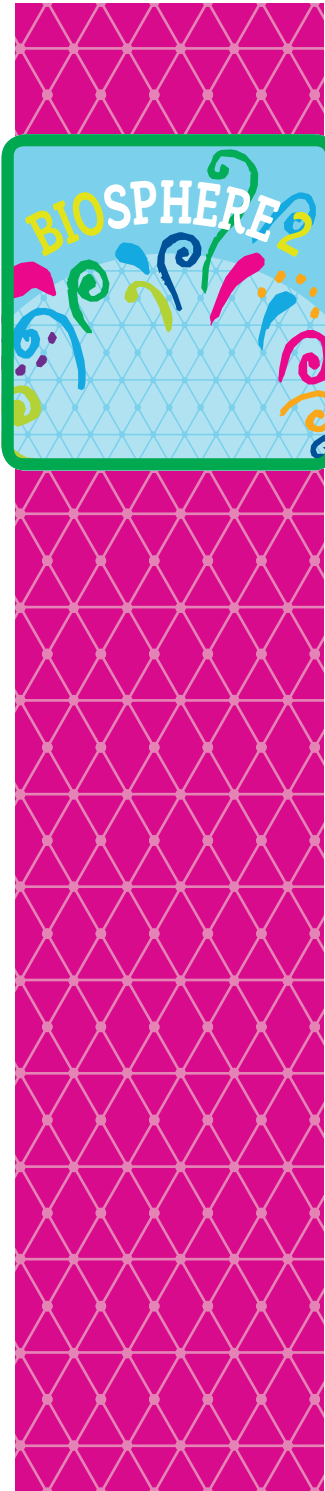




# BIOSPHERE 2 BADGE *Requirements*





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Special thanks to



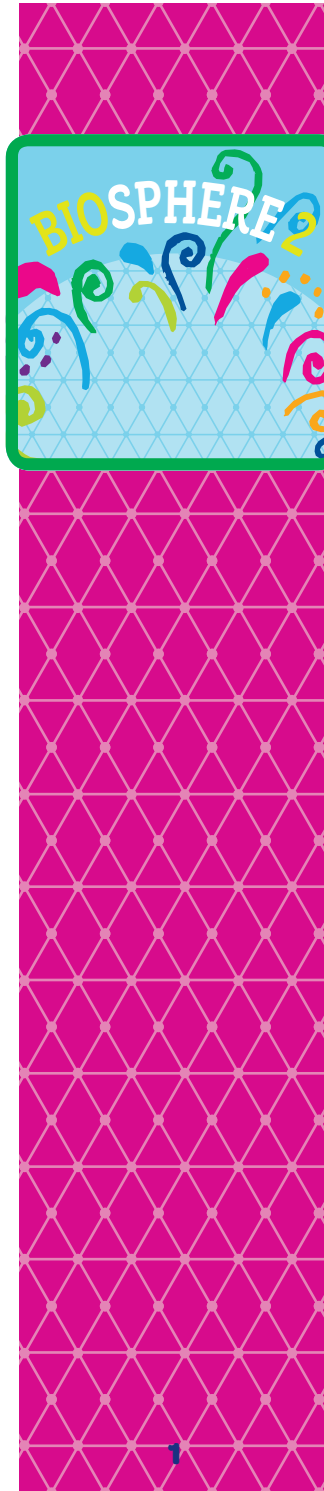
THE UNIVERSITY  
OF ARIZONA®

for their support in developing  
this badge program

**BIOSPHERE 2**

The Biosphere 2 facility serves as a laboratory for controlled scientific studies, an arena for scientific discovery and discussion, and a far-reaching provider of public education.

Biosphere 2 has partnered with Girl Scouts to engage more girls in its mission. Its mission is to serve as a center for research, outreach, teaching and life-long learning about Earth, its living systems, and its place in the universe.





## Requirements needed to earn this badge/patch:

Take one of these two paths to earn the Biosphere 2 badge:

- The **pink path** is for Troops and Girls who are able to complete their level's requirements during their visit to the Biosphere 2.
- The **blue path** is for Troops and Girls who are unable to visit the Biosphere 2. Their level's requirements can be completed at home.

