Beyond Heroes

Companion Rules BH11

The Role Playing Game for all Genres

The Beyond Heroes Roleplaying Game Book XI: The Cosmos

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Contents

Foreword

The Beyond Heroes Role Playing Game is based on a heavily revised derivative version of the rules system from Advanced Dungeons and Dragons 2nd edition. It also makes extensive use of the optional point buying system as presented in the AD&D Player's Option Skills and Powers book. My primary goal was to make this system usable in any setting, from fantasy to pulp to superhero to science fiction.

This document Book 11: the Cosmos mainly uses material from the Cosmic Creation Sourcebook which was written by myself and AJ Pickett. It has also had additional material added to allow for changes brought about by the Strange Realms Invasion which will be featured in book 25.

The following body of charts and tables are a tool. With it any Game master can summon forth countless new worlds and strange alien species. There is no set of hard and unbending rules here, just a collection of conditions and a rough guide to how they slot together. Any type of life or environment is available to you; from beings who live on the surface of stars, to small, stone age, marsupial fish; just grab your dice, a pen, a sheet of paper and start exploring the possibilities. For any RPG game system.

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1. Cosmic Definitions

Astronomical Measurements

Kiloparsec/Kpc	3250 light years
1 Parsec	3.26 ly
1 Light Year/Ly	62,240 AU or 390,363,984,543,616,629,394,560 kms
1 Astronomical Unit/AU	14.968 kms or 6,279,627,051,077,596,944 kms
1 kilometre/km	.6 mile

Astronomical Definitions

Universe	An immeasurable distance of physical space, the same approximate size as the prime plane. Often this will contain thousands of galaxies.
Galaxy	A measurement of space containing the equivalent of anywhere from a few million to several billion stars.
Cluster	A measurement of space containing the equivalent of anywhere from a few hundred to a million stars.
System	A volume of space large enough to accommodate a sun and several planets or the equivalent.
Planet	A volume roughly equivalent to a single world perhaps with some surrounding satellites and space.

Scientific Definitions

Energy	Energy is a property of a body, not a material substance. When bodies interact, the energy of one may increase at the expense of the other, and this is sometimes called a transfer of energy. This does not mean that we could intercept this energy in transit and bottle some of it. After the transfer one of the bodies may have higher energy than before, and we speak of it as having stored energy. But that doesn't mean that the energy is contained in it in the same sense as water in a bucket.
Heat	Heat like work is a measure of the amount of energy transferred from one body to another because of the temperature difference between those bodies. Heat is not energy possessed by a body. We should not speak of the heat in a body. The energy a body possesses due to its temperature is a different thing, called internal thermal energy. The misuse of this word probably dates back to the 18th century when it was still thought that bodies undergoing thermal processes exchanged a substance, called caloric or phlogiston, a substance later called heat. We now know that heat is not a substance.
Inertia	A descriptive term for that property of a body which resists change in its motion. Two kinds of changes of motion are recognized: changes in translational motion, and changes in rotational motion. In modern usage, the measure of translational inertia is mass. Newton's first law of motion is sometimes called the 'Law of Inertia', a label which adds nothing to the meaning of the first law. Newton's first and second laws together are required for a full description of the consequences of a body's

	inertia. The measure of a body's resistance to rotation is its Moment of Inertia.
Kinetic energy	The energy a body has by virtue of its motion. The kinetic energy is the work done by an external force to bring the body from rest to a particular state of motion.
Newton's third law	When body A exerts a force on body B, then B exerts and equal and opposite force on A. The two forces related by this law act on different bodies. The forces need not be net forces.

Air Composition on Earth

The sea-level composition of air (in percent by volume at the temperature of 15°C and the pressure of 101325 Pa) is given below.

Name	Symbol	Percent by Volume
Nitrogen	N2	78.084 %
Oxygen	O2	20.9476 %
Argon	Ar	0.934 %
Carbon Dioxide	CO2	0.0314 %
Neon	Ne	0.001818 %
Methane	CH4	0.0002 %
Helium	He	0.000524 %
Krypton	Kr	0.000114 %
Hydrogen	H2	0.00005 %
Xenon	Xe	0.0000087 %

Temperature Measurements

Kelvin/ 0K	Celsius/C	Fahrenheit/F	Notes
6000	5727	10455	Our sun
5100	4827	8808	Carbon boils
3825	3553	6490	Carbon melts
3023	2750	5032	Iron boils
3000	2727	4990	A red cool star
1808	1535	2823	Iron melts
373	100	212	Water boils
273	0	32	Water freezes
90	-183		Oxygen boils
55	-218		Oxygen melts
0	-273	-459	Absolute zero

2. Dimensions

The irresistible, mind-boggling fantasy comes to just about everyone, sooner or later: Do other universes exist?

Astronomers believe the Big Bang first produced atomic nuclei in the first three minutes of the universe. 300,000 years later, atoms formed and light was released. Today we can still observe evidence of these primordial reactions.
One second, according to theory, there was nothingness. The next, our cosmos sprang into existence. Nature seems to have pulled off the feat of getting something in fact, everything for nothing.

As unimaginable as that sounds, it comes straight out of the theory of quantum mechanics, a set of mathematical rules that describe how the universe works on the smallest scales, inside atoms. Quantum mechanics says that matter and energy can appear spontaneously out of the vacuum of space, thanks to something called a quantum fluctuation, a sort of hiccup in the energy field thought to pervade the cosmos. Cosmologists say that a quantum fluctuation gave rise to the Big Bang. And the thing about quantum fluctuations is that they can happen anywhere, any time. And if our universe was born out of a quantum fluctuation, say theorists, then it's possible that other quantum fluctuations could have spawned other universes.

There's a reason some theorists want other universes to exist: They believe it's the only way to explain why our own universe, whose physical laws are just right to allow life, happens to exist. According to the anthropic principle, there are perhaps an infinite number of universes, each with its own set of physical laws. And one of them happens to be ours. That's much easier to believe, say the anthropic advocates, than a single universe fine-tuned for our existence. But there's a problem. If these other universes exist, there's no way for us to detect them.

But if these other universes do exist, are we really destined never to detect them? Some theorists have speculated that gravitational energy from other universes might leak into ours, and that someday we might figure out how to detect it. But even the most open-minded cosmologists say that's a long shot at best.

It wouldn't be the first time that a wild idea turned out to be right. A bit more than 100 years ago, in the second half of the 19th century, most scientists didn't accept the idea that matter was composed of atoms an idea supported not by direct observation, but by inferences based on theories of temperature, heat, and viscosity. Like quantum mechanics, atomic theory was a construction that went way beyond what anyone could see 100 years ago...

Step One: Size

What is the current size of the universe and what will its finally expand to or does it continue growing until the end of time? What shape is it? Ours is thought to be spherical but others could be flat, rectangular, etc.

Size

01-13 Finite. An Object. This doesn't have to be a land mass, it can be a castle or fortress, or a square planet, or whatever the imagination desires. It could be a lone pyramid, a building, a giant machine, a spaceship, etc.

14-26 Finite. Single Land Mass. The dimension consists of one giant, single land mass that stretches onward and outward in all directions with its own atmosphere, weather and inhabitants just like a planet. If an Infinite Dimension, the land mass will seem to go on forever, with locations on its surface including all kinds of different environments (i.e., there may be a million miles of jungle, then frozen wasteland, followed by desert, then mountains, then forest, then marshland or oceans, and on and on). Some regions will be uninhabitable while others may not only be inhabited but dominated by one or more people with high or low technology. Other areas may be habitable but devoid of intelligent life forms.

27-39 Finite. Multiple Planetary Land Masses or Flat Worlds. These are massive, planetary-sized platforms of land and atmosphere that measure millions of miles in size. They can be separated by thousands or millions of kilometres of space, or whatever the primary element may be, like flat planets, or clustered relatively close together. A unique set of physics keeps inhabitants from falling over the edge (or not). In most cases, only one side (top or bottom) is inhabitable, but in some cases, different terrain and different life forms live on the top and the bottom. Different life forms may also dominate different parts of the floating planetary plates. Small clusters of island sized land masses may also exist near or away from the flat worlds and, from a distance, may resemble an asteroid belt and may have an atmosphere and life forms or be nothing more than lifeless platforms of rock and minerals or ice.

40-51 Finite. Continent Size Land Masses or Slabs. There are two or more (perhaps dozens to thousands) flat, plate-like land masses that stretch onward for several hundred thousand kilometres each. They can be separated by thousands or millions of kilometres of space, or clustered relatively close together like plates or platforms set adrift in a row or in a staggered pile in space. A unique set of physics keeps inhabitants from falling over the edge (or not). In most cases, only one side (top or bottom) is inhabitable, but in some cases, different terrain and different life forms live on the top and bottom. Different life forms may also rule over different parts of the floating continental plates.

52-63 Finite. A single planet is found in this dimension. It can be any size from truly monstrous to as small as the Earth. It will most likely have an atmosphere and support some type of life.

64-75 Finite. A Single Solar System consisting of a sun and random amount of planets and moons which may contain life.

76-87 Finite. The dimension is filled with a galaxy or several galaxies with trillions of stars and planets, but still limited.

88-00 Infinite

Shape

01-03 Circle, a round shape.

04-06 Ellipse, the cross section shape which is derived when a cone or a cylinder is cut

at an angle.

07-09 Oval, used to denote any kind of closed egg shape or oblong curve with no points. This generic term can be used for ellipses as well as. It covers regular or irregular egg shaped curves too.

10-12 Arch, defined as a curved path from one point of a circle to another. It can be considered as a part of the circumference of a circle. An arc is known as major arc if it measures greater than 180 degrees, and if not then it is known as a minor arch.

13-15 Crescent shapes are made when two circles overlap, or when one circle is removed from another circle .

16-18 Lens, a biconvex shape which is composed of two circular arcs meeting with each other through their end points. A symmetric lens is the one in which arcs have equal radii, whereas asymmetric les contain arcs with unequal radii. It can also be known as convex-convex type of shape.

19-21 Annulus, the shape of a ring which is formed when the smaller disk from the center is removed from the center of a disk. The word annulus has been derived from the Latin word which means little ring.

22-24 Triangle, a shape with three sides. Sometimes the sides are equal—sometimes they aren't. Their names are sometimes different depending on the length of the sides. The common ones:
Equilateral triangle has 3 equal sides.
Isosceles triangle has 2 equal sides.
Scalene triangle has no equal sides.

25-27 Square, a box shape, with four equal sides—opposite sides are parallel. Parallel means non-intersecting. For example, parallel lines means that if the two lines kept going forever, they would never cross over each other—they would always be an equal distance apart.

28-30 Rectangle, another box shape, with two sets of equal sides. Equal sides are opposite each other. The sides are parallel to each other.

31-33 Trapezoid, another 4 sided shape, with one set of parallel lines (the other set of lines is not parallel).

34-36 Pentagon, a shape with five sides.

37-39 Hexagon, a shape with six sides.

40-42 Heptagon, a shape with seven sides.

43-45 Octagon, a shape with eight sides.

46-48 Nonagon, a shape with nine sides.

49-51 Decagon, a shape with 10 sides.

52-54 Dodecagon, a shape with 12 sides.

55-57 Prism refers to the solid object possessing two congruent and parallel faces. A rectangular prism is the prism with rectangular bases. It has six faces and all faces meet at 90 degrees. The opposite sides of rectangular prism are parallel. Cube is also a prism but with six congruent faces. It is also known as a member of rectangular prisms. A Triangular Prism possesses triangular bases. Bases are only parallel in this type of prism. Hexagonal Prism is a prism whose bases are hexagonal and opposite faces are parallel.

