

DROUGHT TOLERANT



DIY LANDSCAPE INSTALLATION

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Third of a 4 part series

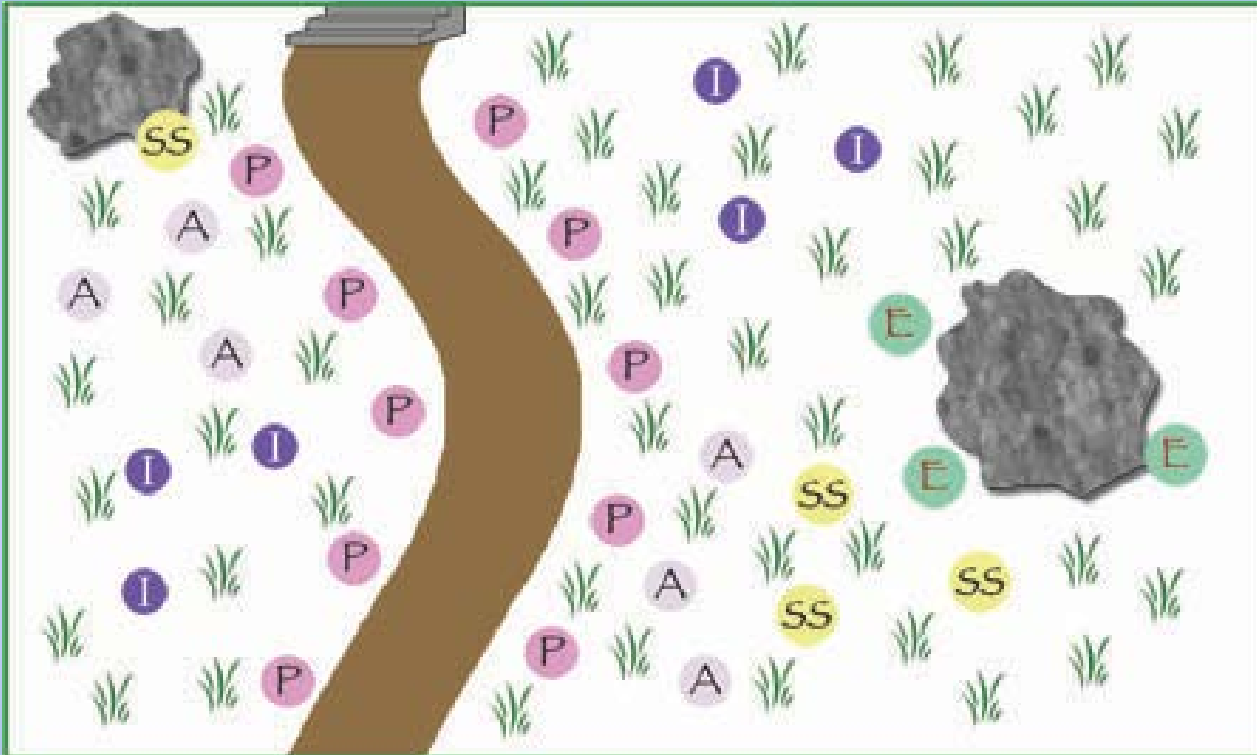
Drought Tolerant Landscape Design
March 22, 2018

Drought Tolerant Plant Selection
April 5 , 2018

 Drought Tolerant Landscape Installation
April 19, 2018

Drought Tolerant Landscape Maintenance
May 3, 2018

Start with a plan



A - Achillea millefolium

E - Epilobium canum

(grass) - Festuca 'Siskiyou Blue'

I - Iris douglasiana

P - Penstemon heterophyllus 'Margarita BOP'

SS - Solidago sp.

This is one of 3 plans found on the native plant nursery site for Yerba Buena Nursery

www.yerbabuenanursery.com

on the right side of the home page

"Lawn Alternatives using California Native Plants"

Questions we will cover

- What are drought tolerant plants?
- How far apart to plant?
- How to plant?
- Soil organisms!
- How to water?

**Which plants
are drought tolerant?**

WUCOLS IV

Water Use Classification of Landscape Species

- 3500 species of landscape plants
(Including 44 different Manzanitas, 49 Oaks, and 90 Sages!)
- Listed by the amount of water they need
- Compared to irrigated turf grass (% ET_o)

| Category | Abbreviation | Percentage of ET _o |
|-----------------|--------------|-------------------------------|
| High | H | 70-90 |
| Moderate/Medium | M | 40-60 |
| Low | L | 10-30 |
| Very Low | VL | < 10 |

HELP WITH HYDROZONING!

www.waterwonk.us

California plant database search tool

Choose city ► Plant search ► My plant list

1

A plant's water needs vary with the climate region where it will live. Choose a city and the tool will place your search in the correct WUCOLS climate region.

2

Proceed to the plant search page, and search to your heart's content. There are 12 different search criteria you could specify, or just bring up the entire regional list, or the full list showing all plants and all 6 regions. You will be presented with the WUCOLS water-use value for each plant.

3

Create a list of plants for your project. This list can be printed or downloaded to your favorite spreadsheet program. We will save your plant lists for you in our database.

- You may have one courtesy plant list for each region. To access your existing plant list for any given region, you must first choose a city in that region, and then go to the plant search page. Your list may be accessed from the "Plant Search" page.
- In order for you to create plant lists, you must register for the site. Signing up is free, quick, and easy to do.

