

Full lesson transcript for Mr. Zindi of School A

Lesson 1: Meiosis on 11 February 2020

Details

- This lesson transcript represents 35 minutes teaching time.
- A black Zimbabwean male teacher was teaching the topic meiosis 33 male and female learner participants, all in grade 12.
- The lesson took place at a former model C co-educational High School in Johannesburg East district in Gauteng on 11 February 2020.
- When used by the teacher, the learners' names have been changed to protect anonymity.
- The textbooks utilised during the lesson are Exam Fever Life Sciences Grade 12 1st edition published by Exam Fever Publishers and Study and Master Life Sciences Learner's Book Grade 12 Published by Cambridge University Press.
- Used PowerPoint presentation (laptop and data projector)
- White board and board markers

Transcription conventions

Symbol	Signification
T:	A verbal contribution belonging the teacher
L:	A verbal contribution belonging to any individual learner
Ls:	A verbal contribution belonging to two or more learners
...	Noticeable pause of less than 1 second in a turn, which could be due to reformulation or hesitation
—	Sound abruptly cut off e.g false start Truncated word

	Formal made shorter e.g S-
/ /	Words between slashes show uncertain transcription (not clearly known or understood).
/ ? /	Inaudible utterances
[]	Words in brackets indicate non-linguistic information eg [pause for 1 second] Laughter, throat clearing, smile, applause, sigh happily/ weryly/deeply, contently, swallowing, nodding, shaking head dance or movement towards/away
()	Parenthesis around tone units indicate words spoken in a sotto voice under one's breath (in a very quiet voice)
,	Slight pause
?	High rising intonation
.	Falling intonation at the end of tone unit
:	Colon following a vowel, indicates elongated vowel sound or extending length of sound e.g Die:d
::	Extra colon indicates longer elongation
↑	A step up in pitch/ high pitch (high quality sound)
↓	A shift down in pitch (low quality sound)
^	A caret indicating high pitch level e.g ^weird
-	Low pitch level
--	Self-interruption or repair

Abc	Best guess transcription
ALL CAPS	Utterance is louder/said with extra stress/emphasised compared with surrounding words
/	Rise tone e.g ...saying something, /
\	Fall tone
V	Fall-rise-tone
Λ	Rise-fall-tone
CAPS	Prominent syllable e.g sOn or FAtHEr

EPISODE 1: RECAP OF MAJOR CONCEPTS

1. Mr. Zindi: We would like to start now...are you ready?
2. Right, I would like to start by looking at what we did yesterday, the lesson was mainly a recap on chromosomes and I am going to ask questions to see if you remember major concepts that we discussed yesterday [getting a notebook from his table].
3. Now I think at this point you all know where the chromosomes are found and / ? / the chromosomes...ehm—the fact that each type of organism contains at least the same type of chromosomes as—
4. These types of chromosomes are, they are / ? / consist of two sets.

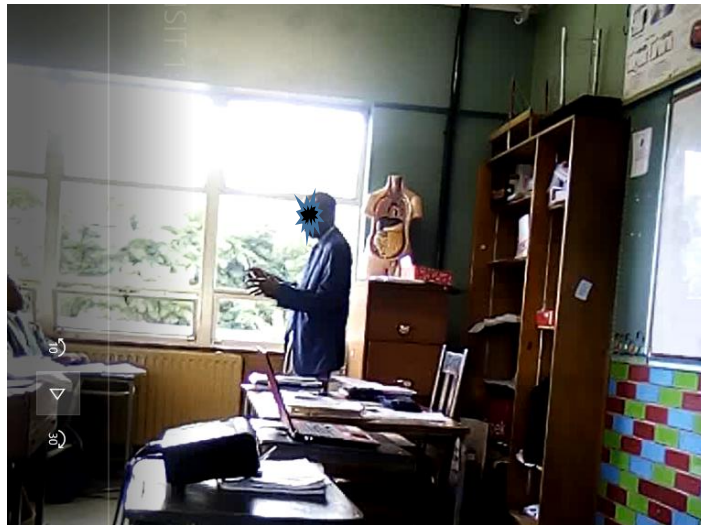


5. For example, human beings we have how many chromosomes?
6. Ls: 46
7. Mr. zindi: 46 and when we have 46, what is the special word do we use to describe that.
8. They appear in even numbers because they consist of two sets.
9. Which word do we use to describe this?
10. [Pointing to a learner] We call it...

