How is a new food product developed?

What jobs are involved in making new foods?

What skills would be required to do these roles?

To study

Watch the video and write down the skills needed to be a food scientist or product development manager.

Role:

Skills:

Skills audit sheet

Write down when and how you used the following skills in your food technology role.

Skill set	When and how you used the skills
Attention to detail and analytical skills	
Enthusiasm	
Self-discipline	
Flexibility	
Patience	
Communication skills – written	
Communication skills – verbal	
Record keeping	
Planning	
Time-management	
Technical skills	
Ability to work as a member of a team	

To study

When a company needs someone to work for them, they produce a job advertisement to tell people about it. Here is an example.

Sales manager
A fantastic opportunity to work for the largest food producer in the UK. We are looking for a sales manager to organise and lead a national team of sales representatives.
Main responsibilities

- Meet sales targets
- Keep accurate records of sales
- Write detailed reports
- Manage regional budget
- Effectively communicate with the team
- Effectively support the team to achieve targets
- Solve any problems that may occur
- Manage team meetings

Skills

- Excellent sales skills
- Ability to motivate and lead a team
- Initiative and enthusiasm
- Analytical skills
- Planning and organisational skills

Qualifications

- Business-related BTEC HND or degree is desirable

To do

Use the template below to write a job advertisement for one of the following roles.

- Food technician
- Food scientist
- Food science team leader

You should include:

- job title
- brief description – what will attract someone to that job
- main responsibilities – what the person will do day to day in the job
- skills - the skills needed to do the job
- qualifications - the qualifications required.

The job advert should be about 150 to250 words long.

Fruit jelly – Student sheet

The following websites may help you:
www.itsyourkindofplace.com

www.catalyststudent.org.uk/cs/publication/search?searchTerm=food+technology

nationalcareersservice.direct.gov.uk/advice/planning/jobprofiles/Pages/foodscientist-foodtechnologist.aspx

Job advert – template

Job title:

Brief description:

Main responsibilities:

Skills required:

Qualifications required:

Fruit jelly – Teacher guidance

Learning structure of the lesson

The big picture

This lesson sequence is designed to exemplify an approach to practical work that makes strong links with careers which use related skills and techniques.

There are many scientific careers involved in food technology – roles that students have probably never considered or even heard of. Through the practical activity, students are introduced to some of these careers. They work in teams to plan and carry out practical research to find out which fruits will allow a jelly to set. They carry out an audit of the skills they used to complete the tasks, and in doing so think about the skills required to work in food technology careers.

Age range: 11–14
(Most suitable for students in year 7, near the start of their secondary science programme).

Timing: 2 x 50 minute lessons at least 4 hours apart

1: Learning episode 1 (teacher-led) 15 mins

Introduce students to the idea that new food products are brought onto the market all the time. Students discuss their existing ideas about how a new food product is developed, the jobs involved and the skills required to do these jobs. They then watch a video about a food scientist.

1: Learning episode 2 (student-led) 25 mins

Students work in teams to find out which fruits will allow a jelly to set by planning and carrying out the practical activity.

1: Learning episode 3 (student-led) 10 mins

Teams list the skills they used as they carried out the practical activity.

2: Learning episode 4 (student-led) 10 mins

Teams prepare brief presentations about what they have set up and what they expect to find out. Some teams present to the class.

2: Learning episode 5 (student-led) 25 mins

Students examine their jellies, record their results and write a report including recommendations. They reassess the skills list they produced last lesson.

2: Learning episode 6 (student-led) 15 mins

Students carry out a skills audit of individual and team strengths and weaknesses in this area.

Learning outcomes

Students will be able to:

- describe some of the careers available in food technology
- plan to make different fruit jellies and test whether they have set
- list the skills required for some food technology careers
- understand that science is involved in developing and producing food products

Equipment and materials

Teacher guidance

Practical guidance

Slide presentation

Video

Student sheet

Per class

Selection of new food products – 1 or 2 is fine

Alternatively advertisements for new food products could be used. These are readily available on manufacturers' websites.

Per group

Ice cube tray

Pack of jelly

Selection of pieces of fruit

Pen or other means of labelling trays

Access to a kettle

Refer to the health and safety advice and practical guidance

Key words

No specific key words needed

Prior knowledge

No specific prior knowledge required.

