

Name: _____

Date: ___/___/___

MITOSIS & MEIOSIS: On the Table **KEY**

A. OBJECTIVE: Discover critical differences between mitosis and meiosis, and possible misunderstandings about the two processes, by showing key “movie frames” of the key stages in each process on your desk.

B. IDENTIFICATION:

1. Each single fuzzy piece (pipe cleaner) equals one **chromosome**
 - a. pink/red piece equals one chromosome inherited from the mother.
 - b. light blue/blue piece equals one chromosome inherited from the father.

2. Two fuzzy pieces, held together by a bead—the **centromere**—equals one chromosome duplicated into two new strands (**chromatids**), each of which becomes a duplicate chromosome when the centromere splits at the beginning of anaphase.

C. INVENTORY: Check your chromosome. Before doing this lab, AND when finished, count all pieces in the container.

Notify your teacher if there are any extras or shortages DO NOT REMOVE BEADS FROM DOUBLE FUZZY PIECES:

2 single pieces, light blue	2 single pieces, blue	1 Mitosis sheet
2 single pieces, pink	2 single pieces, red	2 Meiosis sheets
	4 beads	1 Summary sheet

D. ASSUMPTIONS (for purposes of this exercise):

1. The diploid number ($2n$) of this organism is “4”, or **2** pairs;
2. Chromosomes are NOT visibly divided into chromatids (think “chromosome kids”) until **metaphase**;
3. Twisting and crossing over are NOT to be shown here.

E. PROCEDURE: Do all the following from memory and understanding so far, think each stage as a frame in a movie film of the process:

1. Arrange the pieces on the **MITOSIS** sheet, showing the essential chromosome arrangements during mitosis. When done, raise your hand to be checked. You will demonstrate the whole process to your teacher.
2. When your MITOSIS layout is approved, copy those arrangements onto your Mitosis-meiosis Summary sheet, using red, pink, blue and light blue pencils.
3. Remove all pieces and proceed to arrange them on the two **MEIOSIS** sheets, with MEIOSIS I sheet placed above the MEIOSIS II sheet so the arrows flow from sheet to sheet. Remember to show the essential differences between mitosis and meiosis. Be sure to end up with a sperm if you are a boy, or an egg with polar bodies if you are a girl. You should use ALL of the pieces for meiosis. When finished, raise your hand to be checked by your teacher.
4. When your meiosis layout is approved, copy the arrangements onto your Mitosis-Meiosis Summary sheet, using red, pink, blue and light blue pencils.
5. Count all pieces back into their container and “layout” sheets to the tray.
6. Now help others by giving clues; do NOT show the correct arrangement; let others discover it as you did.

