

Full lesson transcript for Mrs Durand of school A

Lesson 1: Meiosis on 11 February 2020.

Details

- This lesson transcript represents 35 minutes teaching time.
- A South African female white teacher was teaching the topic meiosis 60 male and female learner participants, all in grade 12 (two grade 12 classes combined).
- 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 textbook utilised during the lesson is Understanding Life Sciences Grade 12 Learner's book published by Pulse Education Services.
- Used laptop, data projector, PowerPoint slides, coloured markers and white board.

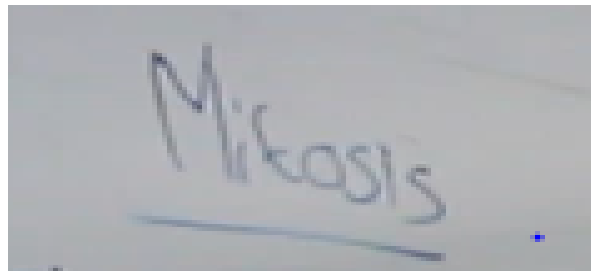
Transcription conventions

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

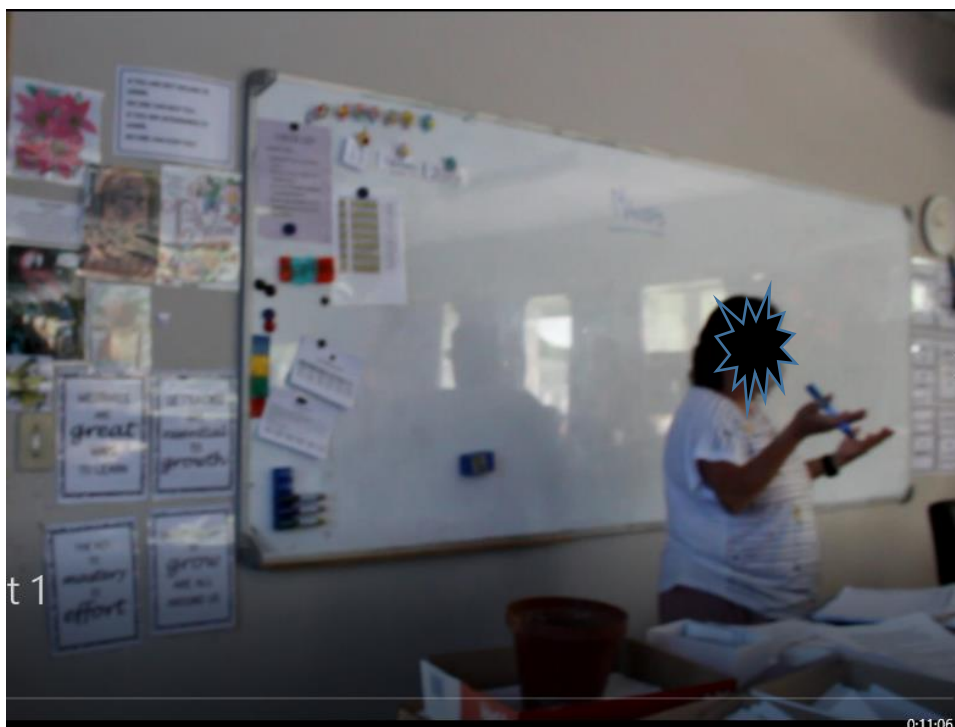
1. Mrs Durand: There is another chair here, there is a girl standing ... there is another chair here...\
2. Right/ we are going to as said... quickly undergo a bit of revision of what you are supposed to know.
3. Mrs Durand: If you make notes... you do it FAST am not going to wait for you. /
4. Khensani: Oka:y
5. Mrs Durand: I am not waiting for you at all.
6. Today's date is 11th... /
7. Khensani: Mrs Durand... [not her actual name]
8. Mrs Durand: /Is this still tested in paper 1? /
It is paper 1 and 2.
9. Khensani; Paper one\
10. Mrs Durand: GUYS=
11. Khensani: /So we are not writing--/
12. Mrs Durand: Bo:th=.
13. This topic is tested in both paper 1 and in paper 2, it one of the topics that is asked in relation with reproduction in paper 1 and of course nucleic acids in paper 2 and genetics.
14. ALRIGHT...What do we know about mitosis? \



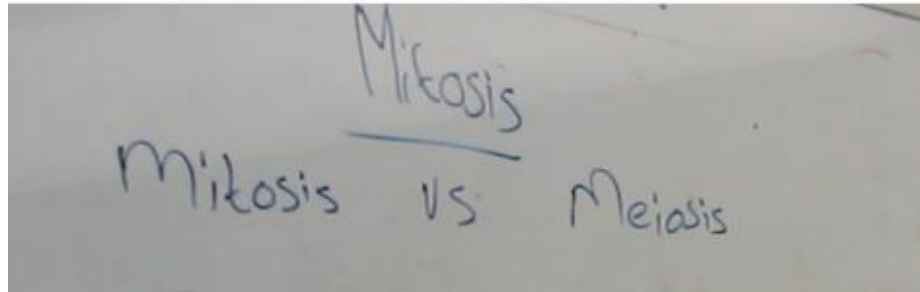
15. What is MITOSIS...? \
16. Ls: Cell division
17. Mrs Durand: YES, its cell division, what type of cell division...? \ [raising her left hand pointing to the word '*mitosis*' written on the board]



