Title: “What, Plants Can Get A Virus”?

Name: Suzanne Bliss

School: University High School

Address: 2450 Cougar Way, Orlando, FL 32817

Phone: 407-482-8700 ext:2290

Email: Suzanne.bliss@ocps.net

Abstract:

“What, plants can get a virus?” is designed to help 9th grade biology students understand that viruses can infect animals, bacteria and plants. A virus is a small infectious agent that can only make copies of itself in a living organism. Students will be testing four of the most common plant viruses that cause extensive damage to crops. These viruses are Cucumber mosaic virus (CMV), Tomato spotted wilt virus (TSWV), Impatien necrotic spot virus (INSV) and Tobacco mosaic virus (TMV).

To start the lesson, students will learn about the structure of each of the major plant organs. Then they will have a lesson on identifying poisonous plants in our local area. After the lesson on poisonous plants they will collect plants and bring them into the classroom. My school has a greenhouse and I will collect plants from the greenhouse. Students will first make observation on their data table of the different plants. They will be looking at whole plant including the leaves, steam and roots. After the observation they will need to cut a small sample of the plant. Next they will use Agdia Immunostrip™ Test to text for the common viruses. After the test, they will have to figure why the greenhouse plants showed no signs of viruses. What vectors are common in the central FL region?

Rationale:

This project will target 9th grade Honor Biology students. Students will have the opportunity to study vector-borne viruses in plants. Plant viruses have a large negative impact on crop production. Some viruses can lead to total loss of the crop or reduce the yield.

Timeline Overview:

- One week of 50 minutes classes.

Student Outcomes:
The students will be able to…

- relate the structure of each of the major plant organs and tissues to physiological processes.
- identify the vector-borne virus in plants
- list the possible causes of infectious disease.
- list the possible causes of infectious disease.
- list the possible methods of transmission of infectious disease.

Standards:

- **SC.912.N.1.1:** Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space
- **SC.912.L.14.7:** Relate the structure of each of the major plant organs and tissues to physiological processes.
- **SC.912.L.16.7**: Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.
- **SC.912.L.16.12** Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning)
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- **HE.912.C.1.8:** Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.
- **HE.912.C.1.3:** Evaluate how environment and personal health are interrelated.

Lessons:

- Lesson 1 – Plant Lab (two days)
- Lesson 2 - Poison Plants and Introduction on ELIZA and Tomato Spotted Wilt Virus
- Lesson 3 – Immunostrips
- Lesson 4 - Vectors

Data Collection Techniques:

- Pretest/Posttest – plant organs and viruses
- Lab Reports- Agdia Immunostrip^{TM} Test
- Students will develop a brochure on plant viruses

Use of Equipment Lockers/Field Trip to UF:

- Pipettes

Connections to ICORE Summer Institute:

- Immunostrip

Improvement on Traditional Teaching Techniques:
In the past I taught a plant unit and a virus unit at different times of the year – boring! By combining the two and adding biotechnology I will their attention.

Item	Cost	Vendor
Seeds, Tomato	2.58	Home depot
Miracle-Gro Soil	3.88	Home depot
Agdia Immunostrip™	350.00	Agdia

I want to open the conversation to vector-borne diseases. That is why I need to buy soil and seeds from Home Depot. The seeds will be grown in a greenhouse to be sure that they do not have any infections. To test for the common viruses in plants I need to order Agdia Immunostrips.

Literature Cited

- "Agdia Products and Services." *Agdia, Inc.* N.p., n.d. Web. 19 June 2013
- "VEGETABLE CROPS." *Virus Diseases of Tomatoes Fact Sheet*. N.p., n.d. Web. 19 June 2013.

Preliminary action plans are due Friday June, 21st.

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