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| **Edible stained glass** | | | |
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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: ⚠ | | | |
| **Subject(s):** KS2/3Science; Light  **Approx time:** 20 minutes [+1 hour cooling time] |  | | **Key words / Topics:**   * Light * Light waves * Spectrum * Refraction * Diffusion |
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| **Equipment** ⚠ |  | | **Ingredients** |
| * Saucepan * Baking tin * Wooden spoon * Cooking thermometer * Kitchen foil or baking parchment/greaseproof paper |  | | * 790g white, granulated sugar * 475ml water * 240ml light corn syrup * ¼ teaspoon cream of tartar * Food colouring (red or green) |
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| **Instructions** ⚠ |  | |  |
| **Step 1**  First, line a baking tray with baking paper, foil, or a reusable silicone liner. If you don’t have anything to line the tray with, you can use olive oil in a spray.  **Step 2**  Pour the sugar, water, corn syrup, cream of tartar and food colouring into a saucepan. You will only need a couple of drops of food colouring. Now slowly turn up the heat and melt the ingredients together.  ⚠ *Make sure to get some adult help at this stage* *as this will get very hot.*  Bring the ingredients to the boil and continue stirring so that the mixture doesn’t burn.  **Step 3**  Now you will need to use the thermometer to measure the heat – it needs to be at 150 degrees Celsius (°C). It is important to make sure that the ingredients are 150°C as it will then go hard once you have created your stained glass. It will take about an hour for the mixture to get to the temperature that you want.  Do not let the temperature go up to 160°C, otherwise it will caramelise and will just be a big, sticky mess!  ⚠*Make sure to get some adult help when you are doing anything with the melted sugar – it is extremely hot!*  **Step 4**  Once the mixture is up to temperature, carefully take the pan off the heat and very slowly pour the mixture onto the baking tray that you covered with foil or baking paper earlier.  Make sure you pour carefully and slowly, as you don’t want to get any air bubbles in the sugar mixture. Ask an adult to help you. This mixture is very hot, and you do not want to risk getting burned.  ⚠*Make sure to get some adult help when pouring the melted sugar.*  **Step 5**  Now move the tray onto a flat surface so that when the mixture hardens, it will be as smooth as glass.  It will take a minimum of an hour to completely harden, so try not to be tempted to touch it!  **Step 6**  When it is completely hard, remove it carefully from the tray. Peel off the foil or baking paper and it is now ready to eat.  You can break it apart to create pieces of edible stained glass. | | | |
| **Science** |  | |  |
| The sugary mixture was clear to start with. If you don’t add the food colouring then it will produce a transparent, uncoloured sugar glass that doesn’t absorb visible light – it lets the light pass right through. However, when you add food colouring, the sugar glass absorbs the colour from the visible spectrum and the rest of the visible light passes through. So, it’s still transparent but now with colour, just like real stained glass! | | | |
| **Basic** |  | | **Extension** |
| One colour glass. |  | | Make more than one batch, using half/quarter of the ingredients and using a different food colouring for each to get a marbled glass effect. |
| **Related activities (to build a full lesson)** |  | |  |
| **Starters** (Options)   * KS2 BBC Bitesize video – [Seymour Science ‘light’](https://www.bbc.co.uk/bitesize/clips/zg6r82p) * [Where does light come from](https://www.youtube.com/watch?v=zBosbqByR3c) video | | **Extension** (Options)  KS3 What is colour [BBC Bitesize video](https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/z7rtng8) | |

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| **The Engineering Context** film |
| * Engineers need to understand how light behaves when designing products for many practical applications. For example, when designing buildings, they may consider the provision of windows and artificial lighting; and when designing cars, they may consider the power and position of both internal and external lights and the placement of mirrors. |

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| **Curriculum links** | |
| **England: National Curriculum**  **Light KS2**   * recognise that light appears to travel in straight lines * use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye * explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes   **Light KS3 Physics**   * the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface | **Northern Ireland Curriculum**  **KS2 Science and Technology**   * How sound travels and light shines through some materials.   **KS3 Science**   * Light |
| **Scotland: Curriculum for Excellence**   * **Science: Forces, electricity and waves** * Learners explore the nature of sound, light and radiations in the electromagnetic spectrum. They develop their understanding of the properties of light and other forms of electromagnetic radiations. | **Wales: National Curriculum**   * **Science KS2**; how light travels and how this can be used. |

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| **Assessment opportunities** | | |
| * [Smithswood](https://smithswood.co.uk/wp-content/uploads/2020/06/Year8ScienceHomeLearning_Cycle9.pdf) test and learn worksheet * BBC [Bitesize](https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/z7rtng8) quiz | | |
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