[illustration] Finn Neary, www.yakahead.com

Character animation

## Develop a sketch into a movie, for HDTV or mobile phones…

As a character animator, you sometimes have the luxury of being able to design your character from scratch, work out how it will be animated, produce the hundreds of drawings needed, and compile them into a single production for a single medium.

More often — especially in these days of multiple formats, where video is cropping up everywhere from the internet to your mobile phone — characters start in one format and need to be re-purposed for others. A web character might be needed for a cinema advert; a character developed for print might need to be transferred to TV; a video mobile ringtone might be required for a pop video, and so on. In this tutorial, we show you how to take a character which starts life as a simple sketch, turn it into an illustration using *Illustrator* and *Photoshop*, then develop it further into an animation. The character needs to go through a range of movements, and be placed into several different scenes which will be cut together to tell a story.

The final version then needs to be produced for a range of formats. We output the following animation as a video for HDTV and, at the other end of the scale, also produce it as a tiny file for playing back on mobile phones. In addition, we're going to produce a web version as a Macromedia Flash animation.

The rules of characterisation remain the same, but the different platforms need to be taken into account. For example, a 42-inch widescreen TV might be big enough to show fine details of a character's expression, but a 1-inch mobile-phone screen won't. Likewise, a video clip can have as many textures as you like, but a Flash animation will quickly become too large to download if you don't keep to flat areas of pure colour.
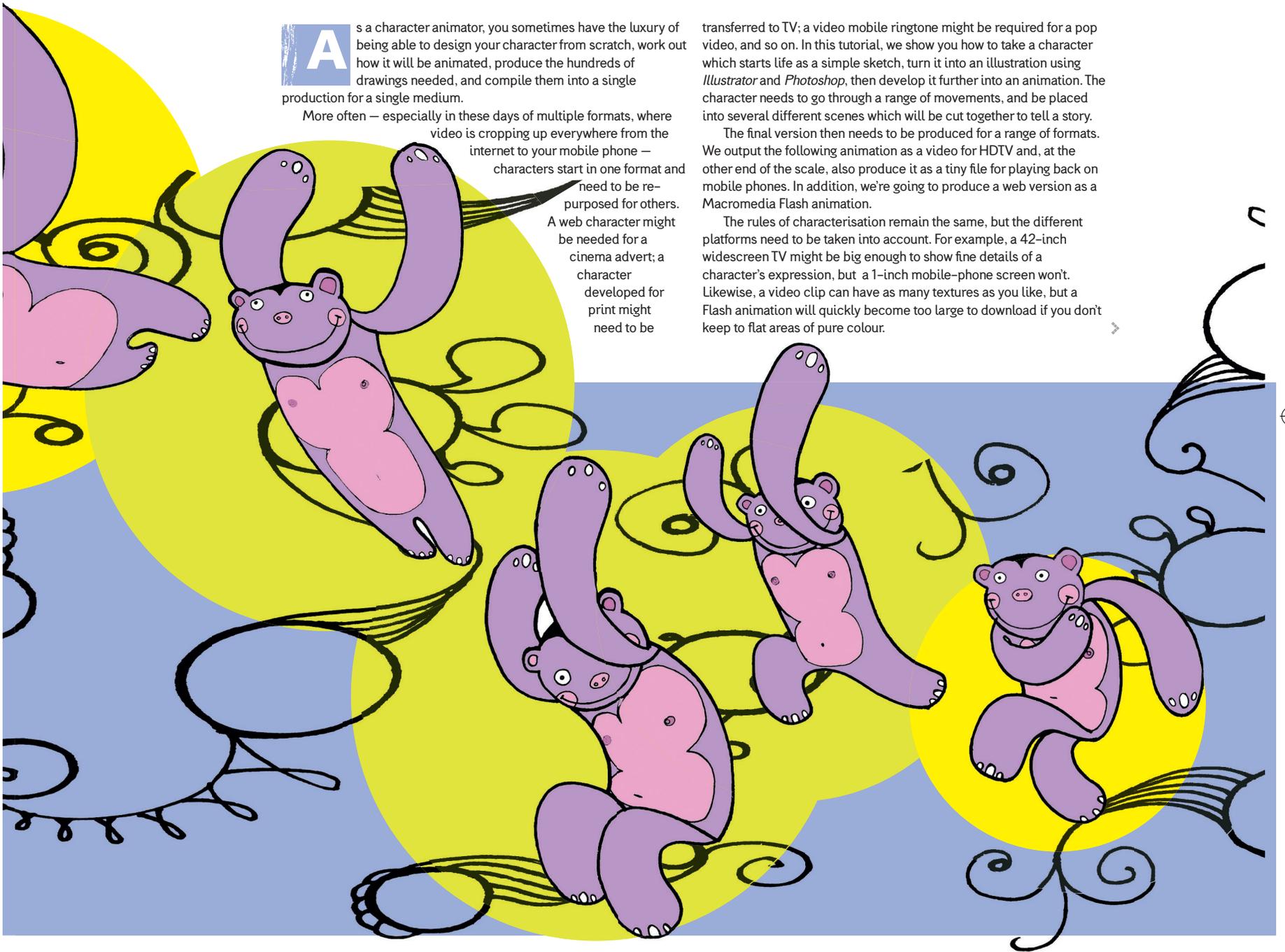
Expertise provided by freelance illustrator and journalist Christian Darkin. Darkin has produced images for newspapers, magazines and a mix of advertising agencies, websites and museums. Visit www.darkin.demon.co.uk for a few examples.

