

Section C

Food science aptitude

A characteristic of good practice in secondary schools is that learners can apply their knowledge and understanding of food science in a practical and meaningful way.

Key features



Staff show an aptitude to the understanding and application of food science in food and nutrition education, making the science of food relevant to learners.



Food science is integrated into Schemes of Work and lessons, demonstrating progression in learner's knowledge, understanding and application of functional properties of ingredients, including sensory evaluation.



Teaching resources, equipment and ingredients that are ability appropriate, encourage an awareness and understanding of safe practices, and enable application, evaluation and justification are developed and/or selected. Specialist equipment is provided where necessary to ensure learning intent is achievable.



Learners are enabled to apply and justify their aptitude through planning, communication and regular food science and sensory evaluation activities.



Assessment procedures reflect stated learning intent, demonstrate progression and provide constructive feedback to learners. Safe, accurate, justified, and evaluated food science skills and knowledge are integral when assessing food science activities.



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CASE STUDY

One of the best aspects of our subject is being able to visually demonstrate and apply theoretical knowledge in a practical manner.

It is sometimes difficult for learners to visualise exactly what is happening in a process, therefore, isolating the individual reactions makes learning more accessible.

To explain yeast action in bread and baking, I use the 'bottle and balloon' investigation with supporting worksheets and investigation cards. This investigation works well with learners aged 11-14 as it can be completed in shorter periods of time and can also be broken down into sections, where focus can be placed on factors affecting growth, preservation of food and the types of yeast.

The investigations follow a simplified scientific format that will eventually be their building blocks for 14-16 courses.

At this point, the investigations can go into more detail and more complex processes can be demonstrated, such as the formation of egg white foams and the factors that affect their stability.

JENINE'S TIPS

1. Decide on the process/reaction you would like to emphasise and the learning objective – then plan the appropriate activity.
2. Change only one factor in each investigation. Keep it simple to start and build complexity over time.
3. "PPPA". Plan - teacher guide and resources. Practice – have a trial run. Prepare – have all worksheets, equipment and ingredients set up before the lesson. Adapt – modify or make changes if needed.

Putting the characteristic into practice

Staff embed food science into Schemes of Work, lessons and practical activities

- Find out about learner's food science knowledge gained from previous educational experiences.
 - Build upon previous experiences and skills learned.
 - Review current Schemes of Work, lessons and activities for food science content.
 - Develop food science investigations that are age/ability appropriate.
 - During cooking, highlight food science in action and encourage observation skills.
- Collaborate with cross-curricular colleagues to ensure consistency of message and progression.

Other examples:



Staff select appropriate scientific investigations and sensory evaluation activities

- Discuss the functions of ingredients during practical demonstrations.
 - Challenge and question the learners about the functionality of ingredients – how, why, what?
 - Use accurate food science terms to explain what is taking place, e.g. coagulate rather than thicken/set.
 - Use resources and materials to support investigations, e.g. spreadsheets to produce sensory evaluation charts.
 - Trial food investigations before learners, learn the pit falls and understand the methodology.
- Ensure that learners understand the importance of fair testing when investigating.

Other examples:



Staff know what makes effective food science investigations work

- Establish a methodology for planning and completing food science investigations, starting with a prediction/hypothesis.
 - Provide samples; explain how to collect data/what is required;
 - Provide examples of previous learner investigations (or a staff trial).
 - Be realistic – the type of investigation/ number of variables will depend on the individual learner.
- Other examples:



Putting the characteristic into practice

Staff and learners take measures to prevent cross-contamination of allergens and the risk of allergic reaction when conducting investigations and sensory evaluation

- Ensure that staff and learners are aware of the main 14 allergenic ingredients in food used for tasting.
- Use separate equipment for preparation and testing to prevent cross-contamination.

Other examples:



Staff and learners research, evaluate, justify and make conclusions using food science investigations and practical activities

Investigations could include:

- why food is cooked;
- how heat is transferred – conduction, convection, radiation;
- gelatinisation, dextrinisation and caramelisation of carbohydrates;
- shortening, aeration, plasticity and emulsification of fats;
- denaturation of protein (physical, heat and acid), foam formation, coagulation and gluten formation;
- enzymic browning and oxidation of fruit and vegetables;
- chemical, physical and biological raising agents;
- positive use of micro-organisms, fermentation;
- common mistakes and remedies.

Other examples:



Insights

- Use practical food activities to explain more complex food science:
 - make bread or yogurt to demonstrate the use of bacteria in food production;
 - make a simple curd cheese to demonstrate denaturation using acid;
 - touch raw and then cooked meat to show the effect of heat;
 - make scrambled egg to show denaturation and highlight syneresis;
 - whisk egg whites to produce a foam and cook to show coagulation;
 - make a simple white sauce to show gelatinisation;
 - marinate meat or fish to show the effect of enzymes on texture.
- Devise investigations that cover food science with little cost in consumable resources:
 - use basic ingredients, e.g. fat, flour, eggs;
 - keep cooking time short;
 - limit the range of variables to start with (3-4 maximum);
 - work in pairs;
 - keep report writing controlled – explain what you did, what you found and the science behind it.
- Use skills developed through science and mathematics when conducting food science investigations. Develop staff and learner knowledge through working with cross-curricular colleagues. Remind learners that skills and knowledge required for food science investigations are not new to them.
- Plan a progressive programme for sensory evaluation. This should enable learners to undertake fair testing,



develop sensory descriptors and know how sensory methods can be used to evaluate food products.

- Establish procedures for setting up and carrying out a sensory evaluation effectively and hygienically.
- Use command words such as *assess*, *compare*, *describe*, *discuss*, *explain* or *justify* in free response questions. Plan to include command words in investigations or other activities to familiarise learners with what command words are asking them to do and how to respond. For example, *compare* asks learners to write about the differences and similarities between two different things and then to draw a conclusion.

Going beyond

Plan a 'fun food science' session for open days/events for feeder primary schools. Look at the science behind the recipe or do some exciting practical investigations.

Offer the opportunity for learners to participate in activities/challenges run by external agencies/groups, e.g. STEM ambassadors, Practical Action or CREST awards.

Set up a food science quiz event for learners/parents/school community. Practical and fun learning about the science of food and what happens when food is prepared, cooked and eaten.

Run food science enhancement sessions at lunchtime or after school to encourage learners, and staff, to further develop their food science aptitude.

Expose staff and learners to new experiences using external experts and trips to science fairs.