

**Lesson objectives**

**KS2**

* multiply numbers of up to 4 digits by a one or two-digit number using a formal written method, including long multiplication for two-digit numbers
* multiply and divide numbers mentally, drawing upon known facts
* divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
* solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
* solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates
* multiply multi-digit numbers of up to 4 digits by a two-digit whole number using the formal written method of long multiplication

**How the line producer uses maths**

Adam Jackson-Nocher is the line producer for Lupus Films, the company that made the animation *The Tiger Who Came to Tea*. There’s a lot of maths in Adam’s job. He had to work out how much it would cost to make the film and how many people Lupus Films needed to employ.

Here are some of the sums that Adam needed to do.   
Can you help him?

**How many drawings did Adam need?**

**Minutes:** 24

**Seconds:** 1440

**Frames:** 36000

There are 25 frames for every second of *The Tiger Who Came to Tea.* Frames are individual pictures that are played in a rapid sequence to create the animation. When an animation is made with 25 frames for each second, we say the frame rate is 25 fps (frames per second). In *The Tiger Who Came to Tea* every single frame, or picture, was drawn by hand.

Using this information to help you, complete the following calculations:

1. If the animation director needed to complete 1 minute of animation, how many frames would the team need to do this?
2. If the artist had completed 3,000 frames, how many minutes and seconds of animation could have been produced?
3. How long would the animation be if he had produced 600,000 frames?
4. If the calculation was 25 x 180 = what information would you be finding out? Is there anything else it could be?

**What crew did Adam need to employ?**

There were 80 artists making *The Tiger Who Came to Tea.* This table shows how long it would take one person to make the film on their own for each department. For example:

* 1 storyboard artist would spend 0.4 years
* 1 art director would spend 0.8 years.
* 2 layout artists would spend 0.7 years – making 1.4 years in total

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| --- | --- | --- | --- | --- | --- |
| **Job** | **Years** | **Weeks** | **Days** | **Hours** | **Cups of tea** |
| Storyboard artist | 0.4 | 21 | 105 | 945 | 420 |
| Art director | 0.8 | 42 | 210 | 1890 | 840 |
| Layout artist | 1.4 | 72 | 360 | 3240 | 1440 |
| Background artist | 0.6 | 30 | 150 | 1350 | 600 |
| Animator | 6.3 | 328 | 1640 | 14760 | 6560 |
| Assistant Animator | 5.4 | 281 | 1405 | 12645 | 5620 |
| Art worker | 6.6 | 341 | 1705 | 15345 | 6820 |
| Compositor | 1.1 | 57 | 285 | 2565 | 1140 |
| **TOTAL:** | **22.5** | **1172** | **5860** | **52740** | **23440** |

Using this information to help you, complete the following calculations:

1. Adam employed 2 compositors who worked on the film for an equal length of time. For how many years did each compositor work?
2. Adam employed 6 animators who worked on the film for an equal length of time. For how many years did each animator work?
3. Suppose Adam had only one month in which to get the work of the storyboard artist done. How many storyboard artists would he need to employ?
4. If the background artists were paid at a rate of £10 per hour, how much money did Adam spend on wages for the background artists in total?
5. If the art director was paid at a rate of £30 per hour, how much did the art director earn?
6. How many cups of tea did background artists drink in one day?
7. How many did they drink in one hour?
8. The storyboard artist had two biscuits every time she had a cup of tea. What proportion of tea to biscuits is this? Can you add a biscuit column for each artist using these proportions?
9. If an animator takes 20 minutes to draw each frame, how many frames will they draw in a 9-hour working day?
10. Using this information, how many seconds of animation would the animator produce in a 5-day working week?
11. Using this information, you have 5 weeks to produce a 27-second animation, and a budget of £2500. The producer has to be paid a fee of 20% of the overall budget. What is the maximum you can pay your animator each week?

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