Future Problem Solving Programme
1999 Problem, #1 Fuzzy Situation - Under the Sea
Middle/Senior Divisions

Sea Star, the first deep-sea, international community, was colonised seven years ago in 2042. It is located in an area in the Pacific Ocean rich in thermal vents. The creatures that live near these hot water sources produce substances critical for treating certain human autoimmune diseases like arthritis and cancer. The creatures can live only in this dark, high-pressure environment. The main business of Sea Star is to farm these animals and purify the treatment substances.

Coral Head is a shallow-depth undersea community, just off the west coast of South America and governed by Peru. It is the training centre for the adventurous people who make their home at Sea Star.The current group of new trainees just finished their first week of the six-week training period. The.group includes marine biologists, technicians skilled in power, light, heat, and communication systems; a doctor; a linguist; and specialists in sea-animal fanning. Group members have already learned to use the gill breathers that allow them to stay underwater without running out of air. Now they are trying to get used living in close surroundings. There have been a few rumblings the last two days about the constant dampness, the isolation from outdoor activities, and the need to carefully plan every trip outside the centre into the surrounding waters. They are going to have to get used to these things, though, because residents of Sea Star normally return to the surface for only ten days at the end of every two months.

Today, June 14, 2049, the new aquanauts are ready for their first of five training trips to Sea Star before they move there. After boarding a deep-sea craft, they descend slowly through the blue-green waters, gradually leaving behind kelp forests and brightly-coloured sea animals. Travelling deeper, the water becomes murkier and darker. One- of the technicians is the first to view a faint patch of light in the distance, and soon the group sees what appears to be a colony of giant, glowing starfish. They have reached Sea Star.

The craft links to an "'arm'" of the largest star in the colony, and the trainees disembark to begin their tour. Everyone remarks about the habitat's walls, which are giant gills providing air to the community. The first stop is the comcentre, where they learn that Sea Star contacts the surface world through satellite uplink and fibre optics inside massive cables made of strong and flexible bioengineered materials. The comcentre also tracks everyone working outside, the habitat. The workers carry a communication device, as well as sensors to detect their bodies' responses to the deep-sea conditions.

The tour moves on to the state-of-the-art medical complex. The trainees are reminded to watch for signs of the bends (nitrogen buildup in the blood caused by high pressure at the depth of Sea Star) and hypothermia (overcooling of the body caused by the cold), as well as other medical problems caused by living at great ocean depths. Sea Star is constructed to protect those inside the habitats from these types of conditions, but those working on the sea floor can become victims. In fact, five people undergoing medical treatment have not been careful to take the ultraviolet showers that remove dangerous microbes.

Other stops on the tour include the central power plant that utilises the geothermal energy from the thermal vents in the area and the water plant that produces pure water from sea water. The next tour will take the trainees to the outlying starfish-shaped habitats, where much of the food is grown hydroponically for the community. Other supplies are brought down from the surface weekly.

Several in the group ask how this deep-sea habitat can be illuminated by what seems to be real sunlight. The diffused light throughout the city is sunlight collected at the ocean's surface by giant flower-shaped collectors and transferred to Sea Star through, fibre optics. The computerised "flowers" are programmed to detect turbulent seas and, when necessary, to retract to a safe depth until a storm has passed.

Your team has lived in Sea Star for two years. You have been chosen to assist the newcomers through their transition period. As you look at their faces, you see excitement mixed with fear and hesitation. You realise that you need to help them understand the many challenges they will confront, and help them developsolutions and strategies to deal with the challenges.