

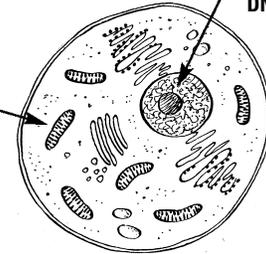
The Hunt for mtDNA

NOVA Activity **Last Flight of Bomber 31**

You are a forensic scientist recruited to help solve a long-standing "missing persons" case. Mitochondrial DNA, or mtDNA for short, is the key to your success.

cellular mitochondria contain mitochondrial DNA (mtDNA)

cell nucleus contains nuclear DNA



Procedure

- 1 Read the *Guidelines for mtDNA Inheritance*.
- 2 Take careful notes as your teacher describes the important elements of the "Case of the Missing Dung Beetle Biologist." Identify which family members in the *Who's Related by mtDNA?* pedigree chart should be chosen to donate their mtDNA for comparison to the missing person's mtDNA (the missing person is noted by a question mark). All deceased individuals have been cremated and cannot be sampled for mtDNA.
- 3 Connect individuals who share mtDNA from the great-great grandmother by darkening the lines that link them to one another.
- 4 Of the individuals connected by dark lines, circle the living relatives who are eligible to be tested for mtDNA.

Questions

Write your answers on a separate sheet of paper.

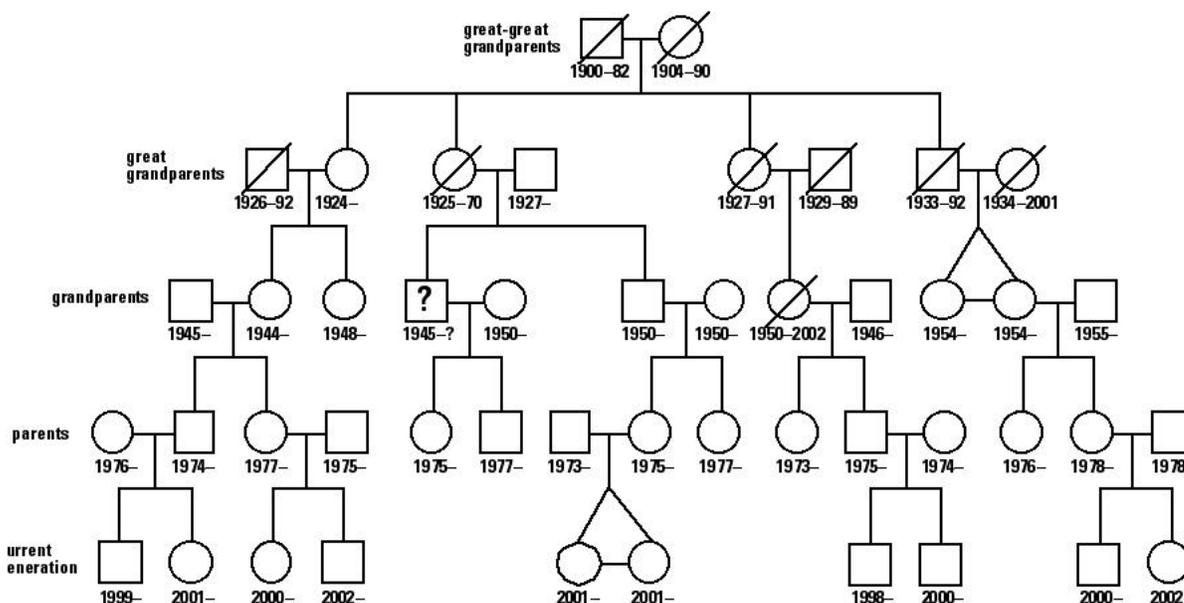
- 1 How many living relatives could provide mtDNA to test against the mtDNA of the discovered remains that are believed to belong to the missing person shown by a question mark in the pedigree chart?
- 2 Describe the inheritance pattern of mtDNA.
- 3 If two brothers died in a crash, could you use mtDNA to distinguish their remains from one another? Why or why not?

Guidelines for mtDNA Inheritance

Mitochondrial DNA (mtDNA) is found in each cell's mitochondria, structures that produce ATP, the cell's main energy source. Here are some guidelines about how mitochondrial DNA is inherited:

- mtDNA can only be inherited from a woman.
- A man can inherit mtDNA from a woman.
- A man cannot pass mtDNA on to any children.

Who's Related by mtDNA?



Key

