

Who is King Tut?

Why does he intrigue us?

Who is his mother? Who is his father?

What do we know about his reign?

Did he have children?

How did he die?



The King Tut Pedigree Revealed

Students will derive the parents and lineage of King Tut through a DNA testing simulation. They will analyze information from DNA evidence of mummies and historical records to reveal the pedigree.

The activities are developed to align with current research using DNA evidence provided by The Discovery Channel (2010). The research is led by Zahi Hawass, Secretary General of Egypt's Supreme Council of Antiquities.

King Tut: Part 1

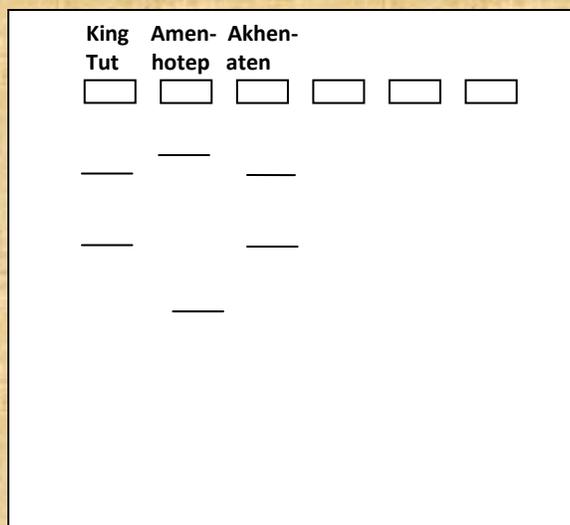
Who is the Father?

The students will be watching the Discovery Channel video, *King Tut Unwrapped*. As the story unfolds, they learn that there are two prime candidates for the father of King Tut: Amenhotep III and Akhenaten. The video shows that DNA fingerprinting is used to determine which Pharaoh was the father of Tut, but before it is revealed in the video, students will do their own DNA fingerprinting test.

The DNA used in our lab is ordered from Edvotek. We request particular banding patterns, but the only aspect that is crucial for this activity is that the *same* DNA is used for Tut and Akhenaten.

Results of the DNA gel for “**Who is the Father?**”

DNA Sample	Tube Color
King Tut	Green
Amenhotep	Red
Akhenaten	Yellow



King Tut: Part 2

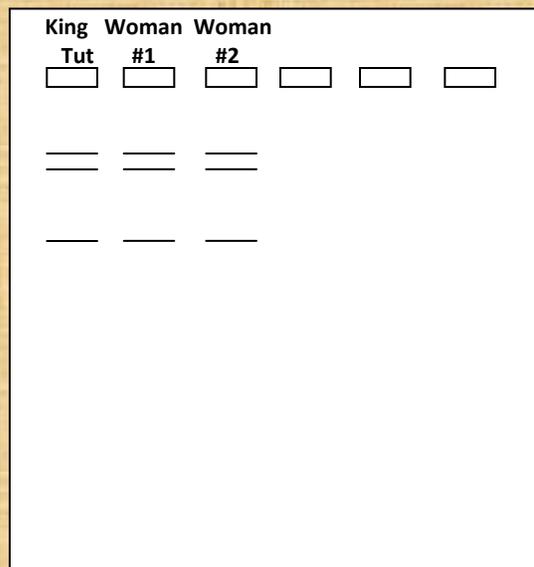
Who is the Mother?

As the students watch the video, they learn that there are two female mummies of interest. The archeologists wonder if they could possibly be related to King Tut. Before their identity is revealed, teachers should have a discussion of mitochondrial DNA and its significance in determining maternal relationships. (Offspring get their mitochondrial DNA from their mother.) Students run a gel to determine if the two female mummies are related to King Tut.

Our DNA is ordered from Edvotek and we request a banding pattern different from the other gel. We use the same DNA sample for all three people to show that they have the same mtDNA. (These are the actual results found in analysis of the mummies.) The students should discuss possibilities as they now have another clue for the pedigree. How can they all match?

