



# Food

# Bugs



**A complete guide to running  
the Food Bugs session**

## Introduction

This session teaches participants how easily potentially harmful microbes on raw food can transfer to humans. The interactive quiz activity will show participants how to prepare food safely and the food labelling activity will help them to understand what is meant by the food labels shown on foods.

Food storage will also be addressed in an activity which allows participants to learn how to correctly store food in the fridge to help prevent contamination between food products and therefore food poisoning at home and in the work place.

## Learning outcomes

Aim to understand that:

- Microbes are found on most of our food, but harmful ones are mainly found on uncooked meat, unwashed salad and raw vegetables
- Bacteria multiply very quickly; cooking food properly can kill harmful microbes, and refrigeration only stops microbes growing, it doesn't kill them
- To stop getting ill, it is really important to wash your hands before and after preparing food and to wash cooking utensils and surfaces with appropriate products
- Most foods should only be reheated once, until it is piping hot
- Where and how to store different foods in the fridge
- The difference between 'use by' and best before

### Key words

Food hygiene, microbe, refrigeration, food safety, food storage, food labelling, food poisoning, cross-contamination

### Available web resources

Kitchen Check Quiz PowerPoint  
Fridge Raiders PowerPoint  
Label Sort PowerPoint  
'Food Bugs' Poster

### Materials required

Activity 1,2 and 3 – PowerPoint Slides available on [www.e-bug.eu/beat-the-bugs/](http://www.e-bug.eu/beat-the-bugs/)  
Activity 4 – A variety of foods, two boxes/containers  
Activity 5 - Toy ovens, plastic chopping boards, plastic food including demonstration meats, plastic knives, paper plates, white play dough for chicken fillets, GlowGerm powder and a UV light.

## Background information

Harmful microbes found in food can lead to food poisoning, which can be very dangerous. The symptoms of food poisoning can last for days and include stomach pains, diarrhoea, vomiting, nausea (feeling sick) and fever (high temperature). The symptoms usually come on suddenly, but can occur several days after eating contaminated food. In most cases food poisoning will get better on its own within 2 days. People should seek medical help if they have severe pain with a tender tummy, if they have blood in their stool (faeces) or diarrhoea for over 5 days.

Not all microbes associated with food are harmful; here are examples of some of the useful and harmful microbes associated with food.

Useful Microbes can be used to make food and drink, e.g. the yeast *Saccharomyces cerevisiae* is used to make bread and beer. *Lactobacilli* bacteria are used in yogurt and cheese making.

Harmful Microbes can cause food poisoning e.g. the bacteria *Salmonella*, *E. coli* and *Campylobacter* are commonly found on raw meats and can cause diarrhoea and vomiting in humans and in rare circumstances death.

Norovirus which causes 'winter vomiting' can also cause food poisoning when those with the illness contaminate the food they handle; this is quite easy as millions of viruses are found in just 1 gram of vomit!

Food Spoilage Microbes do not usually cause harm to humans. These are generally mould or bacteria, e.g. the fungus *Rhizopus stolonifer* causes bread mould and the bacterium *Pseudomonas* can cause the green discolouration on bacon and other meat. The red colour sometimes present on food is caused by the bacteria *Serratia marcescens*. Before scientists knew what this was, people commonly thought it was blood, in fact when it was found on communion wafers it was thought of as the blood of Christ, it was hence known as the miracle bacteria.

## How can we prevent food poisoning and delay food spoilage?

Most microbes we find on food grow best in warm, damp places. They generally dislike places that are too hot and are killed at temperatures above 70°C. In cooler temperatures, below 5°C, most bacteria multiply very slowly, if at all. Some bacteria will die at this low temperature, but many survive and can start to multiply again if desirable conditions return. So we keep our food in the fridge to stop bacteria growing and cook our meat well before we eat it to kill the bacteria. Our fridges should be kept between 0°C and 5°C. Some viruses and spores, such as *Clostridium perfringens* need prolonged cooking or higher heat to reliably kill them.

Sometimes harmful microbes found on food can spread to other foods, for example via hands, or kitchen utensils and cause illness when those foods are eaten. They can also be spread if raw meats are washed and microbe's splash onto work surfaces or other foods. This is known as cross-contamination.