Students who have studied enzymes before could be challenged to develop an explanation for why some jellies do not set – see Differentiation / optional extra activities.

Background information

Some fruit contains an enzyme which breaks down the protein in gelatine leaving it unable to set. This fruit would not be suitable for use in a fruit jelly. Pineapples, papaya and kiwi fruit each contain one of these enzymes.

Terminology

No specific terms needed.

Differentiation

The skills audit may be challenging for younger students; they may need support with it.

Optional extra activities

- Older or more able students could be asked to undertake some research to find out why some of the jellies won't set. This website would be a good place to point them to: www.thenakedscientists.com/HTML/content/kitchenscience/exp/science-of-fruit-jellies/

  They could try boiling the pineapple, papaya and kiwi before placing it in jelly. Older students could be asked to use this evidence to explain why the pineapple, papaya and kiwi don't set the jelly. If they have studied enzymes being denatured at high temperatures they may come up with an explanation by themselves. They can then do some research on the web to find out if their ideas are correct. The enzymes in the fruit break down the protein molecules in the jelly, preventing them from setting.

- Older or more able students could be challenged to find a way to make pineapple jelly rather than just fruit jelly. They could try fresh, tinned in juice, tinned in syrup and boiling some pineapple and be asked to explain which ones set and why.

  Vege-Gel could also be used, perhaps with pineapple juice. Vege-Gel is a jelly alternative made from polysaccharides rather than from protein. It is not affected by the enzymes in the fruit and will set no matter which fruit is put into it. Most Vege-Gel contains carrageenan (E407). For more information see: www.lsbu.ac.uk/water/hycar.html

  They could then write a sales pitch for the version that they prefer, explaining why their idea should be developed.

  As there is more than one way of getting this to work, they could think about the various options which are available and which they prefer. They could then follow this up with the skills audit.

Useful weblinks

The video in this lesson was filmed at the International Food Network, Reading:
www.intlfoodnetwork.co.uk/

Videos from Heston Blumenthal on 'What is jelly' and 'Pineapple jelly':
www.rsc.org/Education/Teachers/Resources/kitchenchemistry/00_video.htm

Alternative practical sheets with a slightly different method:
www.rsc.org/Education/Teachers/Resources/kitchenchemistry/resources4_2.htm
See 'Enzymes and jellies'

A long video about molecular gastronomy:
vega.org.uk/video/programme/59
This video focuses on a very particular career which is not likely to be available in any other organisation, however the first minute or two are very interesting.

Videos about a variety of food technology roles can be found on iCould:
www.icould.com

Futuremorph has a video about a bakery manager which can be used alongside an interesting activity:
www.futuremorph.org/teachers/science_teaching_resources/science_teacher_resources/bakery_manager.cfm

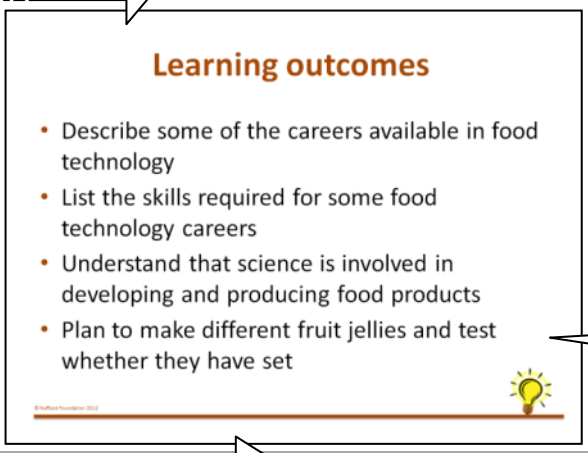
A job profile of a food scientist/food technologist:
nationalcareersservice.direct.gov.uk/advice/planning/jobprofiles/Pages/foodscientist-foodtechnologist.aspx

A Catalyst magazine article about food technology careers:
www.nationalstemcentre.org.uk/dl/b45f9bb494d4ebc27de20d5d0b4ea39ecc574a2a/8597-catalyst_17_1_378.pdf Students can access this via:
www.catalyststudent.org.uk/cs/publication/search?searchTerm=food+technology

Information on roles in Kraft foods (including Cadbury), skills required for the roles and profiles of people working for them:
www.itsyourkindofplace.com