The King Tut DNA gel for “**Who is the Mother?**” should look like this:

DNA Sample	Tube Color
King Tut	Clear
Woman 1	Blue
Woman 2	Amber



Students should add evidence to the pedigree chart.

King Tut: Part 3?

Did he have children?

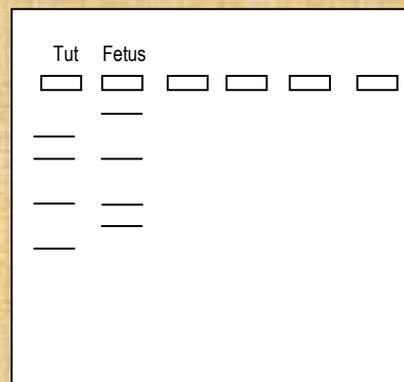


Two fetuses were found buried in King Tut's tomb. Did he have children? Historians argue that the practice of burying fetuses in tombs assured the children could be born in the afterlife, and possibly the children did not belong to King Tut.

Autopsies were performed on the two mummies in 1932. One was previously unwrapped in 1922 when they were originally found by Howard Carter. The exposure eventually led to decomposition of the first fetus. The second fetus remained wrapped. When it was unwrapped in 1932, the small mummy was found to have eye lashes, open eyes with eyeballs and downy hair. Both appeared to be female, and they were later verified as female. The second fetus was later examined by a team of researchers to discover she had spina bifida and scoliosis.

We know from historical records that King Tut had one wife, Ankhesenamun, his half sister and the daughter of Queen Nefertiti. (Ancient Egyptian royalty married within the family as to reserve the purity of the royal blood. They felt the purity empowered them as they would eventually become gods in the afterlife.) We are uncertain if Tut had other wives, so we assume that if the children are his, their mother is Ankhesenamun.

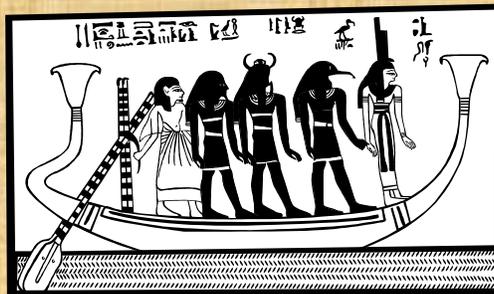
If the DNA of the fetal mummies match the DNA of King Tut, they are his children. Intact DNA was removed from the second fetus for DNA analysis. The image shows the gel comparing the fetus DNA to the DNA of King Tut. Based on your understanding of DNA, do you think the fetus is the child of King Tut?



Students should add evidence to the pedigree chart. If we know the child belongs to King Tut, we can now compare the DNA of the child to unknown royal mummies to find the mother of the child.

(Mummies were moved between tombs to protect them from grave robbers, and many had identification marks removed or multiple mummies were placed together in one site.) What historical evidence do we have for the mother?

The mummy of the great Queen Nefertiti is unknown. How could these findings contribute to the search of her mummy? Justify your answer with evidence.





KING TUT FAMILY PEDIGREE

A pedigree is a diagram representing the familial relationships of individuals. Using the information discovered through various experiments and video clips, construct a pedigree representing King Tutankhamen and his family.

A poster is provided with known information for King Tut's pedigree. Throughout the course of the lab, fill in any additional familial connections as they are discovered.

Constructing a Pedigree:

1. Squares represent males:



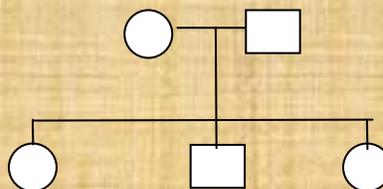
2. Circles represent females:



3. A horizontal line connecting a male and female represents mating, and a vertical line drawn from this horizontal line represents an offspring:



4. Two or more offspring are shown by using a second horizontal line as shown. The offspring shown are two females and a male.



5. Conjectured connections (proposed but not yet proven) can be shown with a dashed line.

