bite. Viviparous sexual reproduction with *nurturing* physical peculiarity (milk).

HUMAN *(Homo sapiens)*
TAXONOMY: Clade Mammalia, Primate Group.
TYPE: Intelligent terrestrial omnivore species.
NATURE: Universalist (Ultra-Generalist)
SIZE: Large
SPEED: Moderate
ARMOR: Very Poor
ATTACKS: Punch/Punch/Bite
DAMAGE: Poor/Poor/Average
MIGHT: Average
RESOLVE: Average
ANIMATION: Average
VISION: Average
CHARM: Average
INTELLECT: Average



DESCRIPTION: Intelligent, universalist-natured, *compelling (domination)* species of a bipedal, tailless, hairless, good sensory, poor physical genus with *warmth* behavior peculiarity (fire starting). Compact, upright body with two legs and two arms, a head with two eyes, two external ears, a neck, and a weak toothy bite. Viviparous sexual reproduction with *nurturing* physical peculiarity (milk).

WORLD

PLANET

BIOSPHERE

CIVILIZATION

TAXONOMY _____

NAME: _____
TYPE: _____
DESCRIPTION: _____
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NAME: _____
TYPE: _____
DESCRIPTION: _____
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NAME: _____
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NAME: _____
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NAME: _____
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SPECIES _____
TAXONOMY: _____
TYPE: _____

NATURE: _____
SIZE: _____
SPEED: _____
ARMOR: _____
ATTACKS: _____
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DAMAGE: _____
_____
PHYSICAL: _____
SENSORY: _____
BEHAVIORAL: _____

DESCRIPTION:

SPECIES _____
TAXONOMY: _____
BIOCHEMISTRY:_____
TYPE:_____

NATURE: _____
SIZE: _____
SPEED: _____
ARMOR: _____
ATTACK: _____
DAMAGE: _____
MIGHT: _____
RESOLVE: _____
ANIMATION: _____
VISION: _____
CHARM: _____
INTELLECT: _____

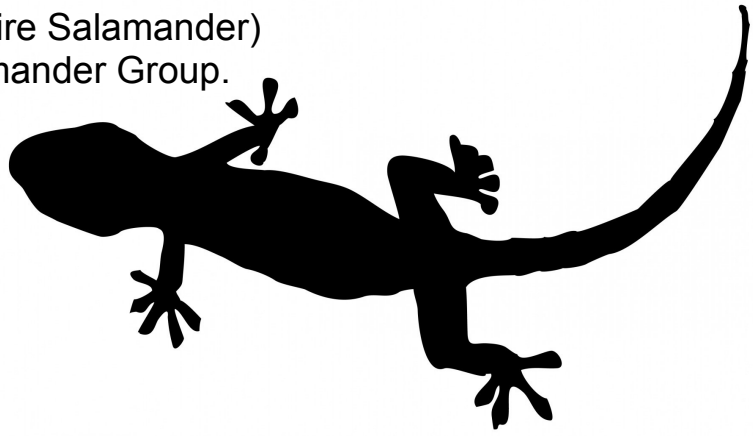
DESCRIPTION:

ANIMALS (CONSUMER KINGDOM)

AMPHIBIA

Medium complex wet terrestrial predator clade.
Bilateral prone endoskeleton with four limbs (limb mover), soft skin, maw, and external sex with physical *transforming* peculiarity (metamorphosis).

RANA CATESBEIANA (American Bullfrog)
Taxonomy: Clade Amphibia, Frog Group.
Size: Very small
Speed: Moderate/Moderate
Armor: Extremely poor
Attacks: Bite
Damage: Sub-poor
Physical: Very poor
Sensory: Extremely good
Behavioral: Average
Description: Generalist species of a very small, moderate hopping/swimming, fragile, very alert genus with gender dimorphism (larger males). One of the Frogs, a furtive wetland predator group with a bulky prone body, no neck or tail, furtive nature, much smaller size, special speed adaptation (jumping), and bite.



SALAMANDRA SALAMANDRA (Fire Salamander)
Taxonomy: Clade Amphibia, Salamander Group.
Size: Very small
Speed: Slow
Armor: Extremely poor
Attacks: Bite
Damage: Sub-poor
Physical: Extremely poor
Sensory: Poor
Behavioral: Sub-poor
Description: Woodland specialist species of an extremely small, slow running, sluggish, very dull genus with viviparous sex. One of the Salamanders, a wet/cool/subfossorial predator group with a thick prone body, neck and tail, furtive nature, extra sub-habitats, weapon (toxin), and physical *regeneration* peculiarity.

ANIMALS (CONSUMER KINGDOM)

AVES

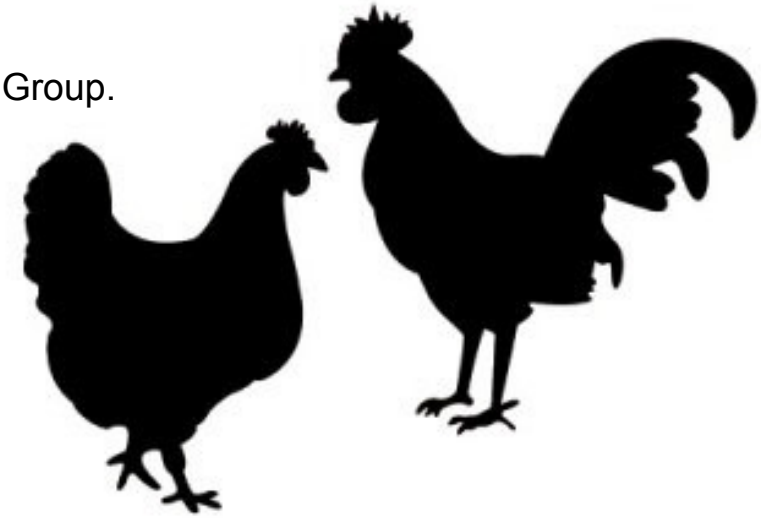
Dominant high complex aerial clade.
Bilateral upright endoskeleton with two wings & two legs (limb mover), thin feathered skin, beak, internal sex, *protection* peculiarity (monogamy).

ANAS PLATYRHYNCHOS (Mallard)
Taxonomy: Clade Aves, Group Anatidae.
Size: Small
Speed: Fast/Moderate/Very slow
Armor: Poor
Attacks: Bill
Damage: Very poor
Physical: Average
Sensory: Good
Behavioral: Good
Description: Generalist species of a small, very fast flying/moderate swimming/ slow running, tough, alert, social genus. One of the Anatidae, an aerial/aquatic grazer group with a long, thick body, climate generalist, many sub-habitats.

BUTEO JAMAICENSIS (Red-Tailed Hawk)
Taxonomy: Clade Aves, Raptor Group.
Size: Small
Speed: Extremely fast/Moderate
Armor: Poor
Attacks: Claw/Claw/Beak
Damage: Average/Average/Good
Physical: Poor
Sensory: Very good
Behavioral: Average
Description: Bird-hunting specialist of a small, extremely fast flying/moderate running, mighty, very alert genus. One of the Raptors, a dangerous aerial/land predator group with compact body, dangerous nature (claws), larger females, larger size, and sharp beak, with physical *perception* peculiarity (super sharp

ANIMALS (CONSUMER KINGDOM)

AVES (continued)



GALLUS GALLUS (Chicken)
Taxonomy: Clade Aves, Galliform Group.
Size: Small
Speed: Slow/Moderate
Armor: Poor
Attacks: Spur/Spur/Beak
(Females: Scratch/Beak)
Damage: Poor/Poor/Very Poor
(Very poor/Very Poor)
Physical: Poor
Sensory: Poor
Behavioral: Poor
Description: Prolific-natured species of a small, slow flying/moderate running, tough, dull, social genus. One of the Galliforms, a communal terrestrial/aerial omnivore group with a bulky body, communal nature, less limbs (small wings), male weapon (leg spurs).

SPINUS TRISTIS (American Goldfinch)
Taxonomy: Clade Aves, Passerine Group.
Size: Extremely small
Speed: Very fast/Slow
Armor: Poor
Attacks: Beak
Damage: Extremely poor
Physical: Very poor
Sensory: Good
Behavioral: Good
Description: Temperate seed-eating specialist species of an extremely small, very fast flying/very slow walking, animated, alert, social, communal natured genus. One of the Passerines, a diverse aerial/land omnivore group with a thick body, diverse nature (many groups), smaller size, colorful males, and no natural weapons, with *soothing* behavior peculiarity (bird song).