Lesson details – Lesson 1

Slide 2

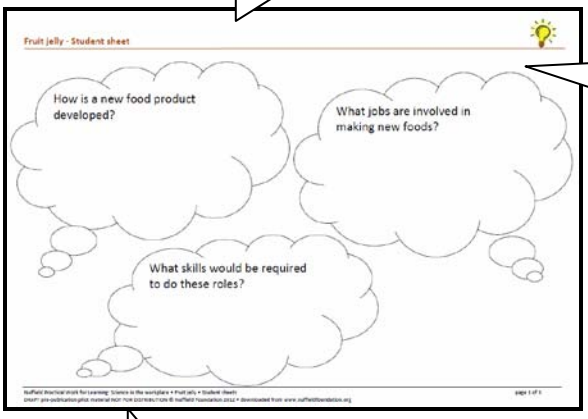


Task: Introduce students to the idea that new food products are brought onto the market all the time by showing a selection of examples.

These might be chocolate bars, crisps, cereals etc. recently on the market that are likely to be known to students. Show either the physical products or advertisements for them (readily available on manufacturers' websites).

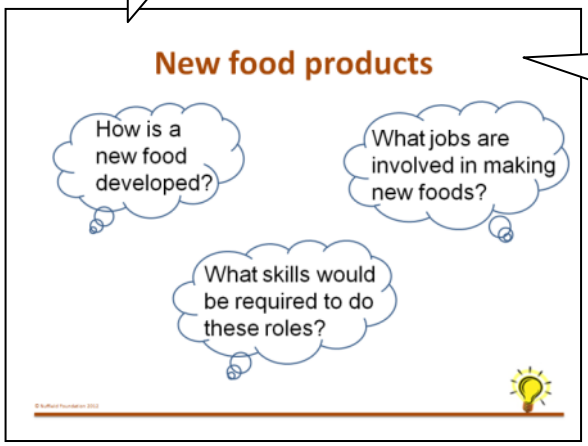
Task: Use **slide 2**, to share the learning outcomes for the lesson.

Student sheet



Task: Put students into groups of three and give each group a copy of **student sheet** page 1 enlarged to A3. Give them 2 minutes to come up with as many answers as they can to the three questions.

Slide 3

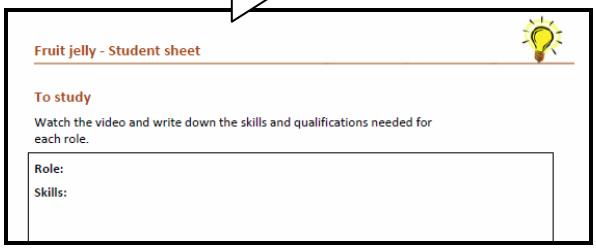


Task: Hold a brief class discussion with their answers to these questions (use **slide 3**), then get them to display their sheets on the wall so that they can be referred to later in the lesson sequence as appropriate.

Video

Task: Show students the **video**. As they watch get them to write down on the **Student sheet** the skills needed to be a food scientist or product development manager.

Student sheet



Fruit jelly - Student sheet

To study

Watch the video and write down the skills and qualifications needed for each role.

Role:

Skills:

Slide 4

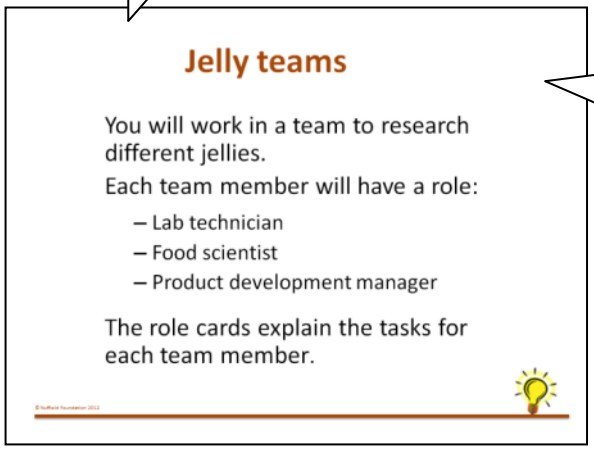
A new fruit jelly

- Parents like their children to eat fruit.
- Children like to eat jelly.
- Your company wants to develop a fruit jelly to appeal to parents and children.
- Which fruits are suitable for putting into the jelly?

