



Succulents and Cacti

2023

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UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

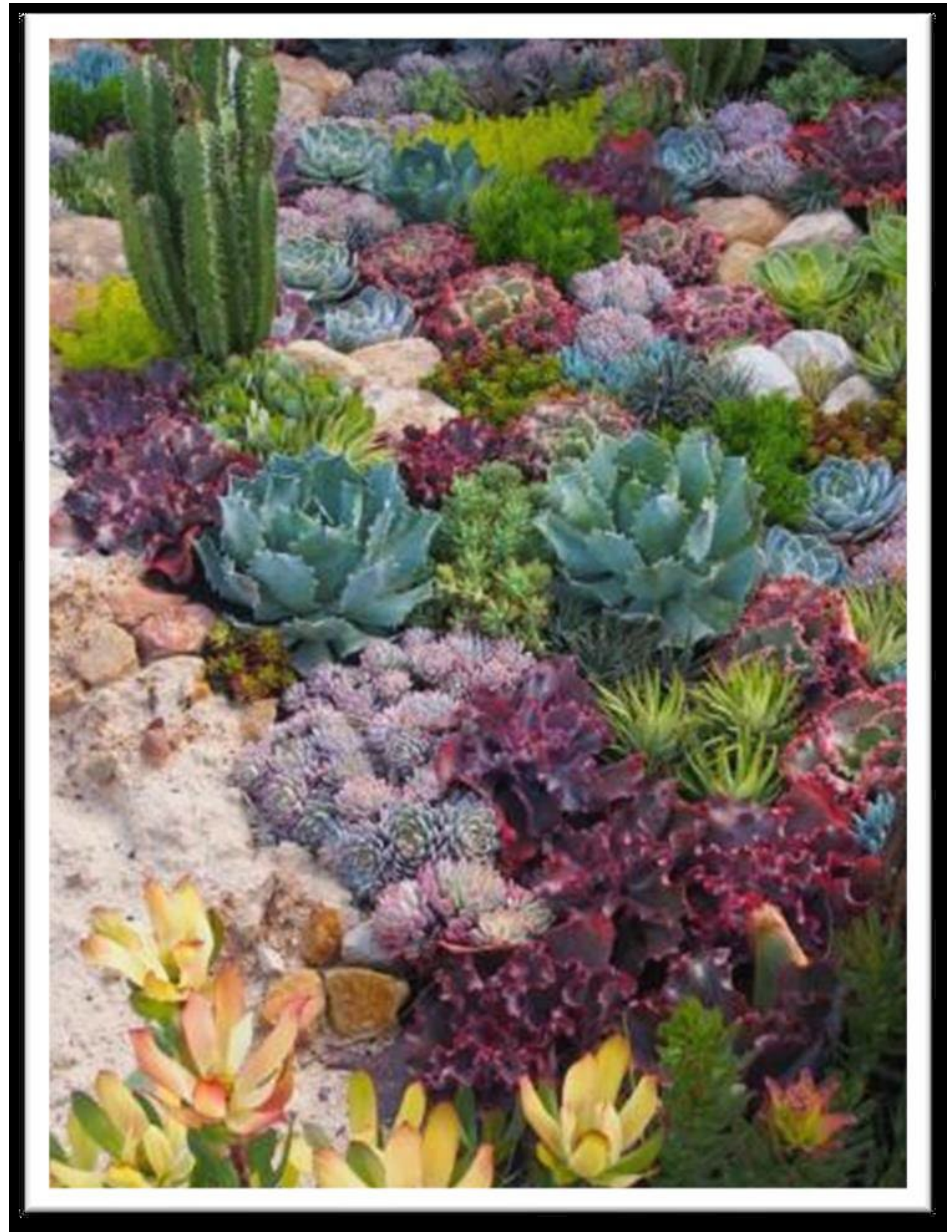
UC Master Gardener Program
El Dorado County

What are Succulents?

“Succulents are water-retaining plants endemic to arid areas of the tropics and subtropics.”

“They have evolved to withstand high temperatures and low precipitation by collecting and storing water in their leaves, stems and roots to survive long dry periods.”

Quote from Succulent Garden -Australia



Types of Succulents

About 60 plant families contain succulents. About 40 percent are found in the cactus and iceplant families, but most of the other common succulents are found within 8 families.