What is WUCOLS?

Water Use Classifications of Landscape Species

Water Use Classifications of Landscape Species (WUCOLS) provides a guide to estimating irrigation water needs of landscape plantings in each of 6 distinct California climate regions. WUCOLS was developed by the University of California Cooperative Extension in cooperation with landscape professionals and funded by the California Department of Water Resources.

 [Click pdf icon to view or download WUCOLS IV plant list. Learn more about WUCOLS \[here\]\(#\)](#)

Get started



Choose City to identify WUCOLS REGION

[Show instructions](#)

Find city in WUCOLS REGION **Go to
Plant Search**

| | | |
|---|----------------------------------|---|
|  | 1 North Central Coastal ▾ |  |
| | 2 Central Valley ▾ |  |
| | 3 South Coastal ▾ |  |
| | 4 South Inland Valley ▾ |  |
| | 5 High and Intermediate Desert ▾ |  |
| | 6 Low Desert ▾ |  |

Or find by city name **Find city**

Begins with 

Search for a category

Example: very low water ground covers

Plant Search

North Central Coastal, CA

WUCOLS Region 1

[Choose new city](#)

[Save to PDF](#)

Botanical name begins with

Common name begins with

Plant Type

- Ba Bamboo
- Bu Bulb
- G Grass
- Gc Groundcover
- P Perennial
- Pm Palm
- S Shrub
- Su Succulent
- T Tree
- V Vine

Water use

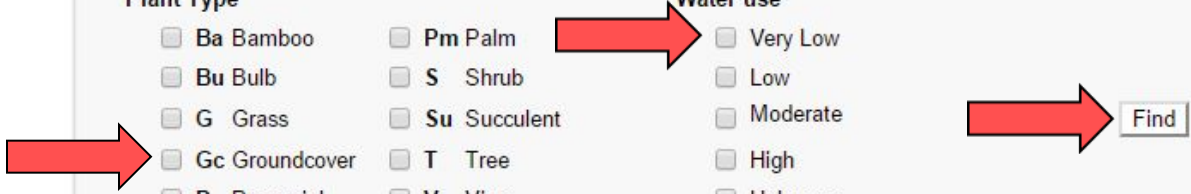
- Very Low
- Low
- Moderate
- High
- Unknown
- Not appropriate for this region

California Native

Reduced Summer Water [What's this?](#)

[Go to WUCOLS list for all 6 regions](#)

All plants for this region



Plant Search

North Central Coastal, CA

WUCOLS Region 1

[Choose new city](#)

[Save to PDF](#)

Botanical name begins with

Find

Common name begins with

Find

Plant Type

- Ba Bamboo Pm Palm
 Bu Bulb S Shrub
 G Grass Su Succulent
 Gc Groundcover T Tree
 P Perennial V Vine

Water use

- Very Low
 Low
 Moderate
 High
 Unknown
 Not appropriate for this region
 Reduced Summer Water [What's this?](#)

Find

[Go to WUCOLS list for all 6 regions](#)

All plants for this region

Find

 New Search

 California Native

 Reduced Summer Water







[Go to list](#)

Search Results

7 plants:

Type-Groundcover

Water use-Very low

| Type | Botanical Name | Common Name | Water Use | Flickr Photos | Select for My List |
|------|---|---------------------|-----------|------------------------|--|
| Gc S | Acacia redolens  | prostrate acacia | Very Low | See it | <input type="checkbox"/>  |
| Gc S | Adenostoma fasciculatum  | chamise | Very Low | See it | <input type="checkbox"/> |
| Gc S | Artemisia spp. (shrubby) | sagebrush | Very Low | See it | <input type="checkbox"/> |
| Gc S | Atriplex CA native species  | saltbush | Very Low | See it | <input type="checkbox"/> |
| Gc S | Atriplex semibaccata  | Australian saltbush | Very Low | See it | <input type="checkbox"/> |
| Gc | Iva hayesiana   | poverty weed | Very Low | See it | <input type="checkbox"/> |
| Gc P | Teucrium cossonii | Majorcan germander | Very Low | See it | <input type="checkbox"/> |

Results for “Very Low Groundcover”
Click on “See it” for a picture!

Teucrium cossoni - Majorcan Germander



Search for a plant and find out its water requirement

Plant Search
North Central Coastal, CA
WUCOLS Region 1

[Choose new city](#)
[Save to PDF](#)

Botanical name begins with

Common name begins with

Plant Type

- Ba Bamboo
- Bu Bulb
- G Grass
- Gc Groundcover
- P Perennial
- California Native

Water use

- Vm Palm
- S Shrub
- Su Succulent
- T Tree
- V Vine

Very Low
 Low
 Moderate
 High
 Unknown
 Not appropriate for this region
 Reduced Summer Water [What's this?](#)

[Go to WUCOLS list for all 6 regions](#)

[New Search](#) [California Native](#) [Reduced Summer Water](#)

Search Results

1 plants:
common name begins with "Japanese Maple"

| Type | Botanical Name | Common Name | Water Use | Flickr Photos | Select for My List |
|------|----------------|----------------|-----------|------------------------|---|
| T | Acer palmatum | Japanese maple | Moderate | See it | <input type="checkbox"/> <input type="button" value="Add"/> |

Not all natives are DT

Many non-natives are DT

Mediterranean plants

- From 5 regions of the world with shared climates
- Grey, small or fuzzy leaves
- Leaves held sideways to the sun

Succulents & cacti

- Fleshy, water holding leaves
- No leaves!
- Summer dormancy

What tools do I need?