Explain: Use **slide 4** to explain the problem to the students.

They are working for a food manufacturer and have been asked to develop a fruit jelly to appeal to parents and children. They need to do some research to find out which fruits will set in a jelly and which won't.

Slide 5



Jelly teams

You will work in a team to research different jellies.

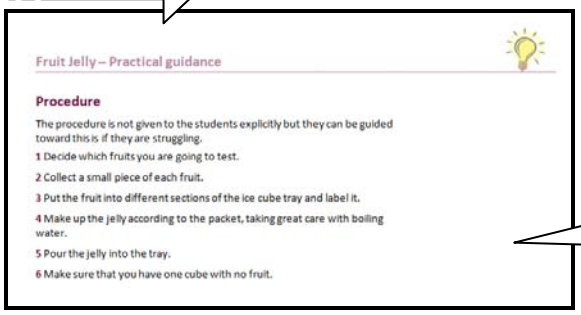
Each team member will have a role:

- Lab technician
- Food scientist
- Product development manager

The role cards explain the tasks for each team member.

Task: Use **slide 5** to explain to students that they will work in teams of three to plan and carry out the practical and each team member will have a role. The roles are outlined on the **role cards** which should be cut out and given to students. The team can give themselves a name if they wish.

Practical



Task: Working in their teams and staying in role, students plan what they are going to do and which fruits they will test, and prepare a results table.

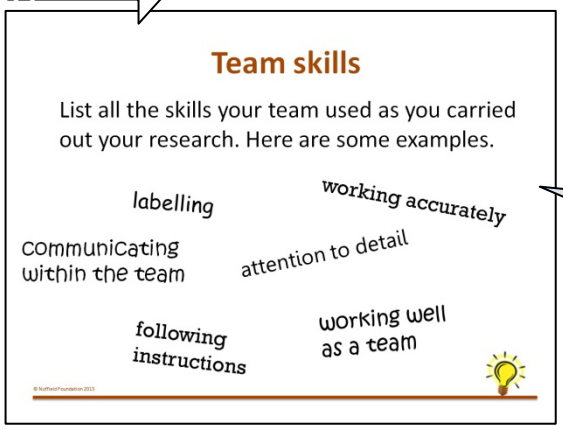
Differentiation: Groups struggling to plan can be guided towards the suggested procedure.

Task: Students make their jellies (see **Practical guidance**). You may need to provide a copy of the instructions from the jelly packet for each group.

If you want students to be able to eat or taste-test their jellies then this work **must not** be carried out in a science laboratory.

Task: Place the jellies in a cool place to set.

Slide 6



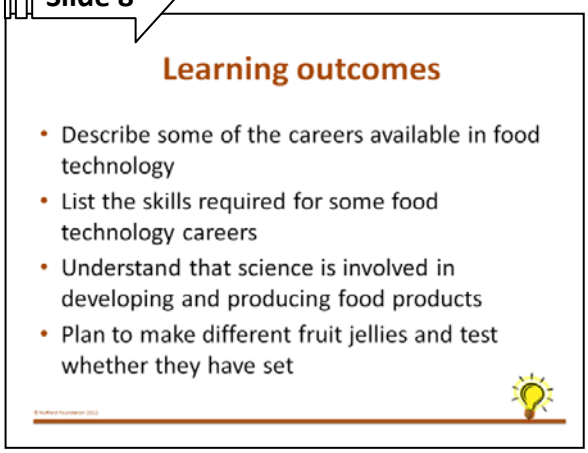
Task: In their teams, students write a list of all the skills their team used as they carried out the practical. These lists are used again at the end of lesson 2.

Differentiation: Some suggestions of skills are on **slide 7** for students that need them, but they should think of others.

Task: If time, the skills can be discussed at this point – otherwise this can be left to the start of the next lesson.

