

# Traveling Treasures Exhibit



## Soil Stories

An inside look at the found beneath



**An activity booklet**

created by NHMU Teen Explainers



**NATURAL HISTORY  
MUSEUM OF UTAH**

Rio Tinto Center | University of Utah

# Seek and iNaturalist

## What are Seek and iNaturalist?

Seek and iNaturalist are phone apps that can help identify things you see in nature. Seek is a kid-safe platform. Sign-up and account creation are not required for users 13 and younger. Identification of plants, animals, and bugs happens in real time, and does not require an internet connection! Seek can identify plants, animals, and insects down to the species. You can earn badges and level up! The more species you observe and record, the more badges you'll earn, and the more levels you will climb! There are also citizen scientist challenges to participate in that vary locally and seasonally.


**Fun Fact:** people have posted photos on iNaturalist of species that have not been seen in that geographical area for decades, or ever! People have posted species on iNaturalist that have never been classified before! Will you be the next scientist to find a new species?

## What is Citizen Science?

Citizen science is a way to link people to scientists, and for scientists to learn from the community! Anyone can be a citizen scientist! In fact, you're probably already doing citizen science without even knowing it. Everyone is an observer in some capacity: we can hear bird songs, see when different flowers bloom throughout the spring, notice all sorts of animal activity in our backyards, on our way to school and work, out the window when we're driving or riding in a car or on a bike.

- ▶ Anyone can participate! You don't need special skills or training for many citizen science projects, making it fun for kids and people of all ages and abilities!
- ▶ The data you contribute will be collected using the same protocol professional scientists use, so that means...
- ▶ ...scientists will be using your data the same as they use theirs! This will help them ask new questions and reach conclusions in their own research.
- ▶ It is reciprocal! Scientists will be learning from you, and you will learn from them. Data is often accessible to the public and to scientists in scientific institutions, like universities and museums. You have the opportunity to contribute to national (or even global!) research!

## There are many ways to get involved in citizen science!

- ▶ Seek and  iNaturalist
- ▶ NHMU-affiliated projects: Western Firefly Project
- ▶ Sageland Collaborative 2023 Field Season: This summer the Sageland Collective is collecting data from community scientists on the: Boreal Toad Project, Riverscape Restoration (no training required!), and the Utah Pollinator Pursuit (variety of options for participation)
- ▶ USU's Extension: Citizen Science



[nhmu.utah.edu/  
citizen-science](https://nhmu.utah.edu/citizen-science)



[sagelandcollaborative.org/  
current-projects](https://sagelandcollaborative.org/current-projects)



[extension.usu.edu/  
utahwaterwatch/  
citizenscience/](https://extension.usu.edu/utahwaterwatch/citizenscience/)

# Surprising Soil Paints



People from Utah have been making paint this same way for tens of thousands of years! They used earth pigments that they found around them to make different colors. Hematite, different shades of ochre and umber, charcoal from fires, and ground calcite were types of sediment used to create various colors of paint. Earth pigments do not fade over time like other kinds of dyes, which is why we can still enjoy pictographs Indigenous people made thousands of years ago today!



All illustrations on this page were originally painted using all-natural pigments collected in Utah!

**Soil Collecting:** Before you go collecting, remember to NEVER collect soil samples out of national/state parks and monuments, or from Native American reservations. You can collect on public lands and private property (with permission).

Generally, if you find soil that is a particular color, your paints are going to turn out to be a similar color to what you have found! Remember, the finer the sediment, the better paint it will make. If you find pigment that is solid, you can use it as well, but you will have to crush it into a fine sediment.



**Soil Prep:** Once you have all of your soils, make sure there are no chunks in them.

If there are small rocks in your samples, you may want to pick them out, or place your samples in a plastic bag and gently tap the larger chunks with a hammer. You can also use a mortar and pestle! If you are crushing the sediment, keep it contained in a bag.