The finished animation can be found on the *Computer Arts Projects* CD82 in the DiscContent\Tutorials\Tutorial Files\Animation folder.

Part 1: **Create your character**

Produce a set of animal body parts to animate in *After Effects…*

Working with vectors

Converting to a vector image means that we can adjust any line on our character, and create new animation frames for facial expressions or other small movements. It also makes the image resolution independent so that our rough sketch becomes a drawing capable of being blown up to full HDTV resolution and beyond.
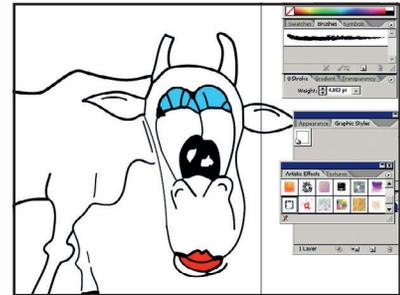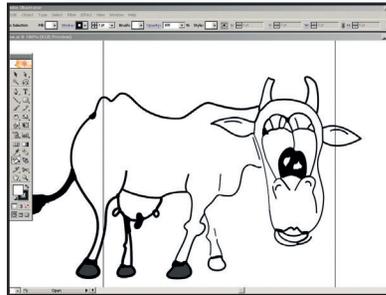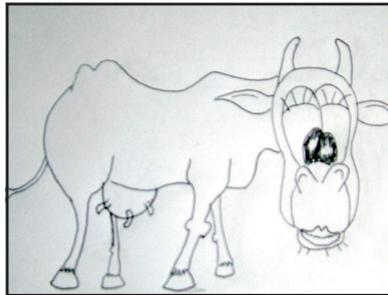
1 Our main character is based on a rough pen drawing. It's not the most impressive piece of artwork to begin with, and it's clearly not designed with animation in mind, so the first thing we need to do is tidy it up.

2 *Illustrator* is our starting point. We load our cow and use the Live Trace tool to turn the original sketch into a set of paths. It takes a while to work out the right settings, and when the job's done, we can simplify the paths to create a more editable character.

