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| **Make your own gingerbread house** | | | |
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| **Stay safe** |  | |  |
| Whether you are a scientist researching a new medicine or an engineer solving climate change, safety always comes first. An adult must always be around and supervising when doing this activity. You are responsible for:     * ensuring that any equipment used for this activity is in good working condition * behaving sensibly and following any safety instructions so as not to hurt or injure yourself or others     Please note that in the absence of any negligence or other breach of duty by us, this activity is carried out at your own risk. It is important to take extra care at the stages marked with this symbol: ⚠ | | | |
| **Age range:** 7 – 14 or younger children helping an adult  **Approx time:** 45-60 minutes [+ 1 hour to assemble] |  | | **Key words / Topics:**   * structures * multiplication * materials |
| **Introduction** |  | |  |
| So, where did this tradition come from?  Ginger was originally used to preserve flour and meat. In fact, the word gingerbread is an old French word that means preserved ginger. Ginger was baked into thin crisps to preserve the flour during the long winter months. These little biscuits were often sold at winter fairs and the little treats became the basis of the gingerbread houses that we are familiar with today.  Now we know a little bit about the history of gingerbread, let’s think about the structure of a gingerbread house.  We need to ensure that the structure is strong and stable, then it is less likely to collapse.  Look at the different shapes used in the template, what shapes do you notice? Is there a shape that appears more than others? Why do you think this is? Look at pictures of bridges. Is there a shape that often appears in these structures? Why do you think engineers have chosen to use this shape so much? | | | |
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| **Equipment** |  | | **Ingredients** |
| Please note – you will need double these ingredients to make the gingerbread house. Get your “Baking Brains” into gear with our maths resource sheet at the bottom of the recipe to help you work out the amounts you need. | | | |
| * Large mixing bowl * Weighing scales * Wooden spoon * Saucepan * Sharp knife * Spatula * Biscuit cutter * Ruler |  | | * 350g Plain flour * 175g unsalted butter * 150 Dark muscovado sugar * 4 tablespoons golden syrup * 1 teaspoon ground ginger * 1 teaspoon ground cinnamon * ½ teaspoon ground mixed spice * Pinch of salt * 1 teaspoon bicarbonate of soda |
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| **Alternative ingredients for dairy-free or vegan gingerbread** | | | |
| It is possible to make this recipe dairy free, simply replace the butter with a vegan friendly olive oil spread. (Flora plant spread can work well as it is quite thick.) | | | |
| **Additional ingredients for decoration** | | | |
| Royal icing – needed to build the house, can be bought ready made in the baking aisle or powdered royal icing mixed with water. Make sure you mix it quite thick to hold the house together. To mix it correctly, keep adding a very small amount of water until you get the consistency you require.  These are a few ideas for decorating but feel free to let your imagination run wild! | | | |
| * Silver sugar balls * Small chocolate buttons or banana chips can be used for roof tiles * Marshmallows |  | | * Sprinkles * Mini icing stars * Jelly tots |
| **Instructions** |  | |  |
| This mixture makes about 20 gingerbread people. If you want to make a gingerbread house, you will need to double all the ingredients. Help with the maths is below.  Before we start, have all your ingredients ready and pre-heat your oven to 180 degrees Celsius (°C), or 160°C for a fan assisted oven/gas mark 4.  **Step 1** Sift the flour, ginger, cinnamon, mixed spice, salt, and bicarbonate of soda into a large mixing bowl.  **Step 2**  Put the butter, syrup and sugar into a saucepan. Put it on a low heat until everything is fully dissolved, melted and smooth.  Remove the pan from the heat and carefully pour into the flour mixture.  ⚠ **The saucepan will be heavy and very hot. Please ask an adult for help with this part.**  **Step 3**  Mix well with a wooden spoon until everything is combined together and makes a firm dough.  Tip the dough onto a clean lightly floured worktop and leave until cool enough to handle.  **Step 4**  Gently knock the dough back (this means kneading the dough so that all the air is knocked out of it) and roll it into a ball.  \*When the dough is rising the bicarbonate of soda creates little bubbles of carbon dioxide. This makes the dough difficult to mould into the shape you want it. If you “knock it back” and get rid of these bubbles, it makes the dough much more pliable, and you can create the shape that you want.  **Step 5**  Now wrap the dough in clingfilm, (or put in a plastic food storage box to save plastic) and chill for 20 minutes until firm.  Once this is done, you can remove it from the fridge and start cutting out the shapes to create your gingerbread people or house.  **Step 6 - Making the gingerbread house:**  Divide the dough into 5 equal portions. You will be working with one portion at a time, so cover the others with cling film, or put in the plastic food storage box to stop it drying out.  **Step 7**  Roll out the first portion to the depth of about half a centimetre. Too thick and it won’t bake all the way through, too thin and it will burn. Precision is the key here.  