

Unit A: Understanding Horticulture

Lesson 3: History of Horticulture

Student Learning Objectives: Instruction in this lesson should result in students achieving the following objectives:

Recommended Teaching Time: 2 hours

Recommended Resources: The following resources may be useful in teaching this lesson:

1. A PowerPoint has also been developed for use with this lesson plan
2. http://www.icarda.cgiar.org/afghanistan/Pdf/NA_Horticulture.pdf
3. <http://www.hort.psu.edu/newcrop/history/default.html>

List of Equipment, Tools, Supplies, and Facilities:

Writing surface

PowerPoint Projector

PowerPoint Slides

Terms: The following term is presented in this lesson (shown in bold italics and on PowerPoint Slide 2):

- Pharmacy

Interest Approach: Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Have the students visit a local greenhouse or other horticultural area. Have a discussion among your students as to the purpose and history of horticulture. Ask them what they know about horticulture, around the world and here in Afghanistan. Discuss available opportunities that may be available to your students that are horticultural related. When back in the classroom lead your discussion into Objective 1.

Summary of Content and Teaching Strategies

Objective 1: Explain the origins of Horticulture (PowerPoint Slide 3)

- I. Horticulture is a science that has been studied around the world for many years.
 - A. The origin of horticultural science derives from a joining together of three events.

(PowerPoint Slide 4)

1. The formation of scientific societies in the 17th century
2. The creation of agricultural and horticultural societies in the 18th century
3. The establishment of state-supported agricultural research in the 19th century.

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B. Two influential horticultural societies were involved:

1. The Horticultural Society of London
 - a. Founded in 1804
 - b. Later renamed to the Royal Horticulture Society
2. Society for Horticultural Science
 - a. Founded in 1903.
 - b. Later renamed the American Society for Horticultural Science

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C. Two horticulturists can be considered as the Fathers of Horticultural Science

1. Thomas Andrew Knight

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- a. He was the first of the 18th century naturalists to devote himself to the emerging science of horticulture, having an interest both in basic issues in botany as well as applications in practical horticulture.

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- b. He was both an observer/naturalist and an experimentalist. His interests were wide ranging and embraced the disciplines that we now call plant physiology, structural biology, and genetics.

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- c. Knight's true love was horticulture. In this field he investigated controlled environmental culture (greenhouse construction and vegetable forcing), plant nutrition and fertilization, culture of fruits and vegetables, pest control, and plant breeding.

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- d. He was an early proponent of the development of plant improvement through cross breeding and selection, and he literally initiated the field of fruit breeding. He released a number of improved cultivars of both fruits (apple, cherry, strawberry, red currant, plum, nectarine, and pear) and vegetables (pea, cabbage, and potato).

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- e. He was interested in developing improved cultural methods to enhance earliness and yield, the effect of rootstocks, the influence of girdling, plant hardiness, and the causes and control of disease.

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- f. Clearly ahead of his time, he was the first to investigate the influence of electricity on plants. He contributed nearly a hundred scientific papers on a wide range of topics, with the bulk on horticultural science. Unfortunately, his notes are lost, so we know little of his methods of collecting data other than what is detailed in his papers.

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- g. He investigated a variety of horticultural species
 - 1. vegetables: bean, broadbean, cabbage, carrot, celery, melons, mint, mushrooms, onion, parsnip, pea, potato
 - 2. fruits: avocado, apple, cherry, grape, lemon, mamey, mango, orange, nectarine, peach, pear, pineapple, plum, quince, strawberry, walnut
 - 3. ornamentals: amaryllis, camellia, fern, ivy, lily, palm, rose

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- 2. John Lindley

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- a. John Lindley was one of the most remarkable horticultural scientists of the 19th century. It is mainly due to his efforts that this branch of horticultural science has risen from the condition of an experiential art to that of a developed science.

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- b. His book The Theory of Horticulture written in 1840, with the 1855 2nd edition retitled, The Theory and Practice of Horticulture, is a classic and is still considered "one of the best books ever written on the physiological principles of horticulture"

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- c. Lindley excelled in several fields. His pioneering works on orchid taxonomy earned him the title of "Father of Modern Orchidology,"
- d. He authored books on medical uses of plants, general botany, popular horticulture, and fossil plants. His botanical texts helped establish the natural system of plant classification as the system of choice, he named innumerable new species brought back by plant explorers, and started the practice of ending plant family names in -aceae.

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- e. As the crusading editor for the Gardener's Chronicle, he worked to improve the state of horticultural science for 25 years. Lindley's horticultural experiences working for his nurseryman father and the Royal Horticultural Society plus the scientific background gained working with the greatest plant scientists of his day made him the ideal person to bring science into horticulture.

**** As a review list different facts about the two people mentioned. Have the students raise their hands if they know which person you are talking about.**

Objective 2: Establishing the Connection between Horticulture and Medicine

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- II. Through the course of medicine, from past to the present, one of the chief sources of cures has been materials derived from plants.
 - A. Early humans determined the potential uses of the plants that surrounded them empirically.

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1. Through trial and error they found plants that were agreeable or distasteful, edible or poisonous, that could cure or kill, could induce sleep, visions, or euphoria, and relieve symptoms of discomfort from constipation or anxiety.

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2. Plants with strong taste and odors (herbs and spices) which were seized upon to alleviate illness, to enhance food, and were considered a source of power and became associated with ritual, magic, and religion.
3. The prehistoric discovery that certain plants are edible or have curative powers and others are inedible or cause harm is the origin of the healing professions and its practitioners—religious figures, physician, and apothecary—and the plant sciences—botany and horticulture.