3 Next we fill in some colours in Live Paint. The original drawing was quite rough, so we need to use the Live Paint Gap Options tool to fill in colours reliably. Our cow may be black and white, but it's a cartoon rule that it has to have red lips and blue eye shadow.
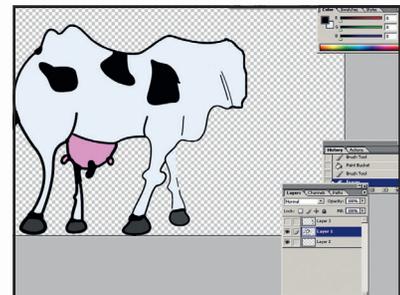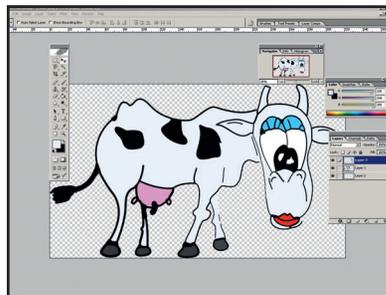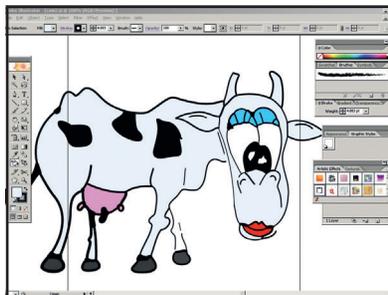
4 To create distinctive patterns on the cow's back, we produce some simple paths, and fill them. With this done, we can turn to *Photoshop* and begin to prepare the image for animation.

5 The cow is imported as a PNG file, which enables us to work with it as an image while retaining the background transparency. Most of the cow's animation will be pretty simple – we want it to chew the cud and blink its eyes. Using *Photoshop's* Selection tools we cut off its head and place it on a new layer.

6 We carefully sew up the neck, so that when the head is placed back on, it can be animated without leaving any gaps in the image. When we come to animate the cow, the two sections will be placed on separate layers within *After Effects*.
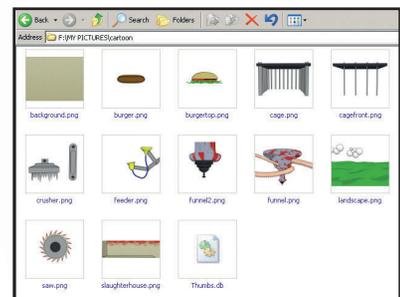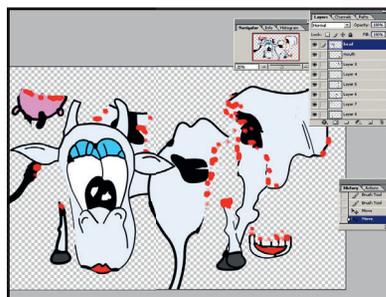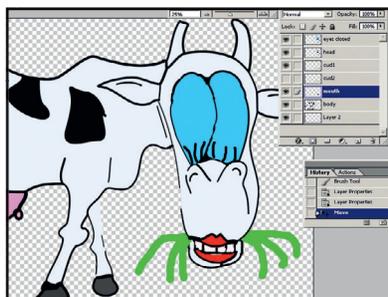
7 The cow has to blink, so we make a copy of its head and close the eyes on this version. We also move the bottom lip and chin to a new layer and place the tail on another layer. Naming the layers clearly will help a lot later on.

8 Our hapless cow is eventually going to be made into beef burgers, so we need to dismember it. In a new *Photoshop* file we cut the cow into pieces, with each piece on a separate layer. We paint in a little blood for effect.

