



Prehistoric theme park to open

For immediate release

Dateline 1st September 2053

Scientists at the University of Bedrock are about to turn back the clock 10, 000 years. Mammoths, woolly rhinoceroses and a host of other extinct animals are about to walk again. They expect to see the arrival of a baby mammoth next week.

The idea came from Jurassic Park – where a scientist brought 65 million year old dinosaurs back from the dead. But that was science fiction. This time it's for real.

Scientists have found well preserved frozen remains of the extinct animals. Using the latest DNA techniques they plan to resurrect them, and put the animals into a giant theme park in Siberia. Visiting the theme park will be like travelling back in time to the world of the Flintstones. These animals have not roamed the planet since the stone age, but could be revisiting the planet in 2053.

At the press conference, a scientist from the University of Bedrock will answer questions on three areas of science:

- How mammoths used to live in Siberia
- Extracting DNA from extinct animals
- The process of cloning a new animal

Press conference notes

You have been to the press conference and have taken these notes to help you to write your story. You have taken notes about the science and facts about mammoths. You have also written down some quotes from the scientist at the University of Bedrock who cloned the mammoth and some quotes from another scientist at the University of Rubble.

Notes from the press conference on 1 September 2053

Mammoth facts

What exactly was a mammoth?

The woolly mammoth was an animal of enormous strength and size, with curved horns or tusks. It was believed to consume huge amounts of grass and have a mild and peaceful nature.

The woolly mammoth probably arose in Siberia (an area to the north of China and Mongolia), but occupied a vast range from Ireland to North America. It lived to the south of the ice sheets and inhabited areas with rich grassy vegetation.

When and where did they die out?

Nobody is sure why, but likely causes were hunting by humans, disease, or the fact that their food supply disappeared as the green pasture of Siberia became a cold desert. Siberia's climate is much colder today than it was 20,000 years ago.

What animals did they share their habitat with?

Giant deer, ancient foxes, woolly rhinos and the ancestors of the Siberian horse.

Quotes

The scientist from the University of Bedrock said

"We are very excited that we will soon see a baby mammoth. A great achievement for 2053."

"We also hope to clone, steppe lions, giant deer, ancient foxes, woolly rhinos and the ancestors of the Siberian horse, as well as the mammoths."

The scientist from the University of Rubble said

"We don't think that it is actually possible to ever clone a mammoth, we do not believe the claims from the University of Bedrock".



Prehistoric theme park

Scientist briefing notes

Notes from the press conference on 1 September 2053

Science Facts

What is DNA?

DNA (deoxyribonucleic acid) is the genetic material of the cell. It determines how living organisms grow and function. DNA is a long stringy molecule, shaped like a spiral staircase and called the **double helix**. This structure was discovered 100 years ago in 1953.

DNA is made from pairs of "bases" which fit together to form the staircase rungs, with sugar-phosphate sides. There are only four bases, Adenine (A), Thymine (T), Cytosine (C) and Guanine (G), and they always pair up as A+T and G+C. The four bases can be arranged in different ways to make up different genetic codes. The complete genetic code is called the genome. Genes are small sections of the DNA code.

The DNA is stored in tightly coiled structures called **chromosomes**. These are found in the **nucleus** of the **cell**.

What happens to DNA when it is left in dead cells?

When cells die, the normal long strings of DNA break down into short segments over time (or are degraded).

Where is mammoth DNA found?

Mammoth DNA would be found in every cell in the mammoth's body, apart from the red blood cells. In fact most cells in an adult body contain identical DNA (except for the germ cells which are the egg and sperm cells).



Quotes

The scientist from the University of Bedrock said:

"We are very excited that in 2053 we have now found viable DNA from the mammoth"

The scientist from the University of Rubble said:

"It is very unlikely that the team at the University of Bedrock would find an animal that was flash-frozen and then remained at between -25°C and -30°C. If they did find some DNA it probably wouldn't be the whole genome. We think that the DNA would be broken down into small fragments and they wouldn't be able to piece it all together again."

The scientist from the University of Bedrock then said:

"We had to search for DNA that we could use to regenerate the mammoth and other creatures. Once we had found a mammoth we looked for cells in its skin. Even after 20,000 years its woolly skin, internal organs and even its stomach contents were in good condition. We found an intact cell. We even managed to find some DNA that had not broken down. We were lucky because we found a mammoth that had died quickly and was flash frozen."

