Counting in powers of 10 year 5 worksheet

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A power of 10 is 10 raised to a exponent. For example, 102 is a power of 10. The small 2 written beside the 10 means it is raised to an exponent of 2. This means 10 is multiplied by itself 2 times. A power is the product of multiplying a number by itself. A power of 10 is 10 multiplied by itself. The exponent written beside the 10 tells you how many times 10 is multiplied by itself. 102 = 10 × 10 = 100 103 = 10 × 10 × 10 = 1,000 104 = 10 × 10 × 10 × 10 = 10,000 When the exponent is 2, 10 is multiplied by itself 2 times. The product is 100. There are 2 0s after the 1. When the exponent is 3, 10 is multiplied by itself 3 times The product is 1,000. There are 3 0s after the 1. Powers of 10 are useful because they allow us to write very large (or very small) numbers in an easy way. If we wanted to write one million in full, we would have to write a lot of numbers down: 1,000,000 Using powers of 10, we can write it much more easily as a power of 10. There are 6 0s after the 1, so the exponent is 6: 106 This is useful for scientists and engineers when they write large quantities down. For example, the speed of light is approximately 300 million metres per second: 300,000,000 m/s A scientist or engineer would write this using powers of 10: 3 × 108 m/s There are 8 0s. The 0s come after a 3, so we need to multiply the power of 10 by 3. This way of writing numbers is called scientific notation. Read more about scientific notation A power of 10 has the same parts as any power. It consists of a base and an exponent. The base is the number that is multiplying itself. In a power of 10, the base is always 10. The exponent tells you how many times the base is multiplying by itself. It is any whole number (any integer). It can be positive or negative. All the examples of powers of 10 we have seen so far have positive exponents. This power of 10 has an exponent of positive 2. If you start with 1 and move the decimal point 2 places to the right, you get 100. This is why there are 2 0s after the 1. A power of 10 can also have a negative exponent. This power of 10 has an exponent of negative 2. If you start with 1 and move the decimal point 2 places to the left, you get 0.02. This is why there are 2 0s before the 1. Here are two useful powers of 10: 100 = 1 101 = 10 A googol is 10100: that is 1 followed by 100 0s. It is a bigger number than the number of particles in the universe (about 1080). The googol gave its name to a famous search engine company. A googleplex is 10 with an exponent of a googol. Live worksheets > English Finish!! Please allow access to the microphone Look at the top of your web browser. If you see a message asking for permission to access the microphone, please allow. Close The exponent (or index or power) of a number says how many times to use the number in a multiplication. 102 means 10 × 10 = 100 (It says 10 is used 2 times in the multiplication) Example: 103 = 10 × 10 × 10 = 1,000 In words: 103 could be called "10 to the third power", "10 to the power 3" or simply "10 cubed" Example: 104 = 10 × 10 × 10 × 10 = 10,000 In words: 104 could be called "10 to the fourth power", "10 to the power 4" or "10 to the 4" You can multiply any number by itself as many times as you want using this notation (see Exponents), but powers of 10 have a special use ... Powers of 10 "Powers of 10" is a very useful way of writing down large or small numbers. Instead of having lots of zeros, you show how many powers of 10 will make that many zeros 5 thousand is 5 times a thousand. And a thousand is 103. So 5 times 103 = 5,000 Can you see that 103 is a handy way of making 3 zeros? Scientists and Engineers (who often use very big or very small numbers) like to write numbers this way. The Sun has a Mass of 1.988 × 1030 kg. It is too hard to write 1,988,000,000,000,000,000,000,000,000,000 kg (And very easy to make a mistake counting the zeros!) It is easier to use 9.461 × 1015 meters, rather than 9,461,000,000,000,000 meters It is commonly called Scientific Notation, or Standard Form. Other Way of Writing It Sometimes people use the ^ symbol (above the 6 on your keyboard), as it is easy to type. Example: 3 × 10^4 is the same as 3 × 104 3 × 10^4 = 3 × 10 × 10 × 10 × 10 = 30,000 Calculators often use "E" or "e" like this: Example: 6E+5 is the same as 6 × 105 6E+5 = 6 × 10 × 10 × 10 × 10 × 10 = 600,000 Example: 3.12E4 is the same as 3.12 × 104 3.12E4 = 3.12 × 10 × 10 × 10 × 10 = 31,200 While at first it may look hard, there is an easy "trick": The index of 10 says ... ... how many places to move the decimal point to the right. You can calculate it as: 1.35 x (10 × 10 × 10 × 10) = 1.35 x 10,000 = 13,500 But it is easier to think "move the decimal point 4 places to the right" like this: Negative Powers of 10 Negative? What could be the opposite of multiplying? Dividing! A negative power means how many times to divide by the number. Example: 5 × 10-3 = 5 ÷ 10 ÷ 10 ÷ 10 = 0.005 Just remember for negative powers of 10: For negative powers of 10, move the decimal point to the left. So Negatives just go the other way. Well, it is really 7.1 x (1/10 × 1/10 × 1/10) = 7.1 × 0.001 = 0.0071 But it is easier to think "move the decimal point 3 places to the left" like this: Try It Yourself Enter a number and see it in Scientific Notation: Now try to use Scientific Notation yourself: Summary The index of 10 says how many places to move the decimal point. Positive means move it to the right, negative means to the left. Example: Number In Scientific Notation In Words Positive Powers 5,000 5 × 103 5 Thousand Negative Powers 0.005 5 × 10-3 5 Thousandths Here we've gathered together all the place value worksheets available from the Third Space Learning Maths Hub. Many of them are free, and all of them are available to download straightaway. All these place value worksheets are grouped by topic and year group so you can clearly find the ones you need. They follow the national curriculum, and are are matched to the White Rose Maths scheme of work and most other maths mastery approaches to teaching KS1 and KS2 place value. Whether you're introducing your Key Stage 1 class to 2 digit numbers and understanding place value, or working on addition and subtraction