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**Making Paint:** Pour a small amount of Elmer's Liquid Glue into small paper cups, or on a plate or tray. Add a small amount of your finely powdered soil to the glue, and for consistency, add a couple of drops of water. You can experiment with the depth of color of each soil type by adding more or less soil to each color.

You can even try mixing colors! You can also use acrylic medium, craft resin like Modge Podge, or even tallow!



Grab yourself a sheet of blank paper. Any kind of paper works, although watercolor or multimedia paper would be the best suited for this kind of activity. Paint to your heart's content using different types of brushes and sponges to create variety in your painting style. Indigenous peoples used their fingers to paint, as well as feathers, twigs and leaves, and moss!

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**Clean up:** Make sure you wash your painting tools thoroughly after use and get all of the glue off or they will not be usable in the future.

Any soil is going to color your paints, but if you're looking for particular colors, here is a list of some Utah soils that you can find brilliant colors in!

**Red/Orange: Morrison Formation** - Morrison Formation - Many dinosaur fossils can be found in this layer. This formation can be found all around eastern Utah.

**Green/Blue: Mancos Shale** - Book Cliffs to the north of I-70 in Central Utah.

**Yellow/White: Navajo Sandstone** - The Henry Mountains between Capitol Reef and Canyonlands National Parks is a good place to collect this sediment, though it can be found throughout Utah

# The Soil Profile

Soil is made up of lots of different parts!



**Sand** is like what you'd find on a beach.



**Silt** is in the middle, sort of like flour.



**Clay** is sticky and very fine, like powder.

Sometimes soil also has these parts:



**Organic matter:** wood, leaves, or anything that comes from living things

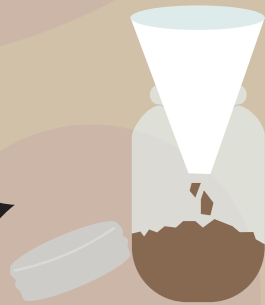


**Gravel:** small pebbles

**Start here!**



Get a clear container that seals. A mason jar is best, but a plastic water bottle works too.

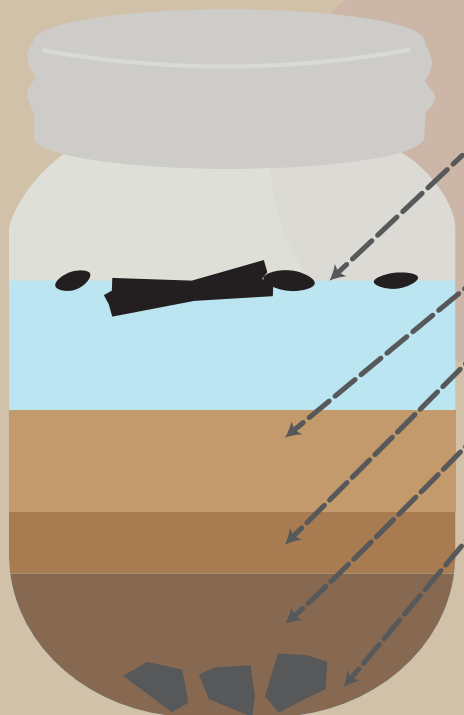


Find soil - from anywhere! But make sure not to destroy anything by digging. Try to get soil that is mostly dry and not muddy. Fill your container to about 1/3 full. A paper funnel might help to get soil through small openings.



Place your container where it will not have to be moved for the rest of the activity. Let the jar sit overnight (or at least until you can see most of the soil has settled below the line you marked).

Mark where the top of the soil is. (You can use a piece of tape if you don't want to draw on your container). Fill it about 3/4 to the top with water and put the lid on tight, then shake it very well.



You should now be able to see layers! Here is what they mean.

You might have some **organic matter** floating on the water.

**Clay** settles on top, since it is the smallest.

**Silt** settles in the middle.

**Sand** settles at the bottom; it's heavier than sand and silt.

Some **gravel** might end up at the very bottom.

*What do you notice about the **ratios** between the different parts of soil?*

After you are done, return the soil back where you found it. (Let's be kind to Mother Nature!)