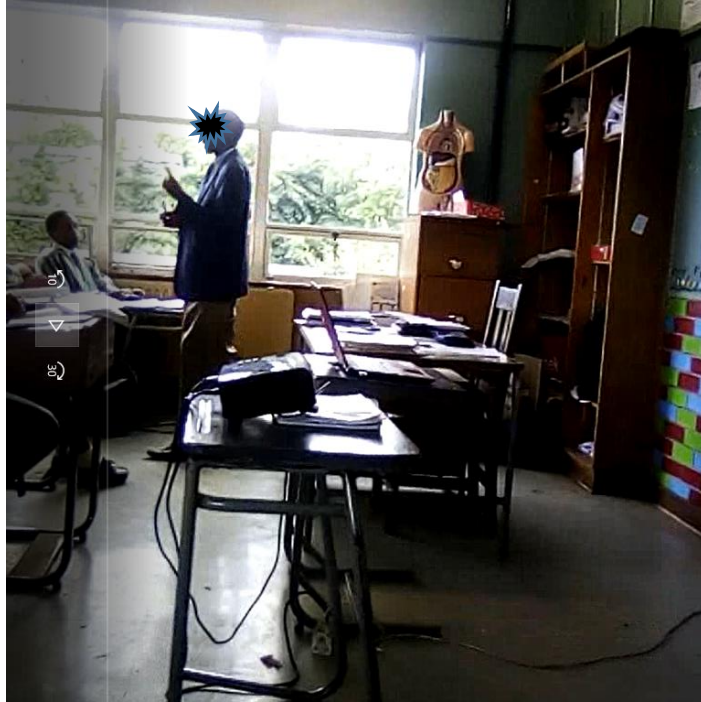


11. Joseph: / ? /
12. Mr. Zindi: Haploid or diploid?
13. Ls: Diploid.
14. Mr. Zindi: We call it diploid [writing on the board] diploid...number.
15. Now if we-- what happens— ehh— gametes sex cells, which word do we use to describe the number of chromosomes in a sex cell...Terrence!
16. Terence: Haploid.
17. Mr. Zindi: We call them haploid, that is / ? /
18. [Reading from his paper] “what is the name we give the pair of chromosomes [pause] that is found in the cells” [pause] which word did we use...Lerato?
19. Lerato: / ? /
20. Mr. Zindi: / ? / we call them homologous chromosomes and [reading from his paper] “what is the special word that we use to the cells-- for the cells for the cells that we find in the body”...ehm...that is the body cells, what are they called? [Moving along the aisle point to a learner] Hanley?
21. Hanley: Somatic cells.

22. Mr. Zindi: These are called somatic cells and the sex cells, they also have a special name what do we call them [Pause] what do we call them?
23. We call them [pauses and there is silence]
24. Ls: Gametes.
25. Mr. Zindi: Gametes or [pauses and silence] right remember we have one pair of these sex chromosomes that is X and Y, this is another word we use [moving along the isle and point to a learner] be the memo!
26. Sibusiso: Karyotype.
27. Mr. Zindi: Not karyotype.
28. / ? / these are also referred to as THE (gonosomes).
29. [Looking at his paper] ↑Right so these are the most important... processes that we learned yesterday [goes to the board and erases the board] and today we are going TO look at WHAT happens in organisms.
30. You remember when organisms--big organism-- all organisms...



...begin their lives as a single cell...



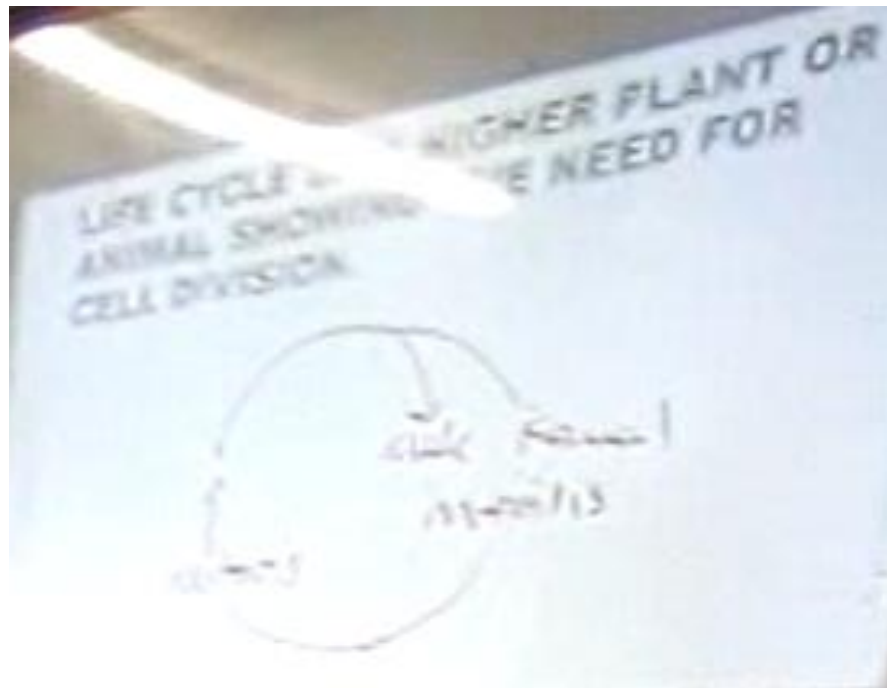
...and then [pause] the single cell grows in the— e womb after fertilization it becomes a baby.