NECESSARY

- Plan (see last week's presentation)
- Gloves (favorite is Atlas Nitrile Grip)
- Shovel
- Rake/pitchfork
- Wheelbarrow
- Pruners (for drip tubing)
- Garden hose

OPTIONAL

- Pick to remove shrub roots
- Lawnmower or string trimmer
- Truck is handy for compost, but it's also deliverable
- Plumbing tools, if you are changing your system to drip (pipe wrench, PVC pipe cutter, etc.)
- Good friends!

What materials do I need?

NECESSARY

- Newspaper or builder's paper
- Free mulch
- Compost
- Plants
- Drip irrigation parts, including a pressure reducer & filter (or a willingness to hand water)

OPTIONAL

- Mycorrhizae
- Compost Tea
- Purchased mulch
- Boulders
- Focal elements like bird bath, bench, pots

SOIL TESTS

- Profile (dig a hole)
- Composition (simple tests)
- pH (simple home test kit)
- Drainage (Percolation/hole test)
- Fertility (professional lab)
- Biology (professional lab)

JAR TEST

Fill a jar 1/3 full of soil, 2/3 water
Shake well

Draw lines on the jar at different
time points, don't disturb

After 1 minute – sand settles out

After 1 hour – silt

After 2 days – clay

Organic material floats to the top



Simple, at home test for soil texture (sand/silt/clay)

RIBBON TEST

- Moisten a bit of soil in your hand and knead it to remove dry clumps
- Squeeze a ribbon upwards between your thumb and fingers
- Stand it upright as you push it out.
- Measure where it breaks off
- 1" sand
- 2" silt
- 3" clay



Percolation Test



Dig a hole and prefill it if the soil is dry

Fill your hole with water





Measure how fast it drains. This Oakland soil drained 2 ½" per hour. Clay soil might drain at only ¼" per hour.

Professional Labs

Chemical testing for soil fertility, pH, and more

- Master Gardeners of Santa Clara County has a list of labs
(Univ. of Mass. is the least expensive)

- http://www.mastergardeners.org/pdf/import/resources/Soil_testing_laboratory_list.pdf

Biological testing for fungi, bacteria, nematodes

- Botanical Arts Alane Weber 650-348-2094
- Mauby All Natural Brian Debasitis www.mauby.com
- Soil Foodweb Intl. Dr. Elaine Ingham www.soilfoodweb.com

Slopes

- If steep, you may wish to terrace
- Mulch on newspaper just slides off so instead, use a sandwich of shredded redwood bark, jute with 6" sod staples, and more bark
- Valves need to be 12" above the highest irrigation lines or have backflow device between water source and valves
- Place emitters above the plant
- Separate zones on the contour, not up and down
- Water the top of hill more than the bottom

What does professional landscaping cost?

| | |
|---|-----------------------|
| Demo, planting, lawn, irrigation only | \$8 to \$10/sft |
| Typical yard, softscape & average amount of hardscape | \$13 to \$18.5/sft |
| More complex with more hardscape | \$27 to \$39/sft & up |

Professional Costs: <http://www.earthcareland.com/what-we-do/installation.html>

Do not use unlicensed operators; they put your home at risk by carrying no insurance. They put trained, bonded, licensed professionals who carry worker's compensation for their employees, out of work.

Costs, if you do all the work yourself

Assuming you already own or can borrow the tools

- Plants: \$5-12 each for small plants (4"-1 gallon)
- Mulch: \$33/yd woodchips, \$73/yd firbark, \$32/yd arbor chips at Lyngso (also can get free)
- Irrigation: \$250-\$300 includes 2 new valves and timer
- Compost: \$40+/yd, municipal compost is less
- Compost Tea: \$8/gallon, get 3-4 gals. which can be diluted
- Builders paper: \$15/3'x140' roll (doubled covers 200sft)
- Staples \$60/1000, but can get smaller amount
- Sod Cutter rental: \$100 for 2 hours (This is only if you have Bermuda Grass. They can be temperamental.)

Sources for material

Plants

- Capitol Wholesale Nursery – good selection of natives, will sell retail
2938 Everdale Drive, San Jose www.capitolwholesalenursery.com
- Native Revival Nursery – great plants, and other retail items, demonstration garden
2600 Mar Vista Dr. Aptos, CA 95003 www.nativer revival.com
- California Native Plant Society has two plant sales/year, in April and October, at Hidden Villa

Mycorrhizae

Capitol Wholesale Nursery, see above
Most retail nurseries

Compost, Mulch, Boulders & Flagstone for stepping stones

- Lyngso Garden Materials 19 Seaport Blvd. Redwood City www.lyngsogarden.com
- Mountain View Garden Center 50 Centre St., Mountain View www.mountainviewgardencenter.com
- South Bay Materials 1781 Angela St, San Jose, CA 95125 (408) 977-1855
- U-Save Rockery 589 E Gish Road, San Jose CA 95112 www.usaverockerysanjose.com

Sources for material

Irrigation Parts

- Home Depot & Orchard Supply (be careful of the ½” tubing size!)
- Ewing Irrigation (wholesale/will sell retail) 1735 Rogers Ave, San Jose www.ewing1.com
- Horizon Irrigation (will sell retail) 1990 Stone Ave, San Jose, CA 95125 www.horizononline.com

Free Arbor Chips

Use the phone book and start politely calling tree trimming companies
Lyngso sells (and delivers) arbor chips, for \$32/yd

Live Compost Tea

Lyngso Garden Materials (usually on Wednesdays, call ahead)
Mauby All Natural Brian Debasitis www.mauby.com

Builder's Paper (Don't get the one with waterproofing!!!)

