

**Title- Investigating Tomato Spotted Wilt Virus in Palm Beach County.**

Dr. Mandakini Kasture-Nair

Inlet Grove Community High School

**Abstract-**

As an entry point for many intended and non intended plant and animal species south Florida is very well suited to monitor the spread of emerging pathogens. It is estimated that this region is home to 4000 species; of these 1000 or about 25% are exotics or nonnative. As I work and live here I am very concerned about the effect this influx is having on our native flora and fauna.

Over a period of time I have noticed that students are very interested in exotic animals they see around their neighborhoods and quite often on TV news. At the same time they are not fully aware of the interdependence of plants and exotic animals and often the pathogens which accompany them. So I propose to do a sample survey of some plants to see whether there is any correlation between their place of origin and the prevalence of TSWV; one of the major emerging plant pathogens.

**Mission Statement-**

The mission of this action plan is to utilize the curiosity, interest and the media exposures generated by exotic animals and plants and channel it to demonstrate the interrelationship between animals, plants and emerging pathogens.

At the completion of this action plan the students will become familiar with the techniques used for collecting samples, will gain greater understanding of virus structure, learn to use diagnostic kits, explain phylogenic relationships, and will be made aware of the job opportunities in biotechnology.

Connection to the teaching Unit- This action plan will be sandwiched between the units on Ecology and the Structure and Function of DNA. The action plan will be carried out in five phases over time.

1. This will be a natural extension of the sections dealing with exotic species, conservation and biodiversity. I will introduce the students to the exotic plants and animals and their effect on the local flora and fauna in Ecology. So they have a working knowledge of the terms and concepts.
2. Next they will learn the basic structure of DNA; proteins synthesis. (Transcription, Translation etc.)
3. This phase is where the students will carry out the actual experiment. In brief they will collect the samples of Exotic and native plants from around the county. Next the samples will be tested for TSWV by Immuno Strip Assay. (Dr.Gallo) by using Agdia ImmunoStrips.

4. Then they will study the phylogeny of the sample plants by using Gen Bank, (Dr. Gordon Burleigh) Bioinformatics.
5. Students will be introduced to the job opportunities in the biotech industry. ( Tammy Mandel CERHB)

**Principal Investigator- Bio and expertise-**

Ph. D – Botany

Professional Teaching Certificate. (State Of Florida)

AP Certificate.

Ten years of teaching experience at different levels.

Member NABT.

**Budget –**

Agdia Immuno Strips- - 4 sets of 25 each

ISK 39300/0025 -----\$ 105 X 4 = 420.

Lesson Plan: See Below.

**Lesson Plans: Biology Honors: Investigating Tomato Spotted Wilt Virus. (SC.G.1.4.1) AA; F 1.4.8.**

**Title : Biology Honors: Investigating Tomato spotted Wilt Virus.**

**(SC.G.1.4.1) AA Interdependence of living things; F.1.4.8 Cell behavior; (SC.912.L.16.7) Transfer of genetic material between cells and the role of this process in biotechnology.**

**Student Target :**

- I can describe how viruses cause infection.
- I can describe the structure of a virus.
- I can describe the physical characteristics of a plant suspected of a viral infection.
- I can describe how viruses and bacteria transfer genetic material between cells.
- I can explain what role this plays in biotechnology.

**Materials :**

1. Plant materials (collected previously)
2. Agdia ImmunoStrip Tests, 2-4 per group
3. Scissors
4. Student manual ( Lab procedure)

**Vocabulary :** Virus, capsid, vector, immunoassay, Thrips, TSWV (Tomato Spotted Wilt Virus), Tospovirus.

**Lesson/Activity : Procedure:**

1. Groups of students will gather around the work stations.
2. They will read the scenario to themselves.
3. Each group will work through the ImmunoStrip assays.
4. Groups will clean up.
5. Group leader will report their findings on the board.
6. Class will discuss (teacher monitored activity.) their conclusions.
7. Each group will write a report conveying their conclusions to

Farmer John.

**EXPLORE** (We Do)

1. Using internet and other resources students will research the major agricultural crops grown in south Florida.
2. Discuss economic impacts of a major outbreak of viral disease on Citrus industry in south Florida.

**Wrap-up :** **EXPLAIN** (You Do)

- The students will complete the lab report questions and hand-in. (May be done as homework if time in class is not available.)

**Daily Assessment :** **EVALUATE**

**Quick Check:**

Students will complete the following quick check(s) on an Exit Card:

1. Would you classify viruses as living or nonliving?
2. What effect do viruses have on plants?

**Other ELABORATE**

**Activities/Resources**

- : Option 1: Video: "Influenza: Tracking a Virus"
- Option 2: Using Model: Sunflower seed as a model for virus structure.

**Reteach/Enrichment RETEACHING**

- : Option 1: Compare virus and cell structures.

## Lesson Plans: Biology Honors: Investigating Tomato Spotted Wilt Virus. (SC.G.1.4.1) AA; F 1.4.8.

**Title :** Biology Honors: Investigating Tomato spotted Wilt Virus.  
(SC.G.1.4.1) AA Interdependence of living things; F.1.4.8 Cell behavior; (SC.912.L.16.7) Transfer of genetic material between cells and the role of this process in biotechnology.

**Student Target :**

- I can describe how viruses cause infection.
- I can describe the structure of a virus.
- I can describe the physical characteristics of a plant suspected of a viral infection.
- I can describe how viruses and bacteria transfer genetic material between cells.
- I can explain what role this plays in biotechnology.

**Materials :**

1. Plant materials (collected previously)
2. Agdia ImmunoStrip Tests, 2-4 per group
3. Scissors
4. Student manual ( Lab procedure)

**Vocabulary :** Virus, capsid, vector, immunoassay, Thrips, TSWV (Tomato Spotted Wilt Virus), Tospovirus.

**Lesson/Activity :** **Procedure:**

1. Groups of students will gather around the work stations.
2. They will read the scenario to themselves.
3. Each group will work through the ImmunoStrip assays.
4. Groups will clean up.
5. Group leader will report their findings on the board.
6. Class will discuss (teacher monitored activity.) their conclusions.
7. Each group will write a report conveying their conclusions to Farmer John.