Cross-contamination can also occur in the fridge, which is why it is important to store food correctly. Meats and other raw foods should be kept on the bottom shelf and should be covered, while other foods such as cheeses, milk and yoghurt should be kept on the upper shelves. This prevents juices from the meats and other raw foods from dripping onto other items in the fridge. The fruit and vegetables can be kept in the allocated drawers in the fridge or, if there aren't any, above the meat and raw foods.

It is important that food is only reheated once. Bacteria grows best at the temperature 'danger zone' (between 4° and 60° C), food will be at this temperature at each cooling and heating stage. Some bacteria can produce toxins and spores; parts of the microbe that can survive cooking temperatures and make us ill. If you re-heat your food more than once, there are more opportunities for these harmful microbes to grow.

Labels placed on food are used to determine when it is safe to eat the food, as well as when the quality of the food is at its best. 'Use before' refers to when the food is safe to eat and 'best before' dates refer to when the food will be at its best quality, but it is worth noting that consumption after this date will still be safe.

## Introduction

Firstly recap on the previous session to reinforce some of the learning points. Then explain to the participants that they are going to learn about food hygiene, and why preparing and storing food properly is so important. In addition to learning the biological aspects of food hygiene (e.g. why food needs to be refrigerated), they will be learning about the practicality of food hygiene such as how to keep themselves safe when preparing food.

The '**Food Bugs**' poster can be used to show how microbes can be used in the food industry, but also how microbes can be found on food which can be harmful to us.

Ask the participants what they already know about food hygiene. Possible questions include:

- Do you know what we mean by the term food hygiene?
- Have you ever had food poisoning? (This could be vomiting or diarrhoea)
- Would you still work if your job included handling or preparing food and you had recently had food poisoning? (*Answer: You should not work for 2 days after the diarrhoea or vomiting has stopped*)
- What do you think causes food poisoning? (*Answer: bacteria, viruses and toxins*)
- What foods can cause food poisoning? (*Answers: unwashed fruit and vegetables, raw meat, foods contaminated by a food handler*)

The following pages describe 5 food hygiene activities. Choose the appropriate activities for your group.

The 5 food hygiene activities could be set up in a workshop style. Split the participants into groups and assign each group to one of the activities. After 10-20 minutes let the participants know that they can move on to the next activity.

## Recommended Activities

The following three activities are recommended.

### Activity 1 – Kitchen Check (10-20 mins)

Set up the Kitchen Check PowerPoint quiz (available on [www.e-bug.eu/beat-the-bugs](http://www.e-bug.eu/beat-the-bugs)) on a computer, tablet or projector.

The participants will go through an interactive quiz which follows the preparation of a meal. Along the way, the participants have to make decisions about what to do next and answer questions. After clicking on their answer, they will find out if they are correct or not, and a short explanation will be displayed.

At the end of the quiz, participants will understand where food hygiene risks lie and will be able to apply it to their own food preparation practices.

#### Learning outcomes achieved:

1. Microbes are found on most of our food, but harmful ones are mainly found on uncooked meat, unwashed salad and raw vegetables
2. To stop getting ill or spreading microbes, it is really important to wash your hands before and after preparing food and to wash cooking utensils and surfaces with appropriate products

### Activity 2 – Fridge Raiders (10-20 mins)

This activity will be set up on a table and will have a large picture of a fridge and pictures of foods that are kept in the fridge. You may wish to laminate the pictures if you are able to do so. The Fridge Raiders PowerPoint (available on [www.e-bug.eu/beat-the-bugs](http://www.e-bug.eu/beat-the-bugs)) contains the images which can be printed and cut out. An answer sheet for the course leader is included at the end of this section (**Educator Sheet 3**).

The participants will place the foods in the fridge in the correct place. Ask the participants which foods should also be covered up to prevent cross-contamination.

The participants will learn how to store food safely, and that refrigeration only slows the growth of microbes, it doesn't kill them.