Lyngso Garden Materials 345 Shoreway Rd, San Carlos, 94070 www.lyngsogarden.com
Home Depot

If you are replacing a whole lawn:

LESSONS FROM *“NATURAL FRONT YARDS”*

- Sustainable landscaping ideals of material re-use and minimal disruption
- Affordable lawn replacement using natives in sheet mulch
- www.naturalfrontyards.com

BEFORE



AFTER

“Natural Front Yards”



Not for Bermuda or Oxalis (different treatments)

STEP-BY-STEP PROCESS

1. Remove unwanted shrubs
2. Cap off sprinkler system underground
3. Scalp lawn (optional)
4. Cut back edges near hardscape, 4" deep
5. Mound extra soil
6. Cover with paper and arbor chips
7. Plant small plants in planting pockets with mycorrhizae & compost
8. Install drip lines
9. Cover with attractive mulch
10. Spray with compost tea (AACT)

Organic Bermuda Removal

1. Water the soil 3 days before removal.
2. Rent a sod-cutter, make two passes (about 1 ½" each) to remove most of the rhizomes.
3. Remove to the landfill or other location to dry out thoroughly (then you can reuse the soil)
4. Rototill lightly, and rake out Bermuda
5. Follow up by spot hand weeding anything that re-sprouts

Organic Oxalis Removal

I haven't really found any (sigh)

Persistent hand pulling before it flowers, for three years

Weeding can be combined with lots of smothering, but will need to replenish paper/cardboard annually



Oxalis pes-caprae

Chickens do eat Oxalis!