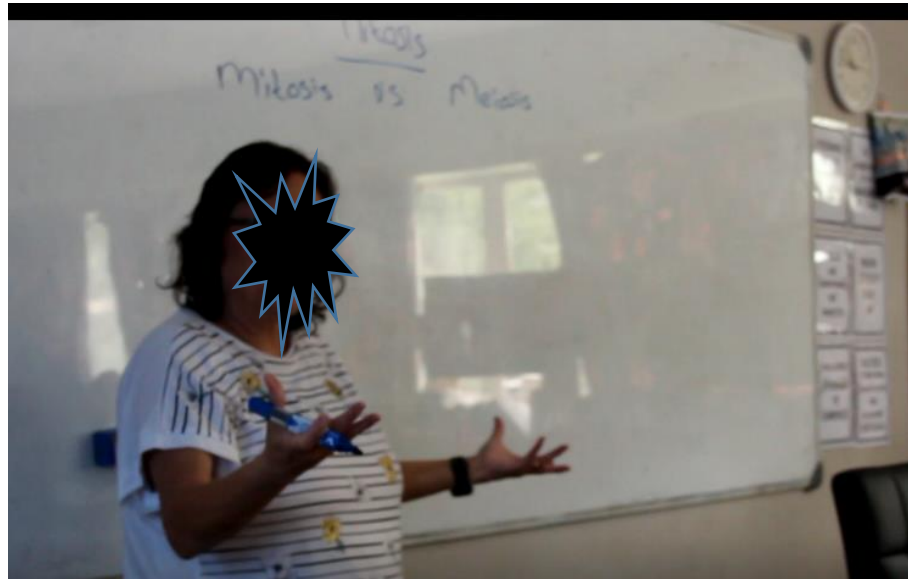
18. Joyce: /Inaudible/
 19. Mrs Durand: Aah...aah...this is the cell division that takes place where? [Showing them her open hands]



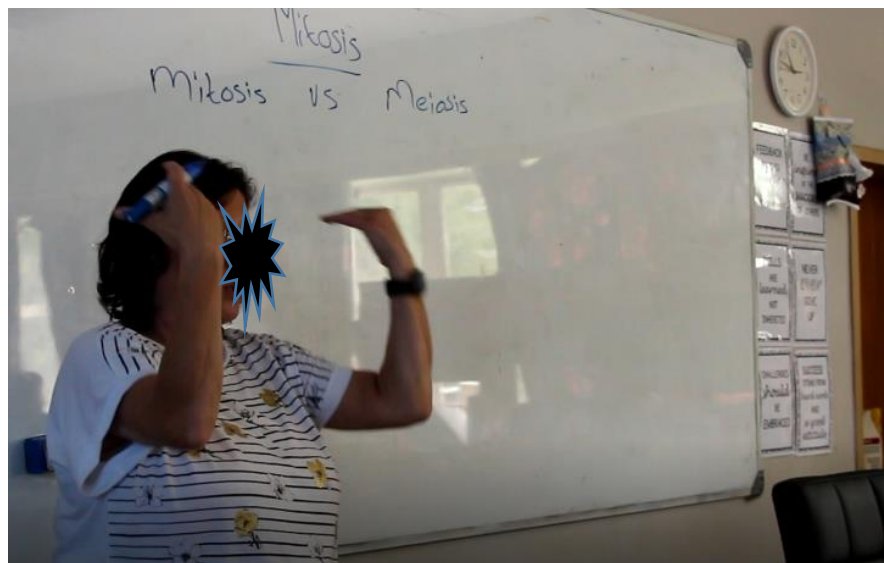
20. All over your body.
 21. What do we call it? [Going to the white board]
 22. Okay, (now writing on the white board '*mitosis vs meiosis*') first...I am going to DO... something like this...because in grade 10, we sort of introduced very briefly, meiosis\



...the essence of what meiosis is going to be about...



...so, you are supposed to now refer...



to your grade 10 terminology.

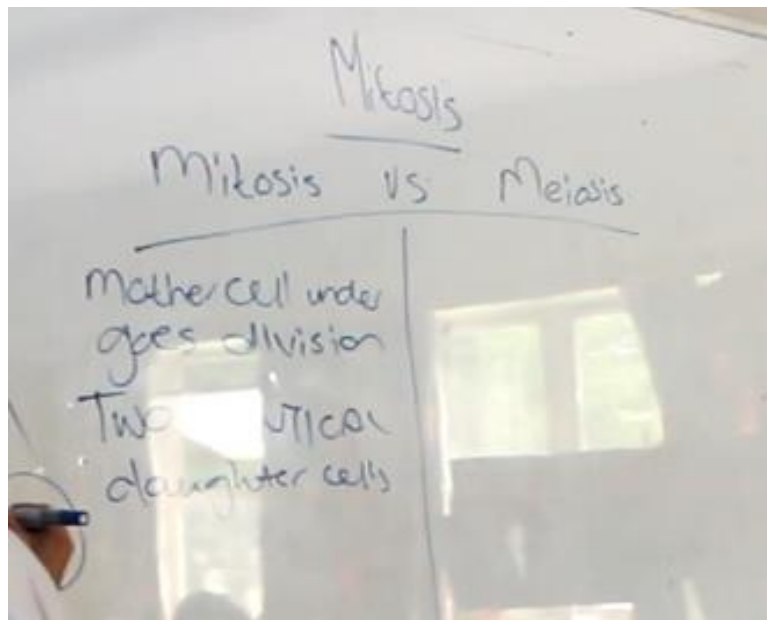
23.

Remember, what I have said to you guys,



my class especially.../inaudible/...one follows the other one, so we are referring to grade 10.

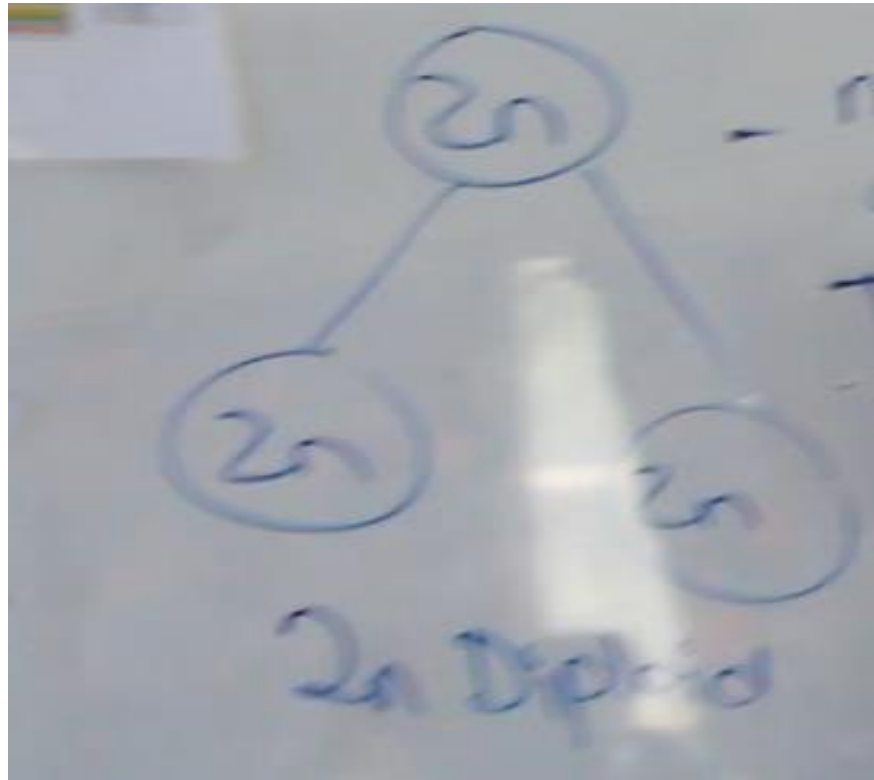
24. [Referring to the board] Okay we are going to look at mitosis vs meiosis.
25. What is MITOSIS? [Pointing to the learners]
26. [Writing on the board] It is a cell division where the mother cell undergoes (pause) division.
27. Okay and what is created?