## All levels need to complete:

### Path from the Biosphere 2

- ☐ Allow approximately 3.5 hours (4 hours with a lunch break)
- ☐ Examine Sustainability & Marine Science Lab (MSL) components
- ☐ Must reserve 3 weeks in advance if a larger troop (20+ people)
- ☐ Tour Biosphere 2
- ☐ Complete two station rotations (if available through guided tours)

### Path from Home

Each level needs to complete the **pink activities** in their section.

- AND -

Daisies & Brownies should pick 2 more.  
Juniors & Cadettes should pick 3 more.  
Seniors & Ambassadors should pick 4 more.

K-3 (BEGINNING) DAISIES & BROWNIES

## 1 Sustainability: ABCs of Living Green

### REQUIREMENTS DO ALL:

- ☐ **Actions to help the earth**  
Discuss and model "Earth friendly" actions

- AND -

- ☐ **Vermiculture**  
Describe role of earthworms in soil

- AND -

- ☐ **Terrarium**  
Make a Biosphere 2

## 2 MSL: Live Invertebrate Investigation

### REQUIREMENTS DO ALL:

- ☐ **Observations of marine animals**  
Gather and record qualitative and quantitative data

- AND -

- ☐ **Water in Biosphere 2 biomes**  
Compare and contrast attributes of water in different biomes



**FROM THE  
BIOSPHERE 2:  
DAISIES &  
BROWNIES**



**FROM THE  
BIOSPHERE 2:  
JUNIORS &  
CADETTES**

4-8 (INTERMEDIATE) JUNIORS & CADETTES

# 1 Sustainability: ABCs of Living Green

**REQUIREMENTS DO ALL:**

- ☐ **Actions to help the earth**  
Discuss and model “Earth friendly” actions

- AND -

- ☐ **Composting**  
Make a system for composting

- AND -

- ☐ **Vermiculture**  
Describe role of earthworms in soil

- AND -

- ☐ **Terrarium** Make a Biosphere 2

## 2 MSL: Intermediate

**REQUIREMENTS DO ALL:**

- ☐ **Soil and water data collection in Biosphere 2 wilderness biomes** (analog and digital tools; data collection details differ between intermediate and advanced curriculum)  
Discuss issues scientists encounter in field sampling

- AND -

- ☐ **Lab analysis of soil and water samples**  
Explain pros and cons of tools used in data collection

- AND -

- ☐ **Collection and observation of microorganisms from B2 aquatic systems**  
Describe specific attributes of different biomes

9-12 (ADVANCED) SENIORS & AMBASSADORS

# 1 Sustainability: ABCs of Living Green

**REQUIREMENTS DO ALL:**

- ☐ **Actions to help the earth**  
Discuss and model “Earth friendly” actions

- AND -

- ☐ **Composting**  
Make a system for composting

- AND -

- ☐ **Vermiculture**  
Describe role of earthworms in soil

- AND -

- ☐ **Terrarium** Make a Biosphere 2

## 2 MSL: Advanced

**REQUIREMENTS DO ALL:**

- ☐ **Soil and water data collection in Biosphere 2 wilderness biomes** (analog and digital tools; data collection details differ between intermediate and advanced curriculum)  
Discuss issues scientists encounter in field sampling

- AND -

- ☐ **Lab analysis of soil and water samples**  
Explain pros and cons of tools used in data collection

- AND -

- ☐ **Collection and observation of microorganisms from B2 aquatic systems**  
Describe specific attributes of different biomes



**FROM THE  
BIOSPHERE 2:  
SENIORS &  
AMBASSADORS**



**FROM HOME:  
DAISIES &  
BROWNIES**

GRADES K-3: DAISIES & BROWNIES

**1 REQUIREMENTS DO BOTH:**

- ☐ If you are unable to visit the Biosphere 2, carefully review the Biosphere 2 website at [biosphere2.org](http://biosphere2.org) including the sections on:

History <http://biosphere2.org/visit/about-biosphere2/history>

Fast Facts <http://biosphere2.org/visit/about-biosphere2/fast-facts>

Virtual Tour and Visitors Guide: <http://biosphere2.org/visit/virtual-tours-visitor-guide>

**- AND -**

- ☐ Learn what these Earth Science terms mean and the draw a picture of each one:

biome	biosphere
community	conservation
ecosystem	habitat
population	threatened species
endangered species	extinction
pollution	

**2 REQUIREMENTS CHOOSE 2:**

- ☐ Learn the meaning of sustainability & then create a short play for your friends and family on what sustainability means to you.