9 Finally, we need some other graphical elements for our animation. These we've prepared as separate drawings which have been saved as .PNG files. It's worth storyboarding your animation thoroughly before you start so you at least know what you're going to need in the way of graphics.
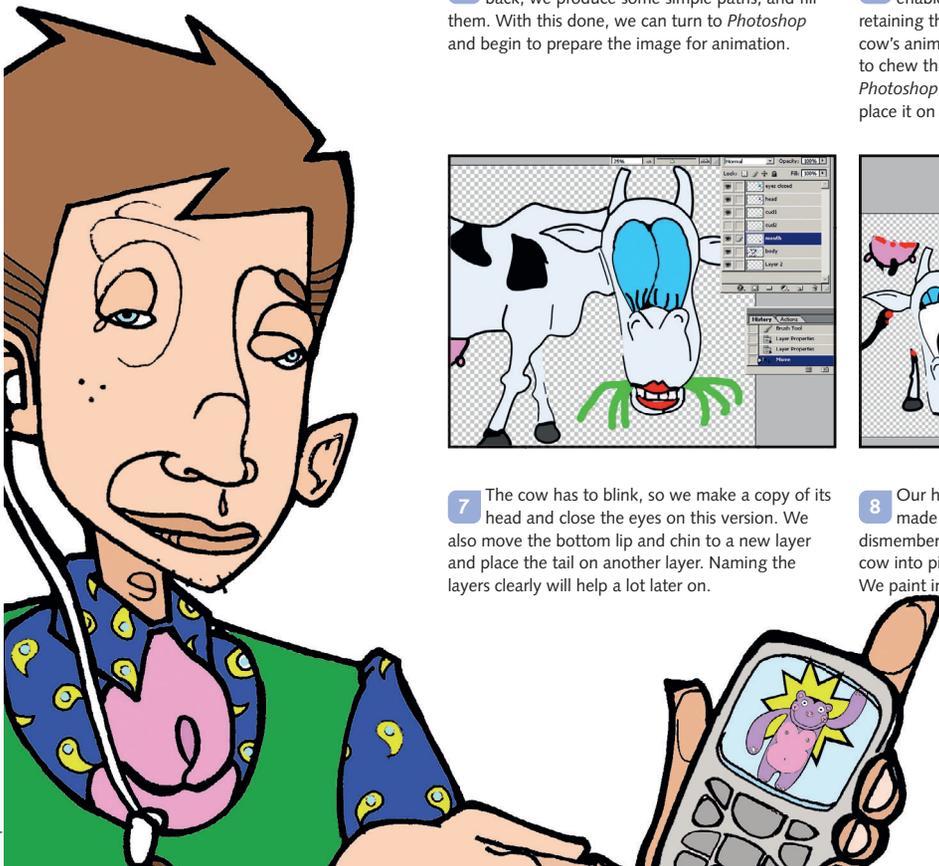
Part 2: Get things moving

Open *After Effects* and begin to animate your character…

Photoshop layers

After Effects accepts *Photoshop* files as compositions, so what we're effectively doing here is creating layers which can be animated separately later. Cutting a character into body parts is much more useful than making layers out of fills and overlays as you might do for a still image. Layer names will eventually appear on the *After Effects* timeline, so if they're clearly named, they'll be much easier to work with.
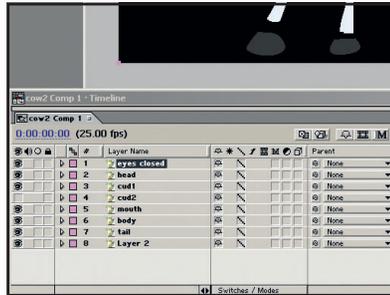

1 Our animation is being assembled in *After Effects*, so we begin by loading in all the elements for our first shot. It helps to work on one shot at a time because too many elements can make things confusing. Our *Photoshop* document can be loaded in as a composition – with the layers preserved on the *After Effects* timeline.
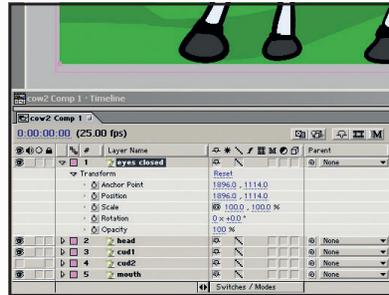
2 We also import the backdrop we're going to be using. This is a still image, and we can drop it on to the timeline behind the character and drag its corners to resize and place it. We're now ready to begin animation. By clicking the tiny arrow to the left of the 'eyes closed' layer on the timeline, we open the animatable functions of the layer.
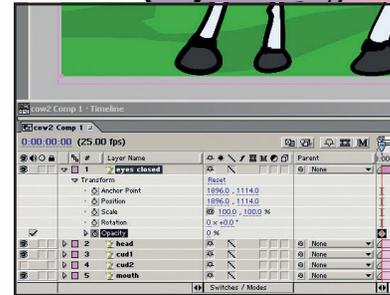

