



Circle and identify at least one cell showing each of the following phases:  
interphase, prophase, metaphase, anaphase, telophase, cytokinesis



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Data from this experiment is provided below:

#### CLASS DATA

GROUP	INTERPHASE	MITOTIC	TOTAL
CONTROL	1055	762	1817
TREATED	2016	1005	3021

For this experiment, the number of treated cells in interphase and mitosis will be the OBSERVED (o) values.

To find the expected values, calculate the percentage of cells in interphase and mitosis in the control group from the data provided.

#### PERCENTAGES

	CONTROL	TREATED
INTERPHASE		
MITOTIC		
TOTAL	100%	100%

Multiply the percentages by the total number of cells in the treated group; this will give the expected numbers (e). Calculate the chi-square ( $\chi^2$ ) value for the experiment.

TREATED	OBSERVED	EXPECTED	$o-e$	$(o-e)^2$	$\frac{(o-e)^2}{e}$
INTERPHASE					
MITOTIC					

$\Sigma =$  \_\_\_\_\_

Degrees of freedom = \_\_\_\_\_

Critical value = \_\_\_\_\_

### CONCLUSION:

Is there a significant difference in the mitotic rate between the treatment and control groups?

What evidence is there to support your conclusion?

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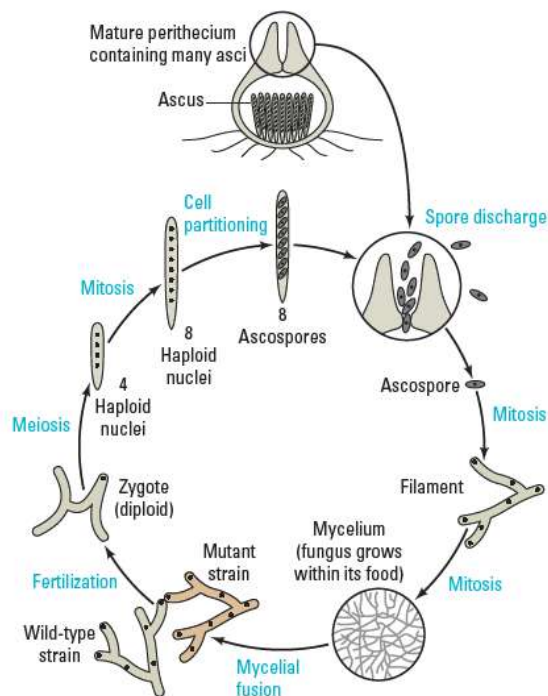
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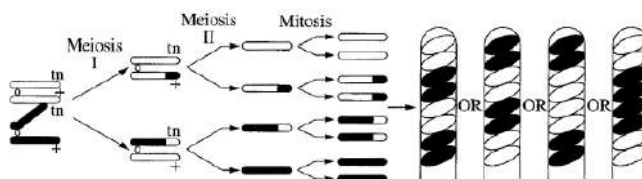
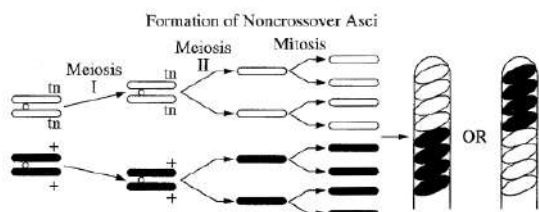


The fungus *Sordaria fimicola* exchanges genetic material when two mycelia meet and fuse. The resulting zygote undergoes meiosis to produce asci; each ascus contains eight haploid spores. A single gene determines spore color.

A cross was made between wild type (+;black) and tan (tn) strains. The resulting zygote produces either parental type asci, which have four black and four tan spores in a row (4:4 pattern) or recombinant asci, which do not have this pattern.

What process that happens during prophase I of meiosis results in recombinant asci?

### MEIOSIS and CROSSING OVER IN SORDARIA



### Meiosis with NO crossing over

### Meiosis WITH crossing over

DATA- Count asci on 3 cards	NUMBER OF ASCI SHOWING 4:4 PATTERN (PARENTAL)	NUMBER OF ASCI SHOWING CROSSOVER (RECOMBINANTS)
CARD 1	<div> </div>	<div> </div>

CARD 2		
CARD 3		
TOTAL		

One map unit equals one recombinant per 100 total events. The percentage of asci showing crossover divided by 2 equals the map units in this activity. This is done because each spore produced by meiosis undergoes a mitotic division.

TOTAL # OF ASCI	% ASCI SHOWING CROSSOVER	% ASCI SHOWING CROSSOVER DIVIDED BY 2	GENE TO CENTROMERE DISTANCE (Map Units)

LOOK AT THE LIFE CYCLE DIAGRAM FOR THIS FUNGUS.

Meiosis is a reduction division producing 1n cells from the division of a 2n cell, but the products that are produced are different in different organisms.

Which type of cells are produced by meiosis in Sordaria? \_\_\_\_\_

Which type of cells are produced by meiosis in humans? \_\_\_\_\_

Why did you divide the % of asci showing crossovers by 2? \_\_\_\_\_

\_\_\_\_\_

MAKE A CONNECTION:

Use what you know about crossing over to predict the connection between the distance between two genes on a chromosome and their frequency of crossing over. ( Draw a picture below if that helps. )

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