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| **Best Christmas wrapping paper** | | |
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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:** 5 - 11  **Approx time:** 1 -2 hours |  | **Key words / Topics:**   * Friction * Gravity/Energy * Materials |
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| **Equipment** ⚠ |  |  |
| * At least six different types of wrapping paper. You can use more if you like (try and find ones which feel and look different, such as shiny metallic paper or tissue paper.) * Some tape for wrapping. * A large bin liner or a Christmas sack if you have one. * Five bricks/ large stones of equal size. (It works best if they aren’t perfectly smooth or round.) | | |
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| **The challenge** |  |  |
| Santa has a problem. On Christmas Eve, he packs all the presents into his sack to deliver to children around the world. He’s found, though, that the presents get a bit bashed about on the way and that some wrapping paper starts to tear. It doesn’t look good to put a present which is battered and partly unwrapped under a tree, so he needs your help.  You need to find out which is the best wrapping paper for Santa to use and then write to tell him. | | |
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| **The test** ⚠ |  |  |
| **Step 1**  Wrap up each brick or stone with a different piece of wrapping paper. These will be your ‘presents’.  **Step 2**  Put them all in the sack together.  **Step 3**  ⚠ Ask an adult to act as Santa and shake the sack for 30 seconds as though carrying it around.  You could all sing Christmas songs whilst you are doing it.  **Step 4**  Take each ‘present’ out and look at it carefully. Record any changes in the wrapping paper on a results sheet. These are your observations.  **Step 5**  Put them all back into the sack and get your helper to shake them again.  ⚠ Do this another three times (if your presents survive the shaking!). Record any changes each time. | | |
| **Results** |  |  |
| Look at your results table and decide which paper would be best for Santa to use.   * You may find there is more than one which has done well so what else could you test? * Do you think the snow and the rain might make a difference to the presents? How could you test this? * Do you think what a wrapping paper looks like might be an important part of Santa’s decision about which paper to use? How could you find out which paper people prefer? | | |
| **Extension** |  |  |
| Write a letter (or even a poem) to Santa to let him know what you did to test the paper and which paper you think he should use. You can also look at packaging materials to see which are best at protecting items delivered by courier or the post. | | |

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| **Curriculum links** | |
| **England: National Curriculum**  **Science**  **KS2 Year 5 Forces:**   * explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object * identify the effects of air resistance, water resistance and friction, that act between moving surfaces. | **Northern Ireland Curriculum**  **KS2 – The world around us**  **Movement and energy:**   * the causes and effect of energy, forces and movement. |
| **Scotland: Curriculum for Excellence**  **Sciences**  **Forces:**   * SCN 2-08a | **Wales: National Curriculum**  **Science**  **KS2 – How things work:**   * forces of different kinds, e.g., gravity * the ways in which forces can affect movement. |