**Learning outcomes achieved:**

1. Where and how to store different foods in the fridge
2. Bacteria multiply very quickly; cooking food properly can kill harmful microbes, and refrigeration only stops microbes growing, it doesn't kill them

## Activity 3 – Label Sort (10-20 mins)

In this activity, participants will match up food labels to their correct explanation. The labels and descriptions can be found in this resource pack (**PW1**) or on the Label Sort PowerPoint (available on [www.e-bug.eu/beat-the-bugs](http://www.e-bug.eu/beat-the-bugs)). From here they can be printed and cut out, to allow participants to arrange the labels on a table. An answer sheet for course leaders is included at the end of this section (**Educator Sheet 4**). You may wish to laminate the labels if you are able to do so. You may like to use the photo examples of food labels or alternatively you can bring in your own food to discuss the labels.

This activity will teach the participants what is meant by each label and will offer guidance on how to follow it so that they can keep themselves safe from possible food poisoning.

**Learning outcomes achieved:**

1. The difference between 'use by' and 'best before'

## Optional Activities

### Activity 4 – Food Sort (10-20 mins)

This activity will help participants identify that microbes can be useful and harmful. Participants are required to sort different foods according to whether they contain or are made with useful/good microbes or contain harmful/food spoiling microbes. It would be good to bring in a variety of foods to make the activity more visual but ensure that the participants know not to consume the food. Foods to include are:

- Bread – made with yeast, a fungi, which helps the bread to rise = **Good Microbes**
- Vegetables e.g. dirty carrots – may contain harmful microbes found in the soil = **Bad microbes**
- Yoghurt – contains useful bacteria that helps us to digest food = **Good microbes**
- Raw Chicken – contain harmful bacteria which cause food poisoning = **Bad microbes**
- Milk – contains useful bacteria that helps us to digest food = **Good microbes**
- Fruit e.g. apples, tomatoes – may contain harmful microbes found in the soil or other people who have handled them if not washed = **Bad microbes**
- Eggs – may contain harmful bacteria which cause food poisoning = **Bad microbes**
- Cheese – good bacteria are used to make cheese = **Good microbes**
- Raw sausages - contain harmful bacteria which cause food poisoning = **Bad microbes**

Participants can sort the food into two different boxes, labelled good microbes and bad microbes.

#### Learning outcomes achieved:

1. Microbes are found on most of our food, but harmful ones are mainly found on uncooked meat, unwashed salad and raw vegetables



## Activity 5 – How clean is your kitchen? (10-20 mins)

In this experiment the participants make a chicken dinner and then the UV light is used to show how germs have spread around the kitchen area. Try to make sure participants have access to chopping boards, plates, plastic food and microwaves and encourage them to ask questions.

### Advance preparations:

1. Prepare chicken fillets from playdough and cover in GlowGerm powder.
2. Set out the food, chopping boards and toy ovens.

### Instructions:

1. Invite the participants to prepare a chicken dinner using the play dough chicken fillet. Ask them to cut up the chicken with a plastic knife.
2. Encourage the participants to cook the chicken in the oven and select other foods to go in the dinner.
3. Afterwards ask them what they forgot to do whilst making their food - wash their hands.
4. Point out that they should have used different chopping boards for cutting up the chicken and preparing the raw ingredients – in a professional kitchen they use different coloured chopping boards for different groups of food.
5. Say you can see where the germs from the chicken fillet have spread using the special 'microbe detector' UV light.
6. Float the UV light over their hands and kitchen equipment to show where the bad germs have spread.
7. Explain what types of harmful bacteria (e.g. Salmonella, Campylobacter, *E. coli*) can be found in raw meat and the importance of hand washing whilst cooking and before eating a meal. Use the different types of plastic meats to help explain.
8. Ask them if they think that harmful microbes can be found on other types of food as well. Explain that harmful microbes can be found on other foods too, so for instance it is important to wash vegetables and fruit well before eating.

### Learning outcomes achieved:

1. Microbes are found on most of our food, but harmful ones are mainly found on uncooked meat, unwashed salad and raw vegetables
2. To stop getting ill, it is really important to wash your hands before and after preparing food and to wash cooking utensils and surfaces with appropriate products.

## Discussion

Ask the participants what they have learnt today. Refer to the 'Food Bugs' poster in the discussion. Make sure the following areas are discussed:

- What causes food poisoning? (*bacteria*)
- How should you avoid getting food poisoning? (*Washing your hands, washing fruit and vegetables, cooking food thoroughly, storing food correctly*)
- How should food be stored in the fridge? (*see group leader answer sheet*)
- When should you wash your hands? (*Before preparing food, after using the toilet, after touching pets*) And kitchen surfaces? (*Before and after preparing food*)
- What food labels do you remember? (*use by, best before etc.*)
- Should you go to work with vomiting or diarrhoea if you handle food in your job? (*No you should be well for 2 days before returning to work*)

Ask the participants what they will do differently now at home?