3 Making the cow blink is just a matter of animating the Opacity of this layer, so we click the stopwatch icon at the left of the Opacity label to turn on animation for that function, and reduce the value from 100 per cent to 0 per cent. Our first keyframe appears as a diamond on the timeline.
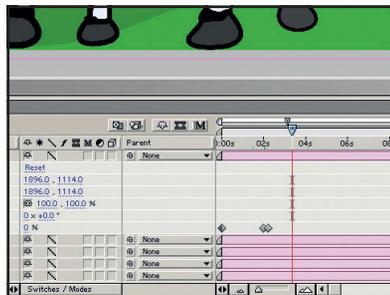
4 We now drag the playback head (the blue marker) a couple of seconds into the production, and click the checkbox at the very left of the timeline in the Opacity row. This adds a new keyframe. We move on a single frame, and set the opacity value to 100 per cent. A couple of frames later, we add a 100 per cent keyframe, and then, one frame on, we set the value back to 0 per cent.


5 Now when we play through the animation, using the time controls at the right of the screen, we can see the cow blinking. Keyframes can be copied and pasted, so we just select them, move the playback head a little, and paste in a few more blinks.
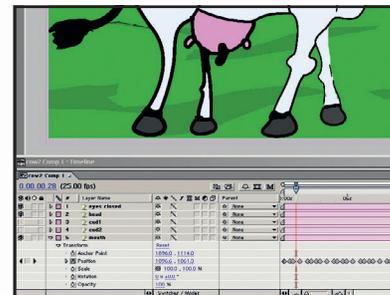

6 Next we open up the mouth layer. Instead of activating animation for the Opacity function, we click the stopwatch next to the Position label. We place the jaw simply by dragging it on the composition window to open and close the mouth. We place keyframes every half second throughout the animation so that the mouth chews constantly.

Copying keyframes

Copying and pasting keyframes works here because the eyes return to their open state after each blink. If you copy keyframes where animations aren't loopable (for example, movement keyframes, where the object doesn't return to its original position), you may get undesirable effects.
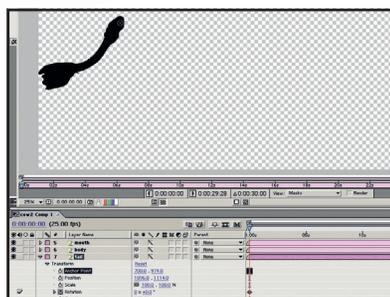
7 To animate the tail, we turn on rotational animation, but there's a problem. Rotation occurs about an anchor point at the centre of our picture. We want the tail to rotate about its base: the cow's backside. By double-clicking on the layer, we open it in the composition window, and we can drag the cross representing the anchor point to the correct position.
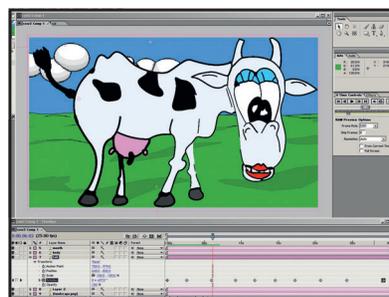
8 When we click on the tab at the top of the composition window to return to a view of the timeline, we can reposition the tail. It's now possible to rotate it properly, and we can add keyframes to keep the tail wagging throughout the animation.
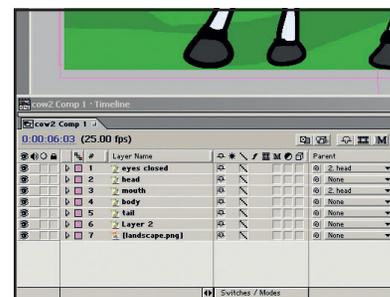
9 We now want to animate the head. This is going to be a little more difficult because the blinking eyes and the movement of the mouth are all related to it. In the Parent column of the timeline, we change the setting for both the eyes closed and mouth layers from None to Head. This makes the head layer into the parent for the other layers.

Part 3: **Fast food**

Prepare your hapless character for a tasty ending…

Blade keyframes

The blades which will eventually make mincemeat out of our bovine friend are off screen at the start of the animation, so it will be difficult to set keyframes for them. However, you can turn on animation for a function at any point on the timeline, and the first keyframe will be placed there, so place your first keyframe where the blades will end up, and work backwards.