Xerophytes

Store Water

Fleshy Leaves

Plump Bodies

CAM plants -they fix carbon dioxide by **CAM = Crassulacean acid metabolism pathway.**

It minimizes water loss and photorespiration. It was first discovered in the plants of the Crassulaceae family



Tree Aeonium *

Crassulacean Acid Metabolism



- **Reverse Photosynthesis**
- Adaptation to arid conditions
- Stomata open at night instead of daytime to preserve moisture-
- During the night, the CAM plants' stomata are open, CO₂ enters and is stored
- Stomata are closed during the day, carbon is released, and photosynthesis takes place

Crassula ovale 'gollum' *

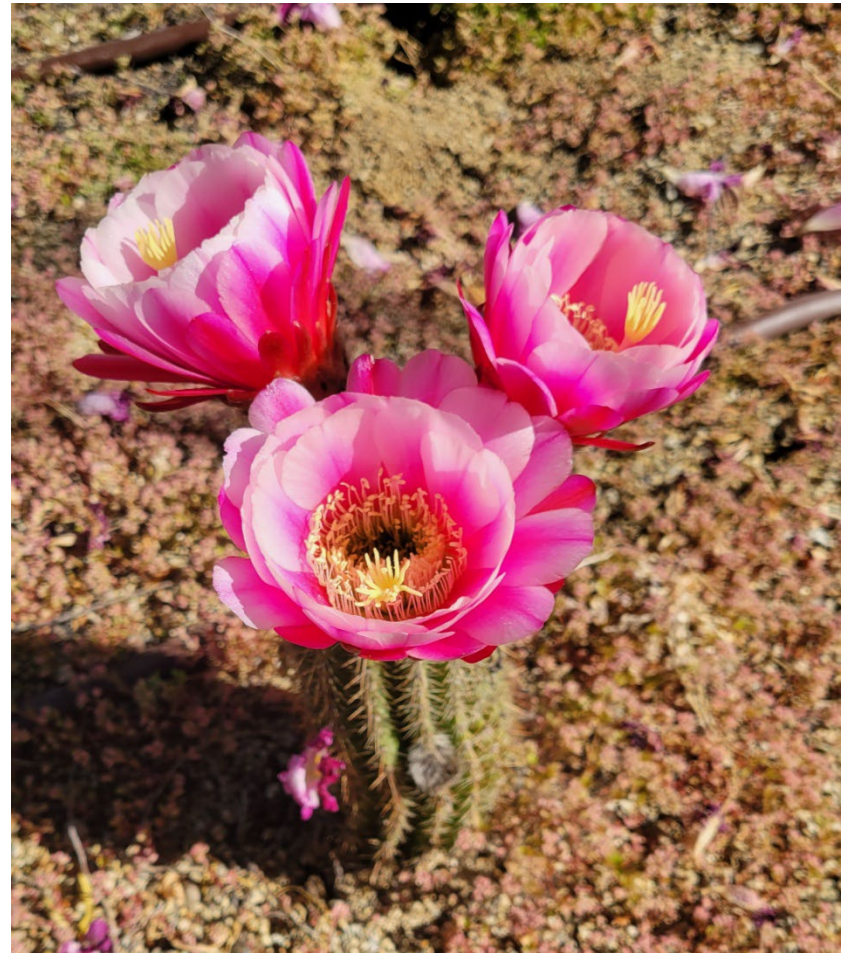
Cactaceae

New World

- Cacti



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Found in California, these natives are happiest in dry conditions