F. DISTINGUISHING FEATURES: What are the three main differences between mitosis and meiosis?

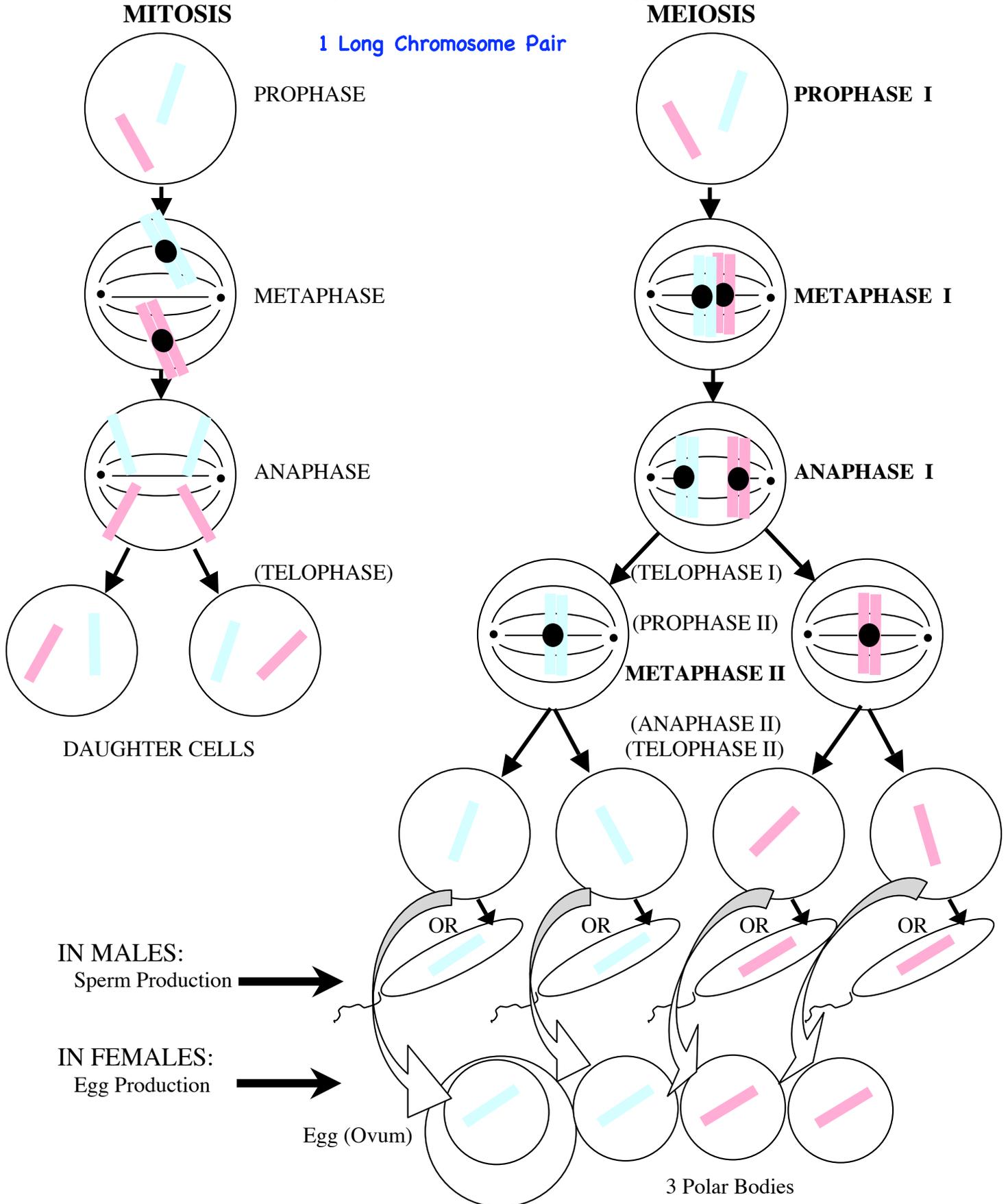
MITOSIS	MEIOSIS
NO synapsis (pairing of matching–homologous–chrom.)	Homologous chromosomes pair off (synapsis)
Centromere splits, 2 chromatids become 2 chromosome	Homologous pairs separate (in first division)
1 division --> 2 cells; $2n$ --> $2n$, or n --> n	2 divisions --> 4 cells; $2n$ --> n

G. QUESTION: What are the 2 main functions of meiosis?

1. Keeps chrom. number from doubling and redoubling;
2. Increases variation by random assortment and crossing over.

MITOSIS-MEIOSIS SUMMARY

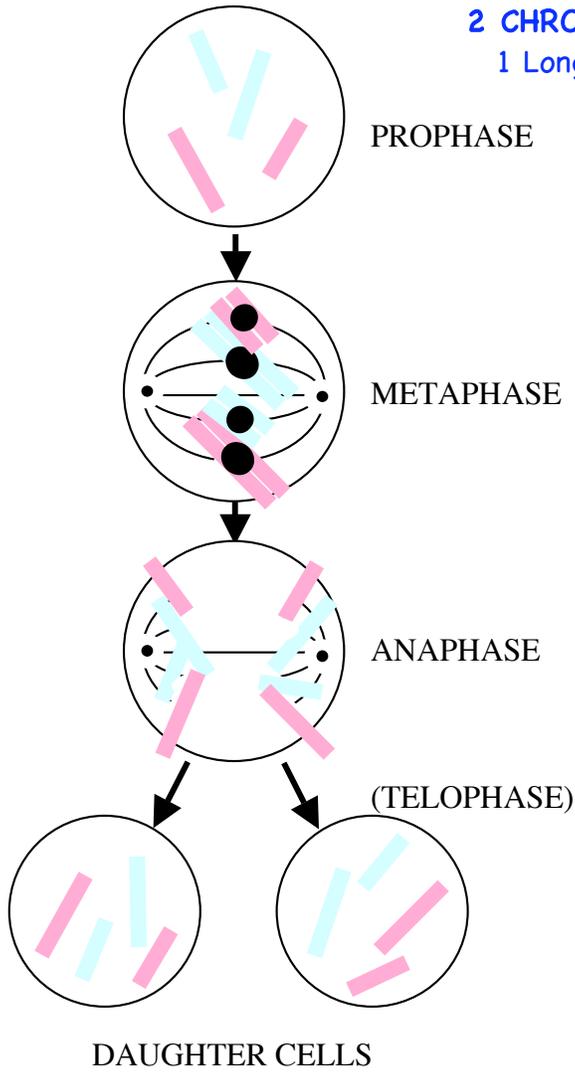
INSTRUCTIONS: When your MITOSIS layout on the table is approved, copy it below (under "MITOSIS"), using red and blue pencils (or two other different colors or shading). Do likewise for MEIOSIS when it is approved.