# Habitat in a Bottle



Terrariums are a great way of growing plants that would be hard to grow in regular pots! There are two types of plant terrariums, open and closed. Closed terrariums have a lid, and foster plants like moss, ferns, and friendship plants. Open terrariums are better suited for growing succulents and cacti. They are open to the environment around them, but are still protected. Terrariums require very minimal care once built, and depending on what kinds of plants are inside of each mini-garden, only need to be watered every so often. Animal terrariums are also an option, but be sure you can provide the food and proper care of that creature before obtaining it.

## Essentials



Water



Indirect  
Sunlight



Transparent  
container  
(plastic or glass)



**Gravel** or lots of small rocks, enough to cover the entire bottom of the container in 2" (Option for terrariums with plants **ONLY**: enough charcoal to cover the entire bottom of the container ½")

**Rocks, leaves, sticks/pieces of wood,** or anything else you'd like to decorate your terrarium with!

**Live plants**

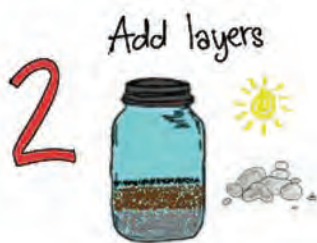
**Live insects** (optional)

**Soil "substrate"** (potting soil, or soil from a garden or backyard), enough to cover the entire bottom of the container in ~1.5"



**A glass jar of any size or shape:** Generally has to be large enough to have 4 inches of dirt on the bottom, and still have room for a plant or two to grow.

**Gravel:** Small stones that can be found around parks, a backyard, or while camping. They should fill the space at the bottom of the jar, and there shouldn't be any big gaps in between the stones. This covers the bottom 2-4 inches of the terrarium space. This layer is essential in order to prevent your plant roots from rotting.



**Moss:** This is not a necessary layer, but it blocks the dirt from filling in the gaps between the gravel stones, and soaks up some excess water so the soil is always damp! This layer also prevents molding and rotting of terrariums. This would only need to cover about  $\frac{1}{2}$  of space above the rocks.

**Charcoal:** This is an optional layer, but recommended. Charcoal eliminates odors that can be emitted from plants, as well as removes toxins in the soil and potential water and air build up! This layer only needs to be about  $\frac{1}{2}$  an inch on top of the moss or it can go on top of your topsoil!

**Topsoil:** This is just dirt! It can be dirt from a backyard or dirt that is purchased at the store. The dirt needs to have enough nutrients for plants to survive! It goes right on top of the gravel, and should be about 1.5 inches thick.

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**Plant away!** Plants should be added right after or even during topsoil installment!

**Decorate:** This could be colorful sand, rocks, or even mini fairy-like furniture like a small park bench! Sand helps protect the roots of plants, and helps to keep them steady and in place while they grow!

**Seal the terrarium,** either with its lid, or by taping a bottle back together, after you've put everything inside it.

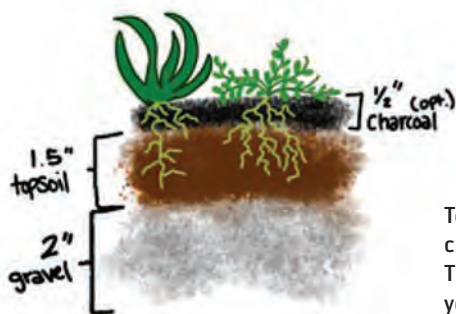
**Mist or lightly water the terrarium!**

**Place the terrarium in indirect sunlight.** Placing it in direct sunlight could cause the inside of the terrarium to become too hot and could kill the plants and/or animals inside!

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## Plants



## Animals



Terrariums are a wonderful way to let creativity blossom, just like plants do! There is no limit to what you can do with your mini-ecosystems!