Prehistoric theme park:

Scientist briefing notes

Notes from the press conference on 1 September 2053

What is cloning?

Cloning is the production of more than one identical offspring. A clone is an animal that is genetically identical to its donor "parent". We now know that this can be achieved using cells from an embryo, a foetus or from an adult animal. 1997 saw the arrival of Dolly the sheep, the first animal cloned in this way.

What animals have been cloned successfully?

Sheep, cattle, goats, pigs, mice and some other animals have now been cloned.

So how does cloning work?

Dolly was produced by a technique called "nuclear transfer". This means that the nucleus of a cell is taken from the animal that you want to clone and is put into an egg from which the nucleus has been removed.

So how can the nucleus be transferred?

The nucleus itself can be transferred or the whole cell can be transferred.

What is the difference?

Both methods will contain the same genetic information. If the whole cell is transferred then the egg cell and the donor cell have to be fused together. The "reconstructed embryo" is activated by a short electrical pulse.

What is the real key to cloning an animal?

The nucleus from the donor cell must be reprogrammed to tell the recipient cell to develop as if it was a newly fertilized egg. The recipient cell is an egg cell that is already programmed to produce an embryo. The two parts should work together

How will the cloning process work?

- 1 First find a cell from the animal that you want to clone.
- 2 Then collect an egg from a suitable recipient and remove the cell nucleus from the egg.
- 3 Inject the donor nucleus into the recipient egg OR fuse the donor cell with the recipient egg.
- 4 Culture the resulting cloned embryo in an incubator.
- 5 Transfer the developing embryo into the reproductive system of a surrogate mother.

Quotes

The scientist from the University of Rubble said:

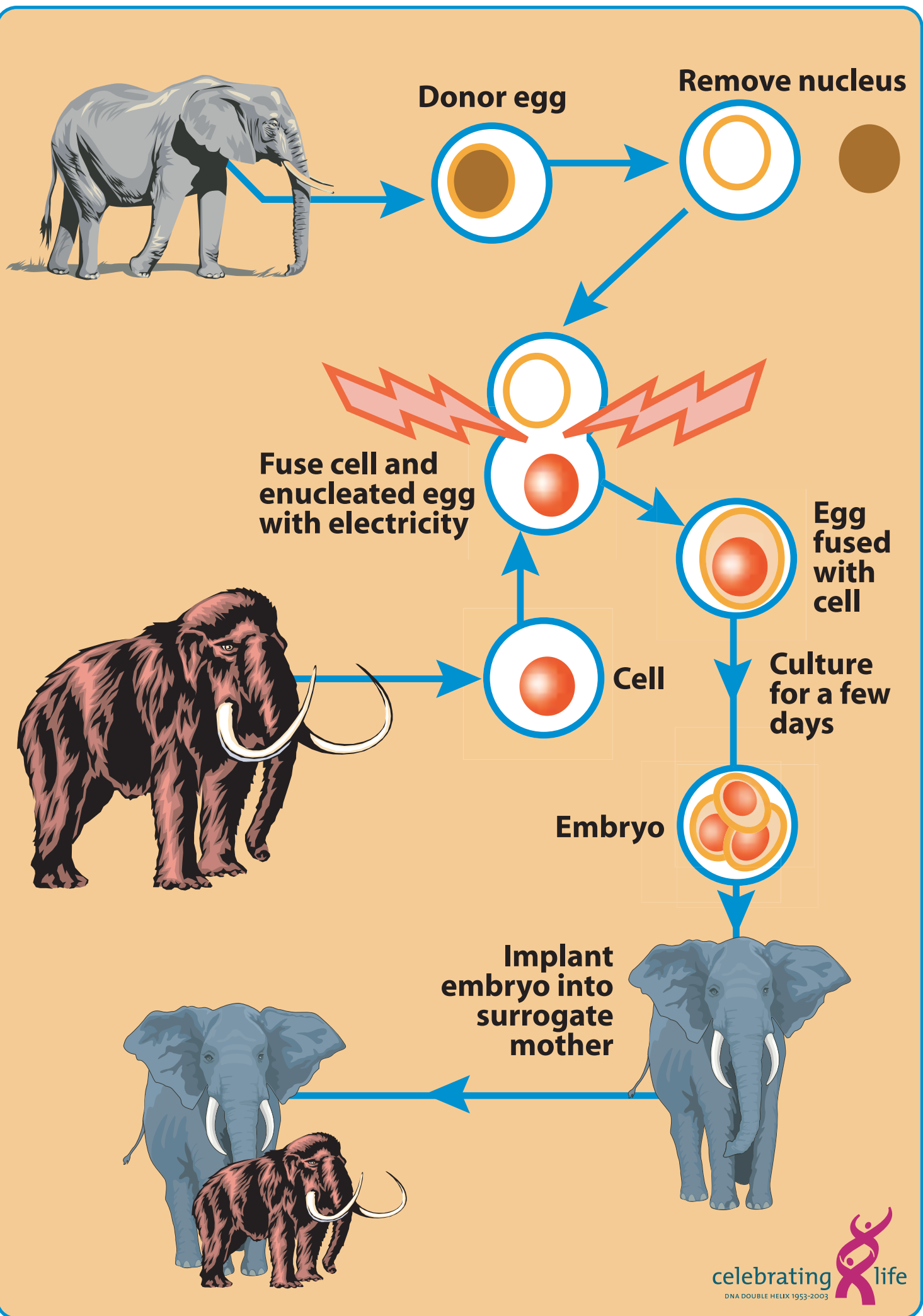
"Don't forget you really must have the whole intact nucleus, with all of the chromosomes. Just having DNA alone would not be enough."