58-60 Cylinder, a flat base and flat top with one curved side. Base, top and in between

region is same. If the middle section of a cylinder is unwrapped and put it flat then it will come out as a rectangle. It can be considered similar to a prism. However unlike prisms, its bases are circles but not polygons.

61-63 A Tetrahedrons is the same as a triangular pyramid. They have 4 triangular faces, 6 edges and 4 vertices.

64-66 Icosahedron are a shape with 20 faces, 30 edges and 12 vertices. All the faces are triangles.

67-69 Dodecahedrons are a shape with 12 faces, 30 edges and 20 vertices.

71-73 Octahedrons are a shape with 8 faces, 12 edges and 6 vertices.

74-76 Cone is a curved shape which is characterized by a circular or oval base which gets narrower towards a point. A cone has only one vertex. A cone can also be considered as a pyramid with a circular cross section. A cone whose vertex is positioned above the center of its base is also known as the right cone.

77-79 Sphere is symmetrical in true senses with no edges or vertices. The distance from any point on the source to the center remains the same. Earth's shape is almost spherical. However, it is known as spheroid shaped as it is not in the perfect shape of a sphere.

80-82 Cubes have 6 faces, 12 edges and 8 vertices. All sides on a cube are equal length. All faces are square in shape.

83-84 Cuboids have 6 faces, 12 edges and 8 vertices. All the faces on a cuboid are rectangular.

85-86 Spheres have either 0 or 1 faces, 0 edges and 0 vertices.

87-88 Ellipsoids have either 0 or 1 faces, 0 edges and 0 vertices.

89-90 Cylinders have either 2 or 3 faces, 0 or 2 edges, and 0 vertices.

91-92 Cones have either 1 or 2 faces, 0 or 1 edges, and 1 apex.

93-94 Triangular Prisms have 5 faces, 9 edges, and 6 vertices. The two faces at either end are triangles, and the rest of the faces are rectangular.

95-96 Hexagonal Prisms have 8 faces, 18 edges, and 12 vertices. The two faces at either end are hexagons, and the rest of the faces are rectangular.

97-98 Square based pyramids have 5 faces, 8 edges and 5 vertices. The base is a square. All the other faces are triangular.

99-00 Hexagonal pyramids have 7 faces, 12 edges, and 7 vertices. The base is a hexagon. All of the other faces are triangular.

Step Two: Age

What is the current age of this universe and when will it finally end? Or is its age immeasurable and infinite?

Current Age

01-05 D20 x D100 million years

06-10 D20 x D100 billion years

11-15 D20 x D100 trillion years

16-20 D20 x D100 quadrillion years

21-25 D20 x D100 quintillion years

26-30 D20 x D100 sextillion years

31-35 D20 x D100 septillion years

36-40 D20 x D100 octillion years
41-45 D20 x D100 nonillion years
46-50 D20 x D100 decillion years
51-55 D20 x D100 undecillion years
56-60 D20 x D100 duodecillion years
61-65 D20 x D100 tredicillion years
66-70 D20 x D100 quattuordecillion years
71-75 D20 x D100 quindecillion years
76-80 D20 x D100 sexdecillion years
81-84 D20 x D100 septendecillion years
85-88 D20 x D100 octodecillion years
89-92 D20 x D100 novemdecillion years
93-96 D20 x D100 vigintillion years
97-00 D20 x D100 centillion years

Lifespan (universe ends at)

01 D20 x D100 million years
02-03 D20 x D100 billion years
04-05 D20 x D100 trillion years
06-07 D20 x D100 quadrillion years
08-10 D20 x D100 quintillion years
11-13 D20 x D100 sextillion years
14-16 D20 x D100 septillion years
17-19 D20 x D100 octillion years
20-22 D20 x D100 nonillion years
23-25 D20 x D100 decillion years
26-28 D20 x D100 undecillion years
29-31 D20 x D100 duodecillion years
32-34 D20 x D100 tredicillion years
35-36 D20 x D100 quattuordecillion years
37-38 D20 x D100 quindecillion years
39-40 D20 x D100 sexdecillion years
41-42 D20 x D100 septendecillion years
43-44 D20 x D100 octodecillion years
45-46 D20 x D100 novemdecillion years
47-48 D20 x D100 vigintillion years
49-50 D20 x D100 centillion years
51-00 Infinite

Step Three: Sub Dimensions

How many sub dimensions is this universe composed of? The primary sub dimensions in our own universe consist of Earth, Air, Fire, Water, Time, Positive/Light, Negative/Dark, Order and Chaos. There are also secondary sub dimensions consisting of the Astral realm, the Dreamscape and Phase space. These sub dimensions influence the primary plane especially with regards to physics, heat, light, etc. See here for more information on these dimensions.

Step Four: Physics Laws

Provided by AJ Pickett

How many directions of movement are available? A one dimensional realm is incompatible with humans and so too is a two dimensional realm (though life is possible). Three dimensions is what we are used to, four dimensions allows temporal shifting or teleportation at will for the locals, five dimensions allows beings to exist in more than one time at once plus they have functional precognition and can teleport at will. Six dimensions have beings which exist as transtemporal entities that look like insane jumbles of tubes that extend an almost infinite distance in more directions than the mind can comfortably perceive, all constantly shifting form and seeming like a hellish gibbering old/young thing both alive and dead at the same moment.

How much energy is required to move around? In a six dimensional realm do beings teleport around with as little energy as we use to walk around the house. Are wormholes possible?

How does acceleration and deceleration work in this universe? Related to both, what about friction?

How much mass is there in this universe? How much gravity do objects generate? Do all objects have positive gravity? Negative? Something totally new?

Does this universe hold any heat? What is the maximum ambient temperature of stars in this dimension? What heat level is safe for life forms in this universe?

Periodic Elements

Which elements from the periodic table exist? All? None? Are there any totally new elements? How common is each element in this universe? You could have dimensions where fusion reactions occur at a greatly reduced temperature, where objects super conduct when chilled slightly, where metals are light or incredibly dense, where even air is hard, or metal has a gaseous state, etc.

01-02	This dimension is identical to ours with all the same elements present.
26-50	This dimension has only D100% -1 of the same elements as ours, but no new elements.
51-75	This dimension has only D100% -1 of the same elements as ours, and the rest are new elements.
76-00	This dimension has completely different elements to ours. All are new.

Contents and Colours

Is space a vacuum or contain an atmosphere based on one or more of the noble gases? Which colours exist in this universe? Colours in our own include Red, Orange, Yellow, Green, Blue, Indigo and Violet. Non colours include Black and White. Colours not visible to our eyes but which we are aware of include Infrared, Ultraviolet and Thermals.

The Contents of Space

01-12 The dimension consists of a vacuum with lots of empty space.

13-20 The dimension is an endless void filled with an unbreathable mist and rolling clouds and has no substance to it. There is usually an ambient light that fills it. Visibility is limited to D100 metres.

21-28 The dimension consists of Phlogiston (also known as Aether); a bright, breathable gas-like medium. There is no void.

29-36 A fluid fills the dimension. Any land masses, islands, planets, or stars that are found in the dimension are found in small, empty pockets. Some force such as gravity or magic would keep the fluid at bay. The fluid can be organic or non-organic. If organic in nature, life might actually be found in the fluid. Regardless of the temperature, the fluid remains in liquid form.

37-44 Space is filled with a clear atmosphere, but it is highly toxic and fatal to any humans who breathe it. Even beings who do not need to breathe will find this an uncomfortable environment and the air stings even their eyes and smells pretty bad.

45-52 Blue bolts of electrical energy make up the primary medium. There are usually small pockets where one can find sanctuary for short periods of time within the cascading energy.

53-60 Pure white light makes up the dimension's primary medium. There is no identifiable source. There is no damage, but visible navigation is impossible, even for those with polarized vision. The type of sensors that actually work best in this medium are those based on sound, like sonar and echolocation.

61-68 Super-heated plasma, like that found in a star, makes up the primary dimensional medium. Any type of secondary medium found will be located in isolated pockets of open space, otherwise the plasma would destroy all types of matter.

85-92 A layer of earth surrounds the dimension as a hollow sphere, making the outer walls a solid dimensional barrier. The earth (dirt, rock, clay, etc.) itself could be habitable, as well as any inner-planets, islands, etc.

93-00 A massive Alien Intelligence occupies the whole dimension and its body serves as the medium within which the dimension exists. Travel is actually within the veins, air passages and/or bones of the massive Alien Intelligence. It is powerful enough to create any type of environment within itself and may capture, torture and torment unsuspecting travellers, or it may be unaware (or doesn't care) that an entire universe or Pocket Dimension exists within its body.

The Colour of Space

01-50 Black

51-68 White

69-70 Red

71-72 Orange
73-74 Yellow
75-76 Green
77-78 Blue
79-80 Indigo
81-82 Violet
83-84 Grey
85-86 Gold
87-88 Silver
89-90 Bronze
91-92 Brown
93-94 Infrared
95-96 Ultraviolet
97 Mix of D4 colours
98 Mix of D8 colours
99 Mix of D12 colours
00 Mix of 4D4 colours

Step Five: Chronal Laws

Does time move forwards or backwards? Which chronal theory applies? Very few dimensions are unaffected by the flow of time. Those dimensions that are, are rare, or have been artificially created.

Chronal Type

1.13 Type 1; The timeline is consistent and can never be changed. One does not have any control and winds up becoming part of the timeline. The Novikov self-consistency principle applies (named after Dr. Igor Dmitrievich Novikov, Professor of Astrophysics at Copenhagen University). The principle states that if you travel in time, you cannot act in such a way so as to create a paradox. Time travel is constrained to prevent paradoxes. If one attempts to make a paradox, one undergoes involuntary or uncontrolled time travel. Michael Moorcock uses a form of this principle and calls it The Morphail Effect. In the time-travel stories of Connie Willis, time travellers encounter slippage which prevents them from either reaching the intended time or translates them a sufficient distance from their destination at the intended time, as to prevent any paradox from occurring.

14-26 Type 2; The timeline is flexible and is subject to change. The timeline is extremely change resistant and requires great effort to change it. Small changes will only alter the immediate future and events will conspire to maintain constant events in the far future; only large changes will alter events in the distant future. There are also numerous science fiction stories allegedly about time travel that are not internally consistent, where the traveller makes all kinds of changes to some historical time, but we do not get to see any consequences of this in our present day. The biggest problem is how to explain changes in the past. One method of explanation is that once the past changes, so too do the memories of all observers. This would mean that no observer would ever observe the changing of the past

(because they will not remember changing the past). Larry Niven suggests that the most efficient way for the universe to "correct" a change is for time travel to never be discovered or for the very large (or infinite) number of time travellers from the endless future will cause the timeline to change wildly until it reaches a history in which time travel is never discovered. This is depicted in the Dr Who TV show. This is also in the first Heroes Universe which I used in my campaign. The Middle Eastern Gods of this universe attempted to manipulate time to their own ends.