**- OR -**

- ☐ **WATER:** Create a map of your home and locate all of the places where you can get water at your home (such as the bathroom, kitchen, yard, etc.). Make a list of how you and your family can conserve water in each of those places.

**- OR -**

- ☐ **FOOD:** For one week, make a list of what food your family throws away. Afterwards, call a family meeting and talk about what food was wasted and what you and your family can do in the future to create less food waste.

**- OR -**

- ☐ **ENERGY:** Define these different energy sources:

fossil fuels	geothermal
hydropower	nuclear
solar	wind

Draw a picture of each one.



**FROM HOME:  
DAISIES &  
BROWNIES**



## FROM HOME: JUNIORS & CADETTES

GRADES 4-8: JUNIORS & CADETTES

# 1

### REQUIREMENTS DO ALL:

- ☐ If you are unable to visit the Biosphere 2, carefully review the Biosphere 2 website at [biosphere2.org](http://biosphere2.org) including the sections on:

History <http://biosphere2.org/visit/about-biosphere2/history>

Fast Facts <http://biosphere2.org/visit/about-biosphere2/fast-facts>

Virtual Tour and Visitors Guide: <http://biosphere2.org/visit/virtual-tours-visitor-guide>

### - AND -

- ☐ Learn what these Earth Science terms mean and then draw a picture of each one:

biome	biosphere
community	conservation
ecosystem	habitat
population	threatened species
endangered species	extinction
pollution	

### - AND -

- ☐ Biosphere 1 (Earth) and Biosphere 2 are closed ecological systems. You can study your own closed ecological system! Plant a terrarium in a closed glass container. Add bugs, such as pill bugs, to keep the soil moving. Keep the plants alive for 2 months and record their progress and the process you observe in your own "biosphere".

# 2

### REQUIREMENTS CHOOSE 3:

- ☐ Research how planetary life-support systems (such as soil, climate, freshwater, atmosphere, nutrients, oceans, ecosystems, and species) support life on Earth and how they interact with one another.

### - OR -

- ☐ In your own words, define sustainability. Invite your family or friends to have a discussion. Talk about what sustainability means to your friends or members of your family.

### - OR -

- ☐ 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.

### - OR -

- ☐ 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.

### - OR -



## FROM HOME: JUNIORS & CADETTES



### FROM HOME: JUNIORS & CADETTES

- OR -

☐ 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.

- OR -

☐ **WATER:** Create a diagram on how water is sourced to your faucet and where it goes after you use it (such as the bathroom, kitchen, yard, etc.).

**Learn about other areas of the world that are affected by drought or limited water.**

Research water conservation practices and then brainstorm ideas of how to preserve clean water for the future.

- OR -

☐ **FOOD:** For one week, make a list of what food your family throws away. Afterwards, call a family meeting and talk about what food was wasted and what you and your family can do in the future to create less food waste.

☐ **Create your own food source** (ex: plant a garden at home/community garden/school garden). Prepare a recipe from your garden to share with others.

- OR -

☐ **ENERGY:** Define these different energy sources:

fossil fuels	geothermal
hydropower	nuclear
solar	wind

List which ones are most sustainable and which ones are least sustainable.

☐ **Define carbon footprint and calculate** your carbon footprint at: [nature.org/greenliving/carboncalculator/](https://www.nature.org/greenliving/carboncalculator/)

☐ **What steps can you take to reduce your carbon footprint?**

- OR -

☐ **WASTE MANAGEMENT:** Keep a log of all purchases you make for a month.

☐ **Plan a project to repurpose or recycle** household items no longer in use.

☐ **Plan a meeting with your family or friends** and brainstorm how to avoid accumulating "stuff". Define overconsumption and find out the effect it has on you, your friends/family and the globe.



