



## BIOSPHERE ADVENTURE

The word Biosphere means the sphere of life (BIO.) Earth's biosphere is the layer around the planet that supports life, including the soil, air and water. Biosphere 2 was built to better understand how the biosphere of the Earth (Biosphere 1) works. The project is designed for three purposes: research, education, and the development of environment technologies for use on Earth and in outer space. Biosphere 2 provides information that can help solve problems in agriculture, ecology, industry and medicine. Biosphere 2 was also built to develop and test new technologies to deal with Earth's environmental problems. Finally, a long distance goal of Biosphere 2 is to discover what people living on a space station on another planet would need to survive for long periods of time.

### INSTRUCTIONS

- » **Girl Scout Juniors** – complete six activities, including the starred ones.
- » **Girl Scout Cadettes** – complete Section 1, two from Section 2, one from Section 3 + two more
- » **Girl Scout Seniors** – complete Section 1, two from Section 2, one from Section 3 + two more
- » **Girl Scout Ambassador** – complete Section 1, two from Section 2, one from Section 3 + two more

### ACTIVITIES

#### SECTION 1

- 1.★ Biosphere 2 is a scientific and technological project that can be observed through on-site tours. To experience this first hand, complete the Biosphere 2 educational tour through the Orientation Center, Analog Green House, “Biospherian” Theater, Lab Exhibit and the Biosphere 2 Guided Tour.  
**-OR-**  
If you're unable to visit Biosphere 2, carefully review the Biosphere 2 website at [b2science.org](http://b2science.org) including the sections on:
  - a. History – <http://b2science.org/who/history>
  - b. Fast Facts – <http://b2science.org/who/fact>
  - c. Facilities – <http://b2science.org/earth/facility>
  - d. Guided Tour – <http://b2science.org/visitor/campus/guidetour>
2. Within Biosphere 2, each Biospherian has a special job that must be completed which contributes to the success of the environmental system. There are certain jobs/responsibilities that must be done to survive in a closed community. List as many as you can. Mark the three that you find most interesting and one that you would NOT want to be involved in and why.



## SECTION 2

1. Biosphere 1 and Biosphere 2 are closed ecological systems. You can study your own closed ecological system. Plant a terrarium in a closed glass container. Keep the plants alive for 2 months and record their progress and the process you observe in your own “biosphere”.
2. Biosphere 2 required several years of planning before the first mission started in 1991. List, with rationale, those items that you would like to take with you into a Biosphere for a two-year period if you were chosen as a Biospherian.
3. Each Biospherian mission requires the Biospherians to live inside for 1-2 years at a time. Place yourself in a closed environment in your home where you could meet all your needs, (i.e., a bathroom) for 24 hours and keep a diary of your impressions of this experience.
4. Plants within Biosphere 2 serve many purposes. Find four plants that would have at least three different uses within a biosphere environment for the Biospherians’ use. List the plants, their uses, and how to deal with the plants’ non-recyclable products.
5. The Biospherians experience fewer illnesses during their mission because they have a very limited exposure to Biosphere 1 (Earth) illnesses. Pick 3 common illnesses that could occur outside Biosphere 2 but not within the Biosphere 2 environment. Give your reasons for the selections.
6. The biomes AND technologies were placed in Biosphere 2 for a reason. Identify certain biosphere plants/features and give your reasons why they might have been put inside the environment.
7. All food was grown in Biosphere 2 and because it is only 3.1 acres, large herds of animals were impossible, so Biospherians diets were mostly vegetarian. Plan three days of eating non-meat/fish  
★ vegetarian meals for yourself and your family. Document your plan, how you carried it out, and what your impressions were of this experience.
8. Because the Biospherians grew what they ate, they knew where it came from and where it was  
★ grown. List your favorite meal at home. Trace each ingredient from that meal to its original source as a basic farm product.
9. Microorganisms help decompose plants so they can be recycled. Microorganisms also produce carbon dioxide. The following is an experiment to show how microorganisms produce carbon dioxide while they are active. Use a Ziploc bag so it can be sealed shut and no air escapes. Place 1 teaspoon of dry yeast, 2 teaspoons of sugar, and 1 cup of lukewarm water into the bag. Seal the bag and place it in a warm place. Using a ruler, measure how thick the bag is before and after 1 hour. Then compare the 2 measurements and describe the reason for the difference in size.
10. Present the pros and cons of conducting Biosphere 2, given the world’s situation today.

## SECTION 3

1. Since Biosphere 2 is a closed system, everything must be recyclable, so no toxic substances are allowed. All the cleaning agents (soaps, etc.) that went into the Biosphere 2 were analyzed before they went inside. The reason is that soap, as other substances, goes into the water system. All the water in Biosphere 2 is recycled; therefore, if the soap were not biodegradable there would be problems with the drinking water. List five common household cleaners and find alternative organic substitutes that do not have any harmful toxins, i.e., baking soda paste instead of ‘Comet cleansers’ for cleaning.
2. Because Biosphere 2 is a project that uses science and technology, there are many benefits from the research that can help Biosphere 1. Go to your local library to learn about the recent progress made at Biosphere or visit <http://b2science.org/earth/research>.

3. In Biosphere 2, there are several experiments being conducted. Recreate one of these experiments or create your own using the concepts you've learned from Biosphere 2.
4. The one-acre farm inside Biosphere 2 is called the Intensive Agricultural Biome. It is considered the most productive acre on the planet. List at least five ways that the foods harvested from the Intensive Agricultural Biome can be preserved for later use by the Biospherians.