28. Ls: Two identical—

29. Mrs Durand: Now there is a term that we spoke about in grade 10...where we say two identical daughter cells.

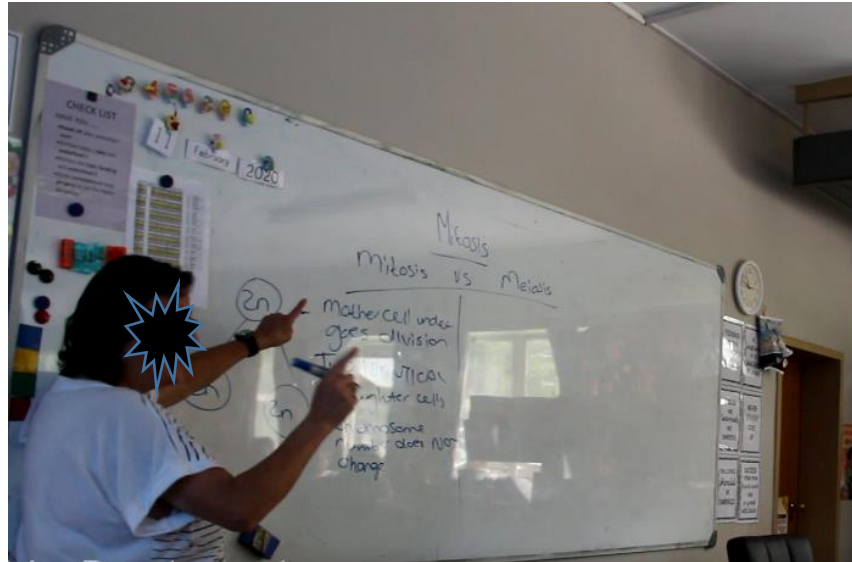
30. In other words, if I do mitosis like this... [writing on the board]



...alrigHT and anybody still remember what this refers to? [Silence]

31. Okay, the chromosome number still stays the same here hey. [Silence]
[writing on the board]

32. In other words when we said in mitosis...



...the chromosome number stays the same in these two identical daughter cells.