# Make a 3D Mushroom

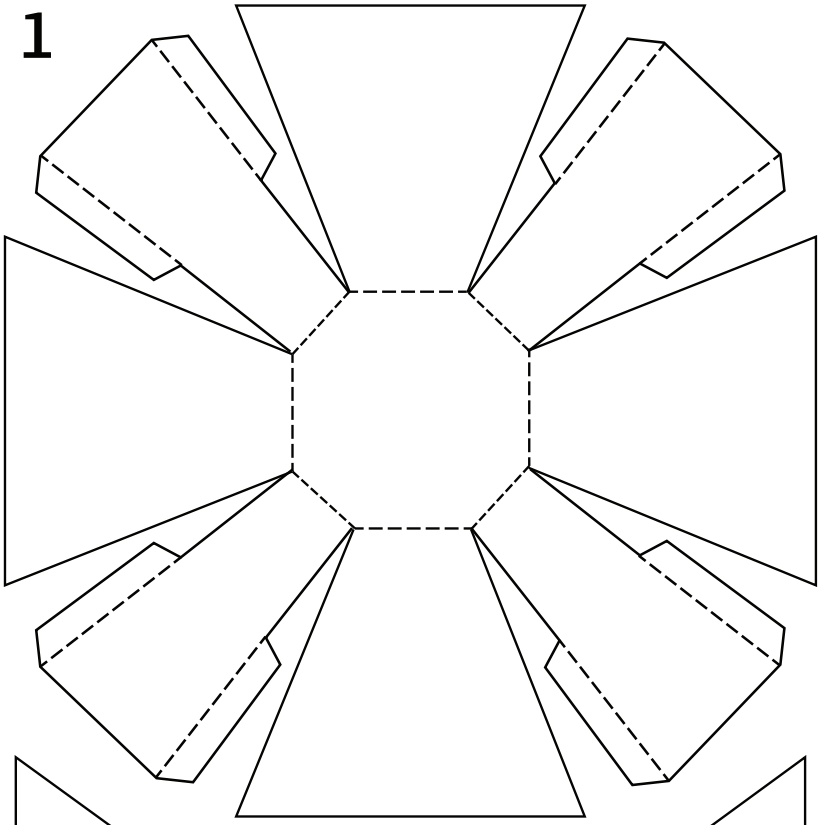


Color your mushroom while it's still flat! It's OK to color outside the lines as well since you will be cutting them out! Piece #1 is the cap of the mushroom. Pieces #2, #3, #4, and #5 are the gills of the mushroom (or the underside of the cap). Piece #6 is the stem of the mushroom.

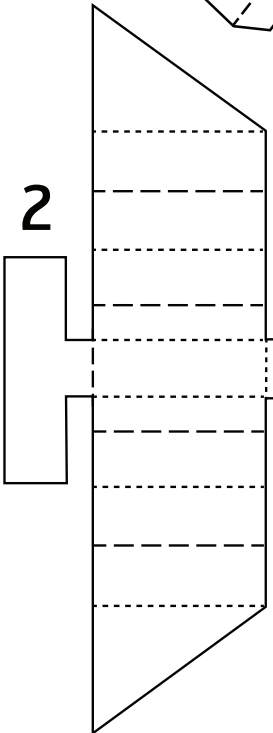
Remember to never, ever, eat a mushroom you find in the wild. Always make sure to wash your hands after handling any wild mushrooms.

- ▶ Cut out all of the pieces. To avoid mixing them up, lightly mark their corresponding number on the back.
- ▶ Take piece #1 and fold down along the dotted lines in the center and along the tabs on the flaps.
- ▶ Use glue (a glue stick will be easier) to attach the tabs to their neighboring, larger flaps. This will be your mushroom cap. **Tip:** Small pieces of clear tape may help in holding the tabs/flaps together.
- ▶ Take pieces #2-5 and fold them back and forth along the dotted lines, like an accordion, so that each fold goes the opposite direction of the last.
- ▶ Glue each of the long tabs, found on the longer side of #2-5, to the four larger flaps of #1. **Tip:** Refer to the diagram in the upper right hand corner of the template page to see how the pieces will fit together.
- ▶ Pieces 2-5 have an unfolded triangle on each end. These triangles overlap the pieces next to them, and should be glued together. These will be your gills, or the fin-like structures on the bottom of a mushroom cap. Set this aside while you create the stem.
- ▶ Glue each tab of #6 to the flap next to it, except for the two tabs on the last stem labeled "6A". Don't glue these just yet.
- ▶ To join the cap and gills to the stem, glue each of the square tabs (located at the center of #2-5) to the inside of each stem section. Finally, glue the tabs marked "6A" to the inside of the stem. Your mushroom is complete!