31. A baby is about 54 centimeters long.
32. Then how did we get— how do we get to that baby of 54cm FROM a single cell?
33. What happens there? [Silence]
34. Remember the sperm and the e-- egg they fertilize, after fertilization we form a zygote right and then the zygote begins to grow, how does that zygote, a single cell grow into many cells?
35. Hope: It is mitosis.
36. Mr. Zindi: By mitosis.

EPISODE 2: CONCEPT OF MITOSIS

37. Right, so today we are going to look at TWO ehh-- ehh—concepts, mitosis and meiosis how do these relate to each other.
38. In the first place what is mitosis?
39. This is revision, we are just doing a recap before we start on meiosis.
40. What is mitosis...yes, Morrison?
41. Morrison: It is cell division.

42. Mr. Zindi: It is a special kind of cell division and this is [pause] the kind of division that makes organisms e-- grow. [Writing on the board]
43. So, write the date and the topic mitosis. [Silence as learners write]
44. [Adjusts the data projector] Right our topic is mitosis.
45. [Writing on the board] Right, I am going to-- if you cannot see do not worry, I am going TO elaborate on that.
46. Now this diagram [pauses as he draws on the board] ...it will help to understand the relationship between mitosis and meiosis-- it will help us to understand the relationship between mitosis and meiosis.
47. [Pauses] Right [pauses] now this explains the life cycle of higher plants and animals showing the need for cell division.



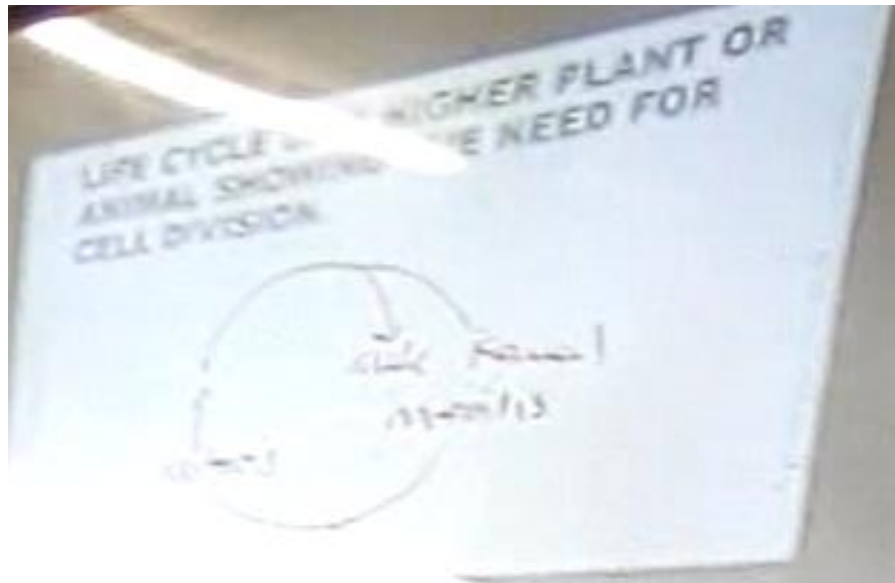
48. As we have said...



...these organisms grow by a process called mitosis and now when we have [writing on the board] an adult organism this can be male or female.

49. What happens?
50. A process called meiosis takes place.
51. Where there is reduction in the number of chromosomes and then [pointing to the board] fertilization then the-- mitosis takes occurs for the organism to grow.
52. Now, I want you to write your own definition of mitosis, what IS mitosis?
53. Write it down / ? / [silence] what is mitosis? [Silence as learners write]
54. What is mitosis? [Silence]
55. Right are you done?
56. Can someone share with us...what you have written?
57. ^Remember you are writing this definition your own... words, in your own understanding from what you learned in grade 10.

58. What is mitosis?
59. Someone mentioned before that it is a special kind of division.
60. How do you go further than that?
61. Joseph: Sir I said that / ? /
62. Mr. Zindi: Right can we have more detail...yes, Marlon!
63. Sibusiso: / ? /
64. Mr. Zindi: Very good!
65. I like the / ? / of the word identical.
66. So, this a process whereby cells divide to form to identical CELLS.
67. [Writing on the board] TWO IDENTICAL CELLS.