33. We refer to this as, being a diploid chromosome number.

34. FULL NUMBER OF CHROMOSOME...

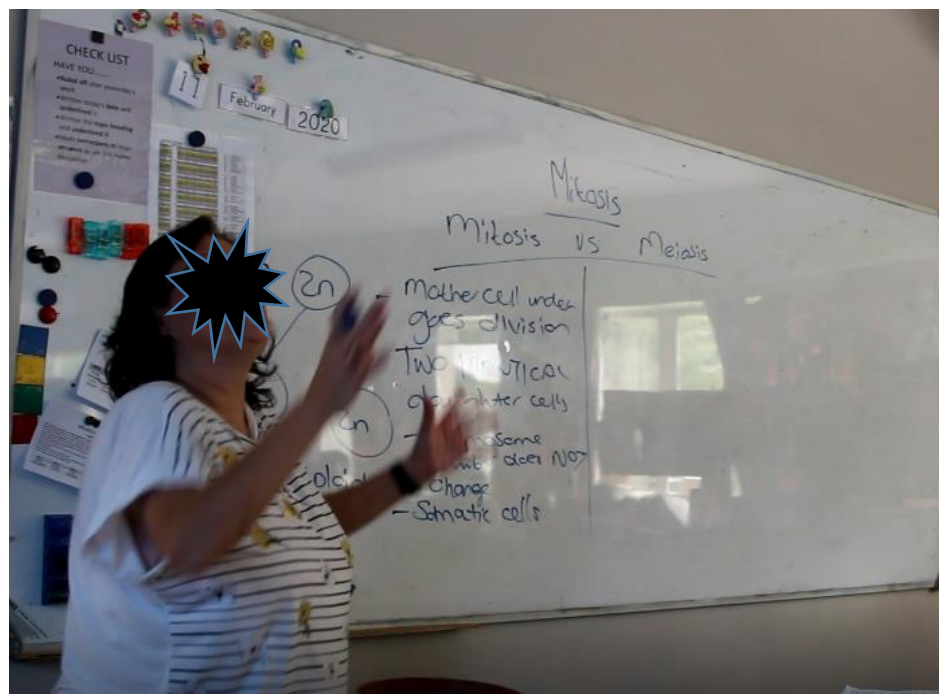


does not change. \

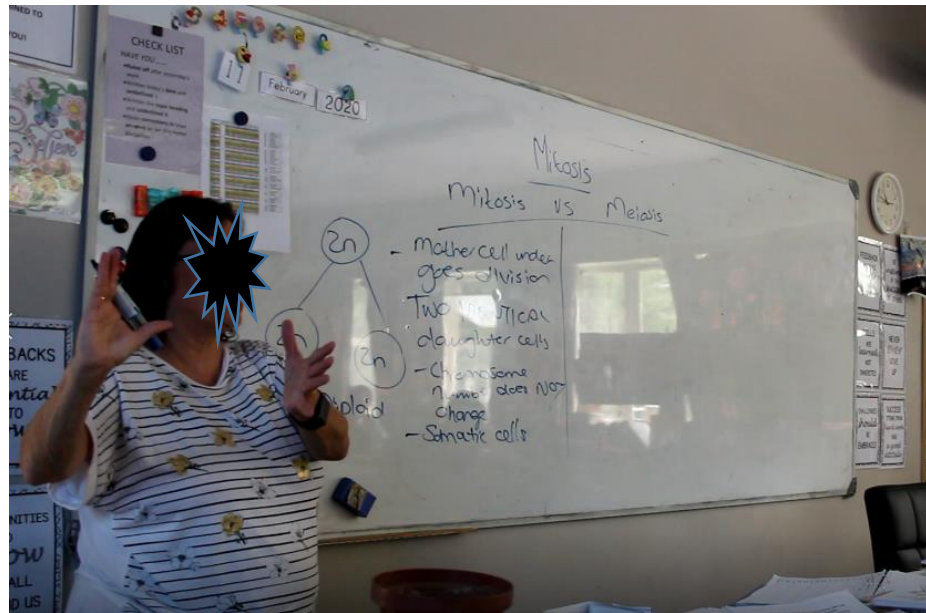
35. Okay the chromosome number does not change, WHETHER you are human or dog. \ ...and it is in your body cells, what cells is body cells...? [pointing to the learners with marker]



36. [Silence] SOmatic cells ↑people [pause as she writes on the board].
37. It occurs in the somatic cells, [writing on the board] in other words... the cells all over your body [using hands]



...EXCEPT in YOUR [pause] sex cells\ [using hands]



38. ↑OKAY [pointing to the board]



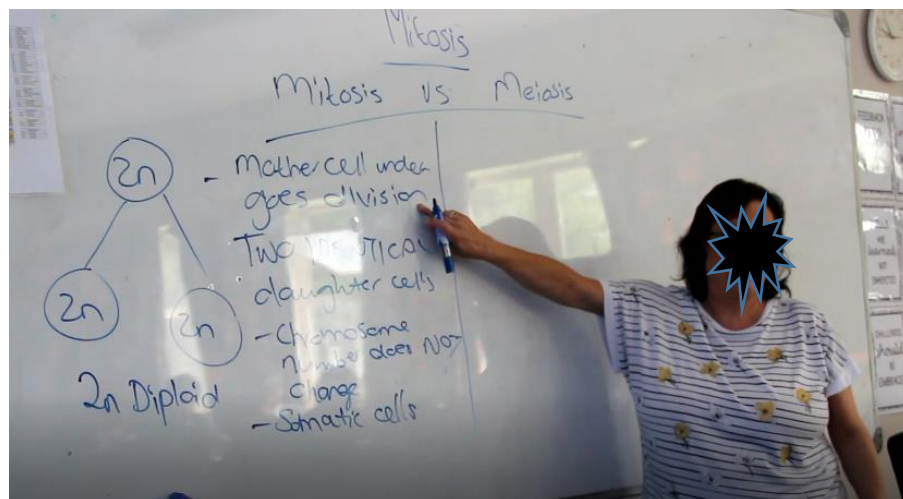
...so, remember that...okay, it stays diploid.

39. Two identical daughter ↑CELLS identical to the parent cell.



40. Now, we will briefly touch on the meiosis side, for a quick comparison.

41. Meiosis-- YES, we are going to have cell division /taking/ place...



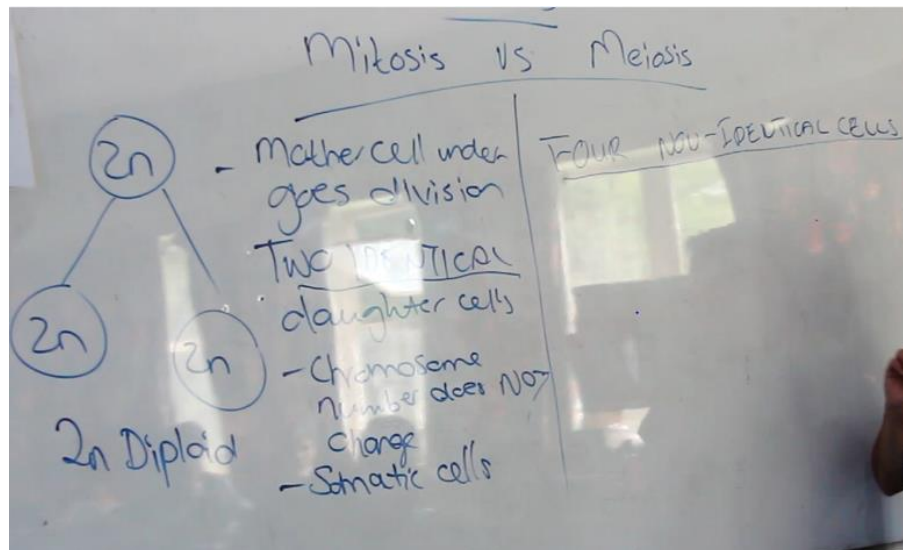
[writing on the board as she compares meiosis to mitosis].

42. We are going to have four non- identical cells... [writing on the board]
FOUR...

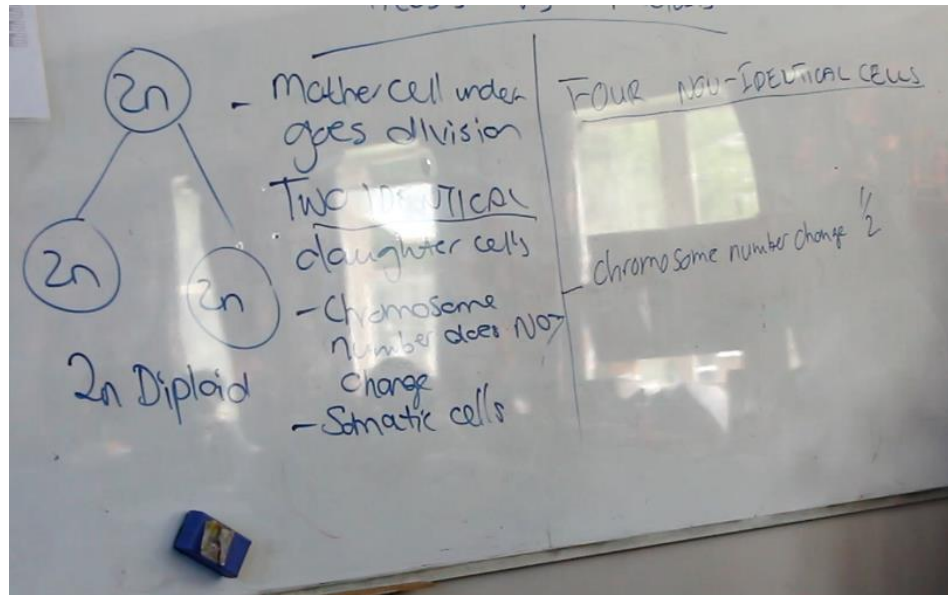


...can you note the difference already.