CHICKEN TRACTOR

STEP BY STEP IN PICTURES



Scalped lawn

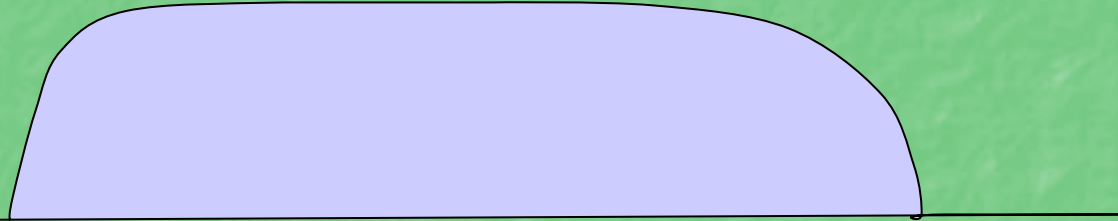


Cut back the edges near hardscape

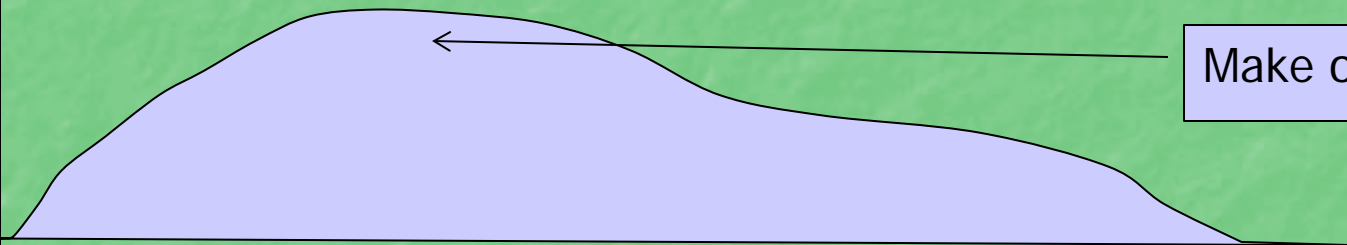


**Cut back the edges and make
a mound with the extra soil**

How to shape a mound



Steep sides look unnatural

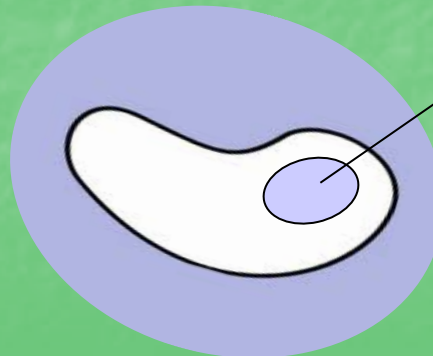


Make one point higher

Gradually taper the edges into the earth

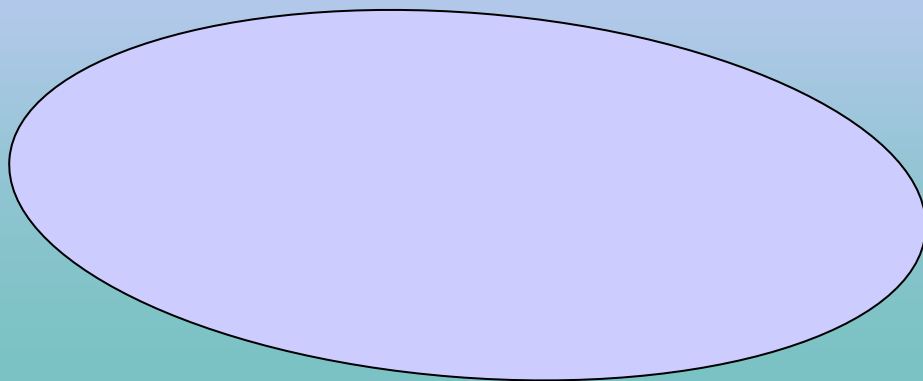
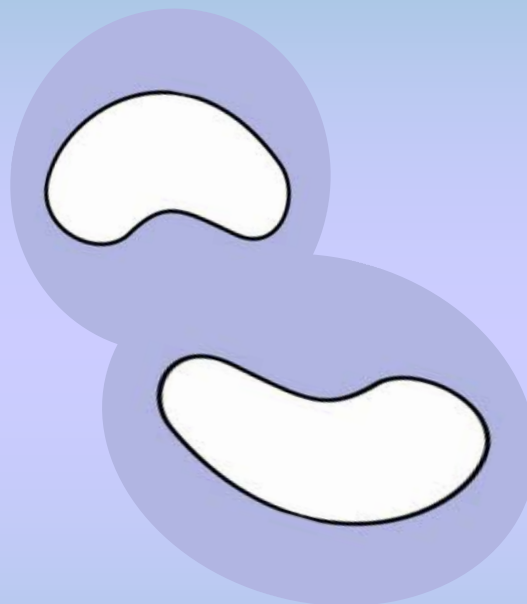
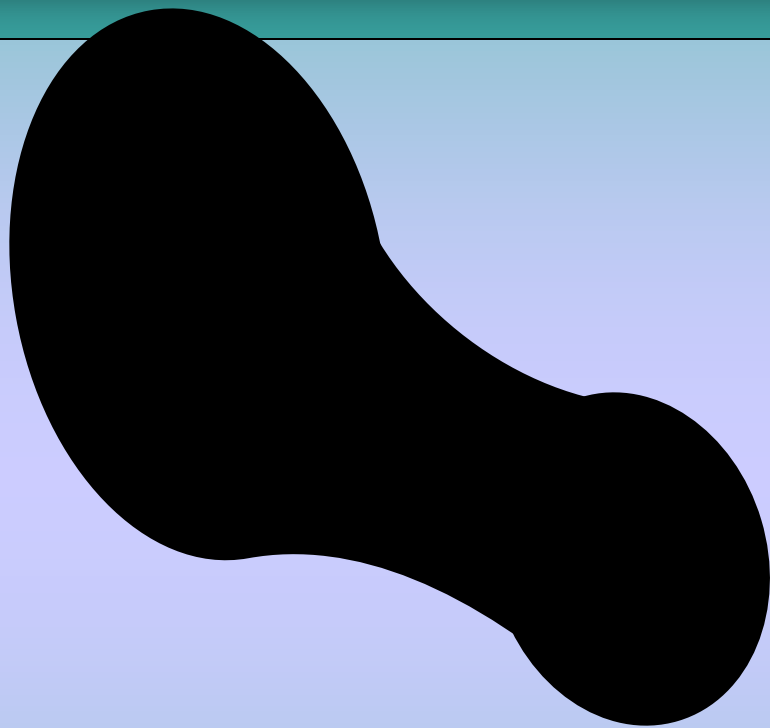