## Action Plan

Ask participants to complete an action plan for this session (found at the back of this session booklet).

Ask participants to either choose one of the action plans from below or to make up their own if they are confident enough.

1. Reduce chance of food poisoning by:

- a. Washing hands before and after handling food such as chicken or dirty fruit or vegetables.
- b. Clean kitchen surfaces and utensils before and after preparing food.
- c. Not eating food that has been out of the fridge for more than 8 hours.
- d. Washing fruit and vegetables before eating them.
- e. Not eating food that is past its use by date.

# Food Bugs

**BEAT THE  
BUGS**

## The Good



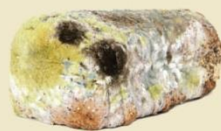
- Microbes are found everywhere and most are harmless and good for us.
- Some microbes are used in the food industry.
- The yeast *Saccharomyces cerevisiae* is used to make bread and beer.
- Rhizobacteria are soil bacteria that help plants absorb food and water from the ground to help them grow.
- Lactobacilli are bacteria used to make yogurt and cheese.
- Without good microbes we would not be able to survive.

## The Bad



- Harmful microbes are mainly found on uncooked meat, unwashed salad and raw vegetables.
- Salmonella, E.coli and Campylobacter are commonly found on raw or undercooked meats, and can cause diarrhoea and vomiting in humans and sometimes even death.
- Norovirus is the most common cause of viral food poisoning. Norovirus is spread by viruses from people's gut getting into food or water, when people vomit or do not wash their hands properly.

## The Ugly



- There are some fungi and bacteria that do not harm us but make food go off.
- The fungus *Rhizopus stolonifer* causes bread mould.
- Pseudomonas bacteria cause the green discolour on old bacon and other meat.

## Food Safety

- ✓ Plastic chopping boards are much easier to clean than wooden ones.
- ✓ Get different coloured chopping boards for different types of foods.
- ✓ Always wash your hands before and after handling food.
- ✓ Always cook raw meat well before eating to kill harmful microbes.
- ✓ Refrigerate all left over cooked food and eat within 3-4 days. The fridge only stops microbes growing, it doesn't kill them.
- ✓ Most foods should be reheated only once, until piping hot.



## Food Labels

Food labels can help us make sure our foods are safe to eat. Common dates on food labels are:

- **Use by** - Food after this date could put your health at risk.
- **Best Before** - Food will taste its best before the date shown, but should not harm you after the date.
- **Display Until** - Instructions for staff, not shoppers.



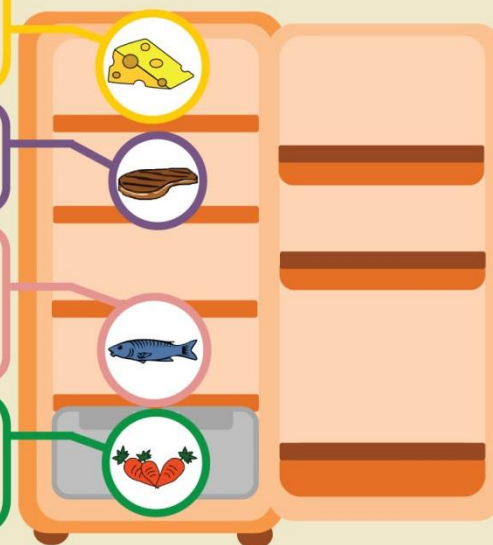
## Storing Food in the fridge

Top shelves: dairy products and prepared foods should go on the top shelves.