43. Ls: Hmm...
44. Mrs Durand: [Writing on the board] I had two identical and I have four non-identical—

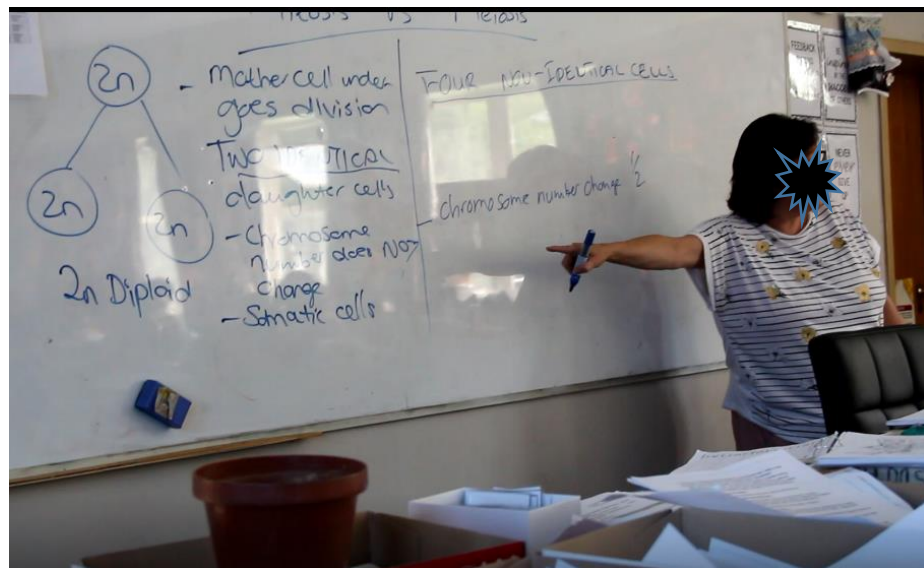


45. Khensani: Cells!
46. Mrs Durand: Okay, chromosome number changes [pauses as she writes on the board] in other words, its halved [writing on the board and pauses].

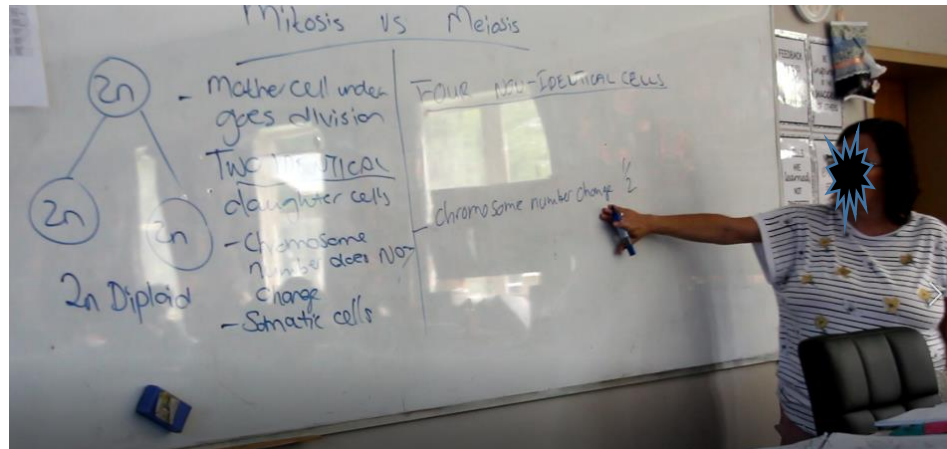


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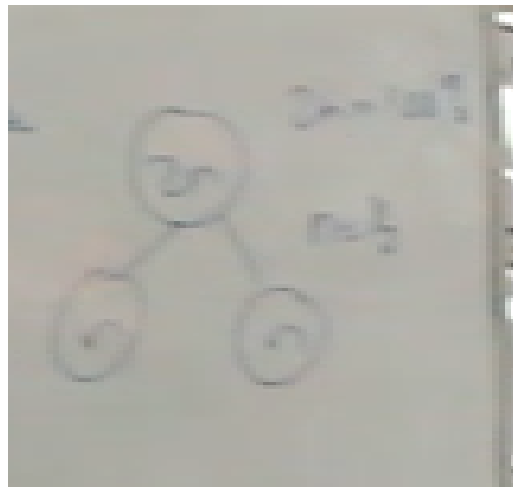
Chromosome number does not change in mitosis...



but here it is going to get halved [pointing to the board and pauses]