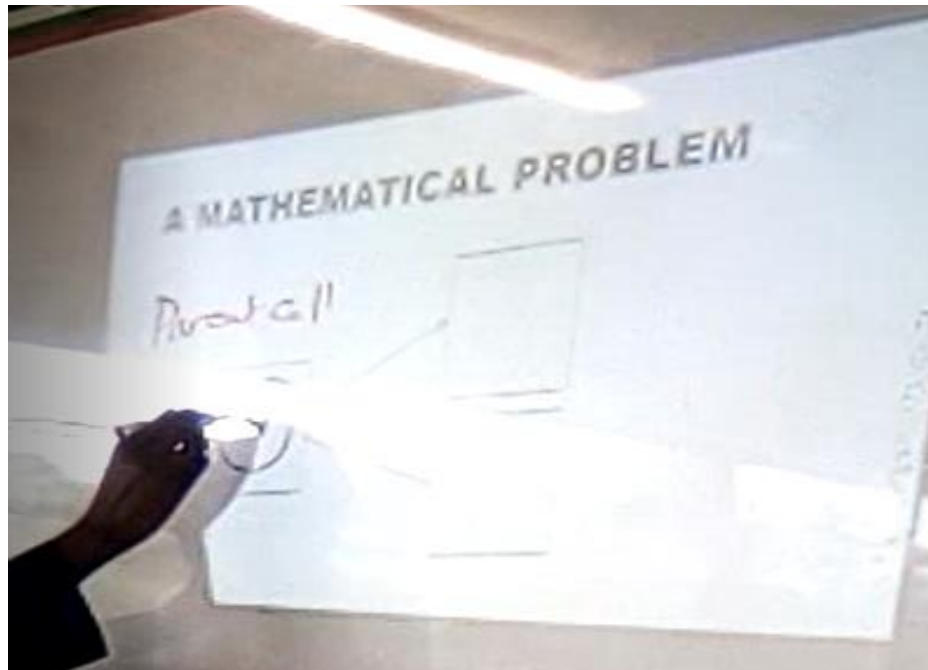


68. Okay when we say they are identical we mean they are identical to each other.
69. Are they going to be different from the parent cell?
70. They are going to be the same.
71. So, you add that on your definition as well.
72. It results in the formation of two identical cells [pause] or cells that are identical to each other and to THE parent cell [writing on the board] also identical to the parent cell.
73. That gives this eeh... point [referring to what is written on the board]
74. NOW which cells of the body undergo eeh... mitosis?

75. Ls: Somatic
76. Mr. Zindi: Somatic cells / ? / [writing on the board] and now who can explain what we mean by the word identical?
77. What do we mean when we say that these cells are identical to each other and the parent cell?
78. What does that mean...? Yes, Morrison!
79. Morrison: It means that they are the same in every concept.
80. Mr. Zindi: Which are these concepts that you are referring to?
81. Morrison: / ? /
82. Mr. Zindi: Louder please!
83. Morrison: They are genetically identical.
84. Mr. Zindi: Genetically identical, what do we mean?
85. Someone sitting there does not understand.
86. Marlon: /When we... genetically identical we mean they have the same type of chromosomes/
87. Mr. Zindi: That is correct! / ? /
88. So, they have the same type of chromosomes further down.
88. They have the same number and type of chromosomes [Pauses as he writes on the board] they have the same number and type of chromosomes. [Erases the board]

EPISODE 3: MATHEMATICAL PROBLEM

89. Our next question is...I want you to write this down [pauses as he writes on the board].
90. Right, [writing on the board] how does one cell divide and still have the same number of chromosomes? [Erases the board]
91. [External noise] Right we are going to do a bit of a mathematical problem and people are going to tell me what actually happens there.
92. So, we have an animal cell... [drawing on the board]



...and we are going TO imagine that we have four chromosomes, and we are going to name these chromosomes 1, 2, 3 and 4 [naming them on the board] right and after cell division how many chromosomes-- after mitosis how many chromosomes are we going to have there?

93. On the / ? / it means the cell is going to divide but we are still going to have the same number of chromosomes in these cells. [Pointing to diagrams on the board]
94. So, here we are going to have 1, 2, 3 and 4 1, 2, 3 and 4 how come?
95. Is this mathematically CORRECT?



96. How do we explain this phenomenon?
97. We have these four chromosomes, the cell divides...



...into two...



...and we still maintained the same who can explain genetically, how that happens...Sifiso!

98. Sifiso: /Maybe the number of chromosomes increases/
99. Mr. Zindi: THAT'S A VERY GOOD OBSERVATION!
100. There could an increase in the number of chromosomes, in the parent cell
okay... is that possible?
101. How...



...what happens— happens?