Put the template on the dough and cut out the shape using a sharp knife. Continue to do this until you have cut out all the pieces needed for the house. You should have 6 pieces in total once you have finished cutting them all out, don’t forget to cut out a door.  ⚠***Make sure to get some adult help when using a sharp knife as they can be dangerous.***  **Step 8**  Carefully lift the shapes onto the baking paper using a spatula, keeping them about 2cm apart to allow for spreading.  **Step 9**  Cut out 1 or 2 windows from each side of the wall, using a small square or circular cutter. A great trick at this stage is to put in some crushed boiled sweets in the window holes. They will melt during the baking stage and when they harden, during the cooling process, they become firm and look just like glass!  **Step 10**  If you have any dough left over, you can cut out some Christmas trees and gingerbread people  **Step 11**  Bake for about 10 minutes at 180°C, 160°C for a fan assisted oven or gas mark 4 until they begin to deepen in colour. When ready, carefully take it out of the oven and leave to cool for at least 10 minutes on a wire rack.  ⚠ **Be careful at this stage, items fresh from the oven can be very hot.**  **Step 12**  When completely cool, use a spatula knife to spread the icing down the edge of each wall to stick them together – think of this as the “cement” that will hold your house together.  Keep doing this until the whole house is fitted together.  **Step 13**  Now is your chance to go crazy making it look lovely with the decorations! And what makes it even better…you can eat it! | | | |
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| **Baking brains** |  | |  |
| This recipe makes about 20 gingerbread people.  For the gingerbread house, you will need to double the recipe, this means multiplying each of the numbers by 2.  In the table below we have started the calculations off for you, can you fill in the rest? | | | |
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| **Calculations** |  | |  |
| |  |  |  | | --- | --- | --- | | **Original Ingredient** | **Calculation** | **Answer** | | 350g plain flour | 350 x 2 = | 700g | | 1 tablespoon ground ginger |  |  | | 1 tablespoon ground cinnamon |  |  | | ½ teaspoon ground mixed spice |  |  | | Pinch of salt |  |  | | 1 teaspoon bicarbonate of soda |  |  | | 175g unsalted butter |  |  | | 150g dark muscovado sugar |  |  | | 4 tablespoons golden syrup |  |  |   For the larger numbers, you may like to partition them and that will make it easier to do the calculation.  **For example: 175 x 2 =**  100 x 2 = 200  70 x 2 = 140  5 x 2 = 10  Then add each of your answers together:  200 + 140 + 10 = **350**  If you want to super-size your gingerbread house, try multiplying each of the quantities by 4. | | | |
| **Related activities (to build a full lesson)** |  | |  |
| **Starters** (Options)   * Have gingerbread pre-made ready for assembly. | | **Extension** (Options)  [Make towers from spaghetti and marshmallows](https://www.tes.com/teaching-resource/spaghetti-challenge-stem-activity-6175483) | |

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| **The Engineering Context** film |
| Baking is engineering. It is using science, maths and technology skills to engineer and create solutions and new tasty ‘products’. So engineers need all these skills – precision in weighing out ingredients and the structural engineer within you to create the best and most sturdy gingerbread house this Christmas! |

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| **Curriculum links** | |
| **England: National Curriculum**  Design & Technology Key Stage 2  Make   * select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately   Technical knowledge   * apply their understanding of how to strengthen, stiffen and reinforce more complex structures | **Northern Ireland Curriculum**  The Arts / Art and Design Key Stage 1  Use a range of media, materials, tools and processes such as: drawing, painting, printmaking, malleable materials, textiles and three-dimensional construction, selecting which is appropriate in order to realise personal ideas and intentions, for example:   * use modelling and construction techniques to make three-dimensional work. |
| **Scotland: Curriculum for Excellence**  Craft, Design, Engineering and Graphics  Design and construct models/products   * TCH2-09a I can extend and enhance my design skills to solve problems and can construct models   Application of Engineering   * TCH 2-12a I can extend my knowledge and understanding of engineering disciplines to create solutions | **Wales: National Curriculum**  Design and Technology Key Stage 2  Designing   * 6. consider the safety, reliability and sustainability of their activities/products * 7. evaluate their design ideas as they develop, considering the needs of the user   Making   * 3. measure, mark out, cut, shape, join, weigh and mix a range of materials and ingredients, using appropriate tools/utensils, equipment and techniques * 4. find alternative ways of making if the first attempt fails   Rigid and flexible materials   * 11. learn about the efficient use of materials * 12. use techniques for reinforcing and strengthening structures in their products   Range   * tasks in which they develop and practise particular skills and techniques that can be applied in their designing and making * tasks in which they design and make products, focusing on different contexts and materials * they should be given opportunities to: be creative, be innovative, work independently and in groups. |
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