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| **Activity title** |
| **How to make a snowflake** |
| **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:⚠ |
| **Time required** |
| 15 minutes |
| **Activity summary** |
| Snowflakes are among nature’s most delicate and interesting creations. But did you know that they are always flat and have six sides? That’s pretty amazing!  We’re going to sum up the fascinating science behind the snowflake. And then we’ll explain how you can make your very own unique snowflake design from a piece of paper. But be warned: this activity is highly addictive!  You will learn why snowflakes are always flat and hexagonal, make your own snowflake patters and develop your practical skills. |
| **What equipment will you need?** |
| * Sheet of white A4 paper * Pen or pencil * Pair of scissors |
| **How to do it** |
| **Step 1: Make a square**   * Fold a corner of A4 paper * Fold over one end of the paper * Cut the paper along the fold, as shown ⚠   **Step 2: Get folding**   * Place your folded triangle in front of you, with the hypotenuse (the longest side) at the bottom, as shown * Fold the right side * Fold the left side … your paper will now be quite bulky!   **Step 3: Snip and squiggle**   * Snip off the two folds at the bottom ⚠ * You’ve just made an equilateral triangle! * Draw a design on the triangle   **Step 4:** **Cut and unfold**   * Cut out your design ⚠ * Gently unfold the paper * Hey presto, you’ve made a snowflake!   **Step 5:** **Mix it up!**   * Cut some lines straight and some curvy – what happens to the pattern? * See how the pattern changes if you make fewer (or more) cuts * Compare your snowflake designs * Display them on your wall or window! * Create smaller versions and stick them onto coloured paper to make gorgeous Christmas cards   What a great way to spend a few hours. We hope your snowflake display looks amazing – do remember to send us some photos! **Share it with us @IETeducation #SantaLovesSTEM**  And if it happens to snow this winter, make sure you get outside and have a good look at the snowflakes around you… see how many different patterns you can identify. |
| **Three Christmas kisses and a wish** |
| It’s always great to reflect on a job well done. Show your best snowflake creation to a friend or family member. Ask them to tell you three good things about it and one thing that could be improved. |
| **Snowflake science** |
| **Snowflake fast facts**   * All snowflakes are flat and have six sides * Snowflakes are made from water (H₂O) * H₂O has two molecules of hydrogen and one of oxygen * Above 4°C the molecules move freely * Below 4°C the molecules freeze in the air, making hexagon shapes   **Why are snowflakes hexagonal? (1 of 3)**   * The hydrogen and oxygen molecules contain electrons and protons * This creates a polar charge   **Why are snowflakes hexagonal? (2 of 3)**   * The hydrogen molecules are attracted to the oxygen molecules * This process is called ‘hydrogen bonding’ * Below 4°C the hydrogen bonds crystallise   **Why are snowflakes hexagonal? (3 of 3)**   * The molecules are all held together by the polar charge * As the bonds crystallise, they create a hexagon lattice * The hexagons then ‘tessellate’ (this means they all fit together in a pattern, without any gaps or overlaps) * And that’s how snow, snowflakes and ice are formed! |
| **Festive fun** |
| All that hard work is snow joke 😊 (sorry, we couldn’t resist). To help you chill out, here are some frosty funnies…  **Q: Why is it unwise for snowmen to lose their temper?**  A: They’ll have a meltdown  **Q: Why did the school band keep their instruments in the snow?**  A: They liked cool music.  **Q: What do Mexican snowmen love to eat?**  A: Brrrr-itos. |
| **Did you know?** |
| * When snow has just fallen, it absorbs sound waves, making everything sound a little quieter. Shhhhhh… * The Inuits are thought to have around 50 words to describe snow – but the Scots have more than 400! * Snow can actually warm you up. It’s a brilliant insulator because 90-95% of it is actually trapped air. |