102. Marlon: / ? /...so that when mitosis happens, they break into two.
103. Mr. Zindi: Where does that other chromosome come from?
104. Marlon: From replication.
105. Mr. Zindi: VERY GOOD...



...FROM THE PROCESS OF REPLICATION, remember that.

106. So, when the cell is about to divide, remember what happens inside the cell.

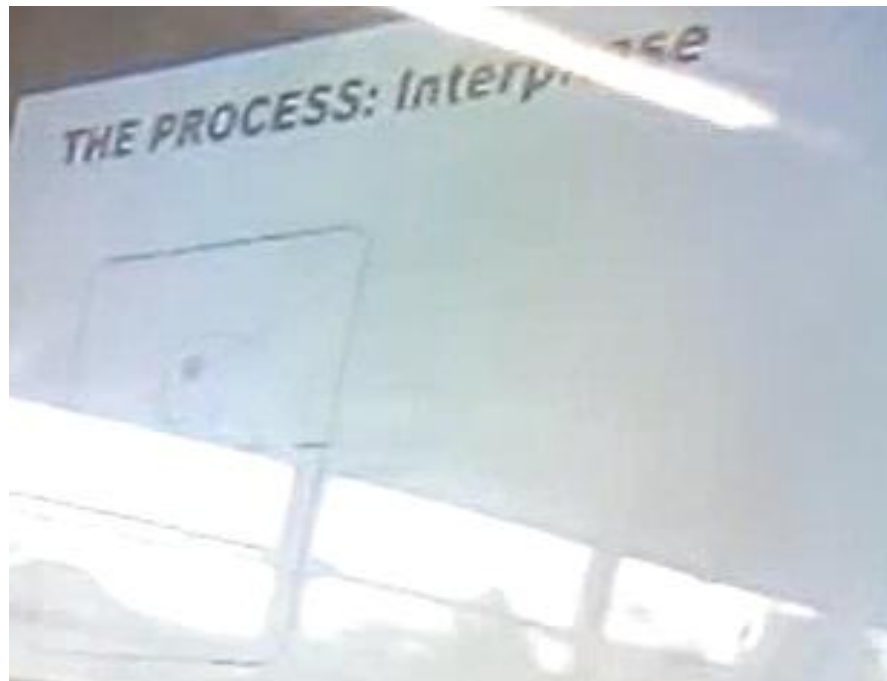
107. Replication takes place So that the answer that I am looking for here [pointing to the board], take it down [pause].

108. This is possible because of replication.

109. When the cell is about to divide replication or duplication of chromosomes takes place. [Pauses] Right, [erases the board].

EPISODE 4: RECAPPING MITOSIS

110. [Erasing the board] Now let us recap the process of mitosis and this phase is called INTERPHASE from what we remember from grade 10.



111. What happens during-- what is the main event that takes place during interphase?

112. Write down interphase and write down the main event that takes place during this phase, we have just discussed it. [Pause]