- Opuntia= prickly pear
- Cholla = *Cylindropuntia*



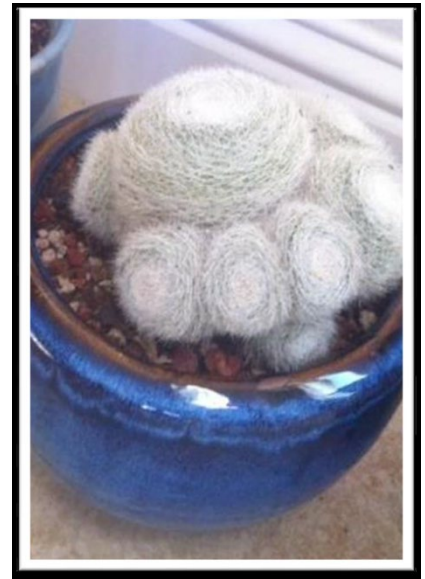
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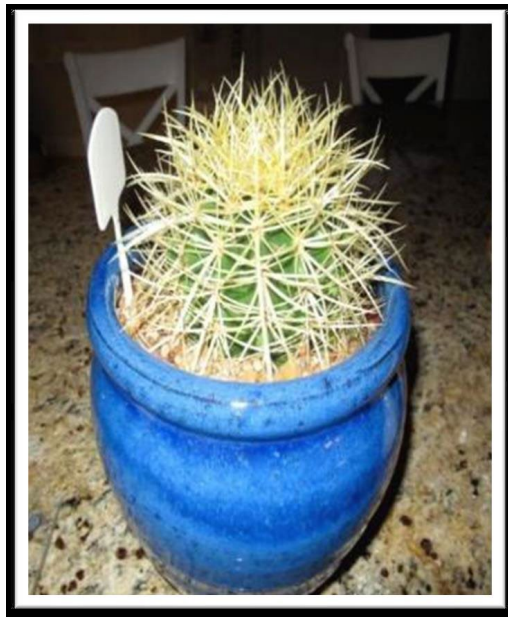
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Cactaceae

Mammillaria



Echinocactus



Echinopsis & Echinocereus



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Dracena

Holiday Cactus-

Christmas Cactus

Thanksgiving Cactus

Easter Cactus- rhipsalis

Also includes Sanseveria



Sanseveria *

Aloaceae

from Africa, most with
rosettes

Aloes

Astrolabe

Haworthia

Gasteria- ox tongue



Azioaceae- iceplant family

- from Africa, esp South Africa
- some are quite tiny and make good groundcovers, others like this *Mestoklema*, make good container plants, and can grow over 2 ft high



Agavaceae- agaves and yucca

- New World plants



- **Apocynaceae** –

found on all continents,
includes oleander and
milkweed



Pachypodium *

- **Bromeliaceae** –

semi-succulents, includes
pineapples and air plants

- From the New World



Bromeliad in Dormancy*

Crassulaceae

- Crassula are the largest genus of succulent plants
- •Native to South Africa and Madagascar
- •Require light but not direct sun
- •Requires winter protection in our area

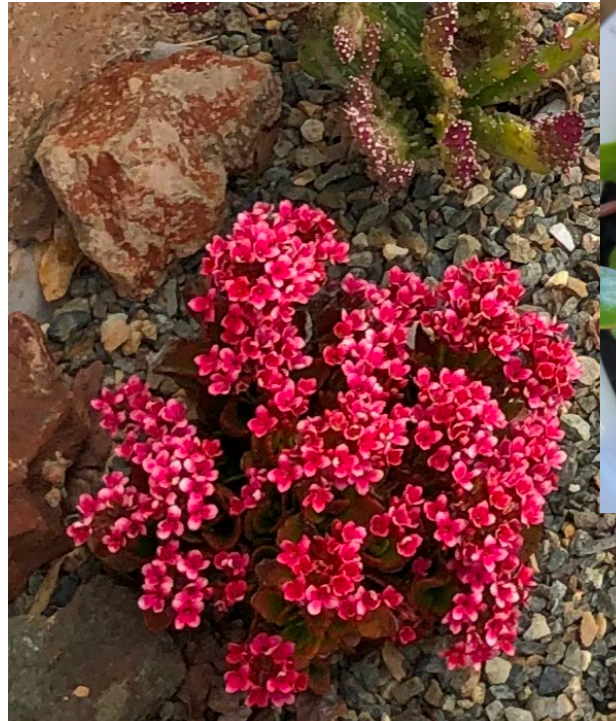


Crassulaceae

Aoenium



Kalanchoe



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Crassulaceae

Graptopetalum



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Echeveria



Crassulaceae

- Euphorbia

Dudleya



DonkeyTails - Spurge **



Liveforever**

Crassulaceae

Crassula

- Sempervivum



*C. Perforata**



Common Houseleeks*

Sedum



- Sedum are often referred to as stonecrop
- Sedum spathifolium-left, Autumn Joy-below
- Like sun and good drainage
- Most are frost hardy



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Native to California

- Natives-range from Northern Mexico and across California's very diverse environment
- Calscape- <https://www.calscape.org/>



