## True Scale Multiplication Grid

This visualisation was created to illustrate what multiplication does. It is essentially a standard multiplication grid, but scaled according to size.

Normal version:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

True scale version:

| io | is | ${ }^{14}$ | ${ }^{16}$ | ${ }_{27}$ | 管 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 0.8121620 | 24 | 28 | 32 | 36 | 40 |
| -1015 2025 | 30 | 35 | 40 | 45 | 50 |
| ¢121824 30 | 36 | 42 | 48 | 54 | 60 |
| 1402228 35 | 42 | 49 | 56 | 63 | 70 |
| 3240 | 48 | 56 | 64 | 72 | 80 |
| 3645 | 54 | 63 | 72 | 81 | 90 |
| 304050 | 60 | 70 | 80 | 90 | 100 |

Because the original image proved so popular, I've put together a small collection of the images used as well as some variations suggested by you. Please feel free to use / distribute / redesign in any way, and I'd love to hear what you do with them: @the chalkface.

Contents:
$\square$
(no numbers - different orientations)

|  |  | 品 | 14 | 16 | ${ }^{18}$ | 2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 15 | 18 | 21 | ${ }^{24}$ | ${ }^{27}$ |  |
| 1216 | 20 | 24 | 28 | 32 | 36 | 40 |
| 1520 | 25 | 30 | 35 | 40 | 45 | 50 |
| 218224 | 303 | 36 | 42 | 48 | 54 | 60 |
| 122128 | 354 | 42 | 49 | 56 | 63 | 70 |
| 2432 | 4048 | 48 | 56 | 64 | 72 | 80 |
| 1127 36 | 455 | 54 | 63 | 72 | 81 | 90 |
|  | 506 | 60 | 70 | 80 | 90 | 100 |

(square numbers emphasized)

| \% $3: 6$ |  | 14 | ${ }^{16}$ | ${ }^{18}$ | ${ }^{20}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| - 812162 | 18 | ${ }^{21}$ | ${ }^{24}$ | ${ }^{27}$ | ${ }^{30}$ |
|  | 2024 | 28 | 32 | 36 | 40 |
| -5015 1520 | 2530 | 35 | 40 | 45 | 50 |
| 102182430 | 3036 | 42 | 48 | 54 | 60 |
| -1042 283 | 3542 | 49 | 56 | 63 | 70 |
| 324 | 4048 | 56 | 64 | 72 | 80 |
| 364 | 4554 | 63 | 72 | 81 | 90 |
|  | 5060 | 70 | 80 | 90 | 100 |

(no squares - just numbers)

| 40 | 50 | 60 | 70 |  | 80 | 90 | 100 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2736 | 45 | 54 | 63 |  | 72 | 81 | 90 |
| -102432 | 40 | 48 | 56 |  | 64 | 72 | 80 |
| (102128 | 35 | 42 | 49 |  | 56 | 63 | 70 |
| -101824 | 30 | 36 | 42 |  | 48 | 54 | 60 |
| -1015 20 | 25 | 30 | 35 |  | 40 | 45 | 50 |
| -1216 | 20 | 24 | 28 |  | 32 | 36 | 40 |
| $4{ }^{\circ} 9$ | ${ }^{15}$ | ${ }^{18}$ | ${ }_{14}^{21}$ |  | ${ }_{15}^{24}$ | ${ }_{18}^{27}$ | . |

(starting from bottom-left like a graph)

|  | ${ }_{10}$ | ${ }_{12}$ | ${ }^{14}$ | ${ }_{16}$ | 18 | ${ }_{20} 20$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ${ }^{3} 6912$ | 15 | 18 | 21 | 24 | 27 | 30 |
| - 81216 | 20 | 24 | 28 | 32 | 36 | 40 |
| P:10 1520 | 25 | 30 | 35 | 40 | 45 | 50 |
| 081824 | 30 | 36 | 42 | 48 | 54 | 60 |
| ${ }_{12} 2128$ | 35 | 42 | 49 | 56 | 63 | 70 |
| 162432 | 40 | 48 | 56 | 64 | 72 | 80 |
| 0,1827 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 203040 | 50 | 60 | 70 | 80 | 90 | 100 |

