

Allergen Monitoring – Sample Activity

Purpose

Food allergies are a body's adverse reactions to proteins in food. Allergic reactions are triggered when the body's immune system identifies a specific protein as harmful. The immune system reacts by producing antibodies that travel through the bloodstream, releasing chemicals to attack the protein. These chemicals generate mild to life-threatening symptoms, such as rashes, swelling, wheezing, and shortness of breath. In the United States, food allergies affect one in three children and one in ten adults.

Approximately 90% of allergic reactions are from nine common allergens. The *Big 9* allergens include milk, eggs, peanuts, tree nuts, fish, crustacean shellfish, wheat, soy, and sesame. Most foods include multiple ingredients, making avoidance difficult for consumers with allergies.

When verifying equipment, always test the surface after cleaning and before sanitizing or sterilizing. Some chemicals in sanitizers create false positives. Figure 1 shows AllerSnap™, a common test for contact surface, with both qualitative and semi-quantitative results. After cleaning the surfaces, an operator swabs a surface, activates a solution, and incubates the test before reading. Table 1 summarizes how to interpret AllerSnap™ results.



Figure 1. AllerSnap™ Allergen Test

Table 1. AllerSnap™ Results

Indicator	Action
Green – Pass	Proceed with sanitation.
Grey – Caution	A small amount of residue is present—repeat testing, rinsing, or cleaning.
Purple – Fail	Reclean and retest. The deeper the purple, the higher the allergen concentration.

What would happen if food facility workers did not follow proper Current Good Manufacturing Practice (CGMPs)?

Materials

Per group of four students:

- AllerSnap™ allergen test
- Device with timer
- Knife, plastic
- Permanent marker
- Plate, paper

Per class:

- Candy (with allergen appropriate for the audience)
- Cleaning supplies
- Incubator

Procedure

Work in a group of four to inspect a food utensil for allergens.

Part One – Predictions

1. Obtain some candy from your teacher.
2. Place the candy on a paper plate and cut it into equal pieces with a plastic knife. Share the candy with your classmates.

3. Identify the *Big 9* allergens your candy may contain. Record in Table 2.

Table 2. Allergens

Candy	Potential Allergens

4. Obtain materials from your teacher to clean your plastic knife.

5. Answer the *Part One Analysis Question*.

q1 Do you think your cleaning methods effectively removed the allergens? Why or why not?

Part Two – Allergen Monitoring

- Obtain an AllerSnap™ allergen test from your teacher.
- Write your group's initials on the side of the allergen test with a permanent marker.
- Remove the swab from the tube portion of the allergen test. Hold the allergen test in the upright position to prevent spilling the solution.
- Swab the surface of the plastic knife with the allergen test.
 - Use a crisscross pattern, as shown in Figure 2.
 - Swab the area with even coverage.
 - Apply pressure to flex the swab shaft, as shown in Figure 3.
 - Rotate the swab tip while collecting the sample.
- Place the swab back into the tube.
- Hold the allergen test upright in your fists and use your thumb to break the blue Snap-Valve. Bend the Snap-Valve forward and backward.
- Squeeze the bulb on the top of each test twice to expel liquid down the swab shaft.
- Shake each AllerSnap™ test for five seconds.
- Incubate the allergen tests at 55°C for 15 minutes.
 - Set the tests upright in the beaker prepared by your teacher.
 - Set a timer for the removal of the allergen test.

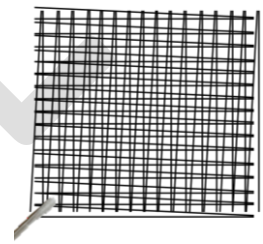


Figure 2. Crisscross Pattern



Figure 3. AllerSnap™ Flex

Part Three – Interpret Allergen Tests

Remove the allergen tests from the incubator. Compare the color of the solutions against the AllerSnap™ label. Record results in Table 3. Include the color of the test, if the knife contained allergens, and list potential cleaning solutions.

Table 3. Allergens

Color of AllerSnap	Did The Knife Contain Allergens?	List Potential Solutions

Sample Teacher Notes

Allergen Safety Note

Note: The lab contains candy with allergens. Check students' allergies in your classes and select the candy to include allergens safe for your classroom audience.