### FROM HOME: JUNIORS & CADETTES



FROM HOME:  
SENIORS &  
AMBASSADORS

GRADES 9-12: SENIORS & AMBASSADORS

1

**REQUIREMENTS DO ALL:**

- ☐ If you are unable to visit the Biosphere 2, carefully review the Biosphere 2 website at [biosphere2.org](http://biosphere2.org) including the sections on:

History <http://biosphere2.org/visit/about-biosphere2/history>

Fast Facts <http://biosphere2.org/visit/about-biosphere2/fast-facts>

Virtual Tour and Visitors Guide: <http://biosphere2.org/visit/virtual-tours-visitor-guide>

- AND -

- ☐ Learn what these Earth Science terms mean and then draw a picture of each one:

biome	biosphere
community	conservation
ecosystem	habitat
population	threatened species
endangered species	extinction
pollution	

- AND -

- ☐ Biosphere 1 (Earth) and Biosphere 2 are closed ecological systems. You can study your own closed ecological system! Plant a terrarium in a closed glass container. Add bugs, such as pill bugs, to keep the soil moving. Keep the plants alive for 2 months and record their progress and the process you observe in your own "biosphere".

2

**REQUIREMENTS CHOOSE 4:**

- ☐ Research how planetary life-support systems (such as soil, climate, freshwater, atmosphere, nutrients, oceans, ecosystems, and species) support life on Earth and how they interact with one another.

- OR -

- ☐ 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.

- OR -

- ☐ 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.

- OR -

- ☐ 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.

- OR -



FROM HOME:  
SENIORS &  
AMBASSADORS



### FROM HOME: SENIORS & AMBASSADORS

- OR -

☐ **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.

- OR -

☐ **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.

- OR -

☐ **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 1teaspoon of dry yeast, 2 teaspoons of sugar, and 1cup 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.

- OR -

☐ **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.

- OR -

☐ **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.

- OR -

☐ **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.

- OR -

☐ **WATER: Create a diagram on how water is sourced to your faucet** and where it goes after you use it (such as the bathroom, kitchen, yard, etc.).

☐ **Learn about other areas of the world that are affected by drought** or limited water. Create a display to educate others on your findings.

☐ **Research water conservation practices** and then brainstorm ideas of how to preserve clean water for the future.

- OR -



### FROM HOME: SENIORS & AMBASSADORS



### FROM HOME: SENIORS & AMBASSADORS

- OR -

☐ **FOOD:** For one week, make a list of what food your family throws away. Afterwards, call a family meeting and talk about what food was wasted and what you and your family can do in the future to create less food waste.

☐ **Create your own food source** (ex: plant a garden at home/community garden/school garden). Prepare a recipe from your garden to share with others.

☐ **Research global practices for food sustainability.**

- OR -

☐ **ENERGY:** Define these different energy sources:

fossil fuels	geothermal
hydropower	nuclear
solar	wind

List which ones are most sustainable and which ones are least sustainable.

☐ **Define carbon footprint** and calculate your carbon footprint at: [nature.org/greenliving/carboncalculator/](https://www.nature.org/greenliving/carboncalculator/)

☐ **What steps can you take to reduce your carbon footprint?**

- OR -

☐ **WASTE MANGEMENT:** Keep a log of all purchases you make for a month.

☐ **Plan a project to repurpose or recycle** household items no longer in use.

☐ **Plan a meeting with your family or friends** and brainstorm how to avoid accumulating "stuff". Define overconsumption and find out the effect it has on you, your friends/family and the globe.

- OR -

☐ **COMMUNITY:** Design a sustainable community (either draw it, write about it, create a poster, or make a model).

☐ **Look at the community you currently take part in** (neighborhood, school, Girl Scouts, etc.) and list how your community can be more sustainable.

☐ **Research how houses/schools/shops/transportation influence sustainability.**

☐ **Compare how Mexico and Canada are different in terms of sustainability.**

☐ **Research how different countries around the world handle sustainability.**



### FROM HOME: SENIORS & AMBASSADORS

**You might also be interested in  
these other Learn Local badges:**



**Angel Philanthropy**



**Scout the Vote**



**Ben's Bells Kindness**



**Master Maker**



**Tu Nidito Memory Beads**



**Healthy Living**



**Centennial Gold**



**Mission Military**



**Biosphere 2**



**Mining in Arizona**