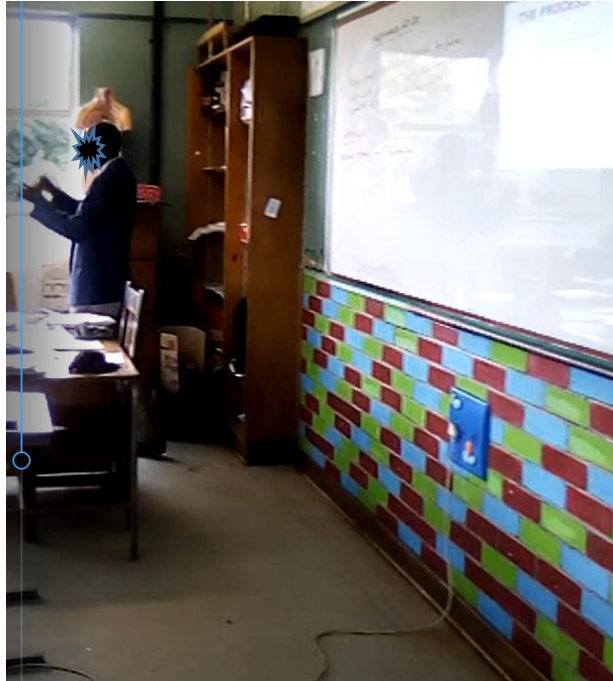
113. We are now looking / ? /

114. What is the main event that occurs during this eeh...stage?

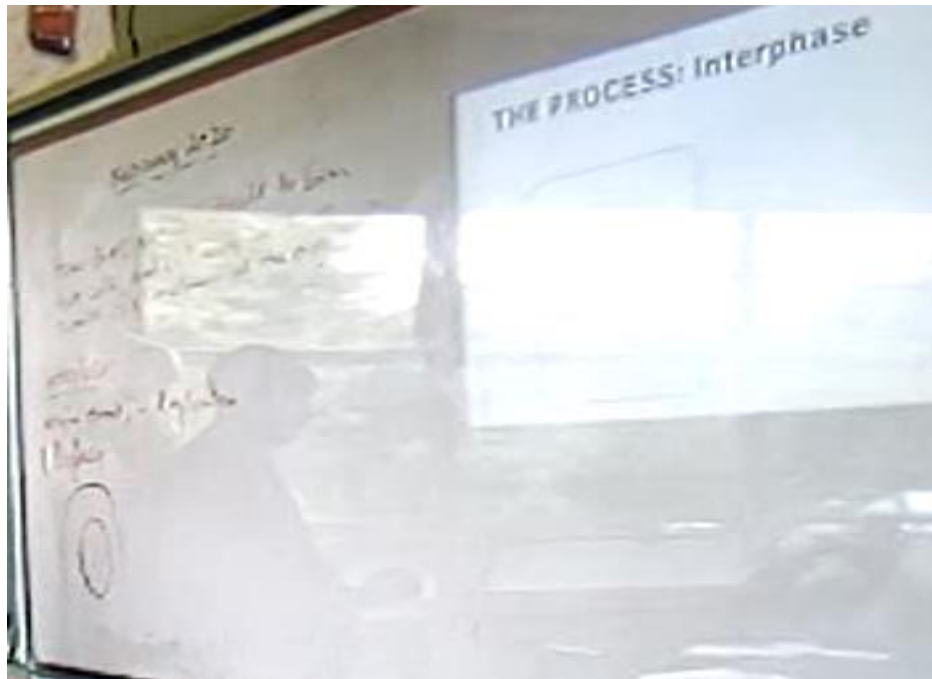
115. Ls: Replication!

116. Mr. Zindi: CORRECT!

117. [Writing on the board] It is replication.
118. Now after replication what is THE next...



- ...stage in the process of mitosis?
119. It is prophase so; I want you to write briefly what you still remember about what happens during this stage.
120. [Writing on the board] It is prophase... we are going to work with four chromosomes.
121. [Drawing cell on the board] so, in your diagrams draw four chromosomes and start with the cell.
122. Remember the cell has a nucleus...the cell has a nucleus.



123. Represent your chromosomes, do not worry about looking at that diagram [referring on the diagram on the slide].
124. I had to represent your chromosomes. [Pauses as he gets his paper from the table].
125. Right, who can still remember what happens during prophase?
126. What happens, remember we are coming from interphase where the chromosomes are in / ? / inside the nucleus and now when you enter into prophase?



...remember the chromosomes—



[points to a learner]

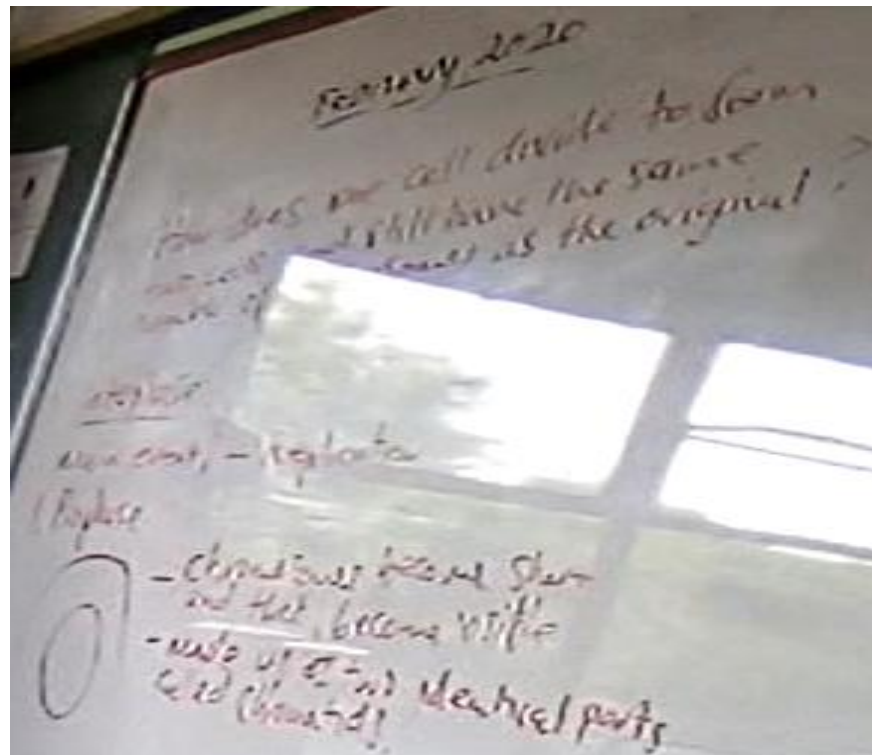


127. Morisson: The chromatin network Sir shortens.
128. Mr. Zindi: VERY GOOD!
129. Take that down.
130. During this process, the main events that occurs is the shortening and thickish-- thickening of chromosomes.
131. [Writing on the board] Become short and thick and they now become visible.
132. And now these chromosomes are now-- they are of two identical parts.
133. What is the name given to these identical parts?
134. What do we call them?
135. This side...