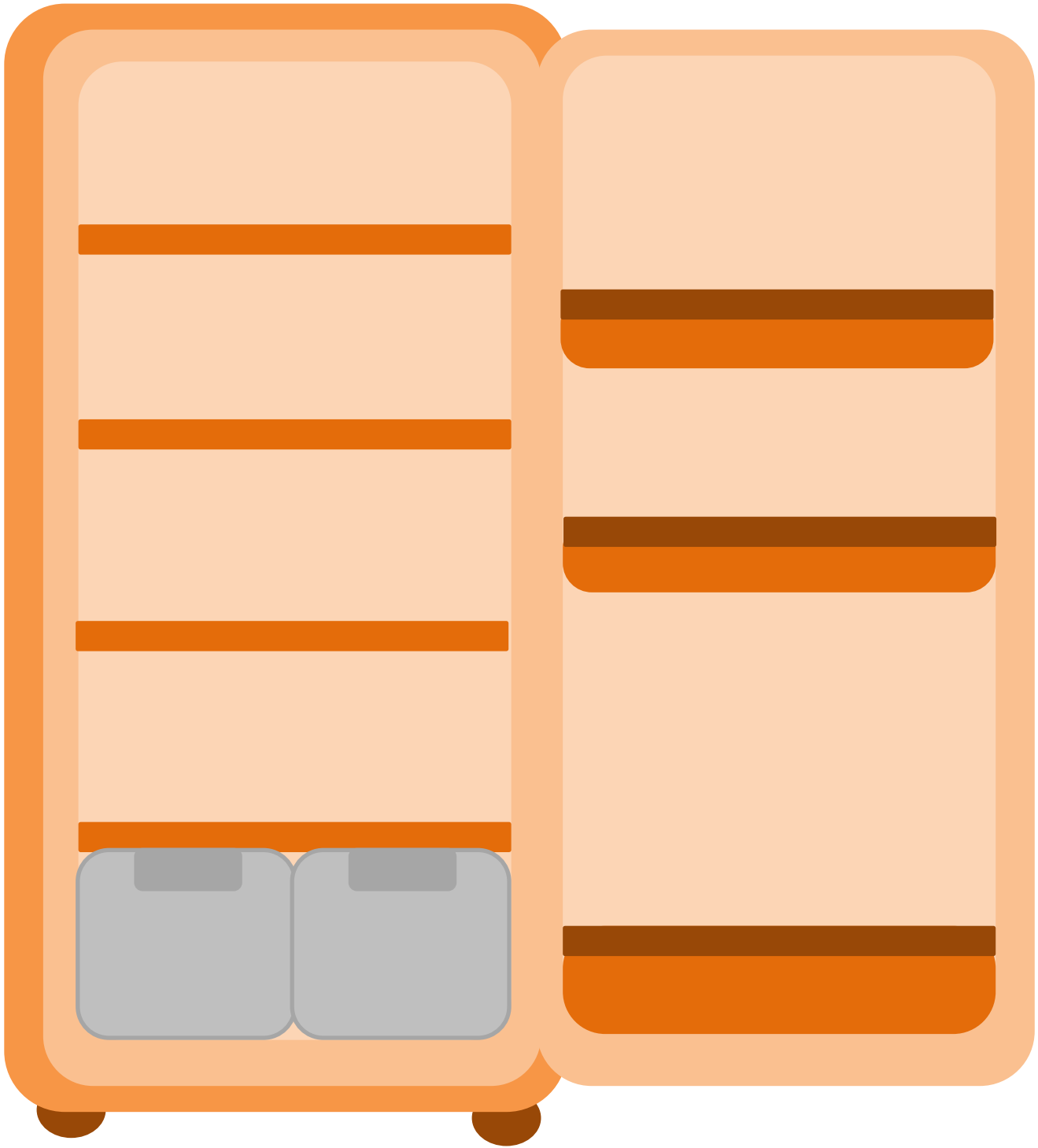
Cooked meat should be kept on the middle shelf.

Bottom shelf: raw meat, poultry and fish should be kept in sealed containers, so it can't drip onto other food.

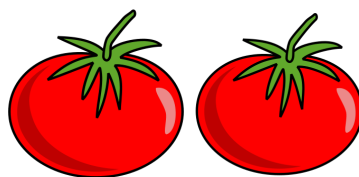
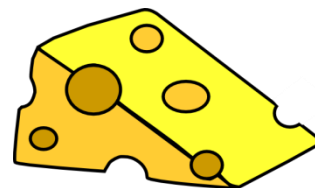
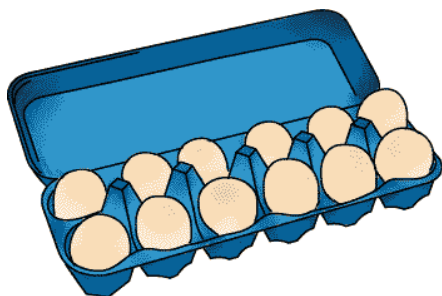
Bottom drawer: salad and vegetables in sealed container.