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Examples



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Propagation of Succulents



Cautions for handling succulents

- Cacti have spines – these can cause mechanical damage, may transmit bacteria or fungi and cause infections
- Agaves will reach out and bite you!
- Succulents and cacti are often poisonous – a few are edible, but be careful



Principles of Succulent Propagation

- Always take cuttings from clean healthy plants
- Take cuttings or sow seed at the appropriate time of year
- Use clean tools (saws, pruners, knives, etc. to remove cuttings)
- Plan ahead, have all the correct tools and other materials readily available



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Seed Propagation

Advantages

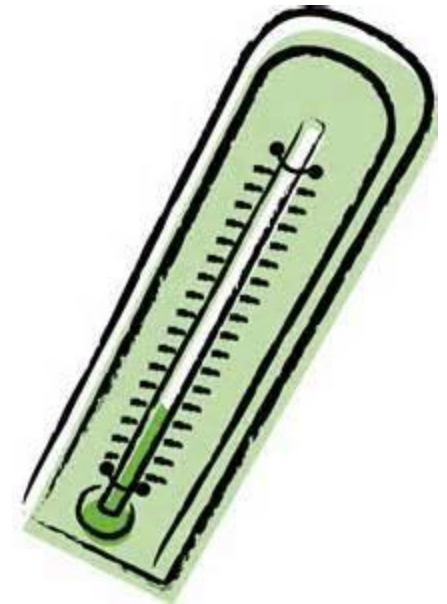
- Relatively inexpensive
- No greenhouse normally required
- Produces numerous plants
- Produces numerous types

Disadvantages

- Some seeds are very small, dust like
- Large seeds (match head size) are slower to germinate
- Cactus seeds can take up to a year to germinate

Seed basics

- Timing mid spring
- Best to use Individual pots at least 1.5 inches deep
- Can use all purpose seedling mix
- Temp 60°-70°
- Keep moist
- Cover to keep in moisture



Seed Propagation

- Once seed is sown, water regularly to keep soil mix damp
- Always label the pot or propagation tray with the date sown, the botanical name and seed supplier
- Keep track of your successes and disappointments



Propagation by Cutting

- Take cuttings from healthy plants
- Take cuttings at the start of the growing season
- Decide whether to cut individual leaves or a larger cutting



Stem & Leaf Cuttings

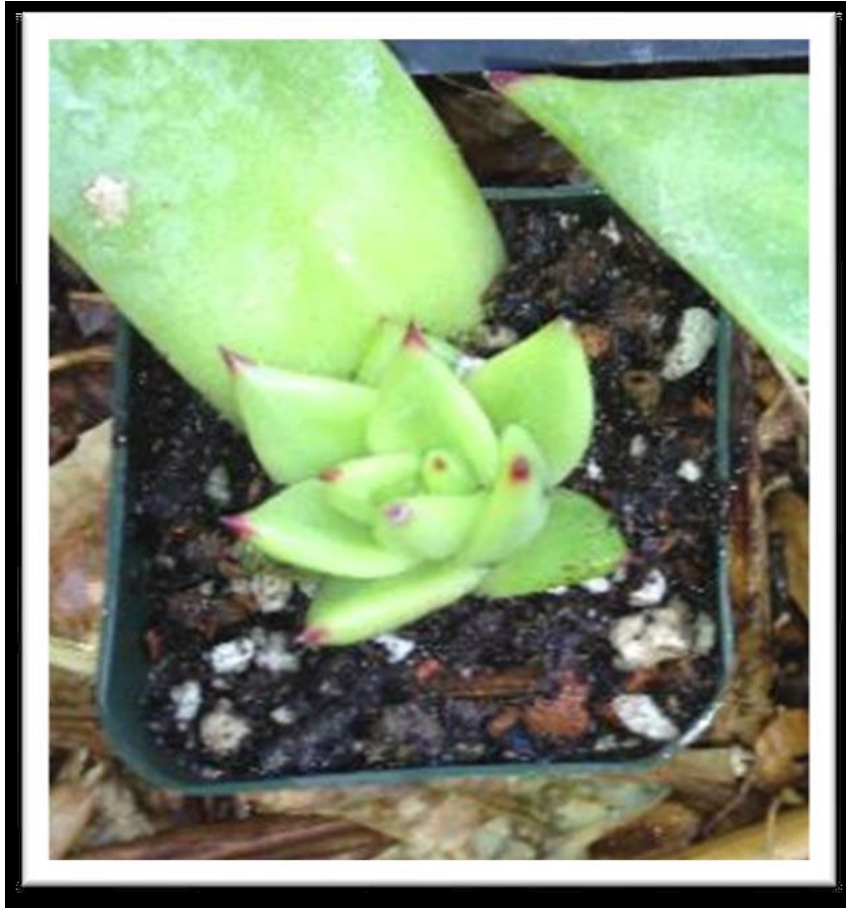
- Strip leaves from the lower part of the stem
- Dip the cut end in a rooting hormone (optional)
- Let the cutting/leaf dry out in a lightly shaded location
- Prepare a succulent potting mix
- Select an appropriately sized pot
- Plant the cutting/leaf