ANIMALS (CONSUMER KINGDOM)

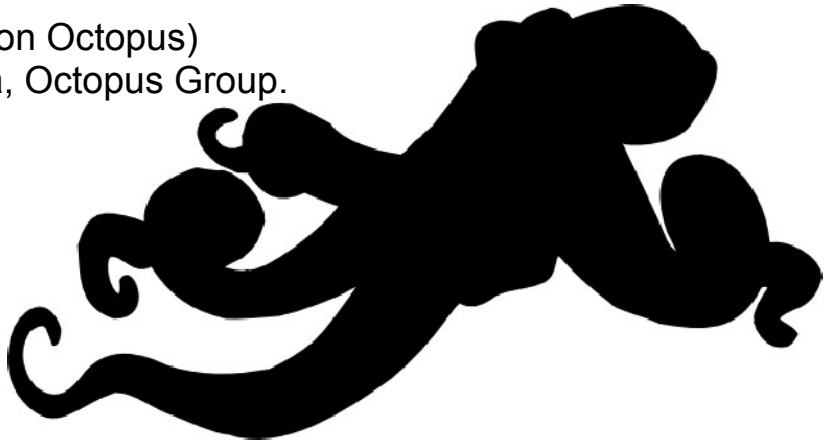
STRUTHIO CAMELUS (Common Ostrich)
Taxonomy: Clade Aves, Ratite Group.
Size: Large
Speed: Very fast
Armor: Poor
Attacks: Claw/Claw/Beak
Damage: Very good/Very good/Poor
Physical: Very good
Sensory: Very good
Behavioral: Poor
Description: Warm and temperate terrestrial species of a large, very fast running, mighty, very alert genus. One of the Ratites, a warm terrestrial dangerous grazer group with compact body, dangerous nature (claws), less limbs (vestigal wings), faster speed, and claws.

CEPHALOPODA
Medium complex aquatic predator clade.
Hydroskeletal bilateral amoeba with many limbs, thin skin, beak, external sex, *camouflage* peculiarity (ink & color changing), and physical *boosting* peculiarity (water jet).

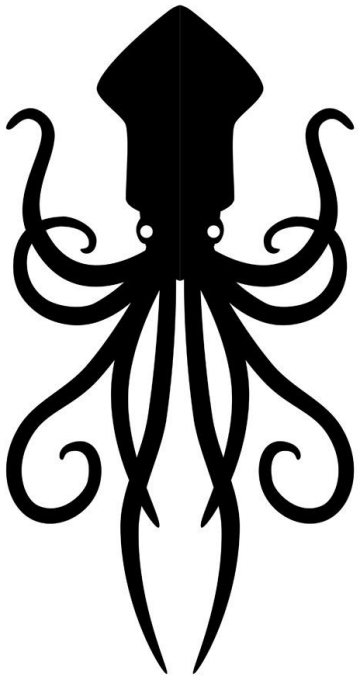
NAUTILUS POMPILIUS (Chambered Nautilus)
Taxonomy: Clade Cephalopoda, Nautilus Group.
Size: Small
Speed: Moderate
Armor: Very good
Attacks: Grapple/Beak
Damage: Very poor/Average
Physical: Poor
Sensory: Extremely poor
Behavioral: Sub-poor
Description: Small species of a very small, moderate jetting, tough, very dull genus. One of the Nautiluses, an armored pelagic predator group with long thick body, myriad tentacles, armored nature (shell), lower complexity (low/medium), and very few sub-habitats.

ANIMALS (CONSUMER KINGDOM)

CEPHALOPODA (continued)



OCTOPUS VULGARIS (Common Octopus)
Taxonomy: Clade Cephalopoda, Octopus Group.
Size: Small
Speed: Fast/Extremely slow
Armor: Extremely poor
Attacks: Grapple/Beak
Damage: Very poor/Average
Physical: Average
Sensory: Good
Behavioral: Average
Description: Generalist species of a small, fast jetting/extremely slow swimming, animated, alert, clever genus. One of the Octopuses, a smart aquatic predator group with a wide thick body, eight tentacles, smart nature, high complexity, internal sex, and *growth* peculiarity (very fast lifecycle).



TODARODES PACIFICUS (Japanese Flying Squid)
Taxonomy: Clade Cephalopoda, Squid Group.
Size: Small
Speed: Extremely fast/Very slow
Armor: Extremely poor
Attacks: Grapple/Bite
Damage: Poor/Average
Physical: Average
Sensory: Good
Behavioral: Average
Description: Generalist species of a small, very fast jetting/very slow swimming, animated, very alert genus. One of the Squid, a communal aquatic predator group with a long thick body, ten tentacles, communal nature, weapon (claws), special speed adaptation (aerial gliding), beak, and claws.

ANIMALS (CONSUMER KINGDOM)

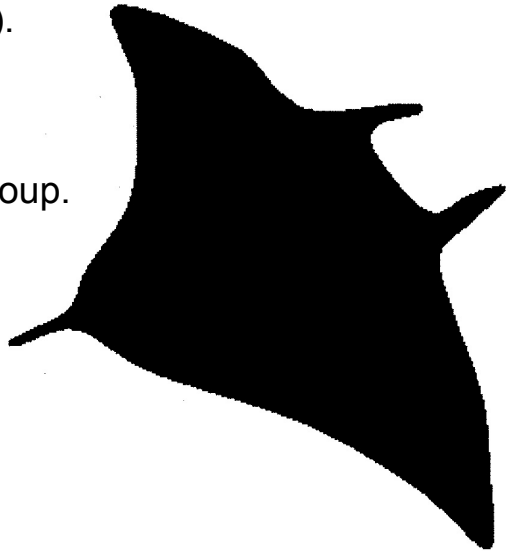
CHONDRICHTHYES

Medium complex aquatic predator clade.
Bilateral long hydroskeleton with four fins and tail (body mover), scaly skin with denticles, fangs, viviparous sex, and sensory *perception* peculiarity (electroception).

CARCHARHINUS LEUCAS (Bull Shark)
Taxonomy: Clade Chondrichthyes, Requiem Shark Group
Size: Large
Speed: Moderate
Armor: Good
Attacks: Bite
Damage: Ultra
Physical: Very good
Sensory: Good
Behavioral: Very poor

Description: Generalist species of a large, moderate swimming, mighty, very alert, very diverse genus. One of the Requiem Sharks, a dangerous pelagic aquatic predator group with a long thick body, dangerous nature (bite), diverse (many genera), and gender dimorphism (larger females).

MANTA ALFREDI (Reef Manta Ray)
Taxonomy: Clade Chondrichthyes, Eagle Ray Group.
Size: Very large
Speed: Fast
Armor: Good
Attacks: Breaching
Damage: Average
Physical: Extremely good
Sensory: Poor
Behavioral: Good

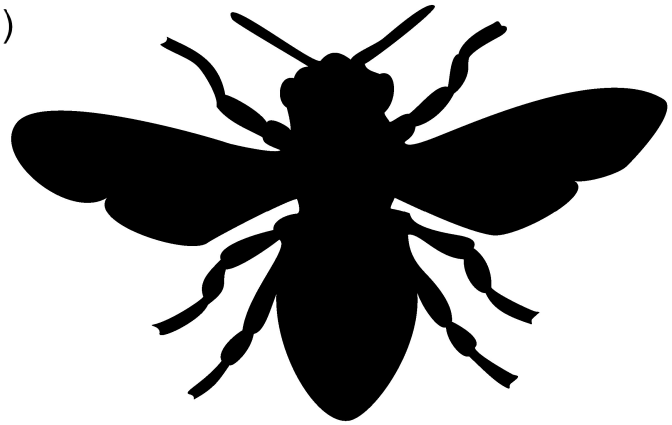


Description: Coastal specialist species of a very large, fast swimming, animated, clever, social, grazer genus with no sting. One of the Eagle Rays, a smart pelagic predator group with wide flat bodies, smart nature, more limbs (pair of wings), bite, and tail sting.