# Fridge Raiders

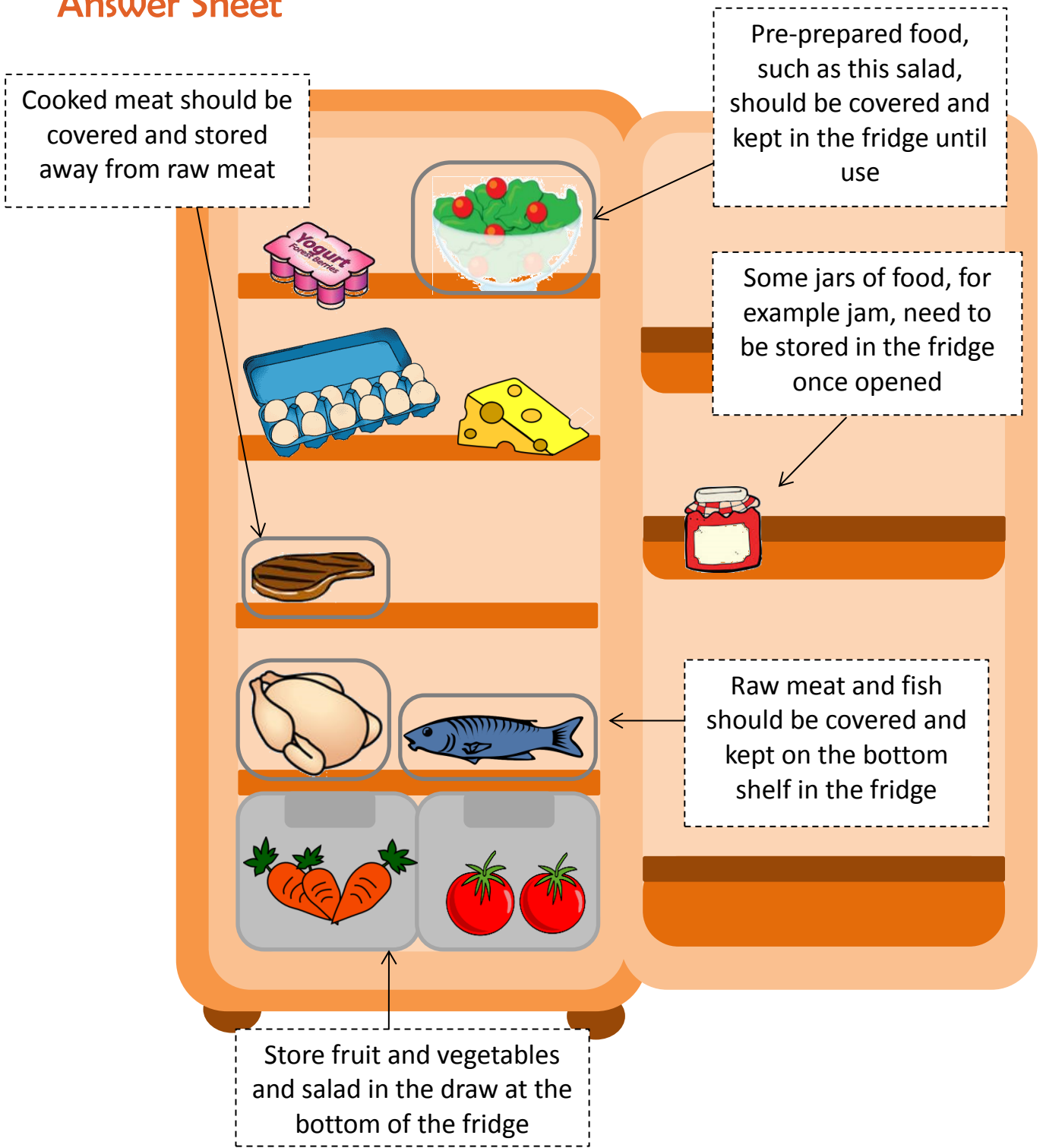


# Fridge Raiders



# Fridge Raiders

## Answer Sheet



# Label Sort

Match the food label to the correct definition.

