MYSTERY of the MATCHING MARKS and the Search for the Tell-Tale Telomeres

BRIEF REVIEW (Useful if lesson done over two days)

A. We have learned that when two objects (bullets, or chromosomes) have identical complex marks or banding patterns, we can be confident that they had a **common origin**.

B. Since our chromosomes have nearly all of the same banding patterns that are found on the chromosomes of chimpanzees, this tells us that humans and chimps had a common origin, or a **common ancestor**.

C. We have also seen that our #2 chromosome is identical to two shorter chromosomes found in chimps (2a and 2b). The question is: How did this come to be?

D. We have also learned that all chromosomes have a special sequence of DNA at their tip-ends, called "telomeres": tandem repeats of ttagggttaggg... for 800 to 1600 repeats.

E. Furthermore, we have learned that if two chromosomes came together at their tip ends, their telomeres would join together in only one way, and the telomere sequence would suddenly change at the point of fusion, something like this: ttagggttagggttagggccctaaccctaaccctaa

F. If we could find the remains of those "fossil telomeres" in the **middle** of our #2 chromosome, this would tell us that our #2 chromosome must have formed by the fusion of 2 shorter chromosomes that are found in modern chimps today. This would provide additional and compelling evidence of our **common ancestry** with chimpanzees.

G. We have a scientific problem here, outlined as below:

A. PROBLEM: How could our #2 chromosome come to look identical to two shorter chromosomes found in chimpanzees?

B. HYPOTHESIS: The two ancestral chimp-like chromosomes in early humans came together head-to-head, and stuck (**fusion**).

C. FAIR TEST: Look for **evidence of that fusion**, in the form of two **telomeres** head-to-head in the **predicted region** of fusion.

D. PREDICTIONS:

If the hypothesis is **true**, we should **find** the **two telomeres** there.
If it's **NOT true**, we should find **NO telomeres**.