Too regular

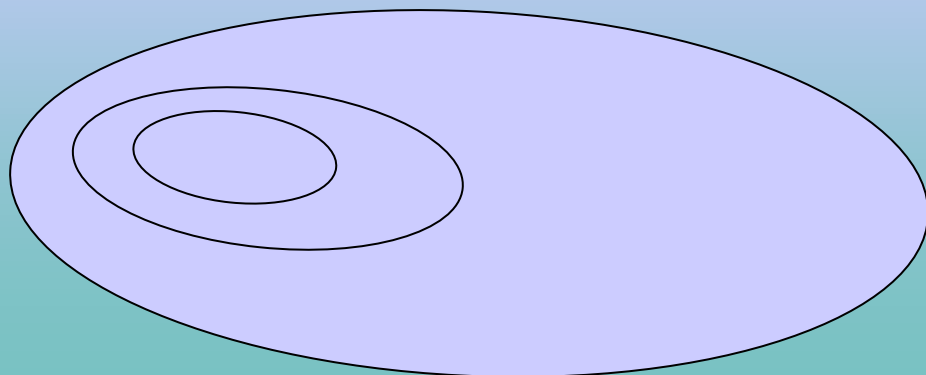
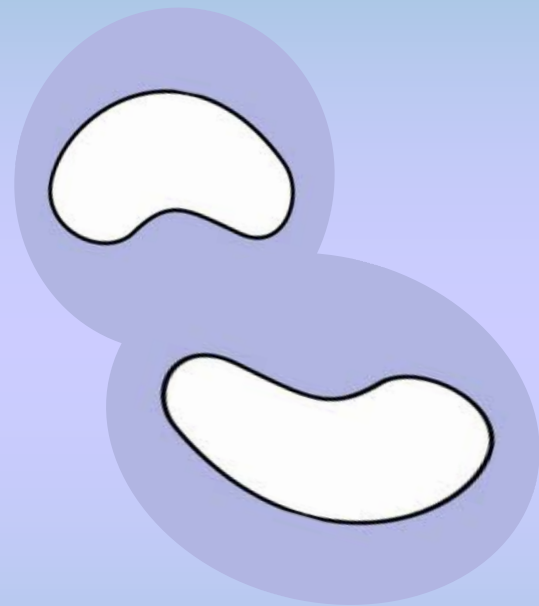
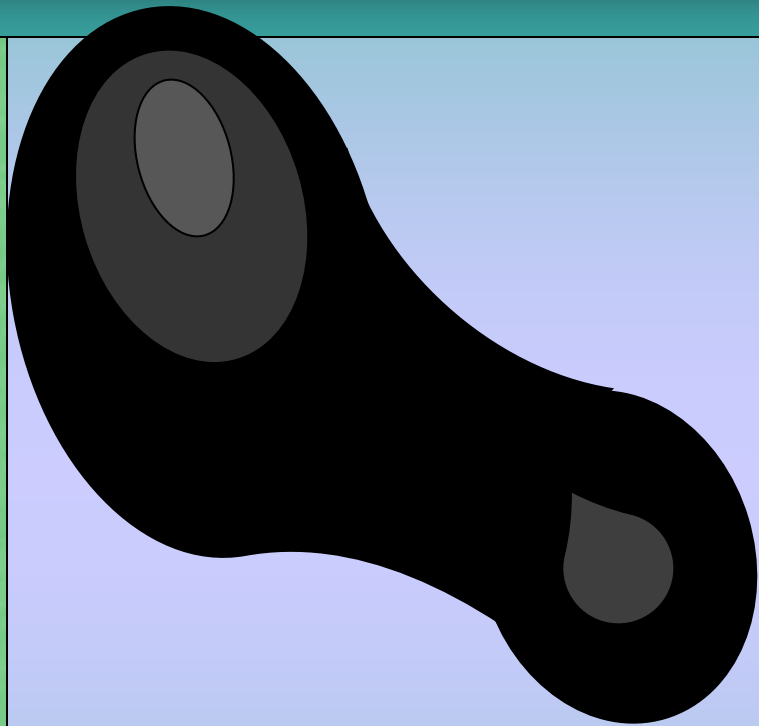