1 When we animate both the position and rotation of the cow's head, the mouth keeps moving, but stays attached, and the eyes blink just as they did before. Parenting is an extremely powerful tool. We also parent the head and tail to the body, and shrink and position the cow a little better within the frame.
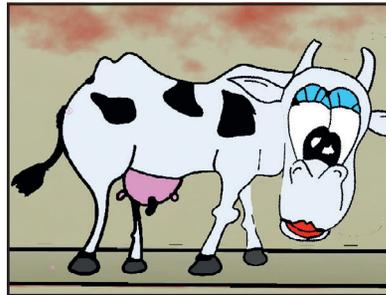
2 One of the most important types of motion in cartoon animation is squash and stretch behaviour. In our next scene, the cow falls into a new environment. We simply delete the background, save the file under a new name, and introduce a new backdrop. This preserves all the animation we've already added, so our cow continues to move, chew and blink as before.
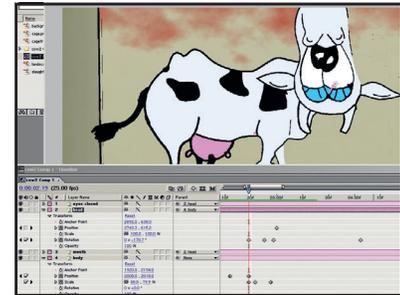
3 A couple of position keyframes on the body are all that's needed to drop the cow into place at the beginning of the scene. We also add a head rotation animation at the beginning so the cow's head starts by facing upward, and is then brought sharply back into position a frame after the cow hits the ground (as though it's shaken by the force).
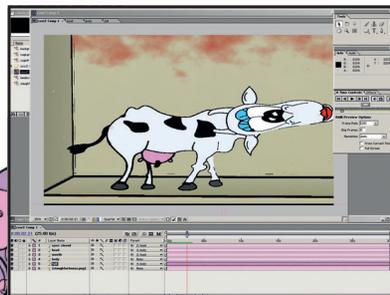
4 With the body layer's pivot placed at the bottom of the hoof, we open the layer on the timeline and turn on animation for scale. We place some keyframes: one with the creature's vertical scale at full as it hits the ground; one a fraction of a second later at about 60 per cent; and a few frames on back at full scale again. The bounce adds comic effect.