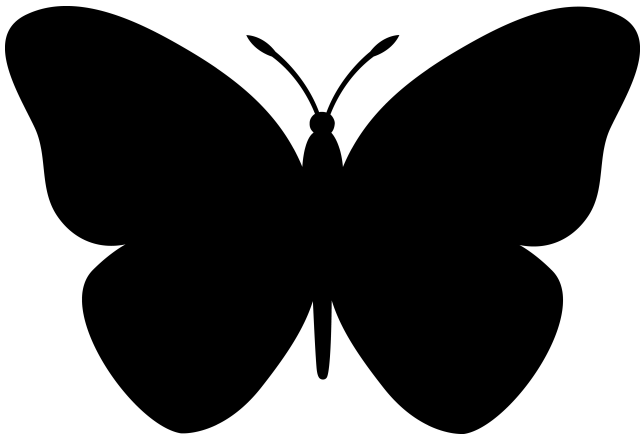
ANIMALS (CONSUMER KINGDOM)

INSECTA

Dominant low complex aerial symbiont clade.
Bilateral prone exoskeleton with six legs and two wing pairs (limb mover), plated skin, beak, internal sex, and *mutation* peculiarity (extreme diversity).

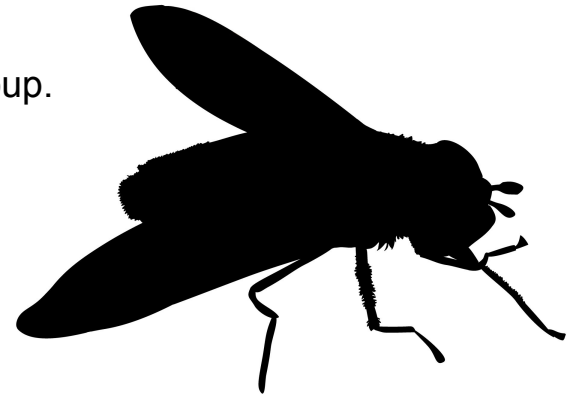


APIS MELLIFERA (Common Honey Bee)
Taxonomy: Clade Insecta, Bee Group.
Size: Fine
Speed: Slow/Extremely slow
Armor: Good
Attacks: Sting + Toxin
Damage: Sub-poor
Physical: Sub-poor
Sensory: Very poor
Behavioral: Average
Description: Generalist species of a fine size, slow flying/extremely slow walking, animated, clever, social, hairy genus with behavioral *nurturing* peculiarity (honey). One of the Bees, a communal aerial angiosperm-mutualist aerial group with compact prone body, communal nature, weapon (suicidal sting), gender adaptation (female/male/neuter), and behavioral *protection* peculiarity (hive).

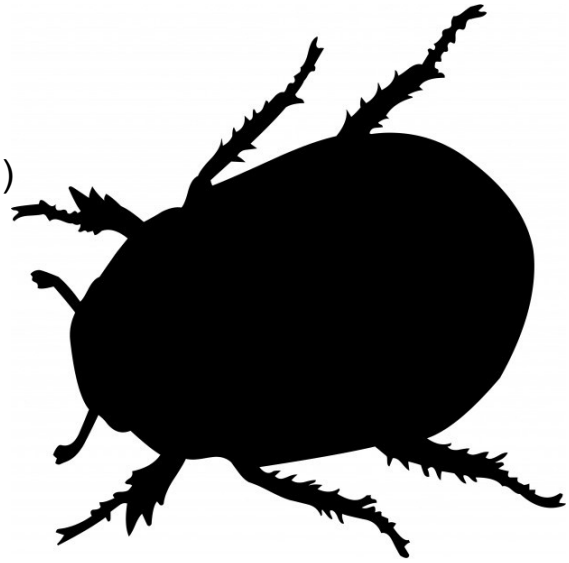


DANAUS PLEXIPPUS (Monarch Butterfly)
Taxonomy: Clade Insecta, Butterfly Group.
Size: Tiny
Speed: Moderate/Extremely slow
Armor: Good
Attacks: None (Poisonous)
Damage: Nil (Toxin)
Physical: Sub-poor
Sensory: Very good
Behavioral: Very poor
Description: Generalist species of a tiny, moderate flying/extremely slow running, fragile, very alert genus with natural weapon (toxin). One of the Butterflies, a furtive aerial/land plant-mutualist group with a compact prone body, large wings, vestigal forelimbs, proboscis, scaly skin with pelage, no natural weapon, and physical *beauty* peculiarity.

ANIMALS (CONSUMER KINGDOM)



MUSCA DOMESTICA (Common Housefly)
Taxonomy: Clade Insecta, Brachycera Fly Group.
Size: Fine
Speed: Fast/Very slow
Armor: Poor
Attacks: Bite
Damage: Nil
Physical: Extremely poor
Sensory: Average
Behavioral: Very poor
Description: Generalist species of a fine size, fast flying/very slow running, very animated, very alert, habitat-tolerant genus. One of the Flies, a swift animal-parasite group with a compact prone body, swift nature, extremely diverse (very many sub-groups, genera, and species), and bite.



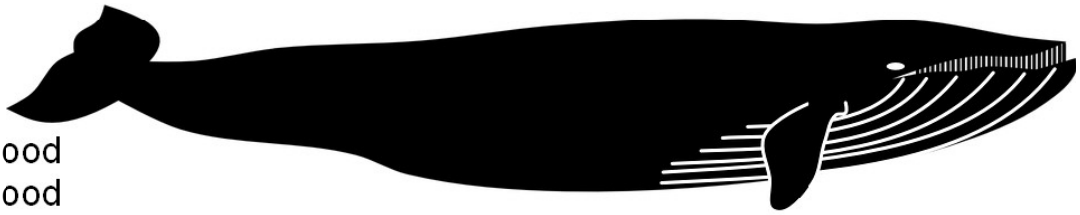
SCARABAEUS SACER (Sacred Scarab Beetle)
Taxonomy: Clade Insecta, Dung Beetle Group.
Size: Extremely small
Speed: Fast/Very slow
Armor: Extremely good
Attacks: Beak
Damage: Extremely poor
Physical: Poor
Sensory: Extremely poor
Behavioral: Nil
Description: Extremely small species of a tiny, fast flying/very slow running, very mighty, dull, hostile genus. One of the Dung Beetles, an armored aerial/land animal-commensal group with a wide bulky body, armored nature (shell), larger size, subfossorial, and beak, with sensory *divining* peculiarity (galactic navigation).

ANIMALS (CONSUMER KINGDOM)

MAMMALIA

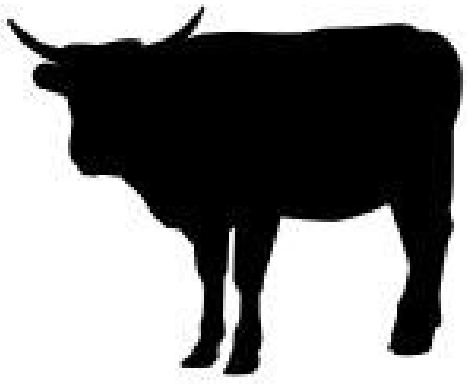
Dominant high complex terrestrial clade.
Bilateral prone endoskeleton with four legs & tail (limb mover), thin hairy skin, teeth, viviparous sex, and physical *nurturing* peculiarity (milk).

BALAENOPTERA MUSCULUS (Blue Whale)
Taxonomy: Clade Mammalia, Mysticeti Group.
Size: Giant
Speed: Fast
Armor: Average
Attacks: Tail
Damage: Very good
Physical: Ultra good
Sensory: Poor
Behavioral: Good



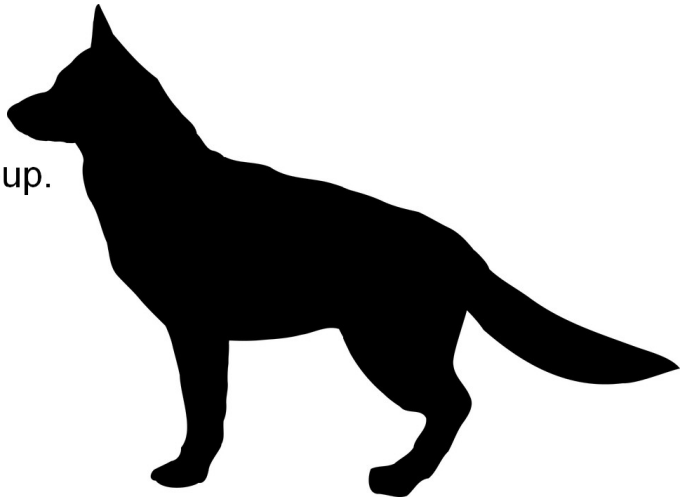
Description: Giant species of an extremely large, fast swimming, mighty, dull, clever genus with extreme *growth* peculiarity. One of the Mysticeti, a larger pelagic grazer group with long prone body, larger nature, gender dimorphism (longer females, heavier males), higher complexity (sub-intelligent).