Place the plant in a warm, airy location 68°

- Keep the soil slightly moist
- Reduce watering as the plant develops
- Use fertilizer cautiously



Rooting occurs over several weeks, either
in soil or in water



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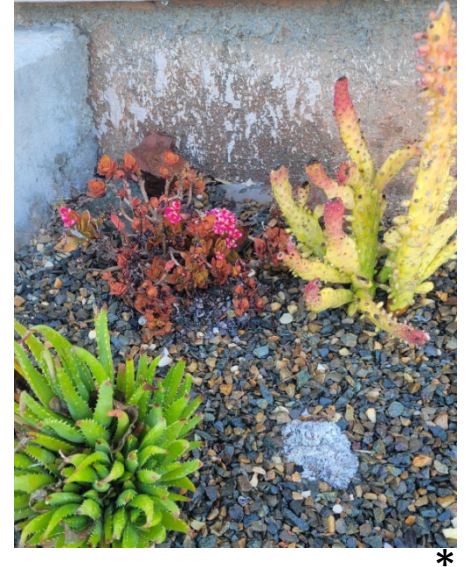
Let's separate some succulents!



Caring for your Succulents

You need to know your plant

Native environment – temperature, altitude
Soil type, water needs
Dormancy periods
Light requirements
Final size and shape



Indoor growing

- Windows or Grow lights
- Air movement
- Humidity

Outdoor growing

- Shade requirements
- Frost protection
- Watering

Beyond the first few weeks

Lighting -most important factor

few grow well in shadow

Haworthia

- **Gasteria**
- **Small Aloes**
- **Sansevieria**
- **Madagascar Euphorbias**

Air circulation – but not wind!

Temperature – happiest in 70s – 80s

Fertilizer N1; P7; K6; Ca 1

- Only in growing season
- No more than once monthly

Cactus/Succulent mixes

2-7-7 or 1-2-2

- **Under-watering results in poor growth.**
- **Over-watering kills the roots- check the soil!**
- **Water regularly during the growing season, but only when soil is dry**
- **Water lightly & infrequently during dormancy**

Pests and Diseases

- Aphids and Black Mold –non-toxic spray and/or systemic
- Mealy Bugs -non-toxic spray and/or systemic
- Fungus Flies and Rot- mostly from overwatering.
- Scale and Powdery mildew