5 We create the impression that the victim is on a conveyer belt by making the background slide. It's a simple two-keyframe job because we've ensured that the background is far longer than the frame it's placed into. The rotating blades are done quite simply using a couple of layers parented to each other and to the backdrop.
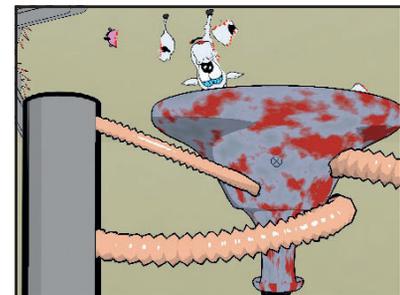
6 As the cow is about to hit the blades, we tastefully cut to the blood-soaked pieces of the cow flying out of the other side. Here, we've started a new composition with our second *Photoshop* file. The pieces of cow are animated separately using position and rotation keyframes.
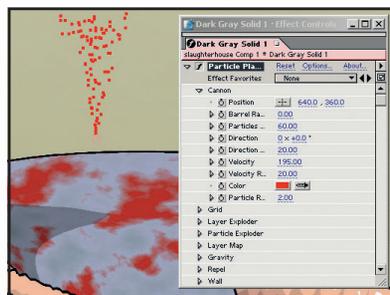
7 We create a particle system to add a gruesome spurt of blood. We do this by adding a solid layer, and selecting Effect>Simulation>Particle Playground. The particle system is basically a spray of objects which can be image layers in themselves, but in this case we've chosen to use crude red dots.
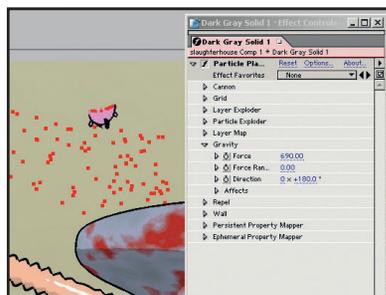
8 The particle system is twisted through 90 degrees, and we animate its rate of flow to turn it on and then off again. Particles have gravity and velocity by default, but we can play with these two controls to ensure that all the blood lands in the funnel.
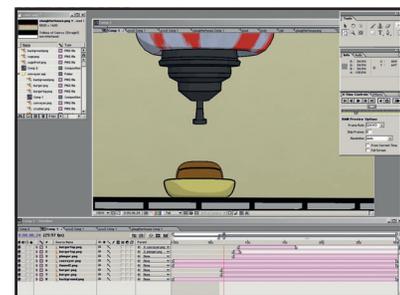
9 Finally, we create a new shot containing just the end of the funnel and a conveyor belt beneath. It's not just the main characters in an animation that have to have personalities. Here, the character of the burger machine is vital in preserving interest after the main focus of the story has been minced. The machine displays its personality by making the viewer wait, then starting to shake, and then finally by delivering one shot of pulped cow onto a bun.
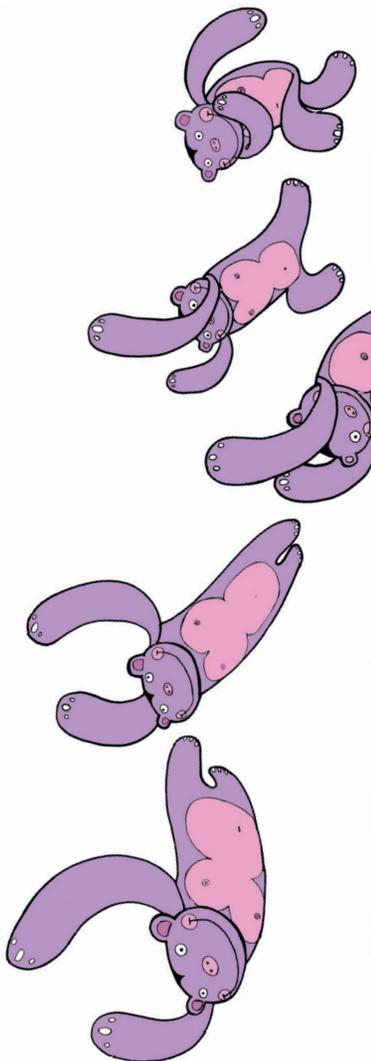
Fast food continued...
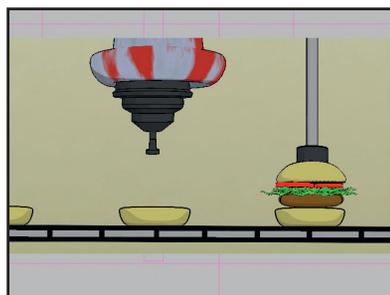
10 The final punchline is delivered by a robot arm flipping down to top off the burger. Again we use squash and stretch animations on the burger, but this time parenting causes problems – the top of the burger must move in the first instance with the arm, and then with the burger along the conveyer belt.
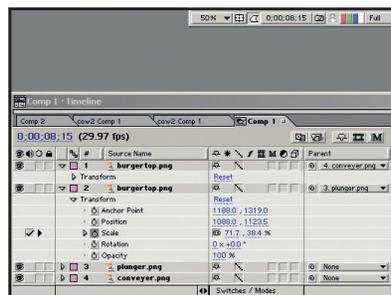
11 The solution is to create two burger-top layers. The first is parented to the arm, and finishes the moment it hits the burger. The second is parented to the burger bottom and begins at the same frame.
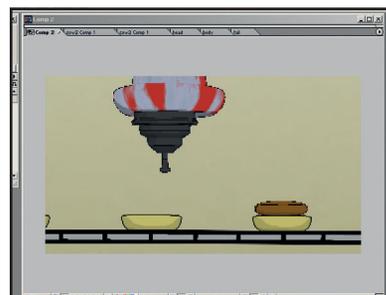

12 We now create a new composition and import our previous scenes into it. Then, we cut together our scenes into a finished animation. If we were being really ambitious, we could also add sound effects.

