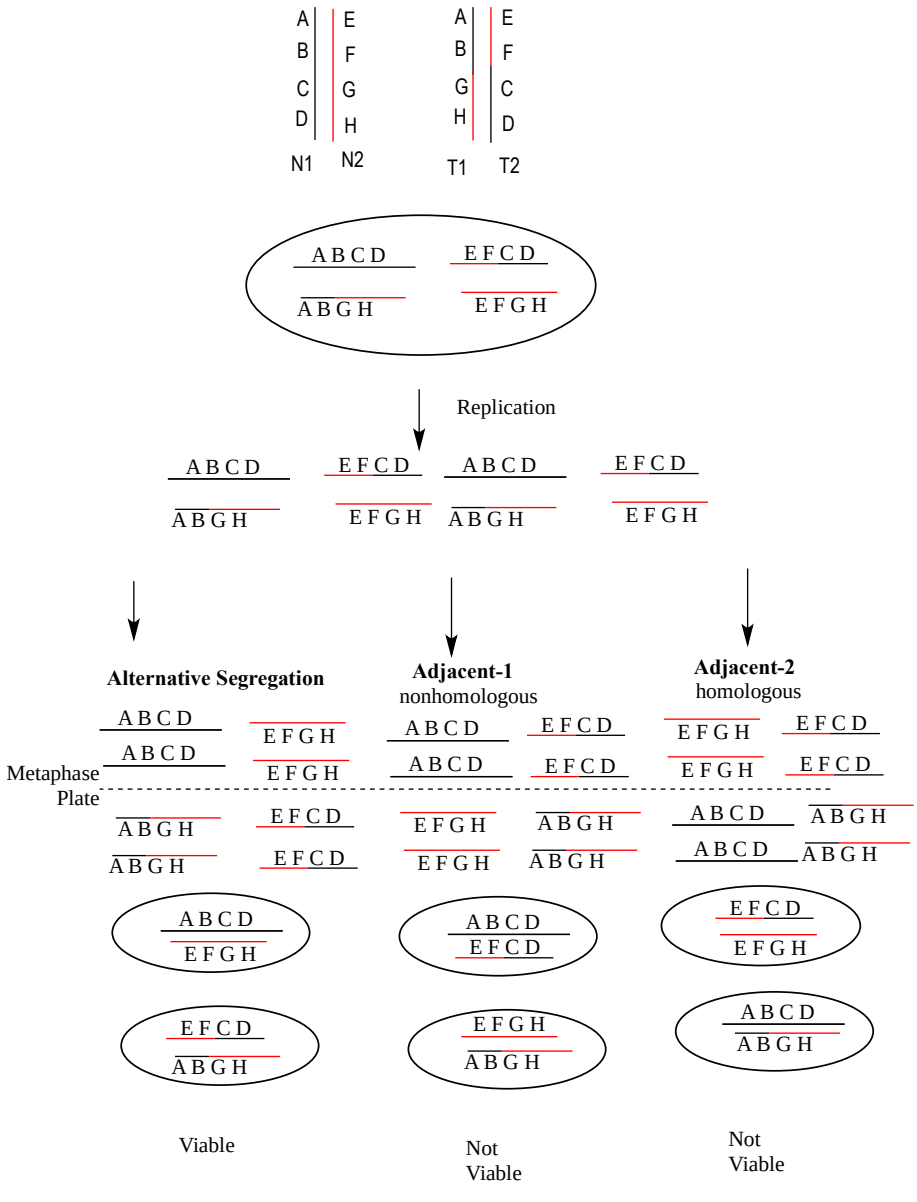
CONCEPT: CHROMOSOMAL REARRANGEMENTS: TRANSLOCATIONS

- **Translocations** describes when a chromosomal segment is moved to a different chromosome
  - □ **Reciprocal translocations** occur when chromosomes trade acentric fragments
    - There are _____ ways these translocations are sorted into gametes (N=Normal T=translocated)

1. **Adjacent-1 segregation** – segregates like: (N2 T1) and (N1 T2)
   - These are inviable
2. **Adjancent-2 segregation** – segregates like: (N1 T1) and (N2 T2)
   - These are inviable
3. **Alternative segregation** – segregates like : (T1 T2) and (N1 N2)
   - The gametes are viable

EXAMPLE:



□ **Robertsonian translocation** occurs when there are breaks at two short arms of two nonhomologous acrocentric

- Forms a chromosome that contains two long arms from two nonhomologous chromosomes

