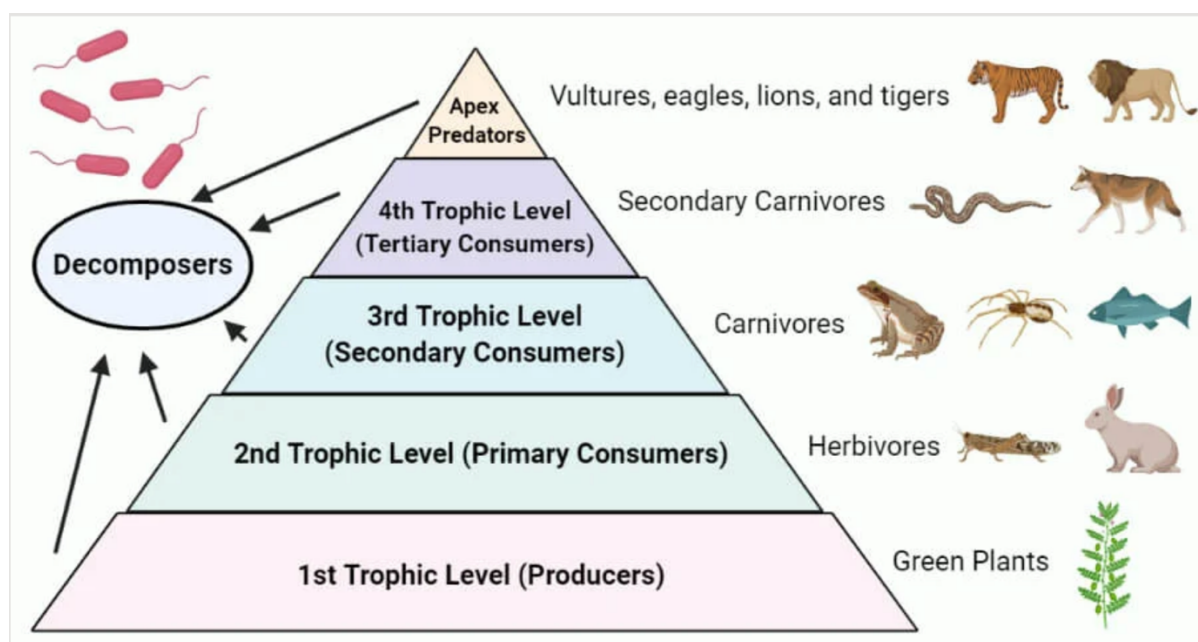


The MicroPrimaryProducerStars (the base of life) Gallery



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We all need to eat, right? Our bodies need energy to do all the things we do, like sport, washing up, and even looking at social media. And we need materials to build new cells while we are growing, and replace cells we lose constantly, like our skin cells that flake off every day. If we don't, our bodies cannot function and give up. To obtain the correct materials in the right proportions to make new cells, and to obtain energy, we need to eat cells. Eating is the process of consuming other organisms, like plants and animals, that have cells more or less like ours. This is the food chain or food web. But consuming another organism is not a terribly efficient process and converting it to cellular material and energy involves significant losses. In our case, this can be clearly seen when we go to the toilet: some of what enters our mouths comes out the other end. We do not use all the energy and materials we consume. This loss of matter and energy occurs throughout the food chain, illustrated by the food pyramid above. These losses mean that the biomass of one trophic level – one level in the food chain – can only support a much smaller biomass of next trophic level. All food chains/webs have a base that does not involve one organism consuming another and instead creates biomass *de novo*, i.e. new, from its individual components: carbon, nitrogen, phosphorus, sulfur, and so on. This process requires an input of much energy to power the creation of biological molecules. The energy may come from the sun, in the case of photosynthetic plants and microbes that capture solar energy, or from energy-rich chemicals in minerals in the case non-photosynthetic autotrophic microbes able to extract this chemical energy. The synthesis of new biomass – cells, organisms – is called biological *production*. The bases of food chains consist of *primary producers* that support the entire chain/web. Without primary producers, life would not be possible, so they are super important. Let's get to know a bit better the microbial primary producers because they are not only crucial to the biosphere but also fascinating in themselves