The scientist at the University of Bedrock said:

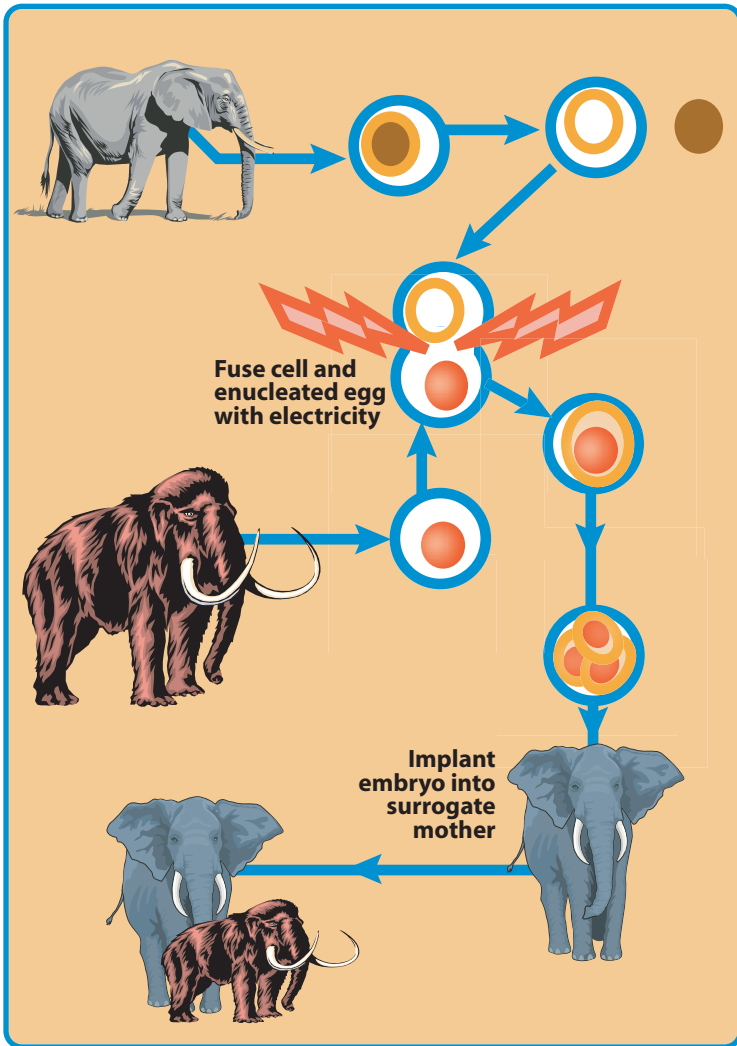
"What we did is similar to the process that created Dolly the sheep. We took an egg from the mammoth's closest living relative, the Asian elephant. We took the nucleus out of the egg. Next we had to find a skin cell from the remains of the extinct mammoth. We took out the nucleus from the mammoth skin cell and carefully injected it into the empty elephant egg cell. An electric charge was used to stimulate the fused egg and donor nucleus. The fertilised egg cell grew normally and divided several times to produce an embryo. This embryo was then implanted into the uterus of an Asian elephant, which acted as a surrogate mother. The baby mammoth will be born next week."