with 4-digit numbers with a Year 5 group, having easy access to a wide variety of place value activities and worksheets is essential for primary school teachers in the autumn term. Use the contents list below to jump to the specific year/topic resources you want, or browse in full by just scrolling down. Place Value Worksheets KS1 At Key Stage 1 pupils will be learning the foundations of place value – recognising the place value of one and two digit numbers, and using addition and subtraction with them. Place Value Worksheets Year 1 As pupils begin to understand place value within 10, our Year 1 place value worksheets model the concrete resources they'll be using in class with pictorial support to help them build a solid foundational knowledge of place value, including partitioning of two digit numbers, and the place value of money. At Year 1 pupils will still be learning to recognise numbers up to 100, and may still need the use of number lines and other pictorial aids to fully understand the relationships between numbers. Free Place Value Worksheets To download free place value worksheets and resources, register to join the Third Space Learning maths hub. 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Find out more here: The Best Place Value Grid Ever! Place Value Worksheets Year 2 By Year 2, pupils should be comfortable with recognising the place value of two digit numbers, and begin using number facts and columnar addition and subtraction in conjunction with them. Our Year 2 place value worksheets cover partitioning with 2 and 3-digit numbers, and consolidates pupils' knowledge of how to order numbers without the need for a visual aid. Ready To Go Lessons – Year 2 Place Value Worksheets – Autumn Block 1 For Year 2 the ready to go place value worksheets and lesson plans cover the following topics from White Rose Autumn Block 1: Year 2 worksheet 1: To count objects to 100 and read and write numbers in numerals and wordsYear 2 worksheet 2: To represent numbers to 100Year 2 worksheet 3: To partition into tens and ones using a part-whole modelYear 2 worksheet 4: To understand tens and ones using additionYear 2 worksheet 5: To know how to represent numbers in a place value chartYear 2 worksheet 6: To compare objectsYear 2 worksheet 7: To compare numbers to 100Year 2 worksheet 8: To order objects and numbersYear 2 worksheet 9: To count in 2s, 5s and 10sYear 2 worksheet 10: To count in 3s Download Year 2 Place Value Worksheets and Slides Autumn Block 1Download a taster pack of free place value worksheets year 2 Place Value Worksheets KS2 By KS2 children should have a solid grasp of the fundamentals of place value, ready to apply them to large numbers, negatives and decimals, as well as using the four operations with them. Place Value Worksheets Year 3 Place value at Year 3 focuses on consolidating pupils' understanding of the value of each digit in two and three digit numbers, up to 1000. This includes partitioning and columnar addition and subtraction. While Year 3 pupils are still working with whole numbers, they should be able to recognise tenths of numbers as related to place value, and be introduced to the concept of decimals. 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Place Value Worksheets Year 4 By Year 4 pupils should be working with 4-digit numbers and using all four operations with two and three-digit numbers. Pupils should also be taught to use Roman numerals, and should be able to connect hundredths and thousandths to tenths and whole numbers. Understanding hundredths in relation to tenths and decimals in a Year 4 Third Space Learning online lesson. 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Place Value Worksheets Year 5 While there is no explicit teaching of place value this year, Year 5 introduces pupils to 5-digit numbers and 6-digit numbers (the tens of thousands and hundred thousands). By this point children should be able to use the four operations with large numbers, including being able to mentally multiply and divide one and two digit numbers. They should also have some awareness of negative numbers, and using the four operations with them. Ready To Go Lessons – Year 5 Place Value Worksheets – Autumn Block 1 For Year 5 the ready to go place value worksheets and lesson plans cover the following topics from White Rose Autumn Block 1: Year 5 worksheet 1: To recognise and represent numbers up to ten thousand (10,000)Year 5 worksheet 2: To know Roman Numerals to 1,000Year 5 worksheet 3: To round to the nearest 10, 100 and 1,000Year 5 worksheet 4: To recognise and represent numbers to 100,000 (5 digit and 6 digit numbers)Year 5 worksheet 5: To compare and order numbers to 100,000 (5 digit and 6 digit numbers)Year 5 worksheet 6: To round numbers within 100,000 (5 and 6 digits)Year 5 worksheet 7: To recognise and represent numbers to a million (7 digit numbers) Year 5 worksheet 8: To count in powers of 10Year 5 worksheet 9: To order and compare numbers to a millionYear 5 worksheet 10: To round numbers within one millionYear 5 worksheet 11: To recognise and use negative numbers Download Year 5 Place Value Worksheets and Slides Autumn Block 1Download a taster pack of free place value worksheets year 5 Other Year 5 Place Value Worksheets Find more Year 5 maths worksheets here. Place Value Worksheets Year 6 In Year 6, any place value work will be revision of topics visited in previous years. While the National Curriculum states that numbers up to 10,000,000 should be introduced this year, this should really be a case of extending pupils' existing number sense abilities rather than teaching them something new. Ready To Go Lessons – Year 6 Place Value Worksheets – Autumn Block 1 Year 6 worksheet 1: To be able to read, write and represent numbers up to ten million (8 digit numbers)Year 6 worksheet 2: To be able to compare and order numbers up to ten million (8 digit numbers)Year 6 worksheet 3: To be able to round any whole number within ten million (8 digit numbers)Year 6 worksheet 4: To be able to calculate intervals across zero Download Year 6 Place Value Worksheets and Slides Autumn Block 1Download a taster pack of free place value worksheets year 6 Other Year 6 Place Value Worksheets Find more Year 6 maths worksheets here. 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