Teacher Preparation

1. Check student allergens and plan accordingly. See the **Allergen Safety Note** above.
2. Set the incubator to 55°C. Water baths are another option instead of an incubator.
3. Provide food-safe cleaning supplies to remove allergens from the plastic knife.

Student Performance

Part One

Students use a plastic knife to cut a piece of candy. Afterward, they select a method to clean the knife to remove allergens. Table 4 lists a sample cleaning procedure a student may attempt.

Table 4. Sample Cleaning Procedure

Cleaning Procedure
Clean all materials and your workspace with warm water, soap, and a clean dishcloth. Place dishes on the counter to air-dry.

Part Two

Students test the surfaces of the plastic knives for allergies. AllerSnap™ is an allergen monitoring swab that indicates the presence of allergen proteins for all *Big 9* allergens, except for sesame. Consult **AllerSnap™ Instructions** for a step-by-step process of the allergen test. Use separate AllerSnap™ allergen tests to monitor both the cookie sheet and spatula. After swabbing and preparing the test, students incubate the allergen tests at 55°C for 15 minutes.

Part Three

The allergen tests change color to indicate the presence of allergen proteins. Table 5 summarizes how to interpret AllerSnap™ results.

Table 5. AllerSnap™ Results

Indicator	Action
Green – Pass	Proceed with sanitation.
Grey – Caution	A small amount of residue is present—repeat testing, rinsing, or cleaning.
Purple – Fail	Reclean and retest. The deeper the purple, the higher the allergen concentration.

Sample Activity

This sample is a modified version of *Activity 3.1.2 Allergen Monitoring* from the CASE 4 Learning *Food Science and Safety* (FSS) curriculum. For more information about the course visit www.case4learning.org. The sample has been modified for time and material simplification to fit a workshop format and is not for resale or profit. Teachers are permitted to use this sample in their classroom without certification.

Contact **CASE 4 Learning** to receive permission to use this sample at a teacher professional development.



FOOD SCIENCE AND SAFETY

Course Description

During Food Science and Safety (FSS) students build content knowledge and technical skills while investigating areas of food safety, chemistry, processing, product development, and marketing. Students become proficient in food handling while using good manufacturing practices, identifying processing hazards, and conducting industry investigations.

Students maintain a research-level laboratory notebook throughout the course documenting their experiences in the laboratory.



Equipping teachers

- Specialization level
- Full year course
- Inquiry and project based instructional practices
- CASE Institute professional development

Engaging students

- ✓ Create and market a food product
- ✓ Record research and labs in a scientific notebook
- ✓ Practice food science lab techniques
- ✓ Use science, technology, engineering, and math to solve problems
- ✓ Demonstrate relevant personal and lab safety practices.

Instructional Units

- Introduction to Food Science
- Food Chemistry
- The Safety of Our Food
- Processing and Preservation
- Health and Food Security
- Consumers
- Food Product Development

Flexibility & Adaptability

CASE provides a comprehensive professional development experience, in addition to a work-life balance so teachers can best educate their students. Course work is adaptable and customizable based on teacher preference to fit all geographies and communities.

“Sometimes, students don't like science because it is conceptual. CASE Food Science and Safety curriculum allows students to touch, taste, smell, and do their experiments alongside of their learning.”