27-39 Type 3; The timeline cannot be altered but instead constantly splinters into all possible alternatives. Every possible choice creates a divergent timeline. Any changes are made to an alternate timeline. Any event that appears to have changed a time line has instead created a new one. Such an event can be the life line existence of a human (or other intelligence) such that manipulation of history ends up with there being more than one of the same individual, sometimes called time clones. The new time line may be a copy of the old one with changes caused by the time traveller. For example there is the Accumulative Audience Paradox where multitudes of time traveller tourists wish to attend some event in the life of Jesus or some other historical figure, where history tells us there were no such multitudes. Each tourist arrives in a reality that is a copy of the original with the added people, and no way for the tourist to travel back to the original time line. This was the Marvel Universe which my players crossed over to continuously. It is policed by the T.V.A., a well intentioned yet somewhat twisted version of the Watch Guard. It was featured throughout two series of the What If comics.

40-50 Type 4; The timeline can be altered but not before a certain point. In this universe you cannot travel to a point in time before Chronal technology has been built. Thus if it is now 2006 and time travel was discovered in 1999 you cant travel to a point before 1999. Forward travel is possible though because time travel exists in the future. This is shown in the TV series 7 Days.

51-60 Type 5; The timeline can be altered but not before a certain point. In this universe you cannot travel to a point in time before you were born. Thus if you were born in 1969 that is the furthest you can travel. Forward travel is possible though because your future is undefined. This is shown in the TV series Quantum Leap.

61-70 Type 6; The timeline cannot be altered because it no longer exists. There is only ever one present and nothing exists before or after it. Time travel is either not possible or the eras visited are some form of ghost wastelands.

71-80 Type 7; Time travel to the past is possible but not to the future. The past may be altered. The future doesn't exist yet thus there is nothing to visit.

81-90 Type 8; Time travel to the past is possible but not to the future. The past may not be altered. The future doesn't exist yet thus there is nothing to visit.

91-00 Type 9; Time travel to the past is possible but not to within your own dimension. Instead you travel into the past of a parallel dimension which is similar. The past and future of this dimension may be altered. This previously happened with the pre 2000 era of Marvel comics.

Chronal Flow

01-25 Normal time flow.

26-50 Time flows faster, travellers going to this dimension will experience a definite time acceleration;
- 01-20 D20 days
- 21-40 D20 weeks
- 41-60 D12 months
- 61-80 D20 years
- 81-00 D100 years

51-75 Time flows slower, travellers experience a time lag when traveling to and from this dimension;
- 01-20 D20 days
- 21-40 D20 weeks
- 41-60 D12 months
- 61-80 D20 years
- 81-00 D100 years

76-00 Time is meaningless in this dimension. While it appears to flow normally, travellers will discover that if they leave on a Tuesday at 4 P.M., they return on the same Tuesday at exactly 4 P.M. It should be noted that people age normally while they are within these dimensions, so if they entered as a young person and they spend 20 years in that dimension, when they return, scant seconds after they left, they appear 20 years older even though no time seemed to pass at home.

Step Six: Meta Physics

Is it possible for some life forms in this universe to have meta, psionic or cosmic powers? Or does life stop evolving at a certain point?

Meta Level 0

None. No lifeform has any form of meta powers.

Meta Level 1

Very Low. Minor mental powers only and less than 1% of any world population has any.

Meta Level 2

Low. All powers are available but at minor level only. D10% of any world population has any.

Meta Level 3

Medium. All powers are available and at any level. 5D10% of any world population has any.

Meta Level 4

High. Cosmic powers are also now available. D100% of any world population has any normal powers.

Step Seven: Mana Level

As per meta powers does Magic exist in this universe? How common is it? Who can use it? How much Mana does each person start with?

Mana Level 0

None. There is no magic but magical beliefs are possible, including belief in luck, the symbolic manipulation of luck, omens, and so forth. Beings may begin to profess belief in religious systems and concepts, including spiritual agencies (higher being or beings) and mythic regions (such as a spirit world or an afterlife). Atheism, the belief in the nonexistence of the preceding, is also prevalent. No evidence of the truth of such beliefs exists, including inspiration, communication with the divine, or prophecy. Religious rites may be devised, but such rites have no effect. Religious communities can form, although individuals often differ greatly on the doctrine or tenets of a faith, and hierarchies may develop.

Mana Level 1

Very Low. Magical energies manifest with the presence of magic altering the outcome of events for good or ill, causing random outbreaks of good or bad luck. People can, through the use of symbols, bless or curse each other or themselves. Omens, spontaneous events that prefigure good or ill luck, first manifest. Rituals to evoke omens are possible, allowing for fortunetelling. Fortunetelling can predict the future, though only in the most general fashion, and doing so is very unreliable. Spiritual energy is so low that rites take years in order to get even the slightest effect. Many rituals do not work and those that do work are extremely unreliable. There is no way to differentiate between the two. As a result, magical knowledge is heavily entwined with folklore. At best a magic user can tap into (INT + WIS) x1 mana.

Mana Level 2

Low. Rituals can evoke magic (though unreliably). A body of magical lore can be accumulated, which lore consists of a collection of recorded rituals. Magical spheres can be formalized, and organizations based on a sphere of magic are possible. Prophecies (predictions of future events) become available, although they are often obscure and difficult to interpret; most commonly, prophecies are understood only in hindsight. Prophesying can simply give inaccurate or incorrect results as well.

Direct invocation of divine power becomes possible, but is extremely unlikely. Even if successful, the effect will never be a visible and direct confirmation of divine agency. Enough spiritual energies exist to infuse life-forms with a permanent essence (a “spirit” or “soul”). Such spirits can be communicated with. An afterlife becomes possible, as does reincarnation (depending on the tenets of the religion. Rites become easier to invoke, involving weeks of effort rather than months or years. Magic users can tap into (INT + WIS) x2 mana.

Mana Level 3

Medium. Rituals increase in reliability; it is now possible to distinguish real rituals from folklore. A deliberate study of symbols is now possible, allowing the learned to guess at what symbols might evoke a desired effect. Through this process, they can discover new rituals. The magical symbology of a sphere can be formulated as a detailed series of magical laws; these laws delineate which symbols are needed to evoke a given effect (thus eliminating guesswork).

Reliable rituals are now possible. The rudiments of spells and spellcasting are developed. Specially trained (or talented) individuals can devise and cast spells. Spells allow precise control over when, how, and how powerfully a magical effect manifests. Divination effects are possible. Permanent magical items are possible. Magic users can discover the essence of mana; this essence underlies all magic in the dimension and is the source of all magic. Knowledge of the fundamental nature of magic allows magic users to transcend the limitations of a sphere.

Some can share spells freely between different spheres and can even devise and cast spells that use no symbols. Spell manipulation becomes possible, allowing magic users to bend the rigid limits of a spell (e.g. to allow the effect to last longer or to make the spell more powerful). Manipulating a spell requires extra effort during spellcasting.

Rites may be invoked without a community of the faithful being present, as long as the invoker has both faith and focus. The presence of the faithful can aid the effectiveness however. Prayers become available but usually require years of study or training since birth to utilize properly. Powerful effects still require the use of lengthy rites, each of which can take several days to complete. Religious symbols can be imbued with spiritual power as a result of divine agency but not through the will of the community; this power most often manifests itself by making the use of spiritual power easier for the faithful.

Believers can now invoke minor miraculous effects via endowment by a deity. Rites are available which can be invoked in a far shorter time- usually in a few hours. Mana is plentiful enough to infuse the unliving with magical energy. Independent action taken by spiritual agencies can occur. The community of faithful may imbue an item or place with spiritual power. Items (swords, talismans) may be imbued with spiritual energy that can aid in the performance of miracles or that allow an individual to perform a specific task. These items will only work for someone of the same faith as those who empowered the object.

The presence of the divine can manifest itself on a sporadic basis, appearing as a separate being or “possessing” a worshipper. Such manifestations are temporary and can only occur in the presence of believers. Beings whose nature is intrinsically spiritual may exist. Typically, such beings can invoke magic far easier than others. More accurate prophecies are available; differences in predicted events and eventual outcomes often lie in mistaken interpretations. Servants of the divine may be empowered with spiritual energy. Such servants can work magic directly, as if they were the divine (e.g., without the need for faith or focus checks). Divinely powered beings (“angels”, “demons”, etc.) may exist as physical beings. Magic users can tap into (INT + WIS) x3 mana.

Mana Level 4

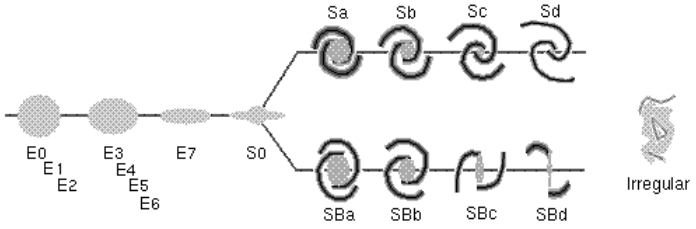
High. Magic is available to everyone though only some may truly master it.
Mana is plentiful enough to reduce some lengthy and complex rites down to prayers. Divine invocations become easier and more available. Divinely granted immortality is possible. Permanent portals to mythic regions may exist, created by spiritual agencies. The divine may now manifest itself directly, but temporarily, as a physical presence.

Magic users can tap into (INT + WIS) x4 mana.

Mana Level 5
Very High. Wish magic becomes an innate ability. Anyone can evoke a wish, simply by concentrating. The spiritual energies of the dimension are potent enough to affect its physical structure, including pocket dimensions or fringe realities, and remake them in accordance with the beliefs of the welder. Physical laws of the dimension may change, geological and archaeological evidence will be altered or eliminated, and the biology of life forms may be transformed. Some remnants of the original form of the dimension may survive, but these are rare. Accurate prophecies are available. Both in precision and clarity, such predictions are highly dependable. Magic users can tap into (INT + WIS) x5 mana or higher.

Step Eight: Inhabitants
Creating races is dealt with extensively in Life and Civilization. But one other detail not covered there is does everyone have a double in each universe? In my campaign the player who was the hero Dragoon in one universe was also Nick Fury, Dr Destroyer, Dr Diabolicus and Traveller in other universes. Some were also heroes, others villains and the rest misguided. Some divergent point can make all the difference between a character being good or evil in a given dimension.

3. Galaxies
Step 1: Galaxy Type
Galaxies are organized systems thousands to hundreds of thousands of light years across made of tens of millions to trillions of stars sometimes mixed with gas and dust all held together by their mutual gravity. The distances between galaxies are large and are often measured in mega parsecs. A megaparsec is one million parsecs (or about 3.3 million light years). For instance, the distance between the Milky Way and the closest large galaxy, the Andromeda Galaxy, is about 0.899 mega parsecs.



The Hubble ''tuning fork'' Sequence of galaxy classification. Galaxies are classified by shape. The **elliptical** galaxies go from circular (E0) to significantly flattened (E7). The spirals are sub-divided into **regular spirals** and **barred spirals.** Each of them is further sub-divided into groups depending on the size of the central bulge and how tightly the arms are wound around the center. The **irregular** galaxies have no definite structure. This is **not** an evolutionary sequence!

01-33
Elliptical galaxies are smooth and elliptical in appearance. There are four distinguishing characteristics of the ellipticals: (a) they have much more random star motion than orderly rotational motion (star orbits are aligned in a wide range of angles and have a wide range of eccentricities); (b) they have very little dust and gas left between the stars; (c) this means that they have no new star formation occurring now and no hot, bright, massive stars in them (those stars are too short-lived); and (d) they have no spiral structure. They are dead galaxies. If spiral galaxies are like rain forests, with cool life-giving interstellar clouds, elliptical galaxies are like deserts, with hot dry winds and little life. Elliptical galaxies are sub-classified according to how flat they are. The number next to the ``E'' in the tuning fork diagram = 10×(largest diameter - smallest diameter) / (largest diameter), so an E7 galaxy is flatter than an E0 galaxy. The flattened shape is not due to rotational flattening but to how the orbits are oriented and the distribution of the star velocities. Most ellipticals are small and faint. The dwarf ellipticals may be the most common type of galaxy in the universe (or maybe the dwarf irregulars are). Examples of elliptical galaxies are M32 (an E2 dwarf elliptical next to the Andromeda Galaxy) and M87 (a huge elliptical in the center of the Virgo cluster).