BOS TAURUS (Domesticated Bovine: Bull/Ox/Cow & Zebu)
Taxonomy: Clade Mammalia, Bovid Group.
Size: Very large
Speed: Moderate
Armor: Average
Attacks: Horns/Hooves
Damage: Very good/Average
Physical: Very good
Sensory: Poor
Behavioral: Poor

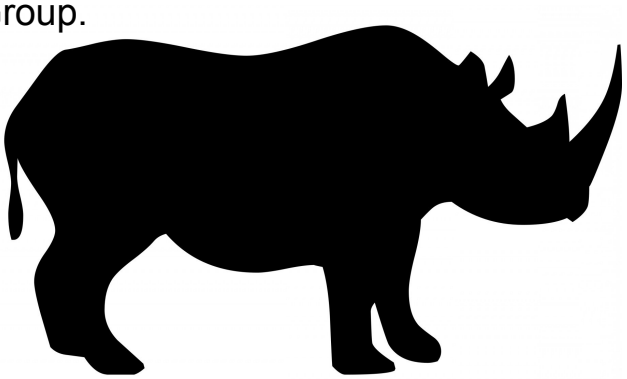


Description: Diverse species with physical *bulking* peculiarity of a very large, moderate running, tough, dull, social genus. One of the Bovids, a communal terrestrial grazer group with thick prone body, dash speed, weapon (hooves), horns, and a behavioral *competition* peculiarity.

ANIMALS (CONSUMER KINGDOM)



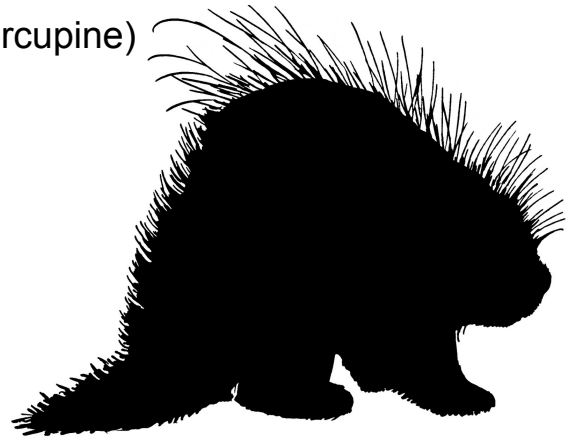
CANIS LUPUS (Wolf & Dog)
Taxonomy: Clade Mammalia, Canid Group.
Size: Medium
Speed: Fast
Armor: Poor
Attacks: Bite
Damage: Very good
Physical: Average
Sensory: Good
Behavioral: Very good
Description: Pack-hunting specialist species of a medium size, fast running, tough, alert, social, runner genus with a *perception* peculiarity (sharp hearing/sensitive smell). One of the Canids, a communal terrestrial predator group with a compact prone body, communal nature, runner, strong bite, and *durability* peculiarity.



DICEROS BICORNIS (Black Rinoceros)
Taxonomy: Clade Mammalia, Rhinoceros Group.
Size: Very Large
Speed: Moderate
Armor: Good
Attacks: Horns/Trample
Damage: Very Good/Average
Physical: Extremely Good
Sensory: Poor
Behavioral: Sub-Poor
Description: Browsing specialist species with *rage* behavior peculiarity of a very large, moderate running, mighty, dull, hostile, long horned genus. One of the Rhinoceros, an armored warm grazer group with a bulky prone body, armored nature (much thicker skin), larger size, and horns.

ANIMALS (CONSUMER KINGDOM)

MAMMALIA (continued)



ERETHIZON DORSATUM (North American Porcupine)
Taxonomy: Clade Mammalia, Rodent Group.
Size: Medium
Speed: Moderate
Armor: Average
Attacks: Quills
Damage: Poor
Physical: Average
Sensory: Average
Behavioral: Poor
Description: Larger species of a small, moderate running, tough, very dull, thickly spined genus. One of the Rodents, a furtive burrowing grazer group with a thick prone body, furtive nature, much smaller size, very many sub-groups, and bite.

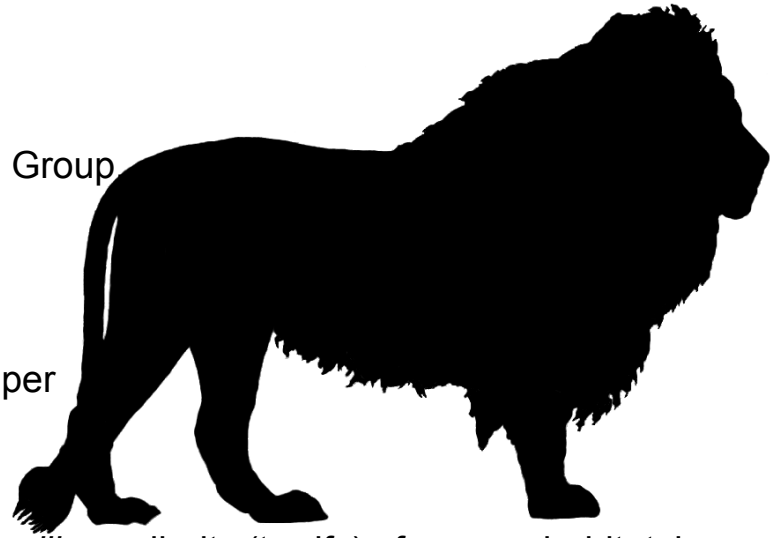
FELIS CATUS (Domestic Cat)
Taxonomy: Clade Mammalia, Felid Group.
Size: Small
Speed: Very fast
Armor: Poor
Attacks: Claw/Claw/Bite
Damage: Poor/Poor/Average
Physical: Average
Sensory: Very good
Behavioral: Poor
Description: Small size species with *multiply* peculiarity of a swift nature, medium size, very fast running, animated, very alert genus with *gamble* peculiarity. One of the Felids, a dangerous temperate predator group with a compact prone body, dangerous nature (fangs), dash, claws, and *leveraging* peculiarity.

ANIMALS (CONSUMER KINGDOM)

MYOTIS LUCIFUGUS (Little Brown Bat)
Taxonomy: Clade Mammalia, Microbat Group.
Size: Extremely small
Speed: Very fast/Very slow
Armor: Poor
Attacks: Bite
Damage: Very poor
Physical: Extremely poor
Sensory: Extremely good
Behavioral: Extremely good

Description: Nocturnal insectivore specialist species of an extremely small, very fast flying/very slow running, fragile, alert, social, diverse nature genus. One of the Microbats, a land/aerial predator group with a compact upright body, furtive nature, less limbs (vestigal legs and hands), communal, bite, and *sense* peculiarity (echolocation).

PANTERA LEO (Lion)
Taxonomy: Clade Mammalia, Felid Group
Size: Large
Speed: Fast
Armor: Poor
Attacks: Claw/Claw/Bite
Damage: Very good/Very Good/Super
Physical: Very good
Sensory: Very good
Behavioral: Average



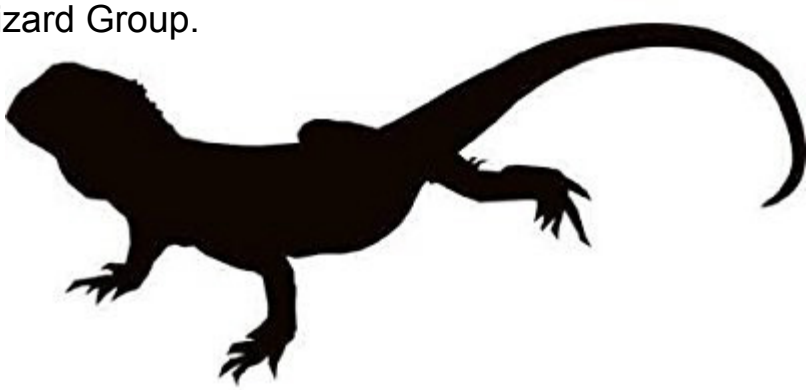
Description: Very alert species with *will* peculiarity (terrify) of a warm habitat, large, fast running, mighty, alert, hostile genus with *competition* peculiarity. One of the Felids, a dangerous temperate predator group with a compact body, dangerous nature (fangs), dash, claws, and *leveraging* peculiarity.