More natural

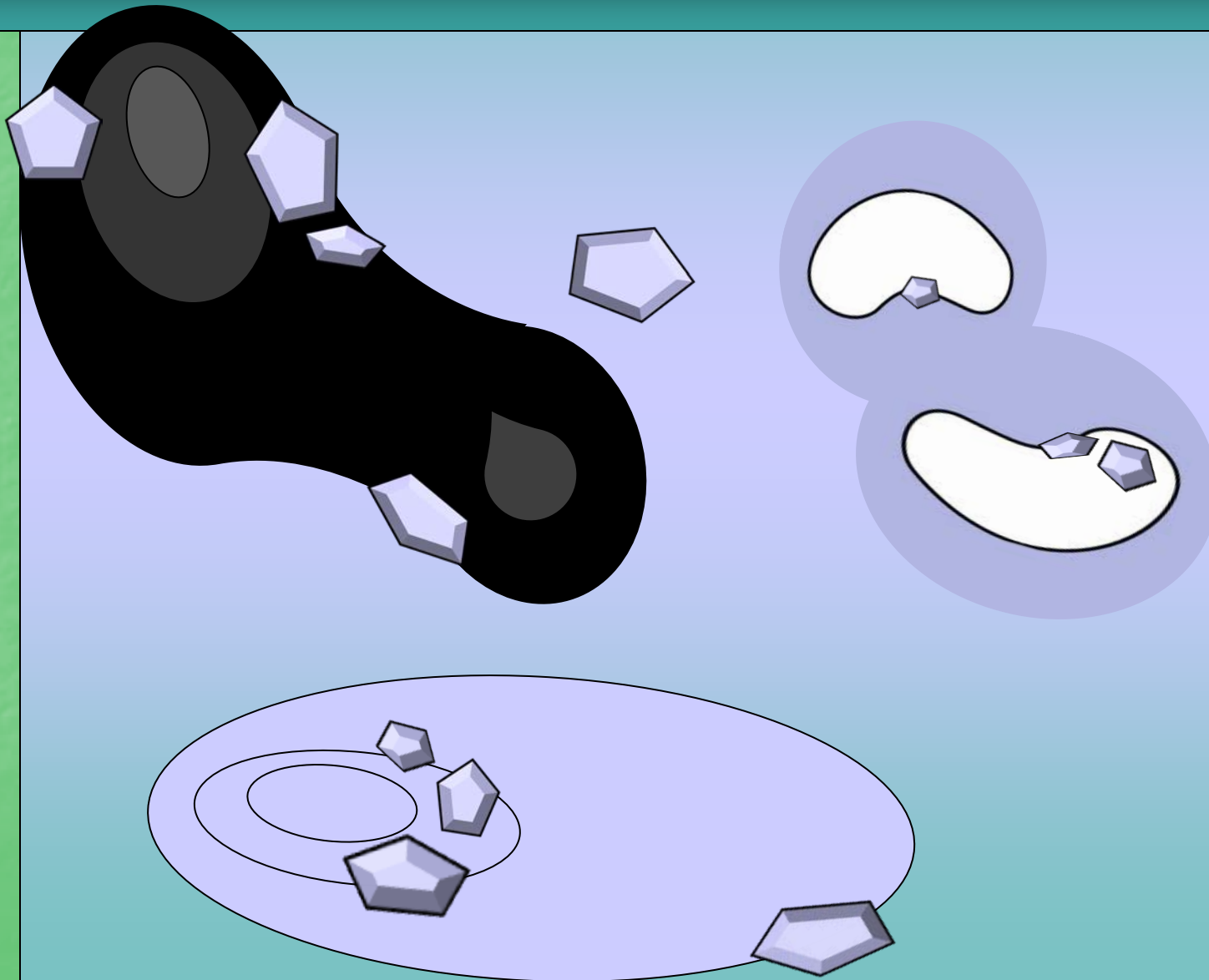
MOUND SHAPES



MAKE ONE END HIGHER



PERHAPS ADD BOULDERS

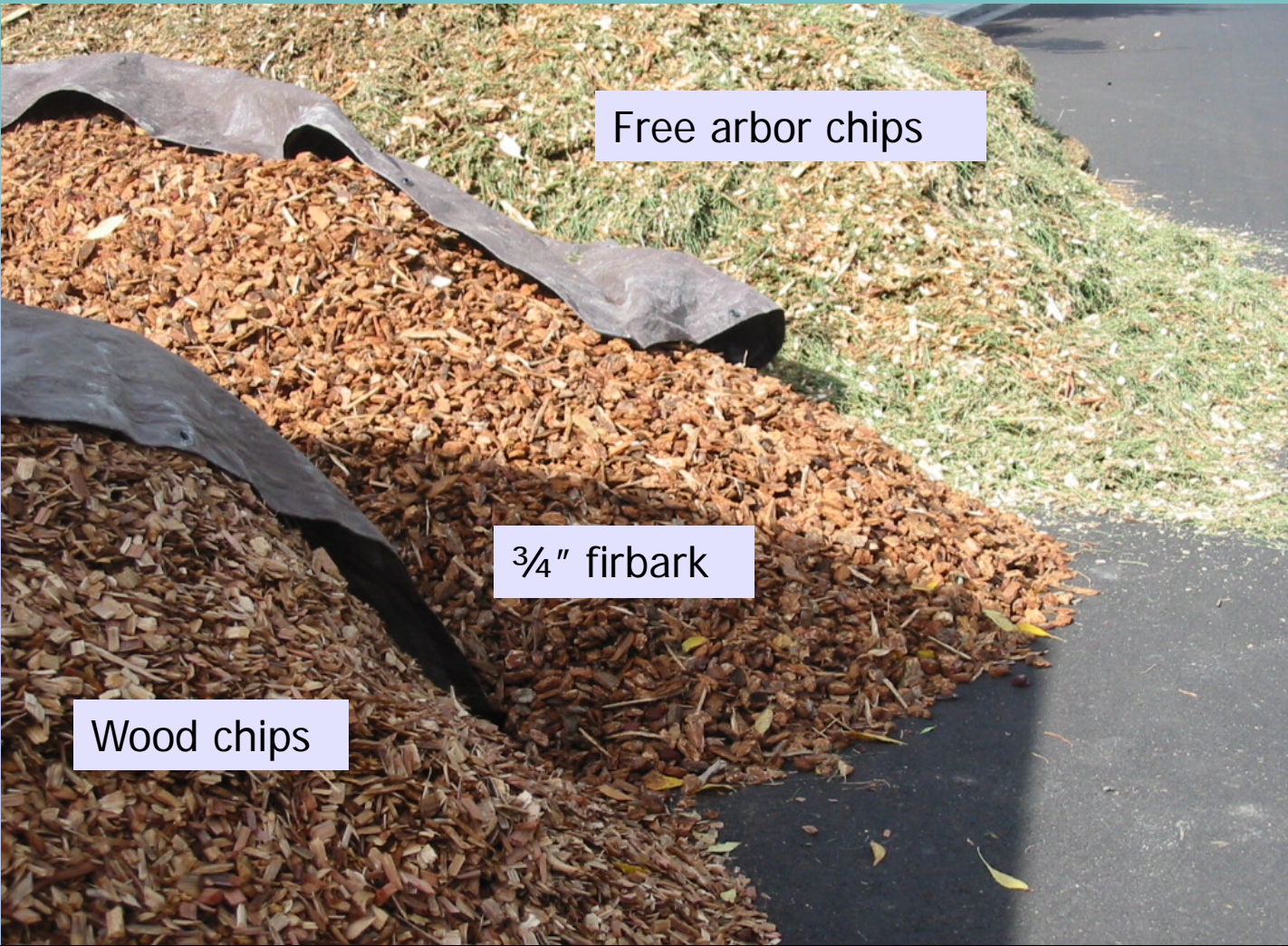




Examples of natural looking mounds



Smother grass with paper



Free arbor chips

3/4" firbark

Wood chips

Examples of organic mulch

Construction Math

CALCULATOR: Bulk materials like compost and mulch are measured in cubic yards.

To figure how many yards you need:

Square foot coverage (width x length) X number of inches of depth. Then divide by 324.

