



**A** Computer-generated imagery (CGI) has greatly influenced and changed the way we see and do things that would have been impossible to even imagine before. Over the years, three-dimensional computer graphics and animation have been applied to all areas of the media such as films, television programmes and video games to enhance the visual and special effects. Each project added new inventions or techniques to make the virtual images more realistic, but one film came along to combine the media and bring the technology many light years ahead; *Avatar*.

**B** When James Cameron, the director and creator of *Avatar*, first imagined the world of Pandora and the Na'avi humanoid tribe, there was no available technology to help him make his dream come true. He had to wait a few years for technology to catch up to him and finally start filming in 2001. Although CGI was widely used in many box-office hits, there were some limitations. Motion capture techniques were used to create digital or animated characters. This was done by having actors wear suits full of markers with reflectors on them which recorded their movements on a computer. Graphic artists would then combine these images with their 3D graphic designs and animation and produce realistic movement and action for their characters. However, this technology could not show detailed human expressions or realistic landscapes. Cameron found a way to do just that.

**C** In *Avatar*, the characters not only have a full range of natural body movements, but complete facial expressions as well. Cameron helped develop a one-of-a-kind technique to copy the movements of lips, eyes and mouths. Actors were given special headgear to wear equipped with a camera. As a result, every muscle and eye movement was recorded and used to make the digital characters in the film truly authentic and lifelike.

To make the world of Pandora even more realistic, many fields of knowledge were used and integrated with art. Experts in biology, engineering and physics worked closely with talented artists and illustrators to create this magnificent world. Great attention to detail was applied to each creature, character and the surrounding environment, including every plant and leaf. Somehow, that wasn't enough for the director; he had to take it a step further.

**D** After years of dreaming about it, Cameron developed the first 3D camera that combined the live action scenes with the computer-generated scenes. Video-gaming technology was used along with a virtual camera and a simulation camera to create a virtual production stage for the director through a computer. But how is that possible, you might ask? CG images were sent to the virtual camera while the simulation-cam combined CG characters and the designed environments into the 3D Fusion camera. After all, fusion means to join many things together to make one. All the director had to do was look through the eyepiece and direct these virtual scenes as if he would a live action scene. This had never been done before. With the use of state-of-the-art technology, a strong team of experts and creative artists and loads of imagination, the director had managed to interact with and control every aspect of the virtual film he was directing.

**E** The film, *Avatar*, with its 3D effects, managed to absorb the audience into the world of Pandora and give them a feeling of interaction like that of a video game. While video games have not succeeded yet in creating such realistic 3D worlds for players, the groundbreaking technology used in the film will certainly lead the way. The same teams that worked on the film released a 3D *Avatar* game, but they are also working on improving the three dimensional experience for future projects.

READ THE TEXT AND CHOOSE THE CORRECT ANSWER:

1 How does computer-generated imagery improve virtual images? 

A It makes them three-dimensional.  
B It animates them.  
C It combines all areas of the media.  
D It makes them more believable and true-to-life.

2 The director of the film *Avatar* 

A based it on a real tribe.  
B came up with the idea himself.  
C saw it all in a dream.  
D started filming immediately.

3 The writer finds Cameron's 'headgear' (l.33) 

A original.  
B very realistic.  
C not good enough.  
D beautiful.

4 Specialists were used 

A to study the world of Pandora.  
B to visit the world of Pandora.  
C to create a believable environment.  
D to record all movements.

5 According to the text, what did Cameron accomplish in this film? 

A He interacted with his audience.  
B He introduced innovative technology to the field.  
C He did something impossible.  
D He played all the characters.

6 In paragraph E we learn that *Avatar* 

A will soon be available as a game.  
B gave audiences a more interactive experience.  
C was as authentic as a video game.  
D has successfully helped create 3D video games.

FIND THE WORDS IN THE TEXT WHICH MEAN:

**Para A:** affected



was developed



**Para B:** broadly



join together



**Para C:** produce



really



combined



**Para E:** fascinate



sense



made available



to the public