(numbers and squares)

| $\frac{12}{2} 2^{2}$ | ${ }^{3 \times 3}$ | $2^{\frac{2}{3}}$ | $2 \times 5$ | $2^{2 \times 3} \times 3$ | $\frac{7}{2 \times 7}$ | $2^{2}$ | $2 \times 3^{\frac{3^{2}}{}}$ | $2^{\frac{2 \times 5}{2} \times 5}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 6 | $3^{2}$ | $2^{2} \times 3$ | $3 \times 5$ | $2 \times 3{ }^{2}$ | $3 \times 7$ | $2^{3} \times 3$ | $3^{3}$ | $2 \times 3 \times 5$ |
| 48 | 12 | $2^{4}$ | $2^{2} \times 5$ | $2^{3} \times 3$ | $2^{2} \times 7$ | $2^{5}$ | $2^{2} \times 3^{2}$ | $2^{3} \times 5$ |
| 10 | 15 | 20 | $5^{2}$ | $2 \times 3 \times 5$ | $5 \times 7$ | $2^{3} \times 5$ | $3^{2} \times 5$ | $2 \times 5^{2}$ |
| $6^{6} 12$ | 18 | 24 | 30 | $2^{2} \times 3^{2}$ | $2 \times 3 \times 7$ | $2^{4} \times 3$ | $2 \times 3^{3}$ | $2^{2} \times 3 \times 5$ |
| 14 | 21 | 28 | 35 | 42 | $7^{2}$ | $2^{3} \times 7$ | $3^{2} \times 7$ | $2 \times 5 \times 7$ |
| ${ }^{3} 16$ | 24 | 32 | 40 | 48 | $56$ | $21$ | $2^{3} \times 3^{2}$ | $2^{4} \times 5$ |
| 18 | 27 | 36 | 45 | $54$ |  | $12$ |  | $2 \times 3^{2} \times 5$ |
| 20 | 30 | 40 | 50 | $60$ | $10$ | $80$ |  | $2^{2} \times 5^{2}$ |

(showing the prime factorisations)




| 12 <br> 2 <br> 2 <br> 4 <br> 4 <br> 4 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ${ }^{3} 69$ | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4812 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 51015 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| $6_{612} 18$ | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| ${ }^{14} 21$ | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| ${ }^{16} 24$ | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| ${ }^{18} 27$ | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 2030 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |


|  |  | 10 | ${ }_{12}$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 69 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 1015 |  | 25 | 30 | 35 | 40 | 45 | 50 |
| 1218 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
|  | 28 | 35 | 42 | 49 | 5 |  | 70 |
| 62 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 827 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
|  | 40 | 50 | 60 | 70 | 80 | 90 | 1 |


|  | ${ }_{8}^{6}$ | ${ }^{5}$ | ${ }_{12}$ | 14 | 16 | ${ }_{18}$ | ${ }^{20}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 36 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4812 | 12 | 20 | 24 | 28 | 32 | 36 | 40 |
| $8: 1015$ | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| ${ }_{612} 18$ | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| ${ }_{12}^{14} 21$ | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 81624 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 928 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 2030 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |


| 22 24.3 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 369 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 812 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 1015 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| $7^{14} 21$ | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 1624 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| ${ }^{18} 27$ | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 2030 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |



|  | $2^{3}$ | 2x5 | ${ }^{2 \times 3}$ | 2×7 | ${ }^{2}{ }^{\text {a }}$ | $\frac{3^{3}}{2 \times 3}$ | ${ }^{2 \times 5}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | ${ }^{2 \times 3} 3$ | $3 \times 5$ | $2 \times 3^{2}$ | $3 \times 7$ | $2^{3} \times 3$ | ${ }^{3}$ | $2 \times 3 \times 5$ |
| 4812 | $2^{4}$ | $2^{2} \times 5$ | $2^{3} \times 3$ | $2^{2} \times 7$ | $2^{5}$ | $2^{2} \times 3^{2}$ | $2^{3} \times 5$ |
| 41015 | 20 | $5^{2}$ | $2 \times 3 \times 5$ | $5 \times 7$ | $2^{3} \times 5$ | $3^{2} \times 5$ | $2 \times 5^{2}$ |
|  | 24 | 30 | $2^{2} \times 3^{2}$ | 2x3x | $2^{4} \times 3$ | $2 \times 3^{3}$ | $2^{2} \times 3 \times 5$ |
| 421 | 28 | 35 | 42 | $7^{2}$ | $2^{3} \times 7$ | $3^{2} \times 7$ | $2 \times 5 \times 7$ |
| 1624 | 32 | 40 | 48 | 56 | $2^{6}$ | $2^{3} \times 3^{2}$ | $2^{4} \times 5$ |
| ${ }^{18} 27$ | 36 | 45 | 54 | 63 | 72 | $3^{4}$ | $2 \times 3^{2} \times 5$ |
|  | 40 | 50 | 60 | 70 | 80 | 90 | $2^{2} \times 5^{2}$ |