34-66
Spiral galaxies have flattened disks with a spiral pattern in the disk. The spiral arms can go all of the way into the bulge or be attached to the ends of a long bar of gas and dust that bisects the bulge. The four distinguishing characteristics of the spirals are: (a) they

have more orderly, rotational motion than random motion (the rotation refers to the disk as a whole and means that the star orbits are closely confined to a narrow range of angles and are fairly circular); (b) they have some or a lot of gas and dust between the stars; (c) this means they can have new star formation occurring in the disk, particularly in the spiral arms; and (d) they have a spiral structure. Spiral galaxies are sub-classified into ``a", ``b", ``c", and ``d" groups according to how loose their spiral arms are and how big the nucleus is. The ``a" group spirals have large bulges and very tightly wound spiral arms and the ``d" group spirals have almost no bulge and very loose arms. The Milky Way is between the ``b" and ``c" groups with a possible bar, so it is a Sbc or SBbc-type spiral galaxy. Most spirals are luminous. Some other examples of spiral galaxies are M31 (the Andromeda Galaxy) and M33 (a small spiral in the Local Group).

Some disk galaxies have no spiral arms and are called ``S0" (``SB0" if there is a bar) or lenticular galaxies. They are placed at the point in the tuning fork diagram where it branches off to the regular spiral or barred spiral pattern prong. Their gas and dust may been blown away by the galaxy moving quickly through the low-density intergalactic medium (hot, very thin gas between the galaxies) or used up in a rapid burst of star formation.

67-00

Irregular galaxies have no definite structure. The stars are bunched up but the patches are randomly distributed throughout the galaxy. Some irregulars have a lot of dust and gas so star formation is possible. Some are undergoing a burst of star formation now, so many H II regions are seen in them. Others have very little star formation going on in them (even some of those with a lot of gas and dust still in them). Most irregulars are small and faint. The dwarf irregulars may be the most common type of galaxy in the universe (or maybe the dwarf ellipticals are). The estimates of the number of dwarf irregulars and dwarf ellipticals are based on the proportions of these types of galaxies in nearby groups. The dwarf galaxies far away are too faint to be seen and are, therefore, overlooked in surveys

of the sky. Perhaps if the dwarf galaxies were brighter, Hubble would have arranged the galaxies in a different sequence instead of the two-pronged sequence. Examples of irregular galaxies are the Large and Small Magellanic Clouds (two small irregulars that orbit the Milky Way).

Step 2: Clusters

Galaxies tend to cluster together. Their mutual gravity can draw galaxies together into a cluster that is several millions of light years across. Some clusters have only a handful of galaxies and are called poor clusters. Other clusters with hundreds to thousands of galaxies are called rich clusters. The low mass of a poor cluster prevents the cluster from holding onto its members tightly. The poor cluster tends to be a bit more irregular in shape than a rich cluster.

Our Milky Way is part of a poor cluster called the Local Group. The Local Group has two large spirals, one small spiral, two ellipticals, 13 irregulars, and 14 dwarf ellipticals. There may be more irregular and dwarf ellipticals. The distribution of the galaxies is shown in the figure below. The Local Group is about 3 million light years across with the two large spirals, the Milky Way and Andromeda Galaxy, dominating the two ends. Each large spiral has several smaller galaxies orbiting them. The proportions of the different types of galaxies in the Local Group probably represents the number of the different types of galaxies in the rest of the universe. The small galaxies can be seen in the Local Group because they are close enough to us. But the dwarf galaxies are hard to see in far away clusters.

The clustering phenomenon does not stop with galaxies. Galaxy clusters attract each other to produce super clusters of tens to hundreds of clusters. Their mutual gravity binds them together into long filaments 300 to 900 million light years long, 150 to 300 million light years wide, and 15 to 30 million light years thick on average. Between the filamentary super clusters are HUGE voids with very few (if any) galaxies. The voids are typically 150 million light years across.

01-50  Rich cluster

51-00  Poor cluster

Step 3a: Sectors

Determine what is present in each separate sector of your created galaxy

01-50 Empty

51-75 Nebula. See table below.

76-00 Star Systems

3b: Nebula

Determine what the nebula is composed of.

01-33 Absorption Nebula; made up of dark matter, containing no developing stars.

34-66 Emission Nebula; made up of the gases of developing stars.
67-00 Stellar Nebula; made up of the debris from stars that have gone nova. They are more dangerous to navigate through due to high levels of shock waves and radiation.

4. Stellar Systems

Step 1: The Star System

Determine the amount of stars in your system.
01-30 Solo star.
31-40 Solo with nearby companion.
41-50 Solo with D4 nearby companions.
51-60 Binary system.
61-75 Binary with nearby companion.
76-80 Binary with D4 nearby companions.
81-86 Trinary system.
87-92 Trinary with nearby companion.
93-97 Trinary with D4 nearby companions.
98-00 Local cluster of 2D6 orbiting stars.

Step 2a: Star Types

Determine what type each star in the system is.

	Class	Colour	Temperature	Notes
01-10	O	Blue	25,0000 Kelvin or more.	Composed of ionized Helium, Oxygen, Nitrogen + Carbon. AU ranges x3 at Step 4.
11-20	B	Blue	11,0000-25,0000 Kelvin.	Composed of neutral Helium, ionized Oxygen + Nitrogen. AU ranges x2 at Step 4.
21-30	A	Blue	75000-11,0000 Kelvin.	Composed of ionized Magnesium, Silicon and Iron. AU ranges x2 at Step 4.
31-40	F	Blue/ White	60000-75000 Kelvin.	Composed of ionized and neutral metals. AU ranges as listed.
41-75	G	White/ Yellow	50000-60000 Kelvin.	Composed of ionized and neutral neutral metals + carbon hydride. AU ranges as listed.
76-85	K	Orange/ Red	35000-50000 Kelvin.	Composed of ionized and neutral metals + carbon hydride. AU ranges halved at Step 4.
86-95	M	Red	Less than 35000 Kelvin.	Composed of ionized and neutral metals + carbon hydride. AU ranges halved at Step 4.
96-00	Special	Special	Special	Roll on Uncommon Star Types table below.

Note: Different sectors of the galaxy feature more new or old stars, such as the high concentration of class M (red, second generation stars) in the outer spiral arms. In other sectors, minus the percentage by the same amount that the sector is closer to the galactic hub (ie, 30% closer, -30% to the roll).

2b: Uncommon Star Types

If Special determine what type of uncommon star it is.

	Type	Notes
01-15	Protostars	Become stars once their temperature reaches 107 and hydrogen fusion starts.
16-30	Neutron Stars	Are roughly 30 kilometres in diametre with half the speed of light required for escape velocity. A teaspoon of matter from one of these star cores weighs one hundred million tonnes on earth. These are formed at the end of a stars life. If the core mass can't support itself, then the neutron star's degenerative pressure collapses it into a singularity, popularly known as a Black hole.
31-55	Red Giants	Have diametres of 10 to 100 times greater than our suns.
56-70	Singularities	Black holes come in three forms; these are spinning, massive and charged black holes. Since the majority are formed from the collapsed core of a dead star, the gravitational pull they exert is about the same as any large star; you could even orbit around one safely and there might even be a few rocky, deep fried planets still floating around one. The real danger is the lethal radiation they emit, which is in the form of intense Gamma and X-ray bursts; these are variable in intensity, but can be huge if the Black hole is in the process of swallowing anything big (such as a planet or the outer atmosphere of a binary star), so caution is strongly advised in approaching any Black holes. Spinning black holes (known as Kerr singularities) are even more unusual in that the singularity at their centre is spinning so fast it forms a ring; through which it may be possible to travel through space and time (nobody knows for sure). That said, nothing can survive a descent into any black hole, the tidal forces are so strong that any object is reduced to a stream of elementary particles, and the time distortion is so intense that (from the plunging observers point of view) the Universe seems to speed up until it winks out of existence.
71-85	Super Giants	Are rarer, bigger and brighter than Giants.
86-00	White Dwarfs	Are hot and dim with a size similar to earths' with 220000K. A teaspoon of matter from these stars would weigh as much as a truck.

Step 3: Planetoid/Asteroid Belts

Determine the amount of Planetoid or Asteroid belts in your system and then their orbits;

01-20 None
21-60 One
61-80 Two

81-00 Three

Step 4: Planets

Roll on this table to determine how many planets are within each orbital zone (inner, middle and outer);

Inner Zone

Hot and inhospitable (Mercury-Venus) = 0.38 to 0.72 AU

01-50 None
51-00 D4

Middle Zone

Habitable zone (Earth-Mars) = 1.0 to 1.52 AU (M Class Planets)

01-10 None
11-65 D4
66-85 D6
86-95 D8
96-00 D10

Outer Zone

Cold and inhospitable (Jupiter-Pluto/Charon) = 5.20 to 39.4 AU

01-05 None
06-15 D4
16-40 D6
41-70 D8
71-85 D10
86-95 D12
96-00 D20

One AU or Astronomical Unit is the distance of Earth from the Sun.

5. Worlds

Step 1: Zone

Each star has a "habitable zone" or biozone, defined as the distance from the star in which water can exist in liquid form on a planet's surface. Human habitable worlds must lie within this zone. The larger and hotter the star, the larger the biozone is, and the farther from the star it is.

Zone
01-30 Inner; hot and inhospitable.
31-70 Middle; ideal habitable zone.
71-00 Outer; cold and inhospitable.

Step 2a: Planetary Size

Determine the size of each planet using the following modifiers;

Inner Orbit -10%
Middle Orbit +5%
Outer Orbit +10%

For mass Earth =1.0 or 6 million million million million Kgs.

Roll	Type	Diametre	Mass	Gravity
01-04	Asteroid/Planetoid Ring	under 1km	0.00007	.007%
05-15	Asteroid/Planetoid Belt	under 200kms	0.01	1%
16-20	Very Small	799km	0.06	6%
21-25	Small	2399km	0.1	10%
26-30	Small	3999km	0.3	30%
31-40	Small	5599km	0.4	40%
41-45	Small	7199km	0.5	50%
46-49	Medium	8799km	0.6	60%
50-55	Medium	10,399km	0.8	80%
56-60	Medium	11,999km	0.9	90%
61-70	Earth standard	12,756km	1.0	100%
71-75	Large	13,599km	1.1	110%
76-80	Large	15,199km	1.2	120%
81-85	Large	16,799km	1.3	130%
86-90	Small Gas Giant	48,899km	16.0	1600%
91-95	Medium Gas Giant	120,199km	95.0	9500%
96-00	Large Gas Giant	152,899km	318.0	31,800%

For comparison; Mercury is 4868kms; Venus is 12,103; Earth is 6378; Mars is 3400; Jupiter is 142,000; Saturn is 120,660; Uranus is 25,700; Neptune is 50,950; Pluto is 3500; and Charon is 1800kms.