Label	Definition
<b>'Use by'</b>	These dates are seen on food that goes off quickly, such as meat products and ready prepared salads. Don't use any food or drink after the end of the date on the label, even if it looks and smells fine. This is because using it after this date could put your health at risk.
<b>'Best before'</b>	These dates are about quality not safety. This food will taste its best before the date shown. Eating it after this date will not mean you will get ill but the flavour might not be as good. These dates appear on a wide range of frozen, dried, tinned and other foods.
<b>'Display until'</b>	Retailers often use these dates on their shelves, mainly for stock purposes. These are not required by law and are instructions for shop staff, NOT for shoppers.
<b>'Consume within 3 days of opening'</b>	This label means that food should be eaten within the amount of days it says on the packaging. After this date the food may be unsafe to eat.
<b>'Keep refrigerated once opened'</b>	This label means that once you have removed the packaging and exposed the food to the air it should be refrigerated so that the microbe growth can be reduced.

# Label Sort

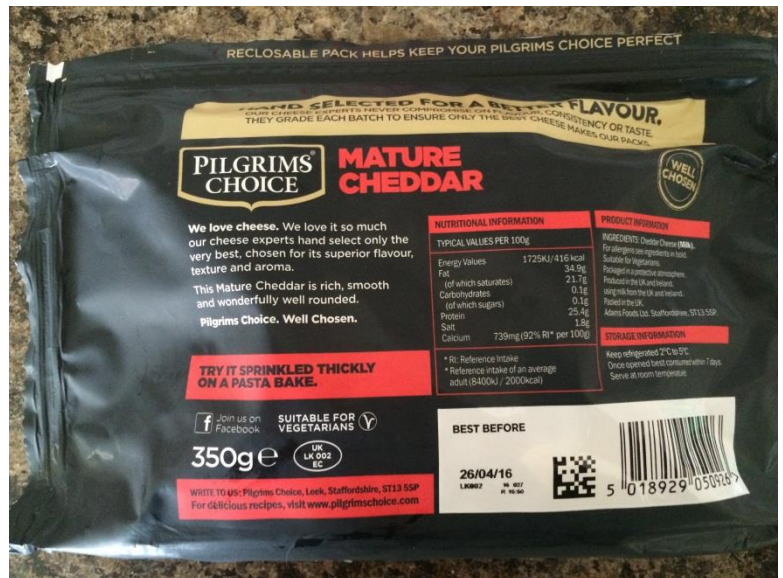
“Use by” label examples





# Label Sort

## “Best before” label examples



# Label Sort

“Display until” label examples



# Label Sort

Match the food label to the correct definition.

Use by

Best  
before

Display  
until

Consume within 3  
days of opening

Keep refrigerated  
once opened

These dates are about quality not safety. This food will taste its best before the date shown. Eating it after this date will not mean you will get ill but the flavour might not be as good. These dates appear on a wide range of frozen, dried, tinned and other foods.

These dates are seen on food that goes off quickly, such as meat products and ready prepared salads. Don't use any food or drink after the end of the date on the label, even if it looks and smells fine. This is because using it after this date could put your health at risk.

This label means that once you have removed the packaging and exposed the food to the air it should be refrigerated so that the microbe growth can be reduced.

Retailers often use these dates on their shelves, mainly for stock purposes. These are not required by law and are instructions for shop staff, NOT for shoppers.

This label means that food should be eaten within the amount of days it says on the packaging. After this date the food may be unsafe to eat.

Name: \_\_\_\_\_

# Action Plan



## Food Bugs

My favourite activity was:

\_\_\_\_\_

After this session I will (please circle):

1. Wash hands before and after handling food
2. Clean kitchen surfaces and utensils
3. Wash fruit and vegetables before eating
4. Not eat food that is past it's used by date

Or write your own:

\_\_\_\_\_

# BEAT THE BUGS

This pack contains an educational hygiene resource for community groups.

This session can be used independently or as part of a six week course and has information, suggested lesson plans and possible activities for you to use in your community groups to help you inspire and inform individuals.

This project was led in collaboration with the Primary Care Unit, Public Health England, and Kingfisher Treasure Seekers.