Part 4: Outputting your cartoon

Finally, we show you how to complete your animation for different platforms…

The right aspect ratio

If you're building an animation for a range of formats, you might find aspect ratio is a problem. Widescreen TV is a different shape to normal TV, cinema film is different again, and mobile phone screens can be landscape, portrait, or square. Decide whether you want your image stretched, clipped, or whether you want to re-compose it entirely for each new medium.
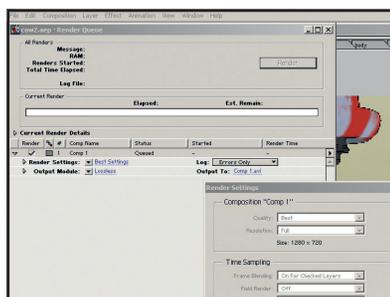

1 All our compositions were done at the highest resolution we're planning for the movie (HD video – 1280x720) so we can output the HD file relatively easily. By selecting Edit>Add To Render Queue and ensuring that the render settings are set to Best Settings, we can produce our movie.
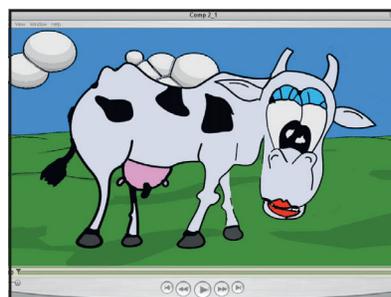

2 We use the output module to set up the movie's format. We've chosen QuickTime, but many animators would output the production as a series of uncompressed still frames. The rendering of our 36-second piece takes around 45 minutes.
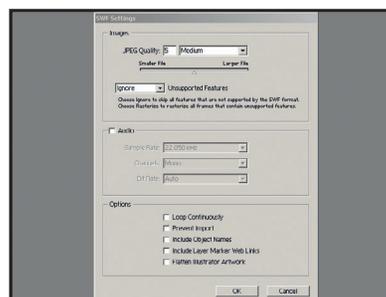

3 You can export *After Effects* compositions as Flash animations with File/Export/SWF, but the exporter is a pretty primitive one and you don't have much control over the size and features of the Flash file. You get more control by exporting scenes individually then re-importing them for the final edit.
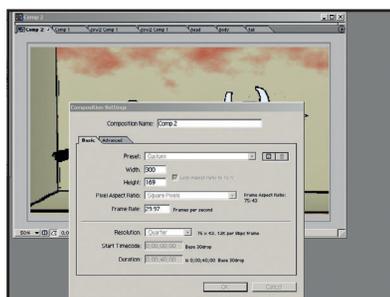
4 You can then create a low-resolution composition into which to composite your Flash files into a single movie for export. If you've got a package which works specifically with Flash, you may want to open the files in that to refine your Flash movie.
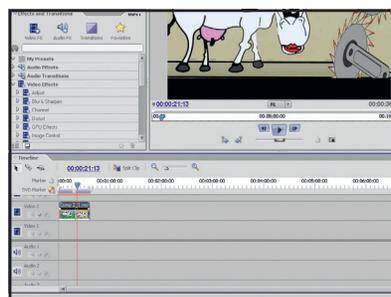
5 *After Effects 6* can't directly export the MPEG-4 files played by mobile phones. However, many editing packages can, including *Pinnacle Studio* and Adobe *Premiere Elements 2*. Here, we've loaded our high resolution HDTV file into *Elements 2* and placed it onto the timeline.
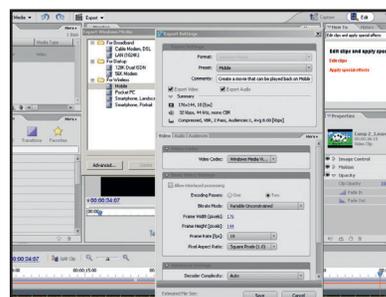
6 You can export it in a couple of different formats for mobiles, and even adjust the settings to suit your content. Within *Premiere* you can also adapt the content for other devices such as video iPods or PSPs. Phone screens are generally limited to 176x144 pixels, so the level of detail is low. **Cap**