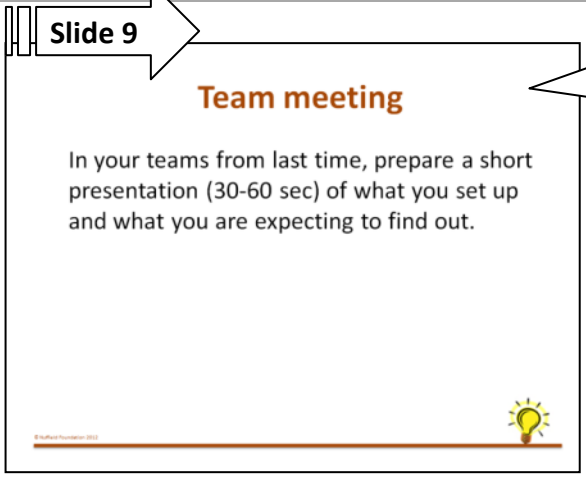
Lesson details – Lesson 2

Slide 8



Task: Use **slide 8** to recap on the learning outcomes from the previous lesson.

Slide 9

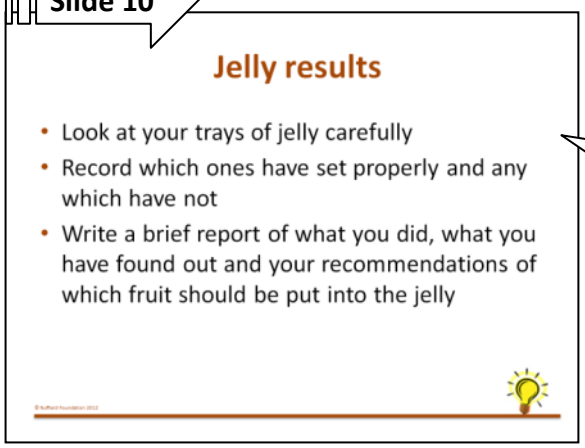


Task: Each team (from last lesson) holds a team meeting, as would be done in a research team. See **slide 9**. They should prepare a brief presentation (30–60 sec) of what they set up for their investigation and what they are expecting to find out.

This is to emphasise the importance of communication skills in food technology careers.

Task: Get one or two teams to give their presentations.

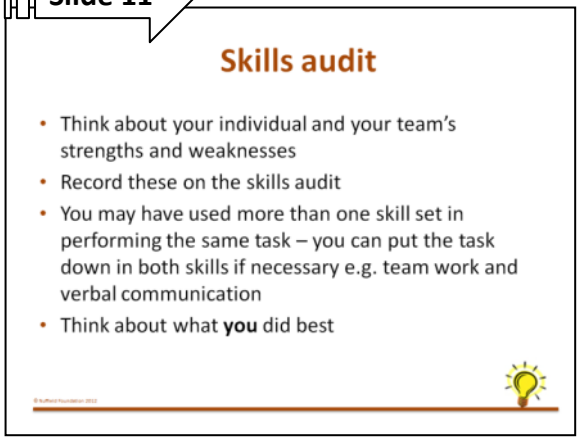
Slide 10



Task: Give out the trays of jelly from previous lesson. In their teams, students look at the jelly, see which has set and record their results.

Task: Students should write a brief report of what they did, what they found out and their recommendations of which fruit should be put into the jelly. See **slide 10**.

Slide 11



Task: Return to the skills lists written at the end of lesson 1. Discuss now if not discussed at the end of lesson 1 (**slide 11**).

Ask students to add to the list any more skills that they have used this lesson. You could ask a couple of groups to share their lists.

Student sheet

Fruit jelly - Student sheet

Skills audit sheet

Write down when and how you used the following skills in your food technology role.

Skill set	When and how you used the skills
Accuracy, attention to detail and analytical skills	
Enthusiasm	
Self-discipline	
Flexibility	
Patience	

Task: Discussing in their teams if necessary but working individually, students complete the **Skills audit sheets.**

Students should think about their individual and team strengths and weaknesses. They may have used more than one skill set in performing the same task – they can put the task down under both, e.g. team work and verbal communication. They may not have used every skill. Encourage them to think about what it is they think they did best and which skills they need to develop further.

Differentiation: Older students can be encouraged to think about this more deeply.