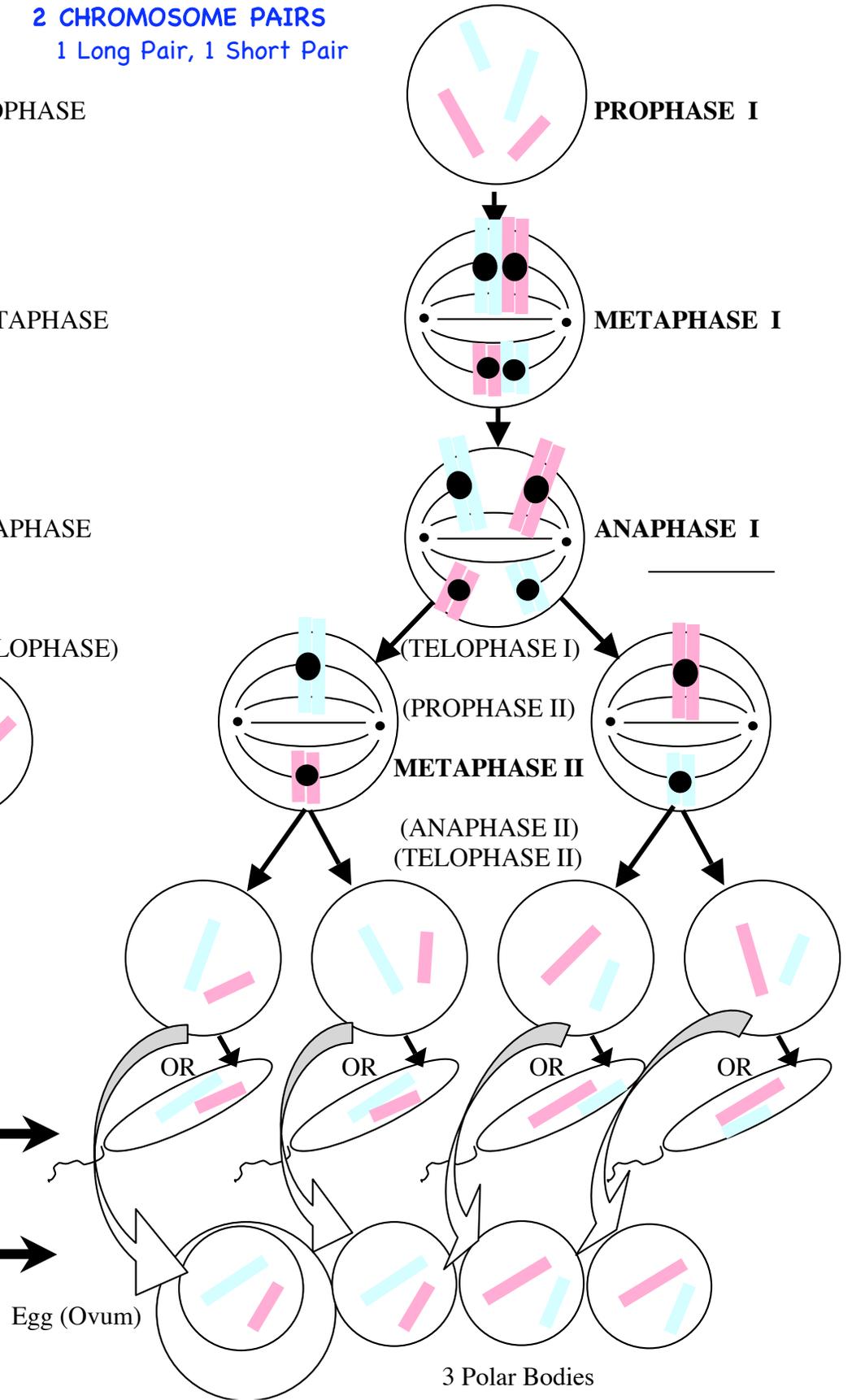
MITOSIS-MEIOSIS SUMMARY

INSTRUCTIONS: When your MITOSIS layout on the table is approved, copy it below (under "MITOSIS"), using red and blue pencils (or two other different colors or shading). Do likewise for MEIOSIS when it is approved.

MITOSIS



MEIOSIS



IN MALES:
Sperm Production →

IN FEMALES:
Egg Production →