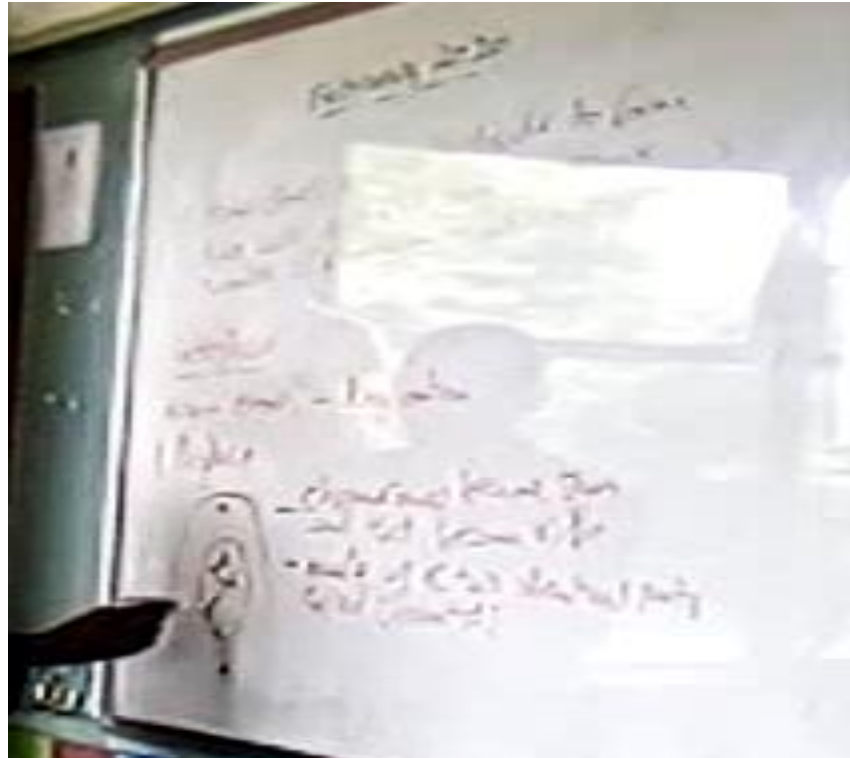


...you are not participating.

136. They become thicker and visible and you can now observe TWO identical parts, what do we call these identical parts...Richmond?
137. Richmond: Chromatids.
138. Mr. Zindi: These are chromatids, take that point down.



139. They become visible and now they are made up of two identical parts [pause] called chromosomes.
- [Learner clearing throat] Right, so your four chromosomes inside the nucleus— [Draws on the board].



140. What other things occur during this phase?
141. If you remember very well, this the phase when the nuclear membrane disappears. [Drawing on the board].
142. The nuclear membrane disappears.
143. [Puts his paper down] Right, are we done?
144. Now what happens in the next stage?
145. But we are interested in the name... [door opens making noise] meta- means middle.
146. Right so, something is going to happen in the middle,



... do you still remember how the chromosomes are— draw a diagram and arrange the chromosomes inside the cell.

147. Right and do not forget that the-- these structures [showing on the board]

...you need to draw [pause] in prophase.

148. What do we call these? [Pointing to the board]



149. Ls: Spindle fibres!
150. Mr. Zindi: They are spindle fibres [pause] ↓ (they are spindle fibres).
151. Now the nucleus has disappeared—



...it is disappearing in the first stage prophase.

152. Now represent the four cells, how are the cells...



...going to look like?

153. If you are done and I would like a volunteer to go and draw the chromosomes on the board [one learner goes to the board] and do not forget the spindle fibres. [Bell rings]