ANIMALS (CONSUMER KINGDOM)

REPTILIA

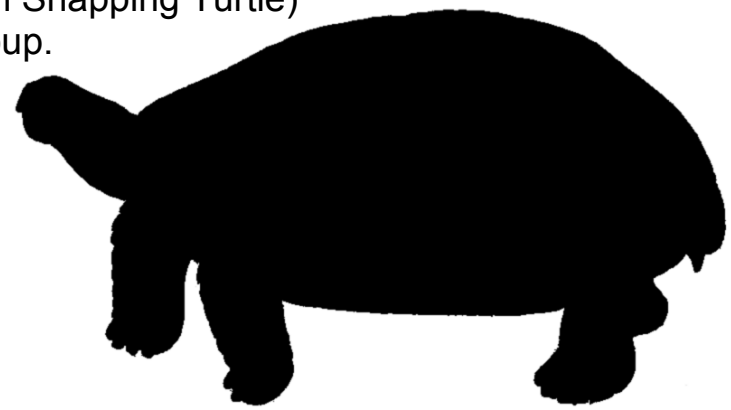
Medium complex warm and dry terrestrial predator clade.
Bilateral long endoskeleton with four limbs and a tail (limb mover), scaly skin, fangs, internal sex.

ANOLIS CAROLINENSIS (Carolina Anole)
Taxonomy: Clade Reptilia, Lizard Group.
Size: Tiny
Speed: Moderate
Armor: Poor
Attacks: Bite
Damage: Extremely poor
Physical: Sub-poor
Sensory: Good
Behavioral: Poor



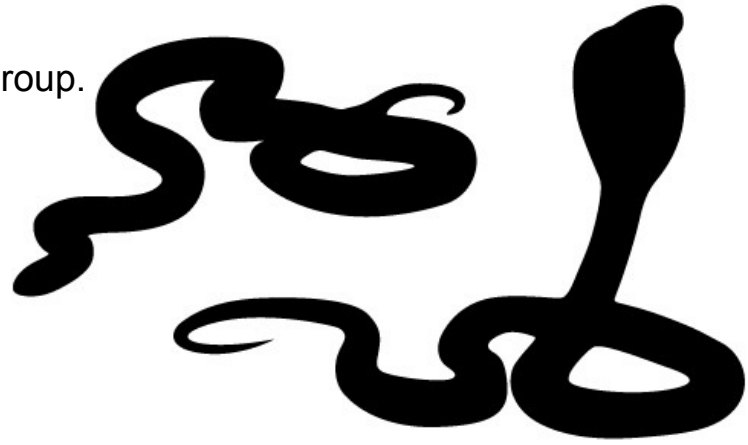
Description: Arboreal specialist species of a tiny, moderate running, very alert genus with physical *camouflage* (color changing) and physical *mutation* peculiarities (extreme sub-habitat adaptability). One of the Lizards, a very diverse warm and dry terrestrial predator group with a long thin body, very diverse nature, smaller size, slower, bite, claws, and physical regeneration peculiarity (tail-shedding defense).

CHELYDRA SERPENTINA (Common Snapping Turtle)
Taxonomy: Clade Reptilia, Turtle Group.
Size: Medium
Speed: Slow/Moderate
Armor: Very Good
Attacks: Beak
Damage: Average
Physical: Average
Sensory: Very poor
Behavioral: Sub-poor

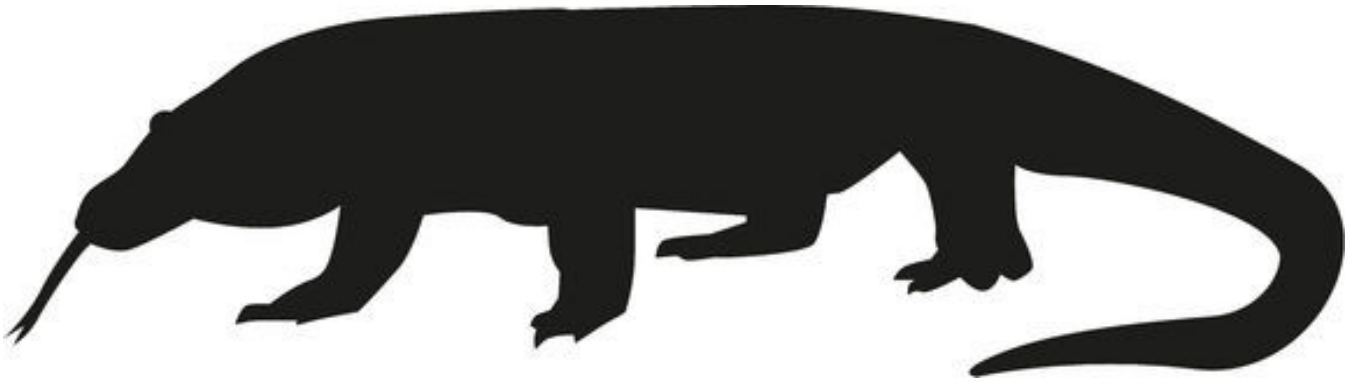


Description: Generalist species of a medium size, slow running/moderate swimming, tough, dull, hostile genus with more limbs (long neck). One of the Turtles, an armored terrestrial and aquatic omnivore group with a wide bulky body, armored nature (shell), extra habitat (aquatic), special *reproduction* adaptation (longevity), and beak.

ANIMALS (CONSUMER KINGDOM)



NAJA HAJE (Egyptian Cobra)
Taxonomy: Clade Reptilia, Snake Group.
Size: Medium
Speed: Slow
Armor: Average
Attacks: Bite
Damage: Average + Venom
Physical: Good
Sensory: Poor
Behavioral: Poor
Description: Medium sized species of a small, slow, animated, very clever, upright genus with physical *bluffing* peculiarity (hood). One of the Snakes, a dangerous predator group with a long thin body, dangerous nature (toxin), no limbs, many sub-habitats, and weak bite with strong venom.



VARANUS KOMODOENSIS (Komodo Dragon)
Taxonomy: Clade Reptilia, Lizard Group.
Size: Large
Speed: Moderate
Armor: Average
Attacks: Bite/Claws/Tail
Damage: Extremely good/Good/Average
Physical: Extremely good
Sensory: Poor
Behavioral: Very poor
Description: Large species of a medium size, moderate running, mighty, clever, hostile, fanged, higher complexity genus. One of the Lizards, a very diverse warm and dry predator group with a long thin body, very diverse nature, smaller size, slower, bite, claws, and physical *regeneration* peculiarity (tail-shedding defense).

ANIMALS (CONSUMER KINGDOM)

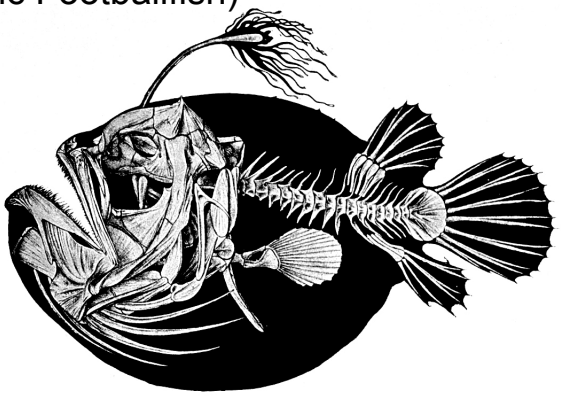
TELEOSTEI

Dominant medium complex diverse aquatic predator clade.
Bilateral long endoskeleton with a tail, no neck, and four vestigal fins (body mover), scaly skin, an orofice, external sex, with physical *shape* peculiarities.