- Jamie Christiansen, Iowa



scan or visit case4learning.org

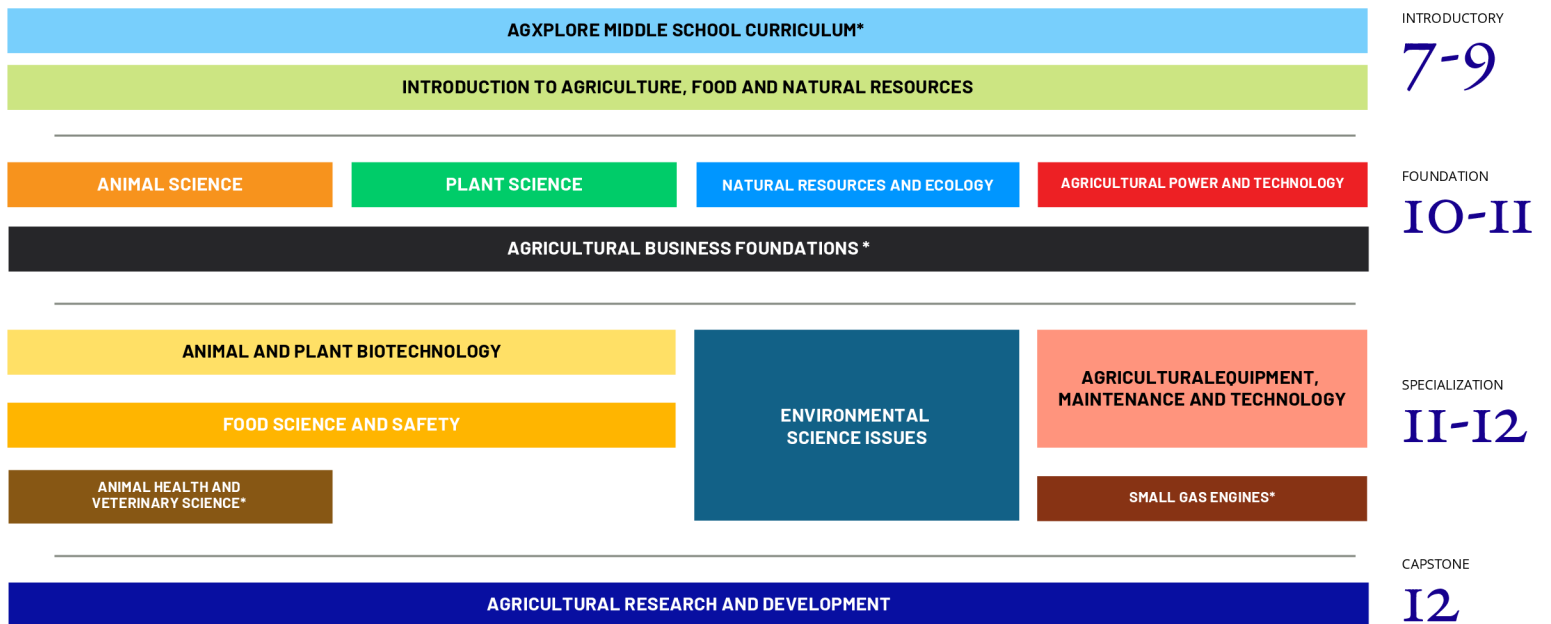
This course is correlated to G-W Principles of Food Science text



Purposeful Curriculum

CASE has sequenced courses at four levels that enhance the delivery of agricultural education through inquiry-based learning and technical skills.

Courses and Instruction Levels



Mission

To design industry-leading, inquiry-based curriculum and teacher education to create lifelong learners and prepare students for the future of agriculture.

Standards Aligned

CASE develops curriculum with industry feedback and aligns courses to National Agriculture, Food, & Natural Resources and Career & Technical Education standards.

Professional Development and Lifetime Certification

CASE 4 Learning enhances agricultural education with inquiry and project-based learning to prepare the next generation of the agricultural workforce through teacher certification and professional development.

CASE Institutes

Professional development events preparing teachers to implement full-year CASE courses. Institutes provide teachers the content and skills needed to use CASE curricula in their classroom. CASE Institutes range from five to eight days in a hybrid, in-person, or virtual format.

BriefCASEs *

Professional development for shortened CASE courses or modules. BriefCASEs range from one to three days.

Grants & Scholarships

Corporate sponsors and donors throughout the agriculture industry support CASE teachers through funding material implementation grants and professional development scholarships. Teachers are eligible to apply in the fall to fund their programs in the following year.

Certification

Once the teacher is certified by attending a CASE Institute or BriefCASE, they have lifetime access. There are no subscriptions or renewal fees!



In-Person

Teachers attend the entire training at the host site.



Virtual

Teachers attend the entire training online. Teachers will receive materials via mail, and are responsible for their lab space.



Hybrid

Teachers receive training both virtually and in-person based on the course.