## Food Science Key stage 3

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Resources</th>
<th>Additional Notes</th>
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<tbody>
<tr>
<td>Photograph all the food you eat in one day and use explore food to calculate the nutritional value</td>
<td>Plan a packed lunch which follows the Eatwell guide. Nutritionally analyse a ready meal and suggest how it could be made heathier. Make your own food science video explaining coagulation and denaturation.</td>
<td><a href="http://www.explorefood.foodafactoflife.org.uk">www.explorefood.foodafactoflife.org.uk</a></td>
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<tr>
<td>Research a pasta dish that follows the Eatwell guide and make it for lunch.</td>
<td>Would you like to make some instant icecream in a bag? See the sheet in the power point.</td>
<td>What are the recommendations for being active for: a) Children b) adults</td>
<td>Design a 3 course meal for a Pescatarian</td>
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<td>Investigate the different types of raising agents and explain how they work.</td>
<td>Watch an episode of Gino's Italian escape and write a review of it. Can you make a dish using denaturation or coagulation? (See passionfruit recipe sheet if you can't find one)</td>
<td>Design the packaging for a healthy burger, remember to include labelling.</td>
<td>Design a poster explaining the importance of effective washing up and clearing away</td>
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<td>Can you make your own cheese? (see recipe sheet)</td>
<td>Write a recipe that demonstrates aeration. Find out what aeration is and make some foamsicles (See recipe and information sheets)</td>
<td>Research and create a picture board showing how gelatinisation works.</td>
<td>Can you make custard or blancmange to show gelatinisation?</td>
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<td>Taste test a snack</td>
<td>Research a country and find out what their traditional dishes are, they eat on a daily basis and where their food comes from</td>
<td>Go on to <a href="http://www.foodafactoflife.co.uk">www.foodafactoflife.co.uk</a> and attempt some of the online quizzes.</td>
<td>Make your own food science crossword or word search, <a href="http://www.puzzle-maker.com">www.puzzle-maker.com</a></td>
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<td></td>
<td>Make your own yoghurt?</td>
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<td>Can you make your own yoghurt?</td>
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Eatwell Guide

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.

- **Choose foods lower in fat, salt and sugars**
- **Eat at least 5 portions of a variety of fruit and vegetables every day**
- **Avoid sugary drinks**
- **Choose unsaturated oils and use in small amounts**
- **Check the label on packaged foods**

**Guidelines:**
- **Water**
- **Lower fat milk**
- **Sugar-free drinks**
- **Limit fruit juice and smoothies to a total of 100ml a day**
- **Daily intake of 6-8 glasses**

**Energy Intake:**
- **Men:** 2000 kcal
- **Women:** 2500 kcal

**References:**
- Public Health England
- In association with the Scottish government
- Food Standards Scotland
- Food Standards Agency in Northern Ireland

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Instant ice cream in a bag

Ingredients
120ml cream or full fat milk
1 tbsp. sugar
Few drops of vanilla essence or a flavouring of your choice
5 cups of ice
5 tbsp. salt

Equipment
1 small zip- resealable bag
1 large zip- resealable bag

Method
1. Add cream, sugar and vanilla (or flavouring) to the small bag and seal it.
2. Place the ice and salt in the large bag.
3. Place the closed small bag (with cream in) into the bag of ice and seal it.
4. Shake the large bag vigorously for 5 minutes. Stop when the cream has started to freeze and turn solid.
5. Remove the small bag and rinse the salt off it with cold water.
6. Pour your ice cream into a bowl, add your favourite toppings and enjoy!

The science behind it.
The freezing point of ice is lowered by adding salt so it starts to melt. As it melts it draws heat energy from it’s surroundings (the cream mixture in the smaller bag) cooling it enough to make the liquid freeze.

Cream is a mixture of fat and water and they don’t usually mix together. To make ice cream we need to change it’s state from a liquid to a solid, but just placing it in a freezer the water would freeze first making large crunchy ice crystals. Ice cream isn’t cruchy so to stop this happening we have to shake the bag, keeping the ice crystals small and ending with a smooth creamy frozen mixture.
Simple bread recipe

**Ingredients (Each)**
- 200g strong bread flour
- 1 tbspn oil
- 1 tspn fast acting yeast
- 1 tsp sugar
- ½ tspn salt
- 125ml warm water

**Method:**
1. Clean the work surfaces using anti-bacterial spray and the white cloth at your sinks.
2. Preheat oven to 180°C.
3. Weigh out flour, yeast, oil, sugar and salt into a medium mixing bowl.
4. Measure out water into a small measuring jug.
5. Add water to flour mixture, stir well with a butter knife to combine and then grab together with the hands to form a dough.
6. Knead for 5 minutes or until smooth and elastic.
7. Put back in the bowl and cover for 20-30 mins to allow the dough to prove.
8. On a floured surface shape your dough and place onto a lined baking tray.
9. Bake for 15-20 minutes until it is golden and it sounds hollow when tapped.
10. Wash up all of your equipment, dry them and put them away.