**1**

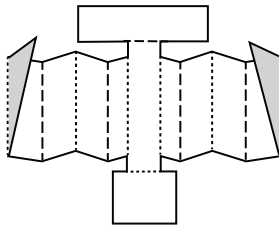


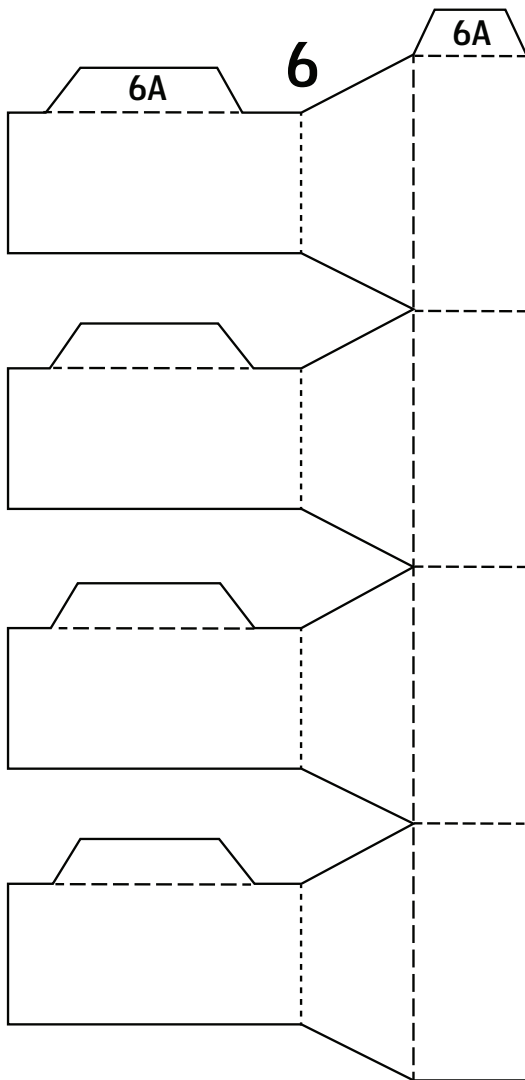
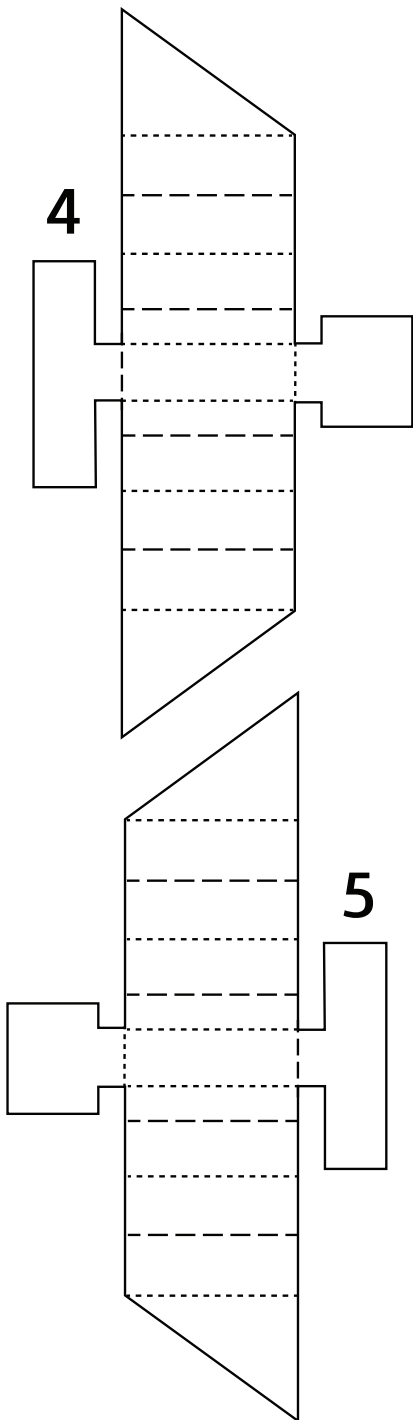
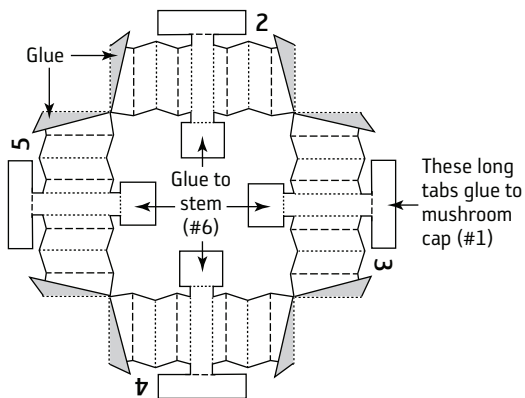
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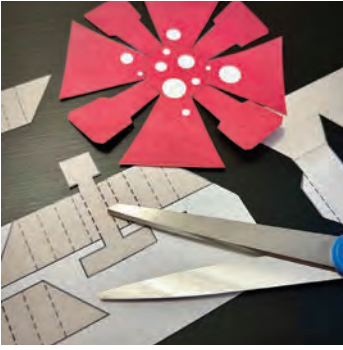
**3**

