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| **How much plastic?** | | |
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| Working out how much plastic we use in a year | | |
| **Subject(s):** Mathematics, Design & Technology  **Approx. time:** 45 – 75 minutes |  | **Key words / Topics:**   * Multiplication * Division * Plastic * Weight * Sustainability |
| **Suggested Learning Outcomes** |  |  |
| * To know how division and multiplication can be used to solve practical problems * To be able to work out how much plastic is used by a person in a year * To be able to convert grams to kilograms. | | |
| **Introduction** |  |  |
| This is one of a set of resources designed to allow learners to use seasonal themes to support the delivery of key topics within design & technology, maths, and science. This resource is part of a group for plastic free month and focusses on the use of division and multiplication in the context of working out how much plastic is used by a person each year. | | |
| **Purpose of this activity**  In this activity learners will identify how much plastic they use on one day and multiply this to work out their annual consumption.  This activity could be used as a main lesson activity to teach learners about the use of plastics and some alternatives or to support the development of mathematics skills. | | |
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| **Activity** |  | | **Teacher notes** |
| **Introduction (5-10 minutes)**  Teacher to explain that learners are going to work out how plastic they use in a day, then calculate what they would use in a year.  **Plastic – How much in a day? (10-15 minutes)**  Learners to think about one school day, from waking up and going to sleep. Make a list of all the plastic they have used that day.  **Plastic weighing activity (15-25 minutes)**  Learners to use either plastic samples they brought in or those provided by the teacher. Learners to weigh the examples of plastic found and record the details on the worksheet. They should record the weight in **grams** then convert to **kilograms**.  **Plastic used over time activity (10-15 minutes)**  Learners to use the daily weight total calculated on the worksheet.   * Work out the weekly use by multiplying the daily weight total by 7 * Work out the monthly use by multiplying the daily weight total by 31 * Work out the yearly use by multiplying the daily weight total by 365   **Review (5-10 minutes)**  Discuss the findings with the class. Which plastics were used the most? How can we reduce the use of plastics? What are the alternatives? |  | | The teacher could either bring in examples of plastic that learners would typically use in a day or set the learners a homework task to collect plastic items that they use during the day.  Ensure that all plastic items are clean and dry before being weighed.  When the totals have been calculated for weekly, monthly and yearly plastic use the teacher should use this information as a discussion point - if the learner is using this much plastic, how much plastic is being used by a town or city etc.?  Some alternatives for plastics are:   * Use a steel water bottle * Use paper straws to drink rather than plastic * Swap hand soap dispensers for a bar of soap * Swap shower gel for a bar of soap * Swap a plastic toothbrush for a bamboo (wooden) one * Swap a plastic lunchbox for a stainless steel one. |
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| **Differentiation** |  | |  |
| **Basic** |  | | **Extension** |
| * Watch videos: **BBC Bitesize** – Short division with remainders: <https://www.bbc.co.uk/bitesize/articles/zfdsy9q>   **BBC Bitesize** – How to multiply and divide: <https://www.bbc.co.uk/bitesize/topics/z36tyrd/articles/z2fkwxs>   * Provide learners with a part completed worksheet to allow them to focus on the working out. |  | | * Make a chart or pictogram to show which items of plastic are used the most. * Use the internet to find out what alternatives can be used for everyday plastics |
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| **Resources** |  | | **Required files** icon-docicon-pdficon-ppt |
| * Plastic items * Weigh scales * Pencils * Erasers * Calculators |  | | icon-ppt Teacher presentation – How much plastic  How much plastic activity sheet |
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| **Additional websites** |  | |  |
| * **BBC Bitesize** – Short division with remainders: <https://www.bbc.co.uk/bitesize/articles/zfdsy9q> * **BBC Bitesize** – How to multiply and divide: <https://www.bbc.co.uk/bitesize/topics/z36tyrd/articles/z2fkwxs> * **YouTube –** Everyday plastic – How much do we really use?: <https://www.bbc.co.uk/bitesize/topics/z36tyrd/articles/z2fkwxs> | | | |
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| **Related activities (to build a full lesson)** |  | |  |
| **Starters** (Options)   * Show the video: **YouTube –** Everyday plastic – How much do we really use?: <https://www.bbc.co.uk/bitesize/topics/z36tyrd/articles/z2fkwxs> * Discuss the plastic do we use on a daily basis? | | **Extension** (Options)   * Make a chart or pictogram to show which items of plastic are used the most. * Use the internet to find out what alternatives can be used for everyday plastics   **Plenary**   * Discuss the findings with the class. Which plastics were used the most? How can we reduce plastics? What are the alternatives? | |
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| **The Engineering Context** film |
| An understanding of numbers is vital for engineers who need to solve lots of interesting problems. For example, they need to know the impact of plastics used in the environment to help them find alternative materials. |

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| **Curriculum links** | |
| **England: National Curriculum**  Mathematics  KS2 Year 3 Number  Multiplication and Division   * solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects. | **Northern Ireland Curriculum**  Mathematics and Numeracy  KS2 Operations and their Applications   * engage in a range of activities to develop understanding of the four operations of number, appreciate the use of brackets, add and subtract with up to two decimal places, multiply and divide decimals by whole numbers, use these operations to solve problems. |
| **Scotland: Curriculum for Excellence**  Numeracy and Mathematics  Third Level Number, money and measure  Number and number processes   * MNU 3-03a | **Wales: National Curriculum**  KS2 Mathematics - Using number skills  Use number facts and relationships   * recall 2, 3, 4, 5 and 10 multiplication tables and use to solve multiplication and division problems | |
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| **Assessment opportunities** | | |
| * Formal teacher assessment of the completed tables and calculations of usage. | | |
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