Improve Your Garden Soil: Grow a Cover Crop

Cover cropping can:
- Protect soil from rain compaction
- Protect soil from wind and rain erosion
- Increase soil porosity
- Increase soil pore size by "critter" feeding
- Leave organic material at depth in the soil (roots)
- Scavenge N-P-K left in soil from last season's crop
- Mobilize and sequestering native soil nutrients
- Provide food (pollen and nectar) and shelter for beneficial insects
- Out-compete weeds
- Some cover crops can increase plant-available N in the soil

Soil Basics
- What's soil made of?
  - 25% water
  - 25% air
  - 45% mineral
  - 5% organic (living insects, worms, microbes, plant roots; dead tissues of plants and critters)
- Mineral part is described by particle texture:
  - Sand - largest particles
  - Silt - middle-sized particles
  - Clay - smallest particles
- What about the 5%? - the organic part?
  - living insects & worms
  - living plant roots
  - dead plant material and dead insects & worms
  - microbes: a thimble full of soil has 100M to 1B bacteria + several thousand protozoa and 10 to several hundred nematodes & fungi
- How Soil becomes "imperfect"?
  - compacted (spaces for air and water are compressed)
  - living organisms are not present or limited in numbers
  - dead plant material has been depleted by the extreme aeration of over tillage
- How Soil becomes "perfect"
  - with restoration of air and water channels
  - restoration of microbial life
  - activities that will preserve "organic matter" in the soil

What cover crop to plant?
- Consider soil conditioning objectives:
  - penetration of "locked soils" (grains or daikon)
  - adding organic material below soil surface (without digging & oxidizing it)
  - growing crop to add nitrogen to soil (legumes)

When to plant it?
- Fall or a time between growing edible crops

At Planting Time:

- Use a legume inoculant to improve nitrogen fixing by beneficial rhizobium bacteria.
- Scatter the seed, ruffle it on the top of the soil and pat it making good soil contact.
- Water it in.
- Consider covering the seed bed with row cover to limit predation by birds and squirrels
- Remove row cover as the crop grows and pushes it up
- The most nitrogen will be present in the crop just as it is 1/2 bloomed out
- To avoid the crop becoming the next season's weeds, don't let it set seed
- Be prepared to irrigate the crop during winter, depending on our rains
- Be prepared to "browse" the crop, cutting it back to about 10-12", and keeping the clippings as mulch or composting them

3 to 6 weeks before spring planting:

- Cut cover crop down to ground, clipping it with shears into small pieces
- Don't pull out plants but rather leave their roots in the soil
- If some larger plants fail to die, pull them enough to break roots but leave them in place to decompose
- Leave clipped cover on soil as a mulch or lightly cover it with earth (don't dig!)

When it's time to plant your spring/summer vegetables:

- Open planting holes down into the cover crop mulch and disturb the soil as little as possible
- If you're planting rows of seedlings or direct seeding, move the crop residue and plant; replace the residue as mulch as it fits
- Don't forget to add a 1" or slightly thinner layer of compost to your planting bed
- Mulch the bed after you have planted and placed your irrigation tubes

Resources:

Chuck Ingels, updated by Judy McClure, "Cover Cropping in Home Vegetable Gardens," University of California Agriculture & Natural Resources, Cooperative Extension, Sacramento County, Environmental Horticultural Notes,
http://ucanr.edu/sites/sacmg/files/117129.pdf

Orin Martin, "Choosing & Using Cover Crops in the Home Garden & Orchard,"University of California Santa Cruz Center for Agroecology & Sustainable Food Systems, News & Notes of the UCSC Farm & Garden, Issue 135, Fall 2012,
http://casfs.ucsc.edu/documents/for-the-gardener/choosing-cover-crops.pdf

"Soil Health Concepts," Cornell University Comprehensive Assessment of Soil Health
http://www.css.cornell.edu/extension/soil-health/1concepts.pdf

"Life Underground," Illinois Natural History Survey, Education & Outreach
http://wwx.inhs.illinois.edu/outreach/subterranean-habitats/

Jeffrey Mitchell, Louise Jackson and Gene Miyao, Pub. 8131, "Minimum Tillage Vegetable Crop Production in California," University of California Division of Agriculture and Natural Resources,
http://anrcatalog.ucanr.edu/pdf/8132.pdf

Richard Smith, Robert L. Bugg, Mark Gaskell, Oleg Daugovish, Mark Van Horn, editors, Pub. 3517, "Cover Cropping for Vegetable Production A Grower's Handbook," University of California Division of Agriculture and Natural Resources.