— Cut  
- - - - - Fold back  
· · · · · Fold forward





1.



2.



3.



4.



5.



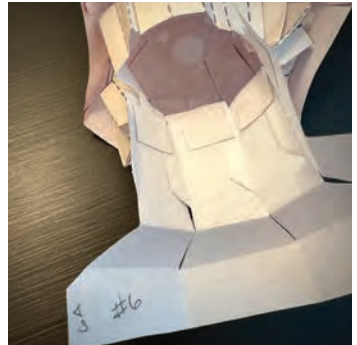
6.



7.



8.



# Firing Clay



Heat is what turns soil into water-tight, heat-proof vessels, also known as ceramics. For the first people who used it, ceramics changed their way of life. They could eat and drink out of it, store water and other types of food inside of it, and even paint designs and stories on them. Ancient kilns (ovens used to heat up clay), like those used by the Ancestral Pueblo People of Utah over a thousand years ago, reached temperatures of 1600°F! The ceramics in this activity will not need to get that hot.



## Salt Dough Recipe

### Ingredients:

2 cups flour (not self-rising)

1 cup salt

1 cup water

### Instructions:

Mix together the flour and the salt. Slowly add in the water, but not all at once.

Mix together until you have a dough-like consistency.

Too sticky? Add more flour. Too rigid or flaky? Add more water.



Using the dough, create a ball about the size of your palm. Insert your thumb on top of the ball and make an indent, but do not go all the way through the dough.

Start pinching the sides of the hole and continue to rotate the ball around until you have your desired pinch pot.

Once you've finished shaping your ceramic, you can fire it in your oven with the help of an adult to prevent it from crumbling. Preheat the oven to 250°F and place your creation on an oven sheet. Bake for 2 hours. Once your pinch pot is dry, you can draw or paint any designs or decorations on it! You can even use the paint from page 3 to decorate it!



**Used to paint symbols and record stories:** the most common colors of ceramic made by people who lived in Utah are grayware (gray unpainted clay, made by the Fremont), black-on-white or black-on-gray (black paint on gray clay or black paint on white paint), and polychrome (red or orange clay painted in red, black, yellow, and white, made by the Ancestral Pueblo People).