YOU COULD FLAVOUR YOUR BREAD BY ADDING SOME GRADED CHEESE, PESTO, OR EVEN SOME SULTANAS. TRY IT!
# Passionfruit pots

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Equipment</th>
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<tbody>
<tr>
<td>600ml double cream</td>
<td>Sauce pan</td>
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<tr>
<td>100g sugar</td>
<td>Blender</td>
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<tr>
<td>1 lime or lemon</td>
<td>6 small glasses or pots</td>
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<tr>
<td>6 passion fruit</td>
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**Method**
1. Heat the sugar and cream in a sauce pan on a low heat until the sugar has dissolved
2. Cut the passion fruit in half and scrape the seeds out,
3. Halve the lemon and squeeze out the juice.
4. Put the passionfruit seeds and the lemon juice in a blender and blitz for a minute or two.
5. Put a sieve over a bowl and pour the passion fruit and lemon through the sieve. Stir with a spoon to help it go through.
6. Throw away the seeds left in the sieve.
7. Pour the sieved passion fruit into the cream and stir thoroughly.
8. Pour into pots and chill in the fridge for 3-4 hours.
Burger box template
Making cheese- Paneer

**Ingredients**
- 1 litre whole milk
- 3 tablespoons lemon juice or white vinegar

**Equipment**
- cheesecloth/muslin cloth
- Colander
- 4 large freezer bags
- Sauce pan

**Method**
1. Pour the milk into a large pot and bring it to boil over medium heat.
2. Once you start hearing/seeing bubbling in the pot, you can stir the milk a little as you wait for it to boil.
3. While the milk is coming to the boil, prep the lemon juice if using. OR, If you are using vinegar, mix it with 60 ml of water so that it is not so intense when you pour it into the milk.
4. Once the milk has boiled, pour in the lemon juice (or vinegar) mixture.
5. Give everything a stir (IN ONE DIRECTION ONLY), and you should see the milk curdle immediately. If you don’t, you can add 1 more tablespoon of lemon juice or vinegar. Let the contents of the pot cool for another 5 to 10 minutes.
6. Line a colander with a cheese/muslin cloth and place the lined colander into the sink.
7. Strain the milk curds through the cheese/muslin cloth.
8. Rinse the curds under cold water to wash out the lemon juice or vinegar. This also helps cool the milk curds so that you can squeeze it immediately afterwards.
9. Gather up the corners of the cloth, twist the cloth so that the soft cheese is in the shape of a ball. Squeeze out the excess water. Usually, the cheese is cool enough to handle at this point.
10. Shape the cheese into a disc. Place wrapped cheese on a plate and weigh it down with a small stack of plates on top. Press the cheese in the fridge for 1 to 2 hours. Once chilled, the paneer is ready for cooking!

You can refrigerate the cheese in an airtight container for up to a week. You can also freeze the cheese for up to several months.
Yoghurt recipe

Ingredients
• 250 ml whole milk
• 15g live yoghurt
• 1tsp milk powder

Method of making
• Heat the milk to 80°C do not boil- just below boiling point
• Stir in the milk powder
• Allow to cool to 45°C- warm enough so you can put your finger in without burning it
• Stir in the live yoghurt
• Pour into a container
• Keep warm for 4-6 hours- wrap it with some towels and keep in a warm place
• Chill in the fridge for 3 hours to thicken
How to make Foamsicles

Ingredients
100g white sugar
2 egg whites
1 tsp lemon juice

Equipment
Lollipop sticks
Baking tray
Parchment paper
Glass bowl
whisk

Method
1. Put oven on lowest setting- gas mark 1/120 degrees
2. Place parchment paper on the baking tray and place lollipop sticks 4 inches apart.
3. Whisk egg whites in the glass bowl until they form soft peaks
4. Whisk in the lemon juice
5. Whisk in sugar a little at a time
6. Continue to whisk until the mixture forms stiff peaks
7. Spoon round drops on one end of each lollipop stick
8. Bake in the oven for 1 hour and 30 mins.

The science behind it
Egg whites contain water and proteins, which are made up of long chains of amino acids. These proteins are normally curled up in bunches but whisking adds air bubbles which cause them to unfold and stretch out. Parts of the uncurled proteins like water (hydrophilic) and some parts don’t (hydrophobic). The hydrophilic parts surround the air bubbles to keep dry and this holds the bubbles in place. Fats and oils disrupt the stability of these protein coated air bubbles which is why any egg yolk or traces of oil on equipment causes the foam to collapse.

The lemon juice is an acid and adding it to a mixture is essentially adding some positively charged particles. These positively charged particles are hydrogen ions- hydrogen atoms that have lost an electron. The hydrogen hop onto the charged portions of the proteins and leave them uncharged. This helps too many proteins from bonding with each other which would make the egg white mixture lumpy and cause it to collapse.

Once exposed to heat the gas bubbles inside the air bubbles expand, making the bubbles bigger. The heat makes the proteins solidify (coagulate) around the expanding bubbles making a solid foam.
How to make chocolate custard or blancmange

**Ingredients**
- 4 tbsp. cornflour
- 2 tbsp. sugar
- 550ml milk
- 115g chocolate chips

**Equipment**
- Sauce pan
- Large jug
- Wooden spoon

**Method**
1. Mix cornflour and sugar with 2 tbsp. of cold milk in a large jug.
2. Heat the remaining milk and chocolate in a saucepan until it comes to the boil.
3. Pour some of the boiled milk onto the cornflour mixture stirring well all the time then pour it all back into the milk and chocolate pan.
4. Stir all the time and bring the mixture back to the boil until the mixture thickens.
5. Continue to cook on a medium heat for 3 mins
6. Pour into small dishes and chill to set.

**The science behind it- gelatinisation**
When liquids and starch are mixed together and heated the mixture will thicken. This is called gelatinisation. At 60°C the starch granules absorb water and swell up. The starch cell then bursts and releases strings of gluten which makes the sauce thicken.