Student sheet

Fruit jelly - Student sheet

To study

When a company needs someone to work for them, they produce a job advertisement to tell people about it. Here is an example:

Sales Manager
A fantastic opportunity to work for the largest food producer in the UK. We are looking for a sales manager to organise and lead a national team of sales representatives.
Main responsibilities:

- Meet sales targets
- Keep accurate records of sales
- Write detailed reports
- Manage regional budget
- Effectively communicate with the team
- Effectively support the team to achieve targets
- Solve any problems that may occur
- Manage team meetings

Skills:

- Excellent sales skills
- Ability to motivate and lead a team
- Initiative and enthusiasm
- Analytical skills
- Planning and organisational skills

Qualifications:

- Business-related BTEC HND or degree is desirable

Task: Refer students back to their original brainstorming sheets (pinned to the wall) about developing a new food product. Ask a few to share what they have learnt in the two lessons or how their ideas have changed.

Homework: Students write an advert for a job working in food technology. They should specify the skills required, the sorts of task that the successful person will have to do and the qualifications needed.

Jelly role cards

Lab technician Your role: Work with your team to plan the experiment Collect all the necessary equipment Prepare the fruit Mix up the jelly	**Food scientist** Your role: Work with your team to plan the experiment Put all the fruit and jelly into the correct places on the tray Record what has been mixed Ensure everything is correctly labelled	**Product development manager** Your role: Work with your team to plan the experiment Design the different types of jellies Oversee the smooth running of your team Ensure health and safety procedures are followed
Lab technician Your role: Work with your team to plan the experiment Collect all the necessary equipment Prepare the fruit Mix up the jelly	**Food scientist** Your role: Work with your team to plan the experiment Put all the fruit and jelly into the correct places on the tray Record what has been mixed Ensure everything is correctly labelled	**Product development manager** Your role: Work with your team to plan the experiment Design the different types of jellies Oversee the smooth running of your team Ensure health and safety procedures are followed
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Fruit jelly – Practical guidance

Equipment and materials

For introduction

Selection of new food products – 1 or 2 is fine.

Alternatively advertisements for new food products could be used. These are readily available on manufacturers' websites.

For making and testing jelly

Per group of students

Ice cube tray (see note 1)

Pack of jelly and accompanying instructions (see note 2)

Selection of pieces of fruit, pre-cut (see note 3)

Pen or other means of labelling trays

Access to a kettle

Health and safety and technical notes

Before carrying out this practical, users are reminded that it is their responsibility to carry out a risk assessment in accordance with their employer's requirements, making use of up-to-date information.

Read our standard health & safety guidance.

1 A chief hazard of this practical is scalding from the hot water required to dissolve the jelly. The jelly could be made up in advance, and left in a 50^0C water bath (to reduce scalding problems). The students could then add the cooled jelly to their fruit.

2 The teacher must be very vigilant to ensure that the students do not eat the fruit or jelly. These lessons **must not** be carried out in a science laboratory if you want students to be able to eat or taste test the jellies.

3 Students are usually very keen to try their products. If possible the practical work should be carried out in a food technology room or a classroom to allow them to do so.

4 Some jellies contain pig or cow gelatin, there may be real religious and/ or ethical objections to using this type of jelly. Teachers will need to make decisions based on their particular school. Other non gelatine based jellies do not always work in the usual expected way.

5 Gel containing carrageenan is not always advisable for people with gastrointestinal problems. Students may want to try jelly made with agar in addition or as an alternative.

6 The jellies can be made in an ice-cube tray to minimise the quantities needed. If none are available, any small pots would be suitable. It is not easy to turn jellies out of ice-cube trays unless they are the flexible kind, but it is still possible to tell if they are set.

7 One standard pack of jelly would be enough for two to four groups using ice-cube trays depending on the number of fruits tested.

You may wish to scale the instructions to 1/3 or 1/2 of a packet, depending on the quantity you plan to give each group. More able students could carry out this calculation themselves, but their answers should be checked before they make up the jelly.

8 Each group will need a finger-nail-sized piece of each fruit. This is best prepared in advance. Ensure that you have at least one fruit that will not set a jelly such as fresh pineapple, kiwi or papaya. Tinned pineapple in juice doesn't always fully set a jelly; tinned pineapple in syrup gives a better set.

Procedure

The procedure is not given to the students explicitly but they can be guided toward this is if they are struggling.

1 Decide which fruits you are going to test.

2 Collect a small piece of each fruit.

3 Put the fruit into different sections of the ice cube tray and label it.

4 Make up the jelly according to the packet, taking great care with boiling water.

5 Pour the jelly into the tray.

6 Make sure that you have one cube with no fruit.