# Exchange of Carbon



## Green + brown = black gold!

Black-looking soil is nutrient-dense and filled with carbon, which plants of all kinds love. Green is typically nitrogen-rich (grass clippings, fresher plants/flowers), while brown is typically carbon-rich (dead leaves, sticks, twigs). Manure from stock animals (not dogs or cats) such as horses, cows, sheep, chickens, goats, etc, is great for compost!



**Limited quantity:** citrus, onions, ready-made products



**NO:** meat, fish, dairy, bones, fats, oils, pet feces, weeds, or diseased plants

**YES:** vegetables, fruits, nut shells, tea and coffee grounds, houseplants, egg shells, paper napkins, food scraps, grass clippings, leaves, flowers, and other natural materials



You can put weeds in your compost, but try to trim the seeds off. Weeds can and will take over your compost! Some weeds are also toxic. It may be best to throw the weeds in the trash.

Composting in place works wonders in a small garden or raised beds! Your garden will create more compost for you.

## Start Composting in 10 Steps!

Composting is a great way to help the environment! It can reduce food waste and your plants will love it too! Growing your own food is a great way to help fight climate change and also provide nutrients to any type of garden!

For a small-scale compost, it will not be necessary to turn it or agitate it. Your compost bin may feel hot to the touch– that's OK! It means the microbes are hard at work turning your garbage into soil.

1

Find a container that is clear plastic—the bigger, the better. You can also try this with a water bottle. It's OK if the container is not airtight.



2

Drill or cut holes that are about  $\frac{1}{8}$ " inch in the top and bottom. There should be one hole for every inch.

3

Start to make layers! The first layer will be sticks of any kind. First, make a layer of sticks and make sure that these sticks are not too big for your container

4

Start another layer of dry leaves, straw, old paper, or other natural materials that are dried and brown.

5

Add a layer of soil, either topsoil from a bag, soil from a current garden, or any type of brown dirt. Brown soil has more carbon content and more microbes, which enable the composting process!

6

You can now start adding food scraps, like vegetable skins/seeds, fruit peels, and coffee/tea grounds, and other organic materials, like fresh leaves and flowers, on top of the soil! This will be organic material that still has some moisture. Foods that are high in fat or oil will not compost: meat, dairy products, fish, bones.

7

Add more soil on top of the organic matter, or continue to add scraps and soil as time goes on.

8

Add a bit of water to the top.

9

Leave the container outside; preferably in the sun. Heat from the sun will help the composting process!

10

Wait a few months until your compost looks like dirt. Food scraps and other organic material will not stink like garbage when the compost cycle is complete. Be wary of critters, pets and wild animals that might be interested in food scraps. Human food is not good for animals, so please seal your container tightly!



# The Story of 3 Sisters

Once upon a time there were 3 sisters. The youngest was named Beans.



Squash was the middle sister. She loved to run around the field they lived in and explore.



The oldest sister's name was Corn. She loved her sisters more than anything and would do anything for them.



One day a strange boy appeared in their field. He was very kind to all the animals but Corn was still very skeptical of him.



After the boy left, Beans disappeared, they searched and searched for her but she was gone.



A few weeks passed and the boy showed up again to collect reeds from the river. That night Squash disappeared.



Corn was all alone. She waited and waited...



And waited, but there was no sign of her sisters. Now her hair had become dry and tangled. And her beautiful green shawl was faded and fraying.



The sounds of her lonely cries carried across the land with the howling wind.



Until they reached the boy's ears.



He found Corn and brought her to his home where 2 familiar people waited.



It was her sisters Beans and Squash! They were all grown up but it didn't matter how much time they were apart for. They were together again.



As they hugged, Beans and Squash explained that they had followed the boy home and had kept them safe and warm.



After they were reunited the sisters decided to stay in the boy's comfortable house. Beans helped feed everyone and kept them full and happy.