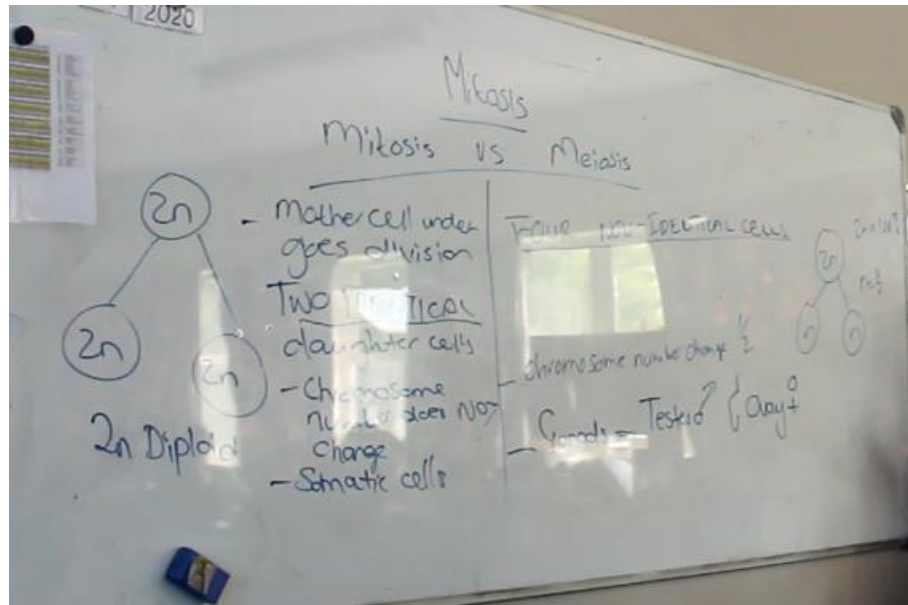


48. Okay in other words, I have THIS CELL [drawing a cell on the board] that becomes the result like this... [pointing to the diagram drawn on the board]

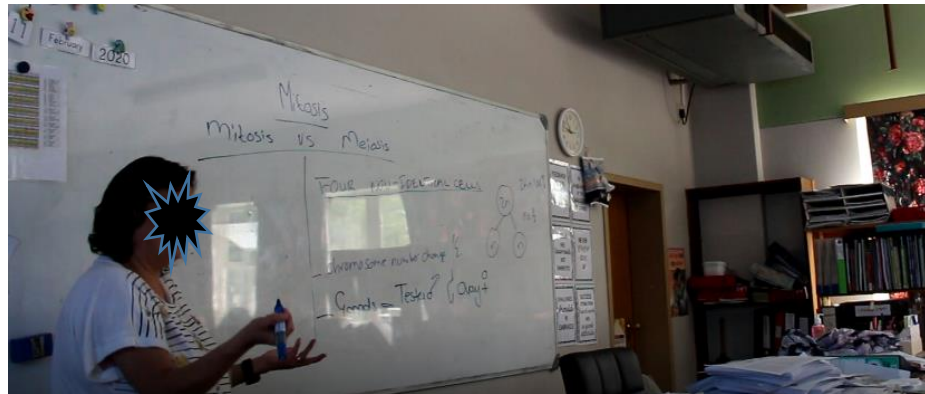


half the number of chromosomes.

49. So, 'n' refers TO [pause] half that refers 100% or full.
50. You got that-- you remember that now from grade 10...
51. Ls: Yes!
52. Mrs Durand: ... 'course some of you look totally, totally lost.
53. Ls: [Chorus]
54. Mrs Durand: Okay, and where does this occur? [Pause]
[writing on the board]

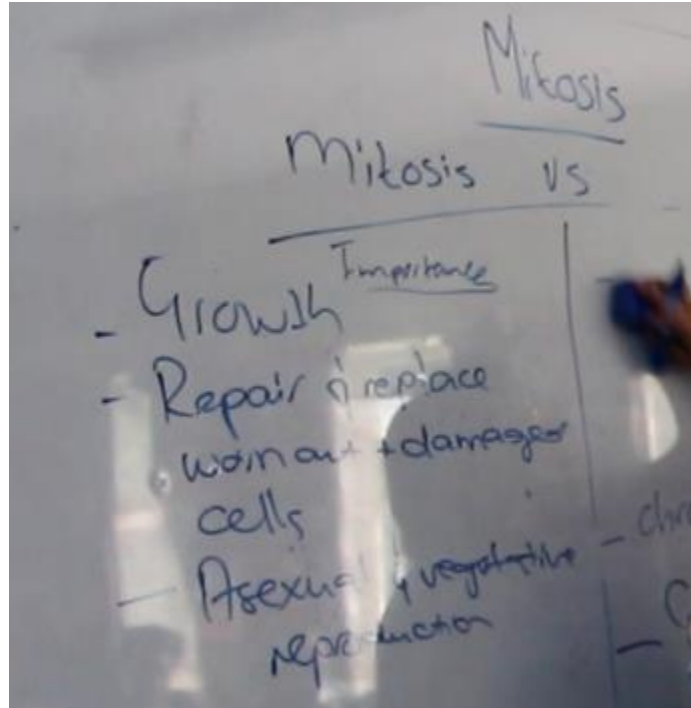


55. IN THE GONADS, in other words [intercom interruption] in the MALE TESTIS and in the female [intercom interruption] ovary— [intercom interruption]
56. Okay, you all got that [intercom interruption].
57. You are NOT TALKING? [intercom continues]
58. Aah... just get over and done with it, damn it!
[Rubbing the board] Right I am rubbing off, I told you I am not waiting [pause]
59. Ls: Yoh... Ma'am, ma'am.
60. Mrs Durand: I am not ↑waiting!
61. Mpilo: It is fine!
62. Ls: [All speak at once]
63. Mrs Durand: KEEP QUIET [clearing throat]
64. Ls: [Clearing throats]
65. Okay, now we also said, why is mitosis then important.
66. Meiosis got to be important, that we will do this year.
67. But why was mitosis important in grade 10, if had to think about it. [Using hands]
68. How do you grow [Pause]



...how do cells get replaced or repaired, how does asexual reproduction take place?

69. If you remember from last YEAR, when we did microorganisms we talked about asexual reproduction [pause] in THE bacteria, the fungi the protists--that when we talked about asexual.
70. Okay, so your [pause] importance here [writing on the board], will be for growth, okay.
71. It could for repair and replace— your worn out and damaged tissues [pause].
72. [Continues writing on the board] Okay, for ↑asexual a:nd vegetative reproduction [pause] and this will be in your microorganisms and in plants [pauses and stops writing] because we get [pointing to the words on the board]



...asexual in plants too and we get vegetative in plants.