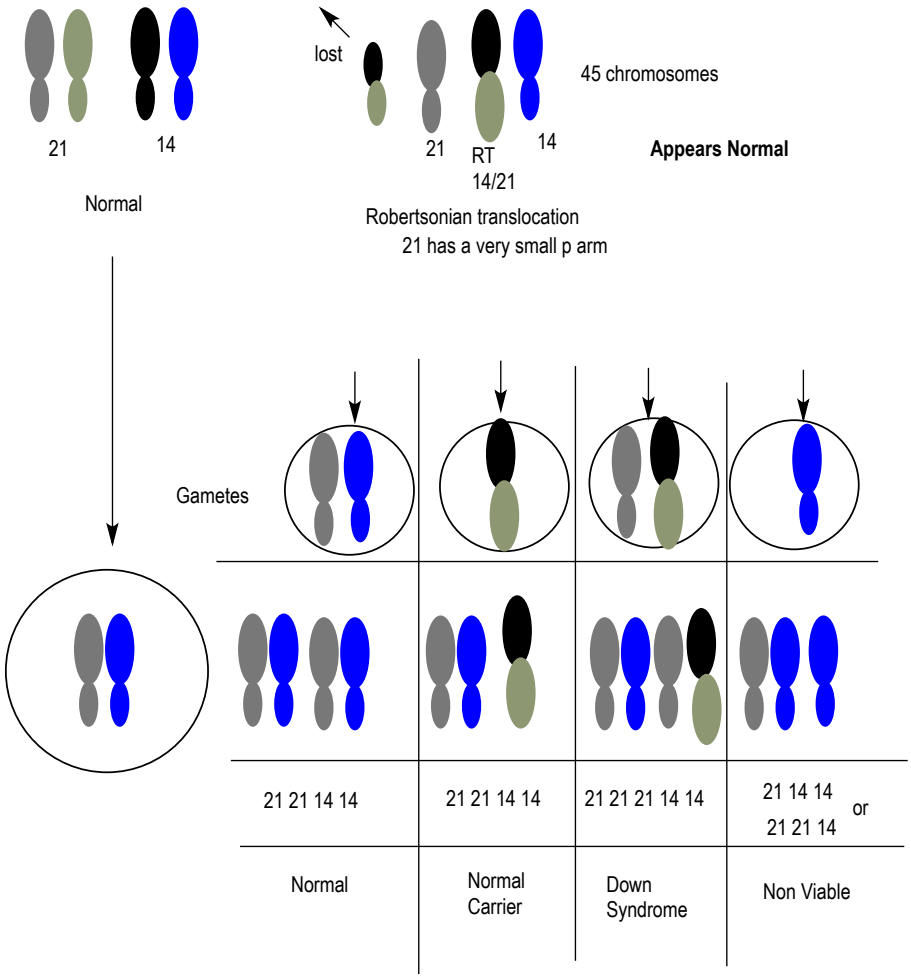
□ The *balanced form (*parent*)* results in _____ problems for the person

- This because it takes the place of two acrocentric chromosomes

□ The *unbalanced form* (child) it results in a chromosomal imbalance

- Example: Familial down syndrome

EXAMPLE:



PRACTICE

1. Which of the following represents the chromosomal segregation into gametes after a reciprocal translocation caused by adjacent-1 segregation? N=Normal chromosome T = Tanslocated chromosome
    a. (N2 T1) and (N1 T2)
    b. (N1 T1) and (N2 T2)
    c. (T1 T2) and (N1 N2)

2. Which of the following ways reciprocal translocated chromosomes are sorted produces viable gametes?
    a. Adjacent-1 segregation
    b. Adjacent-2 segregation
    c. Alternative segregation

3. An individual heterozygous for a reciprocal translocation has the following chromosomes. Which chromosomes do the gametes receive after alternative segregation?

A B • C D E F G	J K • L M N O P
A B • C D N O P	J K • L M E F G

a. A B • C D E F G and J K • L M E F G
b. A B • C D N O P and J K • L M E F G
c. A B • C D N O P and J K • L M N O P

4. An individual heterozygous for a reciprocal translocation has the following chromosomes. Which chromosomes do the gametes receive after adjacent-1 segregation?

A B • C D E F G	J K • L M N O P
A B • C D N O P	J K • L M E F G

d. A B • C D E F G and J K • L M E F G
e. A B • C D N O P and J K • L M E F G
f. A B • C D N O P and A B • C D E F G

5. An individual heterozygous for a reciprocal translocation has the following chromosomes. Which chromosomes do the gametes receive after adjacent-2 segregation?

A B • C D E F G	J K • L M N O P
A B • C D N O P	J K • L M E F G

g. A B • C D E F G and J K • L M E F G
h. A B • C D N O P and J K • L M E F G
i. A B • C D N O P and A B • C D E F G

6. How many chromosomes does a person who is a carrier for familial down syndrome caused by a robertsonian translocation have?
   a. 45
   b. 46
   c. 47
   d. 48