BETTA SPLENDENS (Siamese Fighting Fish)

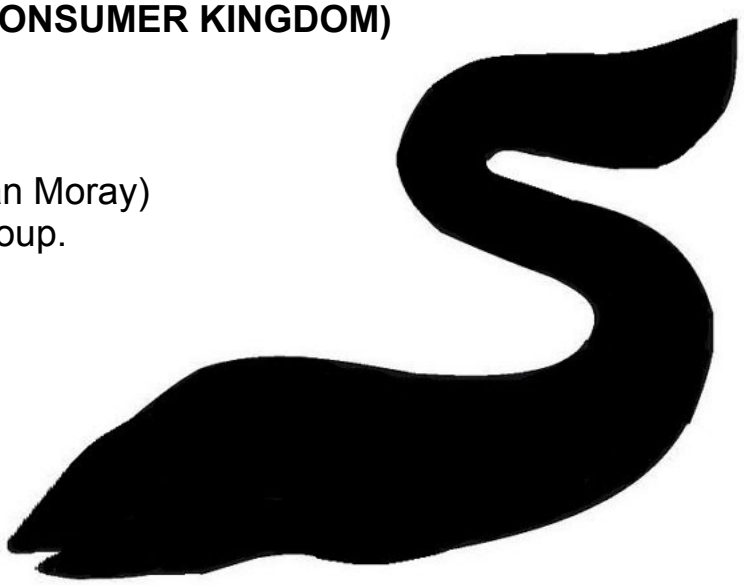
Taxonomy: Clade Teleostei, Gourami Group.
Size: Tiny
Speed: Very slow
Armor: Poor
Attacks: Bite
Damage: Nil
Physical: Sub-poor
Sensory: Average
Behavioral: Poor
Description: Male territoriality specialist species of a tiny, very slow swimming, tough, clever, alert genus with more limbs (long fins/tail) and behavioral *rage* peculiarity (male/male death duel). One of the Gouramis, a pelagic, anoxic-tolerant freshwater omnivore group with a compact prone body, special tolerant nature (air-breathing organ), more limbs (pair of pelvic antennae), paternal egg care, bite, and behavioral *nesting* peculiarity (bubble nests).

HIMANTOLOPHUS GROENLANDICUS (Atlantic Footballfish)



Taxonomy: Clade Teleostei, Anglerfish Group.
Size: Medium
Speed: Extremely slow
Armor: Average
Attacks: Bite
Damage: Very good
Physical: Poor
Sensory: Very good
Behavioral: Very poor
Description: Climate-generalist species of a medium size, extremely slow swimming, sluggish, very alert, spherical-bodied genus. One of the Anglerfish, a furtive aphotic predator group with a wide body, furtive nature, extra limb (bioluminescent fishing rod), extreme gender dimorphism (giant females/tiny males), fangs, and physical *mating* peculiarity (male sexual parasitism).

ANIMALS (CONSUMER KINGDOM)



MURAENA HELENA (Mediterranean Moray)
Taxonomy: Clade Teleostei, Eel Group.
Size: Medium
Speed: Slow
Armor: Poor
Attacks: Bite
Damage: Very good
Physical: Average
Sensory: Good
Behavioral: Very poor
Description: Toxic (slime) species of a medium size, slow swimming, tough, limbless genus. One of the Eels, a furtive benthic predator group with a long thin body, thick skin, furtive nature, less limbs (two fins), metamorphic lifecycle, and fangs.

ONCHORHYNCUS MYKISS (Rainbow Trout)
Taxonomy: Clade Teleostei, Salmonid Group.

Size: Very Small
Speed: Fast
Armor: Average
Attacks: Bite
Damage: Poor
Physical: Average
Sensory: Average
Behavioral: Poor
Description: Dashing species of of a very small, fast swimming, mighty, alert, animated genus with physical *multiplication* peculiarity (semelparity). One of the Salmonids, an anadromous communal aquatic predator group with a long thin body, communal nature, special speed adaptation (jumping), sub-habitat tolerance (anadromous: salt/fresh water tolerance), and sensory *nesting* peculiarity (migration to birthplace).

ANIMALS (CONSUMER KINGDOM)

TELEOSTEI (continued)

XIPHIAS GLADIUS (Swordfish)
Taxonomy: Clade Teleostei, Broadbill Group.
Size: Large
Speed: Extremely fast
Armor: Very poor
Attacks: Sword/Beak
Damage: Very good/Average
Physical: Very good
Sensory: Good
Behavioral: Very poor

Description: Only species of a large, extremely fast swimming, animated, very alert genus with very few species. Only member of the Broadbills, a pelagic predator group with a long thick body, non-diverse nature (very few genera), much faster, thin skin, weak beak, sharp horn (sword nose), and sensory *focus* peculiarity.

FUNGI (DECOMPOSER KINGDOM)

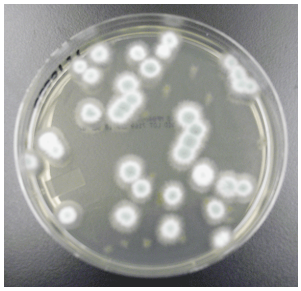
ASCOMYCOTA

Proto-complex underground decomposer clade.
Asymmetric wide hydroskeletons with body growth, soft skin, absorption feeding, and asexual reproduction.

TUBER AESTIVUM (Summer Truffle)
Taxonomy: Clade Ascomycota, Pezizales Group
Size: Extremely small
Speed: Nil
Armor: Sub-poor
Attacks: None

Description: Specialist species of an extremely small, sessile genus with *soothing* peculiarity (delicious!). One of the Pezizales, a burrowing symbiotic decomposer group with a wide flat body, furtive nature, apothecial delivery, and few genera.

FUNGI (DECOMPOSER KINGDOM)



PENICILLIUM CHRYSOGENUM (Penicillin Mold)
Taxonomy: Clade Ascomycota, Green & Blue Mold Group.
Size: Fine
Speed: Nil
Armor: None
Attacks: None
Description: Generalist species with *rejuvenation* peculiarity (antibiotic) of a fine size, sessile, very diverse genus. One of the Green & Blue Molds, a prolific and tolerant underground/terrestrial organotroph group with a wide thin body, prolific nature, toxin tolerant nature, and extra habitat, with *multiplication* peculiarity.

BASIDIOMYCOTA

Proto-complex terrestrial decomposer clade.
Radial hydroskeletons with body growth, soft skin, absorption feeding, and special hermaphrodite reproduction.

CALVATIA GIGANTEA (Giant Puffball)
Taxonomy: Clade Basidiomycota, Puffball Mushroom Group.
Size: Medium
Speed: Nil
Armor: Extremely poor
Attacks: None
Description: Medium size species of a very small, sessile, genus. One of the Puffball Mushrooms, a furtive terrestrial organotroph group with spherical bodies, furtive nature, armor (thicker skin), and larger size.

PSILOCYBE SEMILANCEATA (Liberty Cap Mushroom)
Taxonomy: Clade Basidiomycota, Gilled Mushroom Group.
Size: Tiny
Speed: Nil
Armor: None
Attacks: Special
Description: Generalist species of a tiny, sessile genus with *dream* peculiarity (hallucinogen). One of the Gilled Mushrooms, a dangerous terrestrial organotrophic group with a tall wide body, dangerous nature (toxin), many sub-habitats, many genera.

PLANTS (PRODUCER KINGDOM)

ANGIOSPERMA

Dominant and diverse low complex terrestrial producer clade.
Asymmetric hydroskeleton, many limbs, sessile limb growth, tall aspect, scaly skin, external absorption feeding, and special hermaphrodite reproduction (flowers & fruit).

CITRUS SINENSIS (Sweet Orange)
Taxonomy: Clade Angiosperma, Rue Group.
Size: Large
Armor: Good
Description: Large species of a medium size, sessile genus. One of the Rue, an armored warm photosynth group with a tall, thin body, armored nature (shell), spines, and *rejuvenating* peculiarity (vitamin C).

DIONAEA MUSCIPULA (Venus Flytrap)
Taxonomy: Clade Angiosperma, Sundew Group.
Size: Extremely small
Armor: Poor
Description: Specialist species of an extremely small, sessile genus. One of the Sundews, a dangerous wet terrestrial special producer group with a tall, thin body, special dangerous nature (maw), no other sub-habitats, smaller size, and *veiling* peculiarity (carnivorous plant).

NYMPHAEA MEXICANA (Mexican Waterlily)
Taxonomy: Clade Angiosperma, Waterlily Group.
Size: Very small
Armor: Poor
Description: Generalist species of a very small, sessile genus. One of the Waterlilies, a freshwater/wet photosynth group with a wide flat body, climate tolerant nature, and extra habitat (aquatic).

