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Curriculum for Agricultural Science Education

Principles of Agricultural Science – Plant

Water Works

Unit 3 – Soilless Systems
Lesson 3.2 Hydroponics

What is hydroponics?

- Hydroponics is the growing of plants with no soil
- Plants are grown in a media with no nutrient value

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Uses of Hydroponics

Most species of plants will grow in this culture, but the most common are:

- Tomatoes
- Cucumbers
- Peppers
- Roses

(USDA, 2009)

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Advantages

- Less space
- Less growing time
- Reduced labor
- Conserved water
- Nutrient recycling
- Better control of pest, weed, and disease problems
- No soil-borne pests
- Higher yields

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Disadvantages

- High set-up cost

- Additional skill and knowledge needed

- Diseases spread faster

- Plants react quickly to positive **AND** negative changes

Components of a Hydroponic System

Hydroponic systems must provide the following:

- Plant support
- Water
- Oxygen
- Mineral nutrients
- Light
- Temperature
- Spacing

Support Substances

Plants still need support when there is no soil.

Soil substitutes include:
- Rock wool
- Sand
- Perlite
- Vermiculite

Water and Oxygen

Water

- Provided directly to the roots
- Plants do not have to spend energy looking for water
- Quality – pH and salt content – must be monitored

Oxygen

- Required in the media to avoid killing roots

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Nutrients

Mineral Nutrients

- Macro- and micronutrients are added in premixed forms and diluted in the water

Light and Temperature
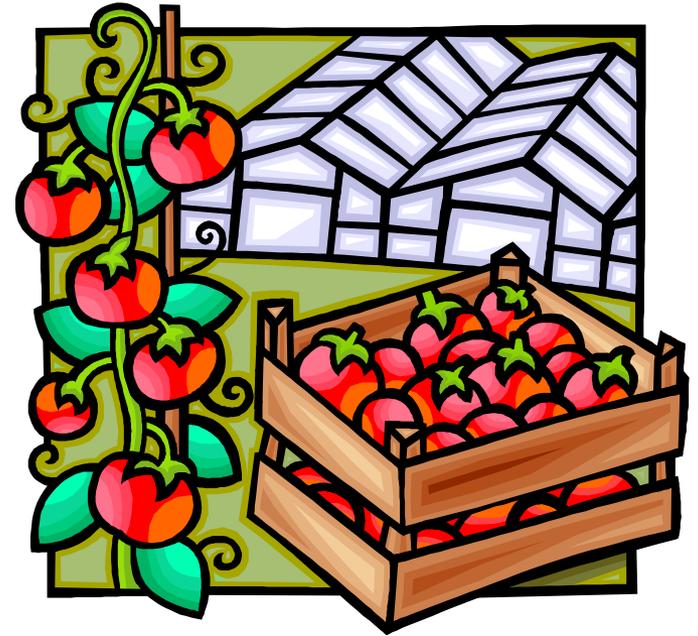
Light

- 8-10 hours of light needed per day

Temperature

- Regulate air temp

- Regulate media temp

Give me room!

Spacing

- Hydroponic systems allow for growing more plants per square foot.

- Vertical space is utilized in a greenhouse to increase the efficient use of space.

References

Burton, D. L., & Cooper, E. L. (2007). *Agriscience fundamentals and applications* (4th ed.). Clifton Park, NY: Delmar.

The Growing Edge. (2008). *The growing edge of hydroponic basics*. Retrieved from http://www.growingedge.com/basics/start.html

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