73. Alright, so this is your IMPORTANCE... why mitosis was important, or still important.



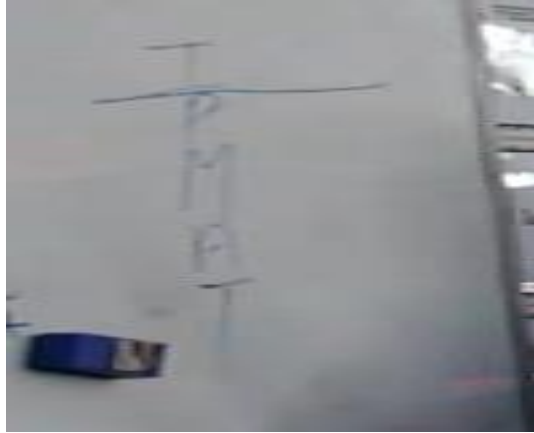
74. Any questions? [Pause]

75. Do you not want to sit down because you are standing in somebody's way/
/ ? /

76. Ivan: Ma'am I cannot see!
77. Mrs Durand: Do you not want to swop with someone at the back?
78. Swop / ? / please!
- [Ivan goes to the back and they swop places]
79. Alright— ↓Now [pause] [leaning on her chair]

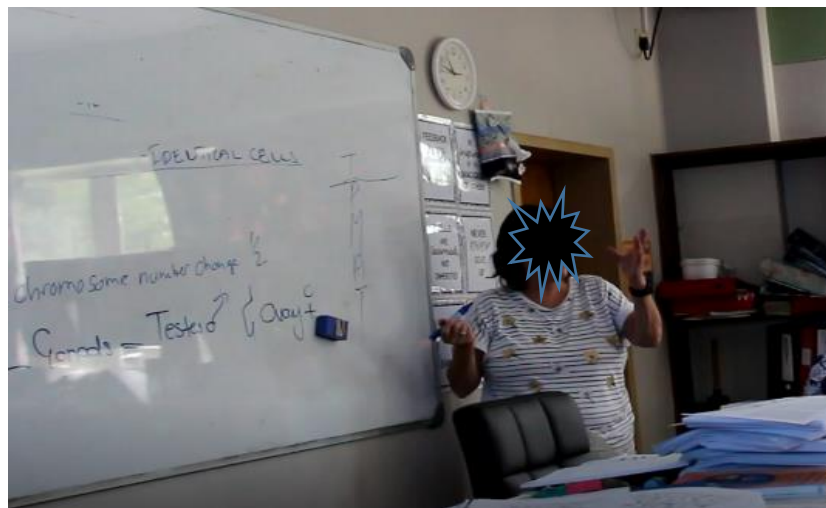


- ...we need to quickly revise the phases of (mitosis) because these phases are going to be in meiosis as well.
80. [Using her hands] It is going to be slightly different wording, but they are very important.
81. You all remember the cell cycle, what is the cell cycle? [Going to the board] Okay, this is the importance hey! [pointing to what is written on the board]
82. What is the cell cycle guys? [Erasing the board]
83. [Erasing the board] It is the events that the cell goes through [pause] okay, to prepare for replication and cell division.
84. I am not going to the whole cell cycle BUT in mitosis we spoke about [pauses as she writes on the board] 'IPMAT'.
85. Okay... [pauses as she draws a line in the board]

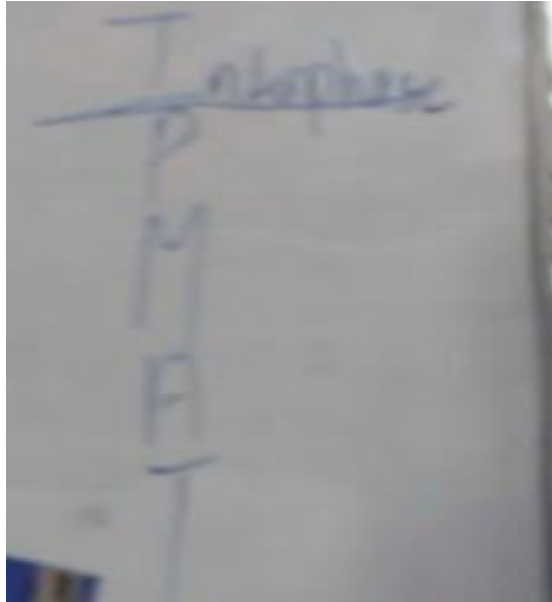


...why do I draw a line there?

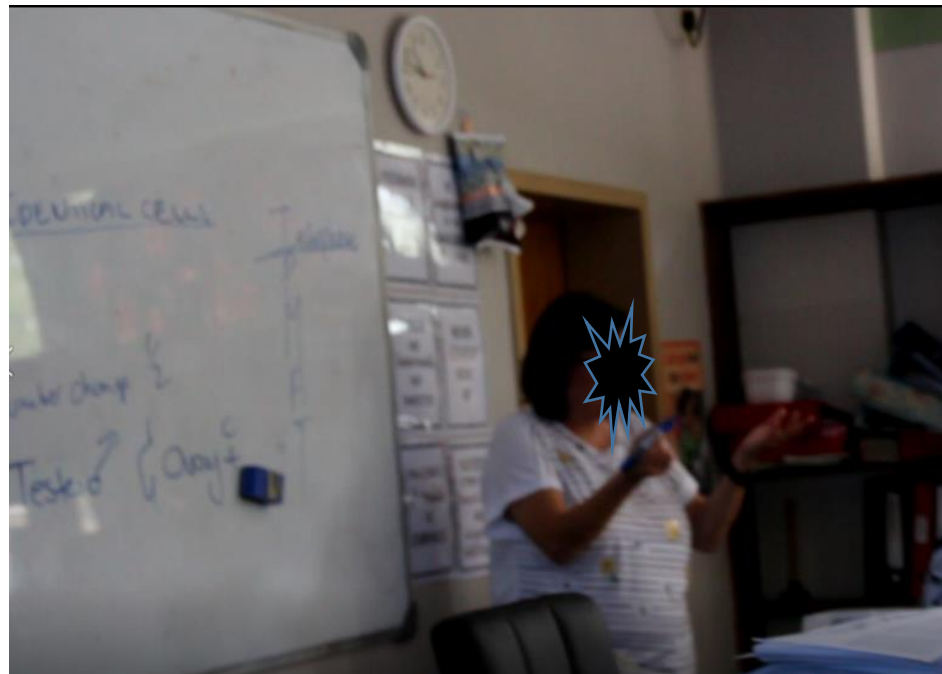
86. What do you remember about the start of the cycle?