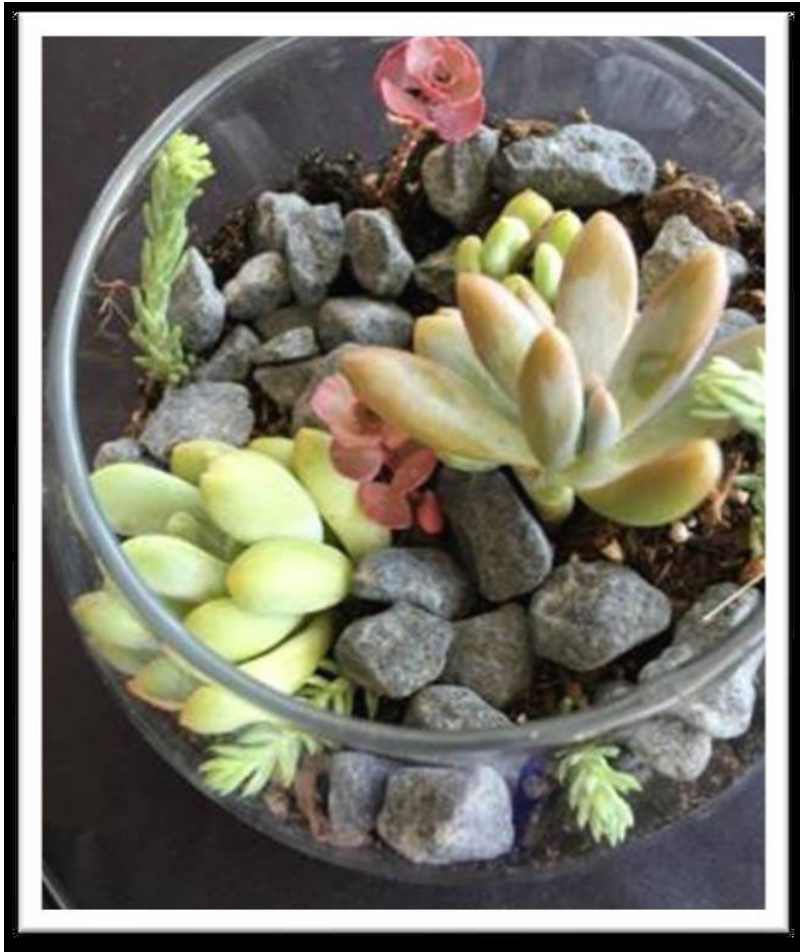


Frost Protection

- Succulents that are not frost hardy need to be protected from freezing temperatures and hail
 - Plants will be permanently scarred from either one
 - Can be purchased at big box stores
 - Fold for easy storage
- Alternative is foam or cloth covering for low-growing plants
- Best is to bring them inside or into a sheltered area



Making Succulent Gardens



Decorative Ideas



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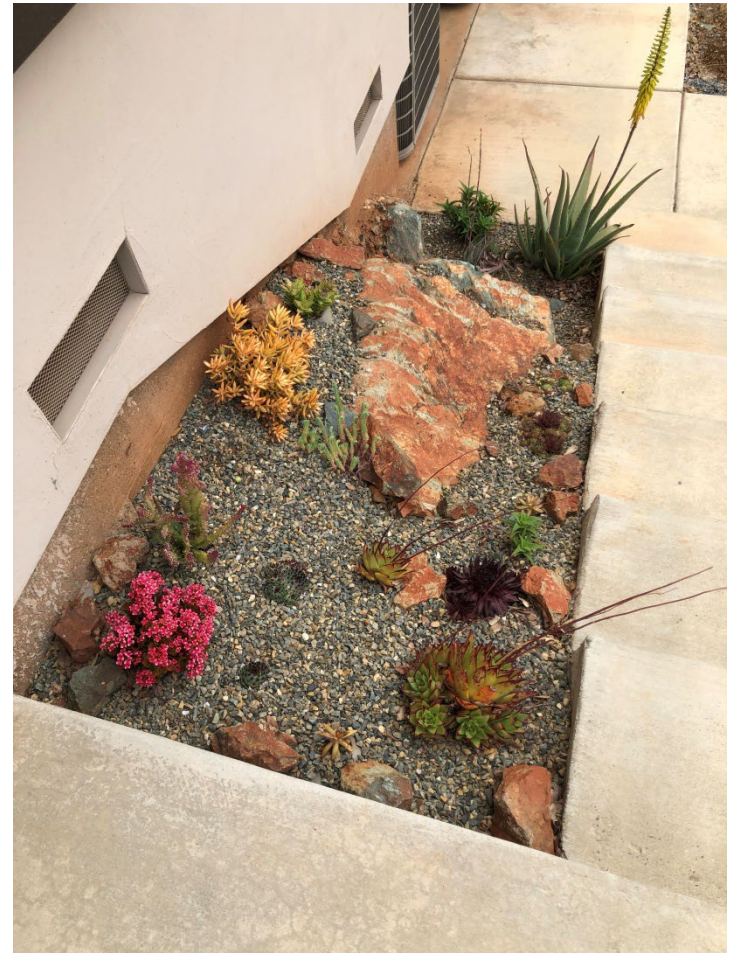


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Growing succulents outdoors

Or when planting in ROCK---

- Recipe for soil for an outdoor 4x8 garden:
- Existing soil in a 4'x8' bed should be weeded, turned, and the chunky bits removed. Then add
 - Two cubic feet of perlite
 - Two cubic feet of cactus mix
 - One cubic foot of volcanic rock



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Thank you

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References

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Photos marked * provided by Kitty Stewart, ** by Rich Stewart



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