The scientist from the University of Rubble said:

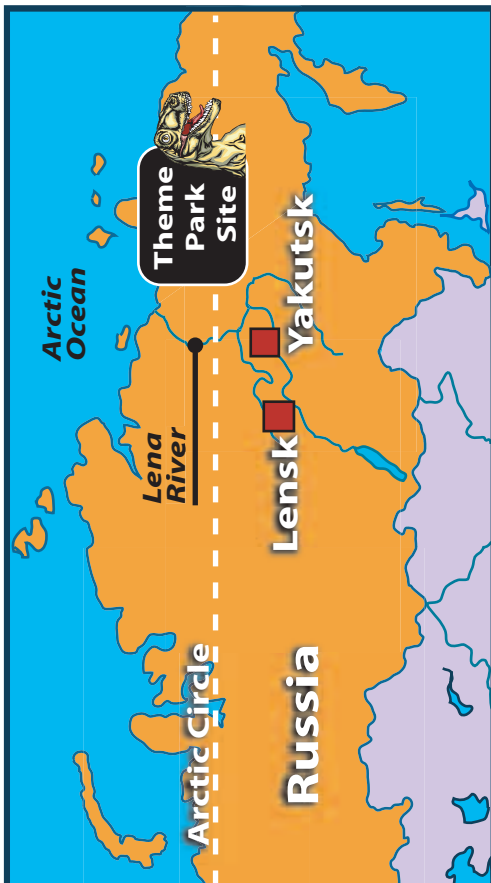
"We have thought long and hard about whether you can clone a mammoth. We are not sure that the Asian elephant is a close enough relative to actually be a surrogate mother. They would have to have a similar gestation period for this to work. The length of time that the Asian elephant would need to carry a developing elephant would need to be similar to the length of time that a mammoth would need to carry a developing mammoth. The egg from the Asian elephant would have to be very similar to an egg from a Mammoth."



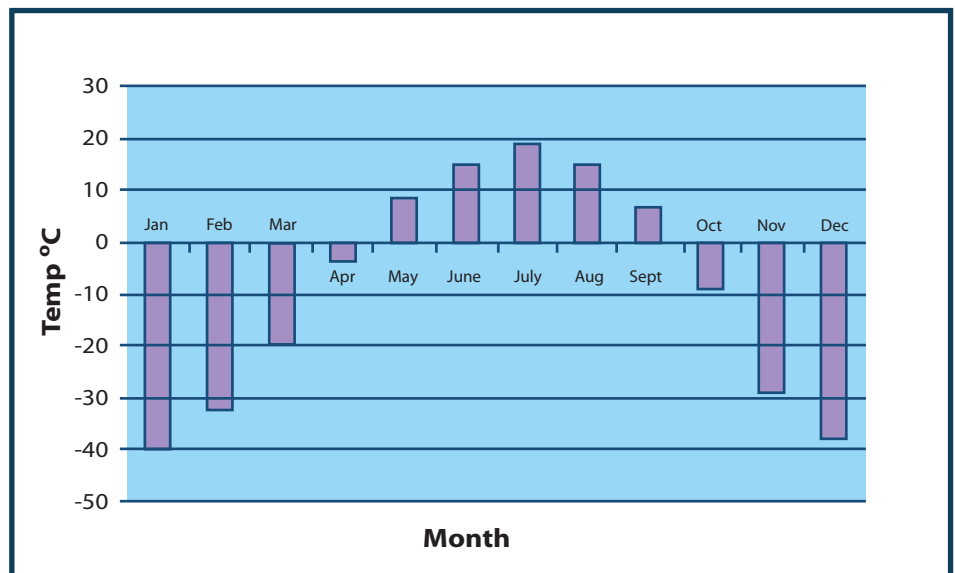
Average temperatures in Yakutsk Cloning



Siberia and mammoths Extracting DNA



Theme Park Site



Mammoth madness in former Soviet State

Mastodons wake up after icy sleep

Siberian Science's Real Jurassic Park

Gene science brings back Mammoths

Magic Mastodon Mania