**Unit plan: Developing personalised solutions for specific diet restrictions**

**Overview**

Students investigate the occurrence of food-related conditions, for example lactose intolerance, within their school or community in order to make a packed lunch suitable to take on a school tramp.

**Purpose**

Students investigate the occurrence of food-related conditions, for example lactose intolerance, within their school or community in order to make a packed lunch suitable to take on a school tramp.

**Background**

**Suggestions for a scenario**

Your teacher has become aware of the range of diet restrictions many students face as a result of their responses to different foods. She needs some help deciding what food to take for a school tramp so that it provides enough energy and nutrients as well as taking into account the diet restrictions of particular students. Your job is to make a packed lunch that satisfies the needs of a particular student (or group of students).

**Where's the Biotechnology?**

At present, diets and foodstuffs can be developed to cater for groups of people with particular food requirements. In the future, personalised diets and products will be able to be designed for individuals. This is because different people respond differently to particular foods. They have different genes, and our genes affect the way our bodies deal with food (see focus story). Two people might have symptoms consistent with the same food-related condition, but respond differently to the same foods.

The study of how food and genes interact is called nutrigenomics. Research is being carried out to identify food components that are particularly helpful / harmful for individuals, even though they might both have the symptoms of the same food-related condition. Bioinformatics is the use of computer systems to manage complex biological data.

Although the genetic component of a food-related condition cannot be studied within the school context, students can think about how different people respond differently to food, and how this affects their dietary decisions. This programme provides an outline of the range of information that needs to be considered when developing a personalised food / menu for a person with a particular food-related condition.

**Curriculum focus**

**Technology**

The technological principles underpinning future dietary decisions will be based on knowledge from epidemiological studies and nutrigenomics. Bioinformatics enables this information to be accessed.

Ethical issues are important when dealing with personalised problem solving. Acknowledging and highlighting differences (cultural and medical) require ethical awareness and sensitivity.

**Science**

To develop an understanding of the relationship between structure and function in living organisms (e.g. digestive system, nutrition and genetic diversity)

Many food-related conditions are inherited.

**Focus of skill & strategy**

This programme provides students with an opportunity to identify a range of food-related conditions, and to realise that genetic variability affects people’s responses to foods.

Students will be able to develop a specialised solution that takes into account a range of information.

**Health and Safety**

Any foods must be prepared in a food technology area under appropriate hygienic conditions.

The packed lunch needs to be checked by the parent/caregiver prior to consumption (to make sure that all parts are safe for the student to eat).