2b: Gravity

Gravity is determined by the Mass of a planet, as listed above; it may be much higher or lower than these average examples, roll on the following table if you want some more variation.

01-09	Minimal	-40%
10-16	Extremely Light	-30%
17-23	Very Light	-20%
24-34	Light	-10%
35-45	Medium	-5%
46-76	Standard	Normal
77-84	Strong	+5%
85-90	Heavy	+10%
91-95	Very Heavy	+20%
96-98	Extremely Heavy	+30%
99-00	Massive	+40%

Step 3: Planetary Atmosphere

Determine the ecosphere of each planet using the following modifiers;

Inner Orbit	+10%
Middle Orbit	+5%
Outer Orbit	-10%

Iceball
Iceball worlds are usually small worlds made totally of rock, from core to surface. Their surfaces are rock plains, mountains and crevices, and perhaps craters and dust plains. Icy rockballs are only found in a star's outer orbits. Iceball worlds consist entirely of frozen liquid and gas, with no rocky core at all. Mercury is a Rockball world and Pluto an Icy Rockball or possibly just an Iceball. Vacc suits and pressurized habitats with artificial air supplies are necessary here.

01-04 Total Vacuum.
05-10 Vacuum with tiny toxic gas trace.
11-14 Vacuum with very thin tainted toxic gas mix atmosphere escaping the planet.
15-20 Vacuum with very thin atmosphere escaping the planet.
21-24 Vacuum with corrosive thin atmosphere or toxic trace metals and gases.

Cool Temperate
A cool temperate planet has an atmosphere poisonous to humans. Often, its climate is far too cold and its free-standing liquid is liquid methane or ammonia rather than water. Nevertheless, such planets may have native life. Hostile terrestrial planets usually occur beyond a star's biozone and may be moons of gas giants. Saturn's moon Titan is a hostile terrestrial world. Atmospheric pressure is lower than Earth's: .51 to .8 Earth normal. If enough oxygen is present, humans will find the air completely breathable with the aid of a respirator and can even breathe it for short periods unaided. Early theories on Mars pictured this kind of atmosphere.

Otherwise unbreathable to humans, but not necessarily poisonous. This type of atmosphere is typical of Terrestrial planets before our type of life develops. But anaerobic life or "nitrolife" is quite possible here.

25-30 Thin and tainted Oxygen/Nitrogen/Carbon Dioxide with toxic contaminants.
31-34 Thin Oxygen/Nitrogen/Carbon Dioxide.
35-40 Thin and corrosive as above with predominantly toxic trace metals and gases.
41-44 Thin and volatile Nitrogen/Carbon dioxide with combustible volatiles.
45-50 Standard glacial Oxygen/Nitrogen with minimal Carbon dioxide and high ozone.

Temperate - Variable
A world rated as earthlike will be very much like our own planet — or at least like parts of it, depending on its overall climate, the amount of water it has and its atmosphere. The climate may be temperate, tropical, or arctic, but is liveable by definition. Of course, there may still be obvious flaws or hidden deathtraps, making the world useless.

Standard .81 to 1.2 Earth normal. Breathable without any artificial aids by humans, if enough oxygen is present. These are the most Earthlike atmospheres. Generally Earthlike atmosphere; almost impossible to find except as a result of life similar to Earth's. Earth's atmosphere is 77% nitrogen, 21% oxygen, and 1% argon, with traces of water, and so on. Nitrogen and argon are inert; the oxygen percentage is vital. Earth's biological and geological processes hold it at 21%.

51-54 Standard and volatile Nitrogen/Carbon dioxide with fierce winds.
55-60 Standard Oxygen/Nitrogen with significant ozone component in stratosphere.
61-65 Standard and tainted Oxygen/Nitrogen with some contaminants.

Greenhouse Inferno
A greenhouse Earth or hothouse Earth is a period in which there are no continental glaciers whatsoever on the planet, the levels of carbon dioxide and other greenhouse gases (such as water vapour and methane) are high, and sea surface temperatures range from 28 °C (82.4 °F) in the tropics to 0 °C (32 °F) in the polar regions. Corrosive atmospheres require well protected artificial life support for survival. Unprotected humans will die quickly and painfully. Vacc suits or protective suits with self-contained air supplies are necessary. Most metals will quickly be destroyed by such atmospheres, especially those with even a trace of chlorine or fluorine.
66-70 Standard and parched Oxygen/Nitrogen with minimal ozone and high Carbon dioxide.
71-74 Standard and corrosive Oxygen/Nitrogen with abundant toxic trace metals and gases.

Hellish
Hellish worlds have thick, dense atmospheres that magnify the greenhouse effect, producing worlds that are very hot, sometimes too hot for life to develop. Atmospheres may have high concentrations of carbon dioxide and sometimes sulfur compounds. Venus as we now know it is a greenhouse world taken to the extreme. Venus as it was once thought to be would be a habitable greenhouse world. Dense atmosphere have pressures greater than Earth's: 1.21 to 1.5 Earth normal. They are still breathable, with some difficulty, if 02 is present. Dense atmospheres may seem "soupy" to regular humans, and asthma sufferers will find breathing very difficult.

75-80 Dense thick atmosphere which is predominantly oxygen and nitrogen.
81-84 Dense and tainted as before but with toxic contaminants.

Arctic
These worlds are usually smaller worlds with thin atmospheres and little, if any, free water. Their water may lie frozen in ice caps, melting only at certain times of the year to nurture what life exists. Mars is an extreme example of an Arctic world. Some Arctic worlds are very old; they once had more water but lost it to space. These have superdense atmospheres which can have pressures up to several hundred times that of Earth. Only the sturdiest structures can maintain Earthlike internal pressures and survive. In the outer zone, frozen or near-liquid atmospheres may qualify as superdense. Nothing less than an EAVS or battlesuit — if that — will make it possible to get around on the surface of these worlds. Venus has a superdense atmosphere. Exotic atmospheres consist of assorted non-breathable or poisonous gases; some may contain corrosive elements. Self-contained oxygen supplies, and often protective or pressure suits, are necessary to survive in these atmospheres. (Alien races may thrive in exotic atmospheres.)

85-90 Exotic mainly ammonia and methane.

91-95 Exotic and dense thick atmosphere of ammonia and methane.
96-00 Exotic and corrosive plethora of toxic trace metals and gases.

Step 4: Climate

Climate is the average temperature of all points on the 30th parallel, night and day — tropics will be warmer, mountains and poles will be colder. Orbital distance, naturally, affects climate. A world at the inner edge of the biozone will be hot, and one at the outer edge will be cold. But a world in the middle can have any climate the GM chooses, because of other factors. For instance, Earth would be much colder if not for the heat still being released from its molten core. Internal radioactives and the "greenhouse effect" can also warm up a world. Interstellar gas can block sunlight; cloud or ice surface can increase albedo and reflect heat, cooling a planet.

Planets in a multiple system can receive extra heat from other suns. Thus, it is quite possible for a world to remain habitable even though it is slightly outside the nominal biozone. Orbital distance, naturally, affects climate. A world at the inner edge of the biozone will be hot, and one at the outer edge will be cold. But a world in the middle can have any climate the GM chooses, because of other factors. For instance, Earth would be much colder if not for the heat still being released from its molten core.

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Iceball	+30%
Greenhouse	-10%
Cool Temperate	+10%
Hellish	-20%
Variable Temperate	+5%
Arctic	+20%

01-10 Very Hot; Low 38C, Average 49C, High 60C.
11-20 Hot; Low 32C, Average 43C, High 54C.
21-30 Tropical; Low 27C, Average 38C, High 49C.
31-40 Warm; Low 21C, Average 32C, High 43C.
41-50 Normal; Low 15C, Average 27C, High 38C.
51-60 Cool; Low 5C, Average 15C, High 27C.
61-70 Chilly; Low -7C, Average 5C, High 15C.
71-80 Cold; Low -18C, Average -7C, High 5C.
81-90 Very Cold; Low -29C, Average -18C, High -7C.

91-00 Frozen; Low -40C, Average -29C, High -18C.

Step 5: Biosphere

A planet's biosphere is its envelope of life — its flora, fauna, and microorganisms. The exact nature of each world's life should be decided by the GM, often in connection with a specific adventure. However, the table below will allow a broad determination of what types of life exist. This table is primarily for Terrestrial worlds within the habitable zone. It may be used with other types of worlds, but life will be truly alien there, if it exists at all.

01-16 Protoorganisms only: single- or multi-celled microorganisms, including algae, protozoa, amoebas and so on.
17-32 As above + lower plants: equivalents of lichens, mosses and fungi.
33-48 As above + higher plants: equivalents of ferns and flowering plants.
49-64 As above + lower animals (INT 1): equivalents of insects, fish, amphibians.
65-80 As above + higher animals (INT 2): equivalents of reptiles, mammals, birds.
81-00 As above + intelligent lifeforms (INT 3+): civilization or the potential for civilization. Tools, fire, and language. Lower forms than the dominant one will usually still exist. The GM may roll again from the choices given under dominant type — e.g., to determine whether insects, fish or amphibians are the dominant type, if "lower animals" is rolled. If intelligence exists, the GM should define its type, tech level, society, and so on .

Step 6a: Orbital Conditions

Determine the stability of the orbit of each planet around its star,

01-20 Very stable, circular orbit, very stable surface temperature.
21-40 Very stable, elliptical (oval) orbit, warmer twice every local year.
41-55 Very stable, very elliptical orbit, gets hot and cold twice every local year.
56-65 Slightly erratic, circular orbit, stable surface temperature changes gradually over thousands of years.
66-74 Slightly erratic, elliptical orbit, warmer twice a year, temperature changes rapidly over hundreds of years.
75-80 Slightly erratic, very elliptical orbit, hot and cold, temperatures become extreme every few years.
81-86 Very erratic, but circular orbit, temperature rises and cools every year by a few degrees.
87-90 Very erratic, elliptical orbit, hot and cold extremes twice a year vary by a few degrees each time.
91-94 Very erratic, very elliptical orbit, very hot and cold extremes, frequent storms, very harsh conditions.
95-98 Extremely erratic, retrograde (backwards) orbit, but stable, unpredictable temperature variations.
99-00 Extremely erratic, retrograde, elliptical orbit, unpredictable, harsh and violent temperature changes.

6b: Stellar Orbit

Determine the length of time involved for the planet to rotate around its star.

.3 AU	50 +D10 days
.4 AU	75 +D12 days
.5 AU	100 +2D10 days
.6 AU	130 +3D10 days
.7 AU	160 +4D10 days
.8 AU	200 +5D10 days
1 AU	300 +D100 days
2 AU	500 +D100 days
3 AU	900 +D100 days
5 AU	10 years +D20 months
6-20 AU	AU x3 years +D12 months
21-40 AU	AU x4 years +D12 months

6c: Axis Spin

Determine the length of time involved for the planet to rotate on its own axis (how long each day is).

Gravity less than 1% to 200%	D20 hours +D8 hours
Gravity 201% to 999%	D20 hours
Gravity 1000%+	D12 hours

Step 7a: Hydrographics

Even if there is no water, an ocean of any liquid element (hydrogen, ammonia, etc.) can still foster life.

01-10 0% water. Solid land with no surface water/liquid.
11-20 10% water. Only a few scattered seas or lakes, bound by land.
21-30 20% water. Single super continent with surrounding shallow ocean.
31-40 40% water. D4 small continents and many islands in deep oceans.
41-50 50% water. Single large continent and thousands of island groups.
51-60 60% water. Many small continents and islands with deep oceans.
61-70 70% water. Standard, D4 large continents and many islands.
71-80 80% water. Thousands of large and small islands in very deep oceans.
81-90 90% water. Covered in a world ocean with only a few, scattered island groups.
91-00 100% water. Completely covered by an unbroken ocean with no land above the surface.