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- B. The early medical arts were associated with the search for and knowledge about healing substances on the one hand and magic and religion on the other.
 1. To understand the unknowable, humans created a wide range of gods, spirits, and forces, many of which were associated with or in the form of animals and plants which were and continue to be worshipped. The cult of fertility, an almost universal belief of primitive humans, was symbolized by trees or animals and from this derives the Tree of Life, the Sacred Tree, the Cult of the Bull, and animal sacrifice.

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2. Knowledge of the healing power of plants became a special calling of the religious figures and magician, and this knowledge became a source of power. For thousands of years the role of the religious figures and the physician were combined and exists today in the form of witch doctor, shaman, exorcist, and medicine man.
 - a. The word **pharmacy** originated from an Egyptian term pharmaki and the Greek pharmakon and is related to another Egyptian word pharagia, which means the art of making magic. Today pharmacy, also called pharmaceuticals, is known as the art and science of preparing and dispensing drugs and medicines.

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- C. In time, the healing profession diverged into separate professions, physician and religious figures.
 1. The diversion of the medical profession from superstition and religion through a more systematic accumulation of knowledge, at first empirical and later experimentally, has now made medicine truly a scientific discipline.
- D. It is calculated that at the present time at least 70% of medicines are or were plant derived.

**** Have a class discussion about plants in your area that are used for medicinal purposes. Are there any plants that people once used but no longer do? Why? Have students get into groups and list as many plants and purposes as they can think of. When complete share as a class.**

Objective 3: Evaluating Horticultural History in Afghanistan.

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III. Agriculture and horticulture has been and continues to be of importance in the establishment of a stable and prosperous society in Afghanistan.

- A. Over the past 20 years, Afghanistan has been devastated by conflict and a debilitating three year drought which has resulted in the collapse of the economy, destruction of infrastructure, massive displacement of the population, and widespread malnutrition and dependence on food aid. Afghanistan now has one of the lowest levels of per capita food availability in the world.

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- B. Prior to the Soviet and civil wars, 70-80 percent of the country's population was engaged in agriculture.

1. Despite its difficult terrain, adverse climatic conditions and limited arable land, Afghanistan was largely self-sufficient in food and a significant exporter of some agricultural products, with the agriculture sector accounting for about half of the Gross National Product. Nevertheless, between 1979 and 1992, food production in Afghanistan dropped by 40 percent.

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2. Prior to the prolonged war and drought, Afghan households were able to produce about 86 percent of their food; now they expect to cover about 59 percent of their total food requirement. Access to quality seed of improved varieties would greatly reduce rural poverty and hunger, according to the findings of the crop improvement and seed assessments.

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- C. Horticulture is one of the areas of greatest challenge and opportunity in Afghanistan. Afghanistan has a long tradition in horticulture and a reputation for high quality produce. Although much of its potential has been lost the opportunity is there today for new growth and development.

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1. In 1972, horticultural commodities supplied 40 to 60% of all export earnings.
 2. Afghan's dried fruit once accounted for 60% of the world's market.
 3. Horticultural production is now estimated at less than 30% of 1978 levels.

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4. Afghanistan's environmental conditions are highly favorable for many tree crops, vegetable species and seed production. There are a large number of endemic horticultural species while the wide range of agro-ecological zones provides a long season of consistent supply.

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- D. Afghanistan has a long history of mercantile activity and a unique natural environment that supports the production of quality horticultural produce that at one time supplied 40 to 60% of the country's export earnings. The re-establishment of a viable horticultural sector should, therefore, play a critical role in the re-development of a stable and prosperous society.

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- E. Considering the regional reputation for high-quality produce and the expanding global opportunities, horticulture can once again become a source for export earnings.

****If possible have someone come in as a guest speaker, which would have stories about how the horticultural industry was in the 1970's. Have the speaker Compare how things are now.**

Review/Summary: Summarize the lesson by reviewing the student learning objectives. The objectives can be used as student review questions. There are questions on PowerPoint Slide 33 that can be used.

Application: The following student activities can be used to apply the student learning objectives: guest speaker, and class trip to local greenhouse.

Evaluation: Evaluation should be based on student comprehension of the student learning objectives. This can be determined using the attached sample written test.

Answers to Sample Test:

Part One: Matching

1. c
2. e
3. a
4. d
5. b

Part Two: Completion

1. herbs and spices
2. 70%
3. 30%
4. 70-80%

Part Three: Short Answer

1. Use Objective 1 for possible answers

Sample Test

Name _____

Test

Unit A Lesson 3: History of Horticulture

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- a. Thomas Andrew Knight
- b. Society for Horticultural Science
- c. Pharmacy
- d. Horticultural Society of London
- e. John Lindley

_____ 1. Known as the art and science of preparing and dispensing drugs and medicines.

_____ 2. His pioneering works on orchid taxonomy earned him the title of "Father of Modern Orchidology,"

_____ 3. He investigated controlled environmental culture (greenhouse construction and vegetable forcing), plant nutrition and fertilization, culture of fruits and vegetables, pest control, and plant breeding.

_____ 4. Influencial society, founded in 1804, and after renamed to the Royal Horticulture Society

I_____ 5. Influencial society, founded in 1903, and later renamed the American Society for Horticultural Science

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

1. Plants with strong taste and odors such as _____ and _____ were seized upon to alleviate illness, and to enhance food.
2. It is calculated that at the present time at least _____ of medicines are or were plant derived.
3. In Afghanistan, horticultural production is now estimated at less than _____ of 1978 levels.

4. Prior to the Soviet and civil wars, _____% of the country's population was engaged in agriculture.

Part Three: Short Answer

Instructions. Provide information to answer the following question.

1. Explain how horticulture has changed in Afghanistan in the last 20 to 30 years.