154. Right, someone else!

155. This a class dominated by a few individuals; it is supposed to be a discussion.

156. Hanley, would you like to try. [Hanley goes to the board and draws]



157. Eeh...what do you think about-- thank you very much...what do you think about that?

158. Is that correct? [Referring to learner's drawing]



159. No, it is not correct although you do not want...



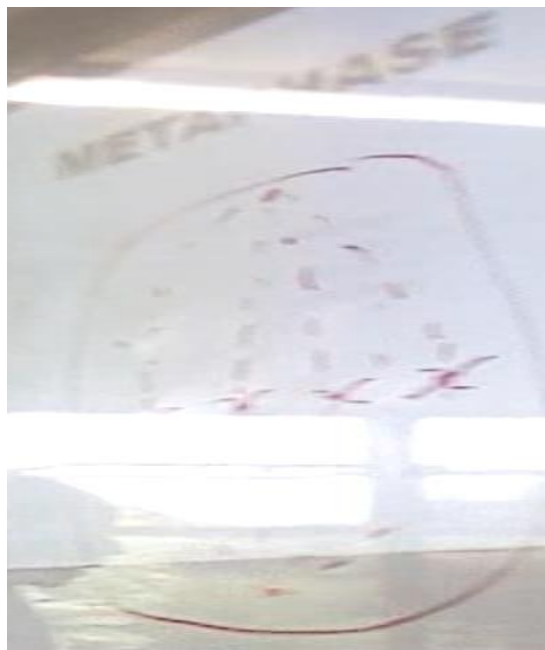
...to say that Sipho?

160.

Who would like to correct that?



[Another learner goes to the board and draws]



161. Remember, the meaning of the prefix meta- means... [writing on the board]



162. Ls: Middle
163. Mr. Zindi: So, what is in the middle...



...are THE chromosomes, so they lie on the equatorial plane.

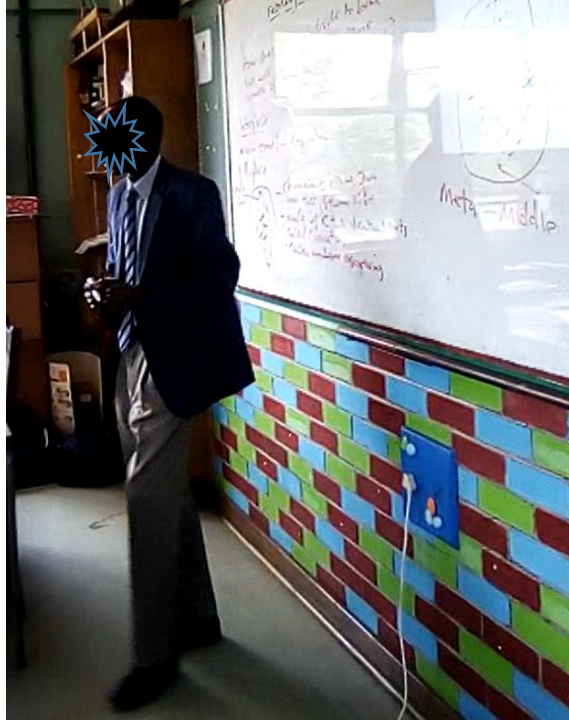
164. So, this is CORRECT!

165. [Referring to the diagram on the board] But before you go,



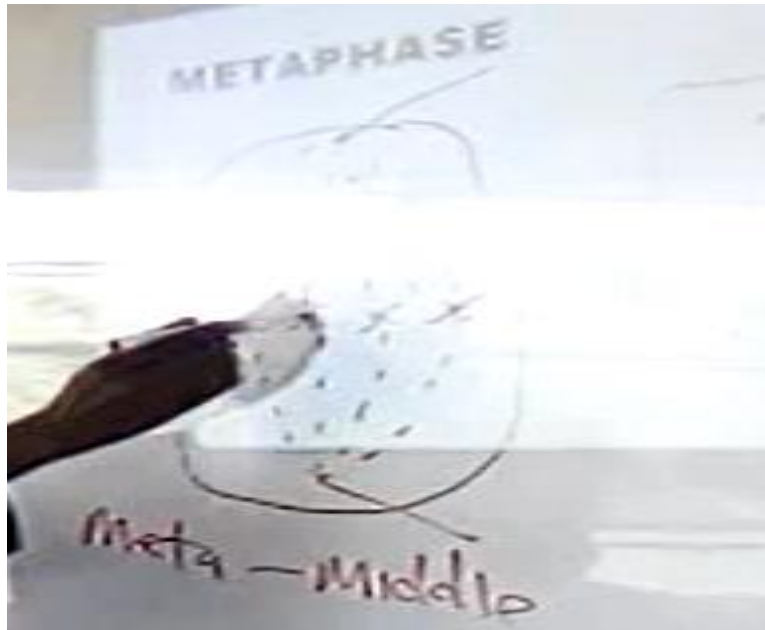
...what is the name that we give to these dots there?

166. [Pointing to the diagram on the board] It is the... [nods at learner]



167. Ls: Centriole!

168. Mr. Zindi: ...and he was putting some [pause] dots on the chromatids...what do we call this...yes! [Showing in the board]



169. Richmond: Centromere!

170. Mr. Zindi: Right— what I want you to do is to go and look at the rest of the phases.
[disruptions from noise from outside]

THE END