7b: Humidity

The amount of water vapour in the air is important to most species. Earth averages 50% humidity. Anything below 30% is uncomfortably dry; anything above 70% is muggy. At 100%, it rains all the time. Average humidity over 100% is impossible. The presence of liquid water makes higher humidity likely, but there are many other factors involved.
To assign humidity randomly, roll D100%, and add 10% of the world's water surface. Thus, a roll of 60 on a world with 50% water would give 65% average humidity. Regardless of the roll or amount of water, humidity cannot exceed 100%.

Step 8: Terrain

Almost every type of terrain can be found somewhere on any planet, if the appropriate plant life has evolved. But the prevailing terrain on a world is governed by its climate and the amount of water present. The following types of terrain may be found on earthlike and hostile terrestrial worlds; most can be found on Greenhouse and Desert worlds as well. Iceball worlds almost always look Hilly/Rough.

Desert/Barren: Low, flat, barren plains, perhaps covered with sand and/or dust in low dunes. Prevalent on older planets with less than 30% surface water, or any world with under 10%. Can occur even on worlds with more water if the land areas are cut off in some way from the seas.

Icy/Barren: As above, but drifted with snow and ice. Prevalent on Chilly to Frozen worlds with more than 30% water; also common on Cool worlds with under 50% water.
Hilly/Rough: Mostly bare, rocky terrain, with small hills, boulders and debris, crevices and ravines and so on. Prevalent on younger planets with less than 30% surface water. Can include cratered terrain and rough glaciers.

Mountainous/Volcanic: High rocky mountains, jagged peaks, cliffs and/or active or dead volcanoes. Most likely on geologically very young worlds with less than 30% surface water.

Plains/Steppe: Low, flat expanses. Not as dry as desert/barren. May have abundant rivers and lakes, moist soil, etc. Common on worlds with 30% to 60% water surface; also found in the centre of large continents, or behind mountain ranges, on wetter worlds. Plant life, if any, is characterized by grasses, low shrubs and bushes, and tough weeds.

Forest/Jungle: These only exist if vegetable life does. Can range from lightly wooded areas to densely packed forests and jungles. Usually abundant near rivers, lakes and other bodies of water. Common on Cool or warmer worlds with more than 40% water surface. Hostile Terrestrial forests might be some other form of immobile alien life, or even forests of crystal, minerals, etc.

Marsh/Swamp: Low, wet areas, often near large bodies of water and almost always including areas of surface water themselves. Mud, quicksand and very moist ground are abundant. If vegetation exists, lush water plants and other life forms are common. Likely if surface water is over 90% and the world is Cool or wanner; very likely if the world is Tropical or warmer.

Step 9a: Density

A planet's density is governed by its composition — the material of which it is made. A large world may have a relatively low gravity if it is made up of light substances; a small world may have a higher-than-expected gravity if its density is high. The composition types, from heaviest (densest) to lightest, are:

01-10 Metallic (Density 7.1 and up): Mostly silicates (rock), but metals and rare elements are plentiful — a great place for mining. But there's high background

radiation, frequent volcanoes and earthquakes, and extra heat (due to internal radioactivity). There's not likely to be much atmosphere, but the strong magnetic field helps to retain any atmosphere captured (perhaps from comets), diverts solar radiation, and provides a colorful aurora. Example: none in the Solar System. There are reasons to believe that planet-sized bodies this dense are very rare; a world of solid iron would have a density of 8.

11-30 High-Iron (Density 6.1 to 7): As above, but less so: a breathable atmosphere is likelier. Composition is essentially earthlike, but with more metal. Example: none in the Solar System.

31-60 Medium-Iron (Density 4.6 to 6): Even more rock and less iron. Examples: Earth (5.5), Venus (5.2).

61-80 Low-Iron (Density 3.1 to 4.5): Density significantly lower than Earth's. Metals are rare — high-tech civilization based on abundance of metals cannot develop. With less interior heat, the climate will be cooler than might otherwise be expected. Volcanoes are rare. The magnetic field is weaker, so the world is less protected from outside radiation. Examples: Mars (4.0), Luna (3.3).

81-90 Silicate (Density 1.3 to 3): A very low-density world. Metals are very rare — any civilization will have to use low-density ores (such as aluminium), a major obstacle to development of a high-tech native culture. Volcanoes are rare, as are earthquakes. There is almost no interior heat, and the weak magnetic field lets harmful radiation reach the surface. Examples: Pluto (1.5?), the Jovian and Saturnian moons.

91-00 Gas Giant (Density .6 to 2.5): An accumulation of frozen gases, uninhabitable by humanoid races. Some gas giants have a central "rockball" core, which will never be seen unless the planet is boiled away by a nova. Others may have a core of solid (metallic) hydrogen. Examples: Saturn (.7), Neptune (2.3).

9b: Resources

Some planets become important because of their mineral resources; others are crippled for lack of a resource. Roll D100 to determine what percentage of each element from the periodic table is present on the planet, using the following modifiers;

+40 for Metallic composition
-10 if surface water is at least 90%
-30 for diamonds, emeralds, rubies, sapphires, industrial silicon and so on
+20 for High-Iron composition
+10 if surface water is 30% or less
+10 for industrial metals such as iron, tin, copper, zinc, and so on
-10 for Low-Iron composition
-20 for radioactives such as uranium, radium, thorium and so on
-20 for rare, special minerals,, or unusual elements or compounds not normally found on other worlds
-30 for Silicate composition
-10 for for heavy metals such as gold, silver, platinum, cobalt and so on
+30 for light metals such as sodium, aluminium, lithium and so on

On Iceballs, metallic, iron or silicate worlds in outer orbits will be almost totally covered with "ice," which may include many compounds other than water. Oxygen, nitrogen and other "atmospheric" gases will be frozen out on very cold planets. Asteroids may have ice, though it will not be on the surface.

If Hostile Terrestrial worlds and Greenhouse worlds with Superdense atmospheres have any liquid at all, it will likely be methane, ammonia or sulphuric acid. Worlds with Exotic or Corrosive atmospheres will have a liquid appropriate to their atmospheric composition and orbital positions Gas giants have no liquid water; there will be solid water on the surface and possibly traces of water in the atmosphere.

Step 10: Satellites

Roll D100 to determine how many moons; on 1-50 None, on 51-00 roll on the table below.

Planet Size	Amount of moons
Small	D4 -2
Medium	D6
Large	D12
Small Gas Giant	D20
Medium Gas Giant	5D10
Large Gas Giant	D100

6. Life

Step 1: Biological Type

For really weird aliens, try rolling on this table twice to find some combinations. This table was created entirely by AJ Pickett.

Roll	Type	Description
01-02	Amoeboid	Species with a body form that has no consistent shape.
03-04	Organic Polymeroid	Species formed out of large molecular chains (plastics).
05-06	Marsupial	Mammal species which possesses a pouch with which they foster their undeveloped young.
07-08	Depositic Amalgamate	Species consisting of collected substances or primitive organisms.
09-10	Fungoid	Plant species that does not require photosynthesis, feeding on (usually) organic matter instead.
11-12	Sporoid	Reproductive parts of a larger organism, spores.
13-14	Osmodic membrane	Species consisting of layered films, usually attached to another organism or solid surface.
15-16	Saurian	Warm blooded, advanced reptiles (dinosaurs).
17-18	Photonic Node	Living light.
19-20	Algoid	Species consisting of a form of water vegetation (sea weed).
21-22	Synthetic	Artificial life form.

Roll	Type	Description
23-24	Mammalian	Warm blooded species which bears live young and nourishes them with milk secretion.
25-26	Planktonic	Species inhabiting a liquid medium with no contact with solids required.
27-28	Saprophyte	Plant species that feeds off other living organisms.
29-30	Malacoid	Species similar to a mollusk (including snails, oysters, cuttle-fish, etc).
31-32	Ecoform	Species that is the combined sum of an entire ecosystem of lesser species.
33-34	Sub-spatial Node	Species consisting of a warp complex in Space/time, such as living wormholes.
35-36	Reptilian	Cold blooded, primitive reptiles.
37-38	Gestalt	Single thought identity formed from all individuals of a species.
39-40	Lipoid	Species consisting primarily of complex organic oils and fats.
41-42	Resonate	Pure energy life form (Non material).
43-44	Plasmadic	Gaseous species.
45-46	Precipitate	Species existing as a by product (usually organic chemistry) of another organism.
47-48	Actinoid	Species with a radioactive body chemistry.
49-50	Cephalopod	Species with limbs directly attached to the head (like an Octopus).
51-52	Herbaceous	Plant like species.
53-54	Microbial	Microscopic organisms.
55-56	Insectoid	Exoskeleton, bodywide respiratory system, segmented body parts.
57-58	Amphipod	Species similar to a crustacean.
59-60	Endomorphic	Species that lives inside another species.
61-62	Baloonoid	Species consisting largely of a gas filled spherical membrane.
63-64	Amorphic	A shapeless species (no set body structure).
65-66	Crystalloid	Species composed of crystalline substances (may or may not be fully solidified).
67-68	Amalgamate	Integrated life forms, usually cybernetic, but including co-operative organisms.
69-70	Recombinate Form	Species that is the end product of a massive mutation process in another organism.
71-72	Bicephaloid	Species with two heads (may also have two separate minds).
73-74	Arthropod	Species possessing a jointed body and limbs.
75-76	Mineraloid	Species composed of inorganic minerals (may or may not be fully solidified).
77-78	Alkaloid	Species with a nitrogen body chemistry.
79-80	Exomorphic	Species that exists attached to another species.

Roll	Type	Description
81-82	Arachnoid	Spider-like, predatory species.
83-84	Ornithoid	Bird like species, adapted to flight.
85-86	Ichypoid	Fish like species, adapted to respirate and live in a liquid medium.
87-88	Amphibian	Species that lives both on land and in water.
89-90	Aliped	Wing footed mammal species, such as a Bats.
91-92	Isomeroid	Species which consists of only one element (and alternate forms of it).
93-94	Silicoid	Species composed mainly of Silicon compounds.
95-96	Chromodic	Species which evolved in the outer atmosphere of a planet or star.
97-98	Benthoid	Species which evolved on a deep ocean bottom.
99-00	Exobiotic	Species that has evolved and lives in space.

Step 2: Species Traits

There's no set number of times to roll on this table, but at least four is recommended. This table was created by myself and AJ Pickett.

01-02 Armour Plated; Double the normal HPs with an AC of 6.

03-04 Covered in fungus; Symbiotic or pathogenic? The fungus may provide camouflage, protection or nourishment of some kind, maybe it augments the host, or is highly cultural or addictive?

05-06 Dome Shaped; like a crab, with it's body flatter underneath and rounder on top. Limbs are arranged around it.

07-08 Double Headed; 2 heads on 1 torso.

09-10 Doughnut Shaped; -1 to hit due to their being no main body to aim at.

01-12 Elastic Bones; Only takes half damage from any kinetic attacks (falls, punches, explosions, etc).

13-14 Emits Vapours; Identical to the Minor Power of Fart Expulsion.

15-16 Extra limbs; D4, D6, D8, D10, D12 or D20 extra arms, legs or heads or a mixture of each.