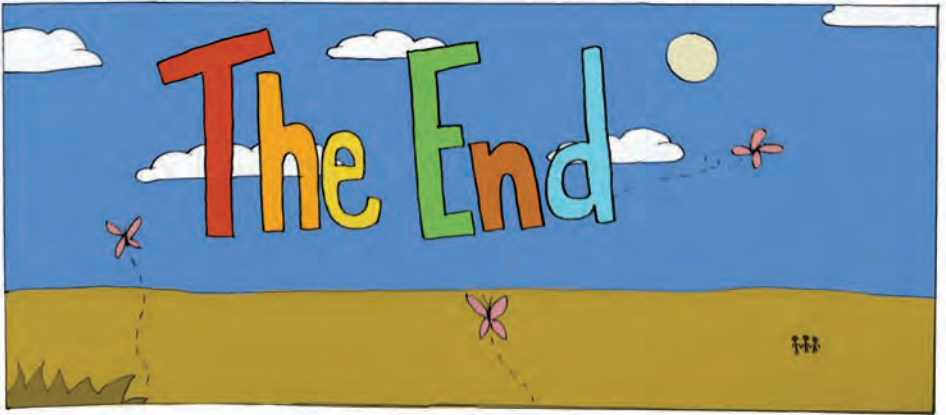


Determined to do her part as well, Squash dried herself to feed her family for when winter arrived.



And Corn dried herself to feed them in winter when the squash ran out.





### Can you find them?

Have fun looking for nature all around you, and looking for these icons throughout the zine!



# Resources Near You

## Museums and Science Activities Near You!

### ► **Zion Human History Museum**

South entrance of Zion National Park on the main park road | The Zion Human History Museum displays artifacts and archival materials from the permanent collections of Zion National Park. These exhibits showcase the rich human history of the place now known as Zion National Park and illustrate the effects water has had upon both the peoples and the place. Cultural museum featuring both Indigenous and pioneer artifacts and stories! | Free and open year-round 9-5pm; ~35mins from Hurricane

### ► **St. George Dinosaur Discovery Site at Johnson Farm**

2180 East Riverside Dr. | St. George, UT 84790 | Phone: (435) 574-3466 | Dinosaur tracks from the Jurassic; active paleontology site! Opportunities to volunteer, and learn from scientists at the educational facility of the track site. | Summer Hours (Mar 1-Sept 30): Open 7 Days a Week, Monday-Saturday 10am-6pm and Sunday 11am-5pm; ~30mins from Hurricane | \$6 for anyone over 12, \$3 for ages 4-12, free for under 4

### ► **Rosenbrunch Wildlife Museum**

1835 Convention Center Drive, Suite B, St. George, UT 84790 | 46mi SW of Zion | Over 300 species of taxidermy animals are featured! Indoor dioramas of animal habitats and a movie theater are part of this museum. | Monday nights are family nights, with special programming! | Open Monday-Saturday 10-6; \$8 for adults, \$4 for children; ~30mins from Hurricane

## National Forests, Parks, and State Parks

► **Dixie National Forest** | Borders three national parks and two national monuments! Varied terrain for a variety of ability levels and interests.

► **Cedar Breaks National Park: Circle of the Painted Cliffs** | Hike and camp near Southern Utah's natural amphitheater! Cedar Breaks is also a dark sky zone, great for stargazing. "Half the Park is After Dark!"

► **Kolob Reservoir and Virgin River** | Kolob Reservoir is regularly stocked with trout! | Fishing, kayaking/tubing, and tubing are all available recreational options for the Virgin River

► **Pa'rus Trail in Zion National Park** | Fully accessible! Paved trail with 50ft of vertical in 3.5mi; pet friendly (only trail in the park for pets!), mobility aid friendly, bike friendly | Interpretive hikes are led by Park Rangers. Trailhead is at the Zion Canyon Visitor Center

► **Riverside Walk** | Great for families with strollers or folks who use mobility aids; paved

► **Timber Creek Overlook Trail** | Family-friendly, less busy than other parts of Zion | Trailhead is 5mi past Kolob Canyons Visitor Center