**Food Safety: Hazards to Food Safety and Factors that Affect Foodborne Illness**

**Lesson 3: Introduction to HACCP**

**Grade Level(s)**

9 - 12

**Estimated Time:**

45 Minutes

**Purpose:**

Once students understand bacteria, foodborne illness, prevention methods, and basic food safety, having a food safety program or protocol is the next step. This standard operating procedure or SOP should be based on the HACCP principles. These same principles are followed by industry, universities, commercial kitchens and more. A comprehensive written food safety program brings together all of the basic food safety practices that emphasize good food safety and prevention of foodborne illness.

**Objectives:**

* Students will be able to identify the 7 principles of HACCP
* Students will be able to brainstorm idea surrounding growing microgreens and concerns that might be present.
* Students will be able to identify common contaminates with microgreens and research how to control for them.

**Standards:**

**Agriculture and the Environment:**

**Science, Technology, Engineering & Math:**

**Materials:**

* Internet access
* Computer/Tablet/Smart Phone
* White Board/Markers
* Large paper (poster paper)
* Coloring Utensils

**Essential Links:**

**Background Agricultural Connections:**

**Interest Approach – Engagement:**

**Procedures:**

In this activity, students will be divided into 7 groups. Each group will receive one principle in HACCP and will make a poster explaining why the principal is required and an example. Students will use either materials given by the teacher or through digital resources.

**Principle 1 - Conduct a Hazard Analysis**

The application of this principle involves listing the steps in the process and identifying where significant hazards are likely to Occur. The HACCP team will focus on hazards that can be prevented, eliminated or controlled by the HACCP plan. A justification for including or excluding the hazard is reported and possible control measures are identified.

**Principle 2 - Identify the Critical Control Points**

A critical control point (CCP) is a point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to acceptable levels. The HACCP team will use a CCP decision tree to help identify the critical control points in the process. A critical control point may control more than one food safety hazard or in some cases more than one CCP is needed to control a single hazard. The number of CCP's needed depends on the processing steps and the control needed to assure food safety.

**Principle 3 - Establish Critical Limits**

A critical limit (CL) is the maximum and/or minimum value to which a biological, chemical, or physical parameter must be controlled at a CCP to prevent, eliminate, or reduce to an acceptable level the occurrence of a food safety hazard. The critical limit is usually a measure such as time, temperature, water activity (Aw), pH, weight, or some other measure that is based on scientific literature and/or regulatory standards.

**Principle 4- Monitor CCP**

The HACCP team will describe monitoring procedures for the measurement of the critical limit at each critical control point. Monitoring procedures should describe how the measurement will be taken, when the measurement is taken, who is responsible for the measurement and how frequently the measurement is taken during production.

**Principle 5 - Establish Corrective Action**

Corrective actions are the procedures that are followed when a deviation in a critical limit occurs. The HACCP team will identify the steps that will be taken to prevent potentially hazardous food from entering the food chain and the steps that are needed to correct the process. This usually includes identification of the problems and the steps taken to assure that the problem will not occur again.

**Principle 6 - Verification**

Those activities, other than monitoring, that determine the validity of the HACCP plan and that the system is operating according to the plan. The HACCP team may identify activities such as auditing of CCP's, record review, prior shipment review, instrument calibration and product testing as part of the verification activities.

**Principle 7 - Recordkeeping**

A key component of the HACCP plan is recording information that can be used to prove that a food was produced safely. The records also need to include information about the HACCP plan. Record should include information on the HACCP Team, product description, flow diagrams, the hazard analysis, the CCP's identified, Critical Limits, Monitoring System, Corrective Actions, Recordkeeping Procedures, and Verification Procedures.

Once students complete the posters, have each group of students (starting at principle 1) explain what their principle means, where in the process it occurs, and an example. Students should take notes about the other 6 principles while other groups are presenting. If possible, hang posters in the room or hallway, so students are able to see them during the rest of the unit.

Once posters and sharing are complete, introduce the following scenario to the students:

**Scenario:**

You and a friend are starting a company that sells pre-packages microgreens. Before you are able to put the microgreens on the market, the USDA wants to know what your HACCP plan for the product is.

Start by having students brainstorm what possible contaminates microgreens could come in contact and ways to combat this problem. Once students (and a partner—depending on teacher preference) have completed the brainstorming process, have them begin researching microgreens, how they are grown, what potential contaminates can occur, the processing procedures, etc., and have students align them to the areas in HACCP.

This is the starting point for students to create their own HACCP plan for growing microgreens.

**Wrap-Up:**

Have students share what they know about microgreen so far (common contaminates, way their most commonly grown, common products) and where they see them fitting into a HACCP plan.

As an exit ticket, have students write down Principles 1-7 on a piece of paper before leaving.