17 Fat; life form appears overweight, however it may be pure muscle.

18-19 Featureless; a totally blank face and body. No eyes, ears, nipples, etc. This life form's senses must work in a totally different manner to the norm. This skin is also totally smooth.

20-21 Flat Billed; platypus type beak.

22-23 Frilled; lizard type vane around the neck.

24-25 Headless; Sensory organs are located on the main torso.

26-28 Horned; Up to D4 horns on head which do D6 damage each.

29 Hourglass Shaped; unusual body shape.

30 Huge Jaw; neck length.
Jointed Spines; The creature has long spines (sturdy) with joints like knees or elbows it can bend and feel like limbs/fingers. The spines may be used as locomotion or for display.

32-33 Large Eared; enhanced hearing identical to the Minor Power.

33-34 Large Eyed; +10% better sight.

35-36 Large Nostrils; smell +10% better.

37-38 Long Limbed; arms reach down to the knees or even ankles.

39 Lumpy; over most of skin.
40-42 Mandibles; like an insect with a STR equal to double your normal attribute.
43-44 Mottled; Multiple coloured hide/skin/surface, probably a method to conceal or stand out on their home environment, such an appearance on earth can be found on coral fish, moths, lizards, other insects, etc. Add prowl bonuses if applicable, otherwise the creature may stand out because it is highly toxic or just mimics a another nasty critter.
45-47 Multiple Mouths; Up to D6 extra mouths located on various parts of the body.
48 Pear Shaped; unusual body shape.
49-50 Prehensile Limbed; can use legs and toes for the same purpose as arms and fingers.
51-52 Reflective Hide; All energy attacks bounce off.
53-54 Retractable Claws; Up to D4 inches long.
55-56 Retractable Tongue; With a length equal to own height.
57 Rough Skinned; course like a shark.
58-59 Round Backed; the creature has a very curved spine/back, giving it a hunched and stooped stance. Very strong, bracing musculature. +2 STR.
60 Segmented; like a centipede.
61-62 Serpentine Scaled; D100% of body is covered in scales.
63-64 Sharp Teeth; +D4 damage.
65-66 Skinny; practically anorexic. -2 STR, +4 MR due to lighter frame.
67-68 Slimy; very difficult to catch or hold on to due to his slippery skin. +2 evade, +3 roll.
69-70 Slit Featured; has slits instead of eyes, ears, nose and mouth.
71-72 Spined; like a porcupine. Length, shape, colour, hardness and function (possibly venomous) is left up to the GM.
73 Split Body; 2 torsos on top of 1 set of legs.
74 Stalk faced; like a snail.
75-76 Striped; like a zebra.
77-79 Sturdy Quadroped; walks around on all fours.
80-81 Suckers; same as the adhesion Minor Power. They can be located on the fingers, chest or wherever else desired.
82-83 Tail; Either thin but strong like a monkey's allowing the life form to lift his own body weight using it, or a thick and powerful bludgeoning weapon.
84-85 Tentacles; Finger or arm.
86-87 Tough Skinned; natural AC 6.
88-89 Transparent Body; Can see right through the life form's body. Note he is not totally invisible as his outline can be made out.
90-91 Transparent Skin; Can see the muscle tissue and veins beneath the life form's skin.
92 Twitchy; shakes a lot.
93-94 Unusual Skin Colour; Pick one, whatever colour you like. Or perhaps a combination of various colours.
95-96 Unusual Sensory Organs; Identical to one of the Minor Power senses. This may include Hearing, Smell, or one of the Vision powers.
97 Veined Skin; skin is semi transparent with arteries and veins clearly showing

through.
98 Webbed; between its fingers or toes or both.
99-00 Wings; Identical to the Minor Power of Winged Flight.

Step 3: Feeding Habits

First roll to determine type, then roll again within its own section;
01-25 Carnivore
26-50 Herbivore
51-75 Omnivore
76-00 Scavenger

Carnivore

01-20	Chaser	Kill their prey after chasing it to the ground.
21-40	Killer	Raw instinct of killing for its own sake.
41-60	Pouncer	Kill prey by attacking from hiding or by stalking and springing, will flee if surprised.
61-80	Siren	Creates a lure to draw a prey to its trap.
81-00	Trapper	Passively allow their prey to enter a created trap wherein they are killed and then eaten.

Herbivore

01-50	Grazer	Devote most of their time to eating with their primary defense being flight.
51-00	Intermittent	Don't eat full time and usually freeze when an encounter occurs, then flee if attacked.

Omnivore

01-33	Eater	Eats anything and everything making no distinction.
34-66	Gatherer	Tend to eat more unresisting food.
67-00	Hunter	Similar to Chasers.

Scavenger

01-50	Carrion Eater	Take dead meat when it becomes available often waiting patiently for all other threats to disperse before beginning.
51-00	Hijacker	Establish their claim to food simply by taking it, relying on superior strength.

Step 4: Size

How tall/long is each species?
01-05 1ft +D10 inches
06-10 2ft +D10 inches
11-15 3ft +D10 inches
16-20 4ft +D10 inches
21-40 5ft +D10 inches
41-60 6ft +D10 inches
61-70 7ft +D10 inches
71-80 8ft +D10 inches
81-85 9ft +D10 inches
86-90 10ft +D10 inches

91-95 11ft +D10 inches
96-00 12ft +D10 inches

Step 5: Attribute Notes

Considerations for determining Physical and Mental Attributes are wide open to variation, but some reasonable estimates should be easy to guess after the entire environmental and behavioural backgrounds have been rolled. Generally mental attributes are based around technology, culture and adaptability. Physical attributes are based around form, local gravity, size, environment and behavioural adaptations. A predatory species is most likely to be strong and fast, but may not have a high endurance; bursts of activity followed by long periods of inactivity are common. A relatively aggressive and uncooperative species may be technologically advanced due to high individual intelligence, and likewise, a relatively stupid species can achieve great technological progress just through lots of cooperation.

7. Civilization

Step 1: Population

Determine the size of the population using the following modifiers;

Inner orbit	-30%
Tainted atmosphere	-10%
Plenty of oceans	+10%
Middle orbit	+10%
Corrosive atmosphere	-20%
Low gravity	-10%
Outer orbit	-40%
Volatile atmosphere	-30%
Average gravity	+10%
No atmosphere	-50%
Stable orbit	+10%
High gravity	-20%
Thin atmosphere	-20%
Erratic orbit	+20%
Class M star	-30%
Average atmosphere	+10%
Very erratic orbit	-40%
Class K-F star	+10%
Dense atmosphere	-30%
No oceans	-50%
Class A-O star	-20%

Population Numbers

01-20 Lifeless, No indigenous life forms at all.
21-30 Barren, No indigenous life forms except for microbial proto cells.
31-50 Unpopulated, No intelligent life forms, plenty of plant and/or animal life forms.

51-60 Lightly populated, beginnings of civilization, D20 x 10,000.
61-65 Moderately populated, D20 x 100,000.
66-75 Heavily populated, D20 x 1,000,000.
76-85 Densely populated, D20 x 10,000,000.
86-95 Massively populated, D20 x 100,000,000.
96-00 Incredibly populated, D20 x 1,000,000,000.

Step 2: Culture

Determine the attitude of the majority of the population.

01-10	Passive	Completely free of violence and evil.
11-20	Enlightened	Truly kind race with little violence or hatefulness.
21-35	Benevolent	More tolerant than standard but still with some violence.
36-55	Standard	Diversified mix of kind and evil people.
56-70	Paranoid	Diversified mix leaning more to evil and selfishness.
71-85	Xenophobic	Fearful of others, harsh but still some redeeming features.
86-95	Hostile	Intolerant and aggressive, held in check by strong social customs.
96-00	Malevolent	Truly malicious race with no redeeming qualities at all.

Step 3: Government

Determine how the society is ruled.

01-03	None	There is no form of government at all.
04-06	Anarchy	There is no individual ownership with everything provided by the governing body and elected area council members serving on a super council.
07-09	Banana Republic	A politically unstable and kleptocratic government that economically depends upon the exports of a limited resource (fruits, minerals), and usually features a society composed of stratified social classes, such as a great, impoverished ergatocracy and a ruling plutocracy, composed of the aristocracy of business, politics, and the military.
10-12	Bankocracy	A system of governance with excessive power or influence of banks and other financial authorities on public policy-making. It can also refer to a form of government where financial institutions rule society.
13-15	Bureaucracy	A system of governance with many bureaus, administrators, and petty officials.
16-18	Communism	A socialist system in which the means of production are commonly owned (either by the people directly, through the commune, or by a communist state or society), and production is undertaken for use, rather than for profit. Communist society is thus, in theory, stateless, classless, moneyless, and democratic — it is usually regarded as the "final form" of a socialist or anarchist society.
19-21	Corporatocracy	A system of governance where an economic and political system is controlled by corporations or corporate interests.

22-24	Bureaucracy	Government by agencies.
25-28	Colony/ Captive	Government by a leadership answerable to an outside group.
29-32	Corporation	Government by company managerial elite, citizens are company employees.
33-36	Democracy	Government by advice and consent of the public whether elected council or large government.
37-40	Dictatorship	Government by a single leader.
41-44	Feudal Technocracy	Government by specific individuals for those who agree to be ruled. Relationships are based on the performance of technical activities which are mutually beneficial.
45-48	Hive	Government by a group mind with a single ruler working towards the betterment of the entire hive.
49-52	Magocracy	Government with the highest and main authority being either a magician, sage, sorcerer, wizard or witch. This is often similar to a theocratic structured regime and is of course only available on a magical world.
53-56	Matriarchy/ Patriarchy	Society ruled predominantly by women (matriarchy) or men (patriarchy).
57-60	Military Dictatorship	Government by military council which has little regard for its citizenry.
61-64	Monarchy	Government by royal family, must be born into the position.
65-68	Nepotocracy	Favouritism granted to relatives regardless of merit; a system of governance in which importance is given to the relatives of those already in power, like a nephew (where the word comes from). In such governments even if the relatives aren't qualified they are given positions of authority just because they know someone who already has authority.
69-72	Oligarchy	Government by restricted minority with little or no input from the public.
73-76	Religious Autocracy	Government by a single religious dictator.
77-80	Theocracy	Government by a religious minority which has little regard for its citizenry.
81-84	Socialism	A system in which workers, democratically and/or socially own the means of production. The economic framework may be decentralized and self-managed in autonomous economic units, as in libertarian systems, or centrally planned, as in authoritarian systems. Public services such as healthcare and education would be commonly, collectively, and/or state owned.
85-88	Technocracy	Government by the educated or technical experts; a

		system of governance where people who are skilled or proficient govern in their respective areas of expertise in technology would be in control of all decision making. Doctors, engineers, scientists, professionals and technologists who have knowledge, expertise, or skills would compose the governing body instead of politicians, businessmen and economists. In a technocracy, decision makers would be selected based upon how knowledgeable and skillful they are in their field.
89-92	Totalitarianism	Government by a minority which maintains absolute control through coercion and oppression.
93-96	Tribalism	A system based on a small complex society of varying degrees of centralisation that is led by an individual known as a chief.
97-00	Unocracy	Ruled by a singularity of all human minds connected via some form of technical or non-technical telepathy acting as a form of super computer to make decisions based on shared patterned experiences to deliver fair and accurate decisions to problems as they arrive. Also known as the "Hive Mind" principle, it differs from voting in that each person would make a decision while in the "hive" the synapses of all minds work together following a longer path of memories to make "one" decision.