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| **UNIT PLAN: Developing personalised solutions for specific diet restrictions** | | |
| **Suggested learning intentions** | Suggested learning experiences *The following learning experiences will provide you with starting points for an exploration of this topic. You may decide to narrow your focus to one component, or include most of the ideas in a unit that incorporates science and/or technology themes.* | Possible teaching/assessment activities |
| An individual’s response to foods can impact on their personal eating habits and lifestyle. For example, diabetes, lactose intolerance. | **Introduction**  Our varied responses to foods   1. Explore a range of food-related conditions in the population (e.g. diabetes, lactose intolerance, gluten intolerance, food allergies, vitamin deficiencies). 2. Consider the impacts (health, diet, lifestyle) of having a particular food-related condition – Interview a family member / friend / classmate with a food-related condition and report back. |  |
| An information grid that identifies food types, and the needs and preferences of the client is the basis of a bioinformatics system that can provide information for the development of a packed lunch for a specific person. | **Introduce the scenario**  Organise the class into groups of five-six students. Discuss the dimensions of assembling a purpose-specific packed lunch. For example, lactose intolerance requires the use of soy products in place of milk products, and investigating the ingredients in snack bars. Does the person have a high-energy lifestyle (i.e. sport)? Do they need to watch their weight?  Each of the components (A) to (F) could provide the basis of a small unit or provide the frameworkfor a larger unit that involved the class with different groups being responsible for different components. The class could follow the following route through the process or each group could work on a particular section and develop their brief for that part.  For example, information from each section can be pooled and used to model a bioinformatics approach to solving the problem: students would develop an information grid that includes information on one or more diet-related conditions, the food tolerances and preferences of one or more individuals with particular food-related conditions, possible genetic links, and information from food tests (about components of particular foods) and food experts (e.g. dieticians).  As an example, a grid for a diabetic would involve information from the diabetics society, food package information (glucose amounts), information on nutrients (from a dietician), personal preferences and lifestyle information. It could be used to justify the selection of a list of potential foods that could be utilised in a lunch. | Interview a person with a food-related condition. Develop a storyboard to describe the adjustments they need to make to their lifestyle and eating patterns.  A grid is constructed that uses food testing results, specialised dietary information (from support groups, dieticians) and individuals to provide the justification for dietary decisions. |
|  | **Developing expertise**   1. **Identification of people within a population who have food-related conditions**   (Anonymous questionnaire or modelling an epidemiological study).  Questionnaire development (taking into account ethical issues) to identify the range of food related intolerances in your community (school, church, sports club). Ask about family history (this may suggest a genetic link) in the questionnaire. Provide an opportunity within the questionnaire for those who are willing to be involved in further research to indicate that they can be contacted for a follow up interview.   1. **Selection and interview of person with a food-related condition**   Strategies for identifying a person to research via interview.  Discuss how to locate a person to interview. Explore ethical issues of privacy and rights of the interviewee. Consider how to approach someone to participate in the study and how to keep the information confidential.  Develop an interview schedule that provides information about the interviewee’s family history (does a family member have a similar condition? This may indicate a genetic link); lifestyle preferences (for example high energy requirements) and dietary preferences (how does some of what they choose to eat / not eat relate to their condition).  Select and interview a person with a food-related condition.  (**C) Contact support groups for people with a diet‑related condition**  For example the Diabetic Association. Develop an interview schedule before approaching this group of people (see B above).  **(D) Contact dieticians or allergy clinics**  Interview this community of practice about food types, food tests and diet-specific foods that are available.  **(E) Investigate a range of diet-specific foods**  For information on ingredients, sourcing and potential for use in the packed lunch.  **(F) Food testing**  Identify the problematic components in selected foods. |  |
| Brief development must take into account both dietary information, lifestyle preference and dietary preferences of an individual. | **Developing specifications to accompany the scenario and problem**  This section will depend on the breadth of the study, i.e. **(A)­–(F)**. | Develop a brief that has specifications that acknowledge the individual’s requirements and preferences. |
|  | **Planning for practice**  Develop a plan for collecting and assembling relevant information (A) – (F) including: identifying the ‘client’, deciding whether the condition might have a genetic link, interviewing the client to find out about their needs and preferences (likes / dislikes), developing a grid that identifies food preferences and food tests required, and consulting with the client as part of the development process. |  |
| A bioinformatics solution provides access to a wide range of detailed information that can be accessed for specialised solutions to individual problems. For example, a packed lunch for a person with a diet-related food reaction that fulfils a particular function (e.g. tramping). | **Developing and adapting the product/diet plan.**  *The following tasks would be allocated according to the brief (specifications) that have been identified in the planning for practice, and the areas of expertise developed within the group.*   * Develop a grid that lists the client’s food preferences against food test results (i.e. whether or not the preferred foods would be suitable for including in the packed lunch). * Develop and present a variety of foods for evaluation by the client. Interview them as well as their caregivers/ medical advisors to judge the suitability of the product. * Use this information to select and pack the ‘ideal lunch’ for the client to take on the school tramp. * Develop a flow chart that justifies the route and provides evaluative evidence of its fitness for purpose. | A packed lunch is developed that meets the dietary needs and preferences of a person with a diet restriction. |
|  | **Presentation of snack food with associated audit trail to the client.**  Evaluate the product with respect to the client’s comments. | The presentation of this packed lunch plan is accompanied by an audit trail that verifies that the person’s requests have been followed and that the specifications (see above) have been fulfilled. |