Example: to put 4" of mulch on a 20' x 30' area = 600sft
 $4 \times 600 = 2400 / 324 = 7.4 = 7 \frac{1}{2}$ yards.



Delivery of “Arbor Chips” on top of paper





Space plants for ultimate growth



Planting “pocket” in mulch



**Scuff or open root balls,
Add mycorrhizae**

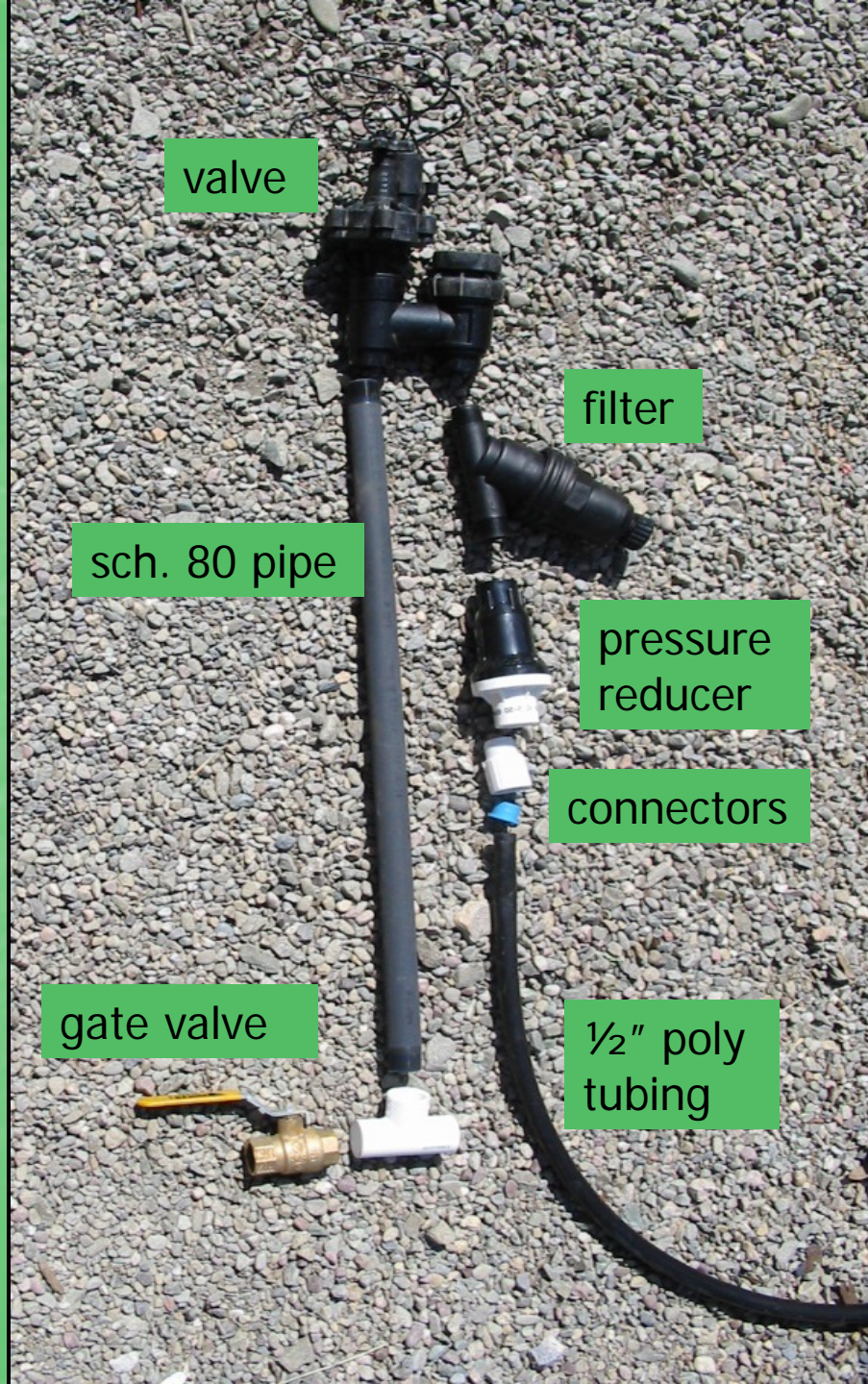


Drip irrigation



Expandable drip irrigation

How it goes together



Change your sprinklers to drip

- Turn off irrigation system and separate the valves from the pipes
- Unscrew the sprinklers, leaving the pipes in the ground
- To make sprinkler valves suitable for drip, add a 30psi pressure reducer and a filter to each one. They need to be 12" above the highest point of the system, on schedule 80 pipe. Use teflon tape on threads.
- Connect ½" drip lines to the valves and snake them around the yard. Make sure your .710 or .620 tubing matches your compression fittings (Raindrip is the smaller one)
- After you plant, add ¼" tubes with a barb to each plant. Use a hole punch
- Connect a length of ¼" tubing that has emitters every 6 or 12", add an end plug. Spiral it around the plant and stake it in place.
- Flush your system, cap the end and test your system.



Dry creek rough grading



Dry creek and two colors of mulch



Natural Front Yard one year after planting





November 2010



Six months later





Newly planted Oct. '09



Natural Front Yard two years after planting





October 2008



Same yard three years after planting



THE END