Step 4: Law

Determine how rigid the society is.

Roll	Law Level	Control
01-09	None	No prohibitions.
10-17	Low	Prohibition of machine guns, automatic rifles, explosives and poison gas.
18-25	Low	Prohibition of above + shotguns.
26-33	Low	Prohibition of above + pistols.
34-42	Moderate	Prohibition of above all firearms.
43-55	Moderate	Prohibition of above + blade weapons.
56-64	Moderate	Prohibition of above inside homes as collections.
65-70	High	Rigid control of civilian movement.
71-78	High	Unrestricted invasion of privacy.
79-85	High	Paramilitary law enforcement.
86-89	Extreme	True police state.
90-93	Extreme	All facets of life rigidly controlled.
94-97	Extreme	Severe punishment for petty infractions.
98-00	Extreme	Totally oppressive and restrictive.

Step 5: Technology

Determine how technologically developed the society is. It is also possible for more advanced societies to have a mix of tech levels between for instance weapons, spaceships and medicine.

Roll	Tech Level	Technology type
01-08	0	Stone Age; Cave dwellings. Counting, oral tradition, fire, sewing needle. Skis; dogsleds; dugout canoes. Wooden and stone weapons; primitive shields; hides for armour. Human muscle power; dogs. First aid; herbal remedies; primitive agriculture.
09-16	1	Bronze Age; Arithmetic, writing. Bare horseback; the wheel (and chariots); ship-building; sails. Bronze weapons and armour. Donkeys; oxen; ponies. Surgery; animal husbandry; fermentation. The plough, papyrus, sundials, the month (lunar cycle defined mathematically), potter's wheel, kilns, tanned hides (boiled or dried leather), woodcutting for fires, composite bow, sickle with curved handle, file, plane (wood-working), abacus, balance for weighing and measuring, ladder, trumpet (from animal horns), ships built from planks, early siege weapons (rams and picks). Wheelblades, bulldozer blades and ploughs for vehicles.
17-24	2	Iron Age; Geometry, scrolls. Saddle; roads; triremes. Iron weapons; iron armour (including mail); siege engines. Horses; water wheels. Bleeding the sick; chemical remedies. Keystone arch, horseback with a saddle, ocean going galleys, shields, scale armour, power from windmills, bleeding the sick, chemical remedies. Crop rotation, iron ploughshare (the blade of the plough), heated rooms (heat pumped under tile floor), large-scale glassblowing, irrigation, water clocks, codex (early books), scrolls, rotary locks, heavy cavalry, wheelbarrow, bellows, bridle and bit, saddle, spurs, soap, weapons: pike, trident, mace, broadsword, shortsword, scythe, crossbow, metal harpoon, lasso, ballista.
25-32	3	Medieval; Algebra, books. Stirrups; ocean going sailing ships (longships, round ships, etc.). Steel weapons; early firearms; plate armour; castles. Heavy horses and horse-collars; windmills. Crude prosthetics; anatomical science. Steel weapons, mathematics with zero, transportation on horseback with a saddle and stirrups, sailing ships, lances, flails, crossbows, plate and chain mail, castles, power from horses with horse-collars, amputations and crude prosthetics.
33-40	4	Age of sail; Calculus. Stagecoach; three-masted sailing ships; precise navigation. Muskets and pikes; horse artillery; naval broadsides. Improved windmills; belt drives; clockwork. Optical microscope makes cells visible. Gunpowder, printing, transportation from fully-rigged ships, hot-air balloons, black-powder muskets, cannon, sailing warships. Dress smallsword, fencing sabre, rapier, cavalry sabre, buff coat (long leather coat worn by musketeers), amputations, bonesetting, cauterizing wounds, opium as a medical painkiller, basket hilt.
41-50	5	Industrial Revolution; Mechanical calculators, telegraph. Steam locomotives; steamboats; early submersibles; balloons and early airships.

Roll	Tech Level	Technology type
		Early repeating small arms; rifled cannon; ironclads. Steam engines; direct current; batteries. Germ theory of disease; safe anaesthetics; vaccines. Mass production, steam power, telegraph, transportation by steam ship, railroads, zeppelins, ironclad warships, dynamite, repeating handguns, direct current power, germ theory of disease. Steam engine, earliest internal-combustion engine.
51-60	6	Mechanized Age; Electric calculators, telephone, radio. Automobiles; continental railways; ocean liners; submarines; aircraft. Smokeless powder; automatic weapons; tanks; combat aircraft. Steam turbines; internal combustion; alternating current; hydroelectricity. Antibiotics; blood typing and safe transfusions; heredity; biochemistry. Radio, battleships, tanks, machine-guns, fighter aircraft, fission bombs (A-bombs), flak jackets, hydroelectric power, alternating current, major surgery, antibiotics. Helicopter drivetrain, tracked drivetrain, liquid fuel rocket, helium airships and manned balloons, weapon bays (in aircraft), radar, sonar, bombsight, airlock, diesel engine.
61-70	7	Nuclear Age; Mainframe computers, television. Nuclear submarines; jet aircraft; helicopters; manned space flight. Ballistic body armour; guided munitions; combat jets; nuclear weapons. Gas turbines; fission; solar power. Discovery of DNA; organ transplants; pacemakers. Nuclear energy, computers, lasers, rockets, jet aircraft, space shuttles, mag-lev monorails, hovercraft, nuclear missiles (H-bombs), atomic submarines, Kevlar, fission and hot fusion power (nuclear power plants), solar power, organ transplants. Ablative armour, composite armour, laminate armour, improved suspension for ground vehicles, variable sweep wings for aircraft, aircraft with controlled instability designs, improved brakes, all-wheel steering, roll stabilizers for water vehicles, leg drivetrain, magnetic levitation vehicles, orion engine (space drive using nuclear explosion for propulsion), ornithopter drivetrain (aircraft with mechanical flapping wings), ducted propellers for water vehicles, ducted fans for aircraft, tilt rotors, afterburners.
71-80	8	Digital Age; Personal computers, global networks. Satellite navigation; SSTO ("single stage to orbit") spacecraft. Smartguns; blinding lasers; unmanned combat vehicles. Fuel cells; advanced batteries. Genetically modified organisms; gene therapy; cloning. Slower-than-light space travel, fusion power, bionic implants, ballistic airliners, turbofans, ramjets, turbo-ramjets, cybertanks, orbital lasers, combat armour and battlesuits, gauss needlers, fission/electric power, orbital-collected solar power, plastiskin.
81-90	9	Microtech Age; Artificial intelligence, nanotechnology, real time virtuality, lightsails (space drives that use light for propulsion). Robot cars; space elevators; fast manned interplanetary space flight. Electrolasers; heavy laser weapons; battlesuits; combat robots; designer viruses. Micro fuel cells; deuterium-hydrogen fusion; high-temperature superconductors. Human genetic engineering; tissue engineering; artificial

Roll	Tech Level	Technology type
		wombs; cybernetic implants. Force screens, tractor beams, fast FTL radio, personal force shield, antimatter missiles, sensa-skin. Gravgun, paralysis pistol, reactionless thruster, cannibal nanokits, translation program for robots, bioplastic nanomorphs, disassembler (nanobot cloud that breaks down matter). Gauss guns; nanotech armour; nanoviruses. Impulse space drive. Fusion Power, Optionics (holography), Molecular Data, Gauss/Rail, Gravitic Control, Stealth Fields, Particle/Plasma, Spaceship Ion Protolight Drive.
91-95	10	Robotic Age; warp drive, antimatter bombs. Helium-3 fusion; antimatter. Brain transplants; uploading; bioroids; uplifted animals. Contragravity, grav compensators, personal flying belts, grav tanks, personal force screens, full panimmunity, regeneration of limbs and organs. Compact particle-beam weapons; defensive nanites. Portable fusion power. Living machines; cellular regeneration. Faster-than-light space travel, sentient computers, space yachts, genius bombs, flamers, particle-beam blasters, stunner weapons, cold fusion/electric power, panimmunity, braintapes, complex implants, suspended animation, automedic. Blaster pistol, blaster rifle, electrolaser, electrolaser rifle, hand flamer, plasma rifle, tripod flamer, holdout laser, survival laser, monowire blade, monowire whip, gatling laser, gauss SMG, gauss battle rifle, sonic stinger, stunner (beam weapon), stun rifle, screamer (beam weapon), M-LAW (missile launcher). Stellar Power, Tachyon Communications, Molecutronics (living circuits), true Biotech, Teleportation.
96-98	11	Diamond Age; Contragravity, grav compensators, personal flying belts, grav tanks, personal force screens, full panimmunity, regeneration of limbs and organs. Gamma-ray lasers; "living metal" armour; black-hole bombs. Portable antimatter power. Full metamorphosis; regeneration. Antimatter power, artificial gravity, slow FTL radio, nerve pistols, superheavy combat armour, disruption beams. Bioplas sails for water vehicles, fusion air-ram (jet engine), hyperdrive, gatling x-laser vehicle gun, x-ray laser cannon, neutrino communicator, sentient computer, neural interface vehicle control: socket interface and neural induction field, artificial gravity unit (generates a gravity field inside or on top of vehicle in space), bioconvertor power plants (herbivore, carnivore, omnivore, vampire). Full terraforming of planets, planetary missiles, "pocket" antimatter. Construction of ringworlds.
99-00	12	Enlightened Age; Phase Gate (dimension crossing), Spaceship Intergalactic Jump Drive. Construction of worlds, perfect medicine, teleport projector, reality stabilizer, parachronic technology (time machines). Mobile worlds, dyson spheres, tesseract technology.

General Traits of Classifications

The classification number is based on the combined energy consumption of the entire species, each step up the scale represents an energy consumption ten billion times greater

than before. No matter what type of Civilization, each consumes some level of energy; thus this is a very reliable indicator of their technological advancement.

Class 1-6: Primitive Civilization
Relies on fossil fuels and other limited resources. May have chemical or nuclear power, primitive solar power; anything from stone age to primitive fusion technology. Unlikely to have any intersystem colonies but may have an active, exploratory space program.

Class 7: Planetary Civilization
Generally politically stable, relies on full planetary resources, generating power by a number of methods; including geothermal, ocean, atmospheric, solar and fusion power systems; still vulnerable to astronomical or environmental catastrophes. Unlikely to have any extra-solar colonies, but may have intersystem colonies on favourable local planets.

Class 8-9: Stellar Civilization
Consumes more energy than a planet can produce, having to tap into the direct energy output of their sun. May choose to conceal their TV and radio emissions, but heat waste is huge, even if their star is completely utilised (all energy collected) it may be detected by infra red emissions. Immune to natural disasters except massive cosmic bombardment (ie super novas) and highly efficient at recycling waste products. The Civilization is now capable of massive colonisation, including extra-solar colonies.

Class 10-11: Galactic Civilization
Mastery of interstellar travel, most likely to send out masses of interstellar probes, most local star systems would be colonised. Advanced energy systems may include "Planck energy" generators (capable of tearing open worm holes) classed as Cosmic Energy Technology, this allows colonisation via dimensional travel, not just interstellar jump drives.

Class 12: Pan dimensional Civilization
Fabulous energy manipulation capabilities, able to transport stars from one point in space to another, or across transdimensional gates. God-like technology to any species below class 8. These Civilizations are effectively immortal, immune to any degenerative sociological problems. They may be found in any sector of their local Universe and have colonies in multiple dimensions.