PLANTS (PRODUCER KINGDOM)

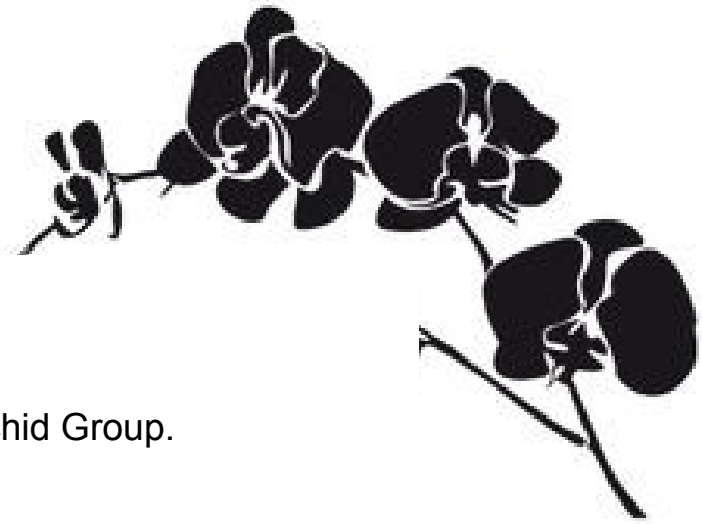
QUERCUS VIRGINIAIA (Southern Live Oak)
Taxonomy: Clade Angiosperma, Beech Group.
Size: Extremely large
Armor: Extremely good
Description: Generalist species of an extremely large, sessile genus. One of the Beeches, an armored terrestrial photosynth group with a tall, thick body, armored nature (shell), armor (thicker shell), and many sub-habitats.

ROSA CHINENSIS (China Rose)
Taxonomy: Clade Angiosperma, Rose Group.
Size: Small
Armor: Good
Description: Generalist species of a small, sessile genus. One of the Roses, a spiny terrestrial photosynth group with a tall, wide body, armored nature (spines), armor (thicker skin), many genera, and *enamoring* peculiarity (fragrance).

VITIS VINIFERA (Grapevine)
Taxonomy: Clade Angiosperma, Vitales Group.
Size: Medium
Armor: Average
Description: Generalist species of a medium size, sessile genus. One of the Vitales, a prolific terrestrial photosynth group with a long thin body, prolific nature, many genera, armor (thicker scales), and *growth* peculiarity (fast climbing).

PLANTS (PRODUCER KINGDOM)

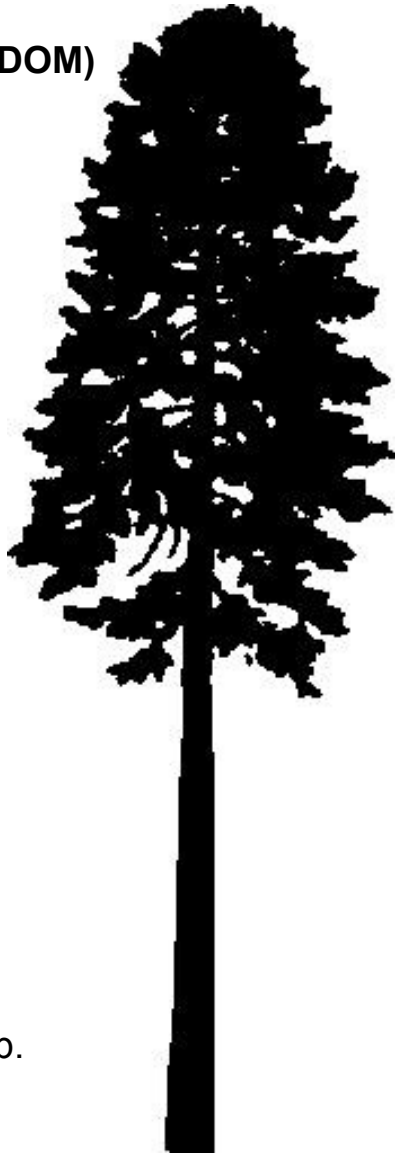
MONOCOTYLEDON
Very diverse low complex underground producer clade.
Bilateral tall hydroskeleton, few limbs, sessile body growth, scaled skin, external absorption feeding, and special hermaphrodite reproduction (flowers & fruit).



ORCHIS PURPUREA (Lady Orchid)
Taxonomy: Clade Monocotyledon, Orchid Group.
Size: Very small
Armor: Poor
Description: Specialist species of a very small, sessile genus. One of the Orchids, a diverse warm photosynth group with a tall thin body, diverse nature (many genera and species), many sub-habitats, and *enamoring* peculiarity (beautiful).

POA PRATENSIS (Kentucky Bluegrass)
Taxonomy: Clade Monocotyledon, Grass Group.
Size: Extremely small
Armor: Poor
Description: Generalist species of an extremely small, sessile genus. One of the Grasses, a communal terrestrial photosynth group with a tall thin body, communal nature, many sub-habitats, smaller size, and *regeneration* peculiarity (fire colonizer).

PLANTS (PRODUCER KINGDOM)



CONIFERA
Low complex terrestrial producer clade.
Radial endoskeleton, many limbs,
sessile body growth, tall aspect, scaly skin,
external absorption feeding, and simultaneous
hermaphrodite reproduction.

SEQUOIADENDRON GIGANTEUM (Giant Sequoia)
Taxonomy: Clade Conifera, Redwood Cypress Group.
Size: Supergiant
Armor: Very good
Description: Supergiant species of a giant (size +8), sessile genus with very few sub-habitats. One of the Redwood Cypress, a larger temperate photosynth group with a tall thin body, larger nature, much larger (x2) size, and *endure* peculiarity.

TAXUS BACCATA (European Yew)
Taxonomy: Clade Conifera, Yew Group.
Size: Very large
Armor: Average
Description: Very large species of a large, sessile genus. One of the Yews, a dangerous terrestrial photosynth group with dangerous nature (toxin), many sub-habitats, and larger size with *reversion* peculiarity (extreme flexibility).

HOMEWORLD

STAR (d8)
1-2 Red Dwarf (d8: 1-2 Carbon System, 3-4 Flare Star, 5-7 Standard, 8 Binary OR Special)
3-5 Orange Dwarf (d8: 1 Carbon System, 2-6 Standard, 7-8 Binary OR Special)
6-7 Yellow Dwarf (d8: 1-2 High Density System, 3-5 Standard, 6-8 Binary OR Special)
8 Other Star (d8: 1-2 White Star, 3-7 Giant Star, 8 Dead Star or Special)

WORLD TYPE (d100)
1 Variable/Flare Star (Size -1/Speed +1) AND roll d100 again.
2 Carbon System (Other Hydrosphere only) AND roll d100 again.
3 Gas World (Hydrogen atmo; d20: 1-7 Planet, 8-17 Giant, 18-19 Supergiant, 20 Special)
4 Subdwarf Star (no Metal or Rock Worlds) AND roll d100 again.
5 Adjacent to Belt (Size -1/Speed +1) AND roll d100 again
6 High Debris Density System (Size -2/Speed +2) AND roll d100 again.
7-19 Moon (Weak Magnetosphere only) AND roll d100 again.
20-29 Metal World (d10: 1-3 Dwarf, 4-9 Planet, 10 Special)
30-49 Rock World (d10: 1-2 Dwarf, 3-7 Planet, 8-9 Giant, 10 Special)
50-99 Cloud/Ocean/Ice World (d10: 1 Dwarf, 2-6 Planet, 7-9 Giant, 10 Special)
100 Special

ORBIT (d4)
1-3 Moderate Zone (d4: 1 Moderate/Hot, 2-3 Moderate, 4 Moderate/Cold)
4 Other Zone (1 Hot Zone, 2-3 Cold Zone, 4 Special Orbit)

MAGNETOSPHERE (d6)
1-5 Strong (d6: 1 Extreme, 2-3 Strong, 4-6 Moderate)
6 Weak (Unless Cloud/Ocean world, Hydrosphere is a Cryosphere OR Underground)
NOTE: Dwarf Planets always Weak; Supergiant Planets always Strong.

HYDROSPHERE (d20)
1-19 Water (Except Gas World, Metal World OR Hot Zone: Use Other sub-table.)
20 Other (d20: 1-2 Sulfur, 3-14 Ammonia, 15-19 Hydrocarbon, 20 Special)

ATMOSPHERE (d12)
Water: 1-11 Oxygen, 12 Halogen
Sulfur: 1-3 Hydrogen, 4-6 Sulfur, 7-12 Halogen
Ammonia: 1-5 Hydrogen, 6-10 Nitrogen, 12 Halogen
Hydrocarbon: 1-9 Hydrogen. 10-12 Sulfur.

