The long-term concept is to let a living ecosystem create itself in an engineered dome on the moon under controlled Mars-like conditions. Under robotic control a community of organisms creates its own environment that is no longer hostile to living things. For example, the energy to self-construct the bubble is initially obtained from fuel cells that also produce the water that the enclosed system will use to moisten the regolith. Initially, robotically controlled bottled gases will control the internal pressure at 1.0 – 1.5 kPa, heat from the sun will be controlled by radiators initially actively positioned by photovoltaic electric motors or solar-powered Stirling engines. Then chemoautotrophic microorganisms gain energy from the lunar regolith producing organic matter for fungi, which produce CO₂ for algae, which will produce O₂ for some simple invertebrate animals. This would be a precursor to terraforming studies (fairly controversial) for Mars, but accessible and controllable owing to the relative proximity of the moon. This approach differs from Closed Environment Life Support Systems (CELSS) approach in that the Ecopoiesis Test Bed is an architecture that causes the environment to evolve on its own, starting with water and nitrogen and spores or inactive cells of appropriate prokaryotes, seeds, and eggs of organisms that eventually occupy the module. Experimental ecoesis is a new field, so experiments will begin in the laboratory and evolve to ISS in at least three phases before a lunar module is considered. A gradual, stepwise multi-year approach is proposed, in which Phase I is a feasibility study, Phase II consists of laboratory experiments and spaceflight planning, and Phase III is a multi-institution undertaking of indefinite duration culminating with a robotic lunar ecoesis laboratory.