LIFEFORM NOTES
White Star (Size -5/Speed -2), Giant Star (Size -2/Speed +2),
Moon (Size +2), Dwarf World (Size +1), Giant World (Size -1), Supergiant World (Size -2).
Hydrocarbon (Size +1/Speed -2), Ammonia (Speed -1), Non-Oxygen/Non-Halogen Atmosphere (Size -1/Speed -2), Halogen Atmosphere (Speed +1).
Cold Zone (Speed -1), Frozen Zone (Speed -2).
Gas World (Size -5/Only Aerial habitat), Ocean World (Size +1/No Terrestrial habitat), Cloud or Ice World (Size +1), Cryosphere (Only Aquatic or Underground habitat).

LIFEFORM

NATURE (d100)

01-04	None
05-14	Armored (Speed -1; Two Skin Rolls)
15-24	Communal (Hive if rolled twice)
25-29	Dangerous (Two Weapon Rolls)
30-34	Diverse (Extra Habitat)
35-54	Furtive (Size -1)
55-64	Generalist (Extra Habitat)
65-74	Larger (Size +1)
75-79	Prolific (Size -1)
80-84	Smart (Intelligent if rolled twice)
85-89	Swift (Speed +1/Size -1)
90-95	Tolerant (Extra Habitat)
96-00	Reroll Twice or Special

HABITAT (d10)

1-3	Aquatic (Size +1/Speed -1)
4	Underground (Size -1/Speed -1)
5-9	Terrestrial
10	Special or Aerial* (Size -2/Speed +1)

*Consumer only unless non-oxygen atmo.

ROLE (d10)

1	Symbiont (Size -1/Speed -1)
2	Decomposer (Size -2/Speed -5)
3-4	Producer (Speed -7)
5-10	Consumer

ASPECT (d20)

1	Wide
2-5	Long
6-14	Prone
15-20	Upright OR Tall

SYMMETRY (d12)

1	Asymmetric (Speed -3)
2-4	Radial (Speed -2)
5	Amoeba (Speed -1)
6-12	Bilateral

SKELETON (d12)
Asymmetric: 1-3 Hydro, 4-9 Exo, 10-12 Endo
Radial: 1-6 Hydro, 7-9 Exo, 10-12 Endo
Amoeba: 1-9 Hydro, 10-12 Special
Bilateral: 1-3 Hydro, 4-6 Exo, 7-12 Endo
NOTE: Exo (Size -2), Hydro (Size -1).

LIMB (d8)

1	Myriad (1d100 pairs)
2-4	Many (1d5+2 pairs)
5-7	Few (1d2 pairs)
8	None OR Special

SIZE (d4)

Fine		(-5 to -9)
Tiny		(-4)
Extremely Small		(-3)
Very Small		(-2)
1	Small AND Reroll	(-1)
2-3	Medium	(+0)
4	Large AND Reroll	(+1)
Very Large		(+2 to +3)
Extremely Large		(+4 to +5)
Giant		(+6 to +9)

SPEED (d6)

Sessile		(-5 or less)
Creeping		(-4)
Extremely Slow		(-3)
Very Slow		(-2)
1-2	Slow AND Reroll	(-1)
3-5	Moderate	
6	Fast AND Reroll	(+1)
Very Fast		(+2)
Extremely Fast		(+3)
Super Fast		(+4)
Ultra Fast		(+5 or more)

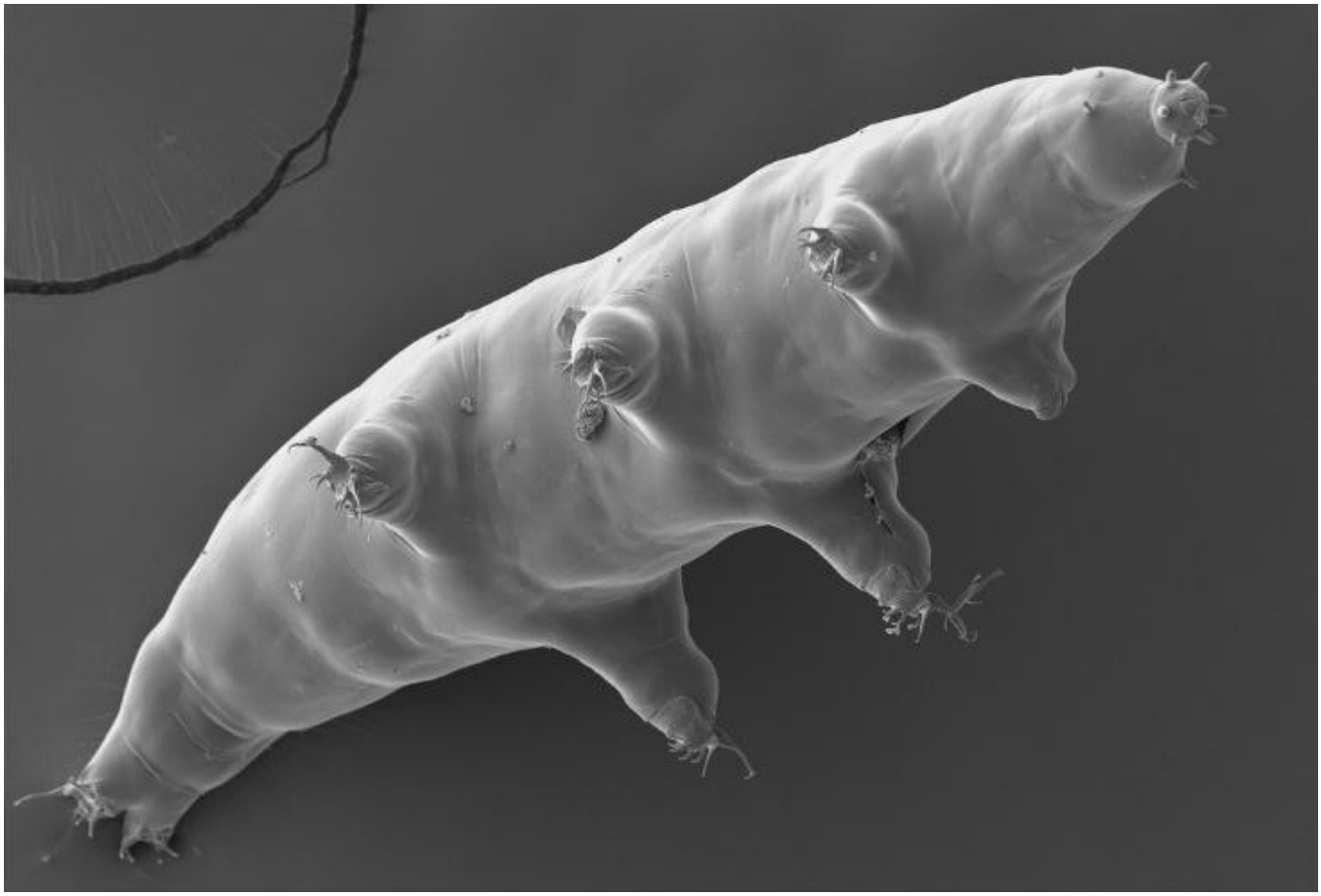
SKIN (d10)

1-2	Thin (+1 Speed)
3	Spines AND Reroll
4-7	Thick
8-9	Shell (-1 Speed)
10	Reroll twice OR Special

CONSUMER	OTHER*	WEAPON (d10)
1	1-4	Toxin
2	5-8	Spine/Sting
3-7	—	Bite
8-9	—	Claws
10	9-10	Special

*Only roll if non-consumer lifeform has Dangerous nature.

TARDIGRADA
Proto-complex consumer clade.
Bilateral prone exoskeleton with eight legs (limb mover), thick skin, bite, external sex, *stop* peculiarity, and ultra *durability* peculiarity (most resilient animal on earth).



MILNESIUM TARDIGRADUM (Giant Waterbear)
Taxonomy: Clade Tardigrada, Eutardigrade Group.
Size: Fine
Speed: Creeping
Armor: Very poor
Attacks: Bite
Damage: None
Physical: Nil
Sensory: Nil
Behavioral: Nil
Description: Generalist species of a fine, creeping swimming, tough, very dull genus. One of the Eutardigrades, a tolerant aquatic omnivore group with bulky prone body, tolerant nature, and very many sub-habitats.

Instant Aliens

Finally!
An alien life creator that
builds complete, plausible ecosystems
from microbes up to plants,
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