87. Ls: [Chorus]
 88. Mrs Durand: What is this one called...I—?
 89. Ls: Interphase!
 90. Mrs Durand: Interpha:se... [writing on the board]



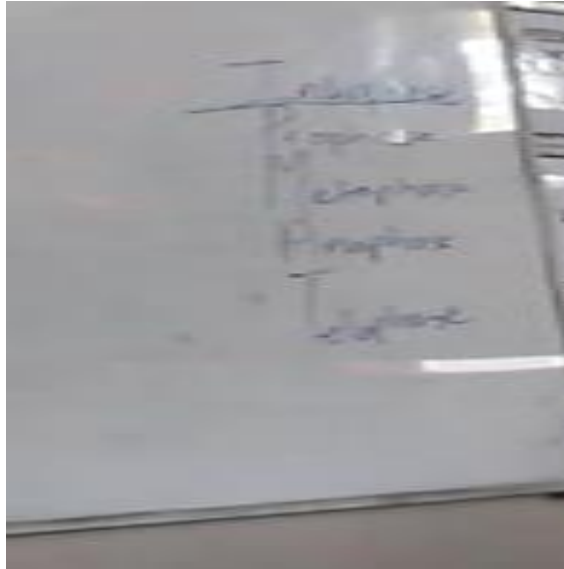
...interphase is not really part of the whole mitosis,



it is the PREPARATION for mitosis.

91. Okay, remember you have got to know this in the order, that is why I am using the acronym IPMAT; PROPHASE, METAPHASE and ANAPHASE and TELOPHASE, alright, in telophase we will also do the cytokinesis part.
92. Alright, I am going to leave in the early and late telophase.

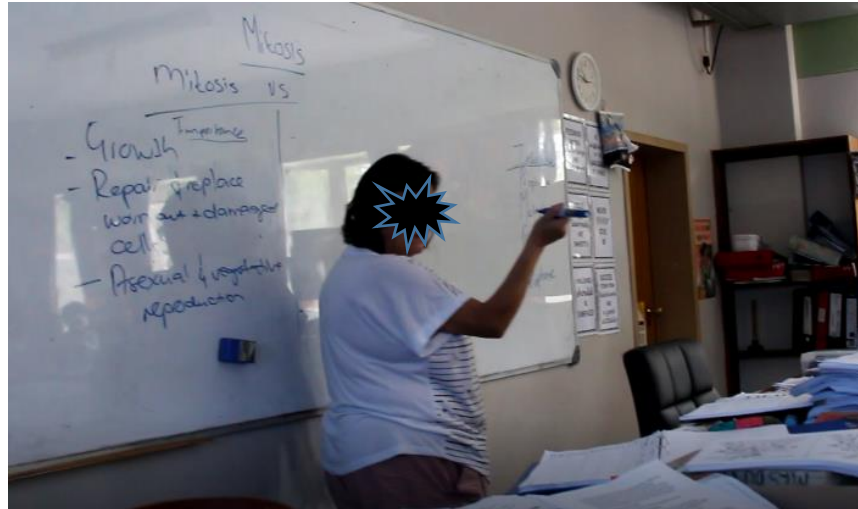
[Erasing the board] These are the phases we are going to look at, you just completed now.



93. DNA replication.
94. Okay, we not going to go through the whole process again, but you need to know it is not in isolation. [Erasing the board]
95. [Continues to erase the board] Okay our cell is going TO replicate its genetic MATERIAL— for cell division to take place, [using hands]



...and that will happen in the interphase /phase/, remember that.



96. Okay, so interphase [writing on the board] is also when your organelles would replicate, alright so it is the DNA replication, plus organelles will replicate in here as well.
97. Okay, it is going to happen in interphase.
98. Also, your cell is going to grow in interphase.



99. So, it is quite a lot happening in interphase, because growth also takes place in here.
100. That is where your S1, G1 S2 come from.



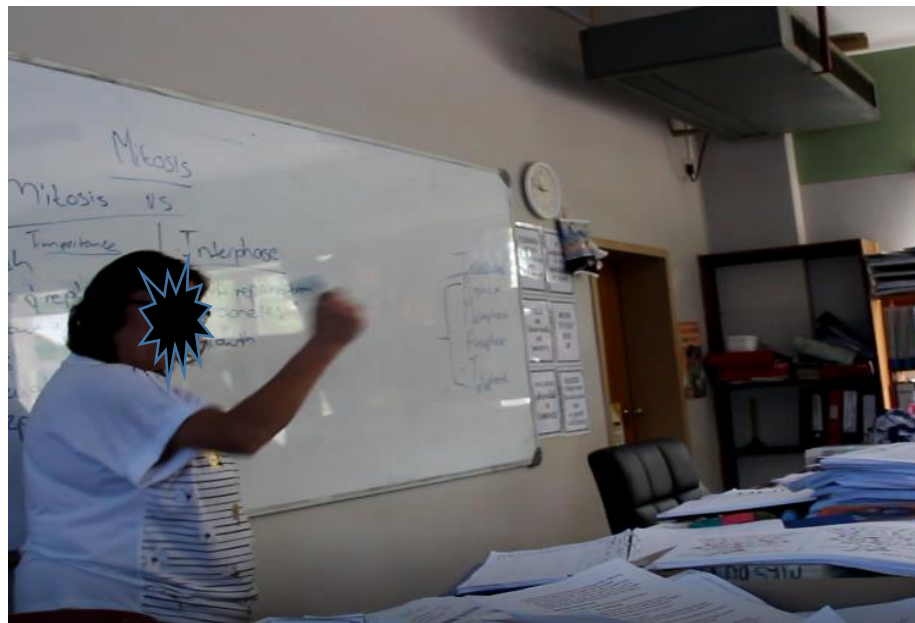
101. I am not going to go through that again, this is / ? / now comes to real part, your preparation for cell division, that is what interphase is all about.



102. It is a preparation phase, that is [going to the board] why it is not part of the actual cell cycle.



103. ↓ It is not part of mitosis; it is BEFORE mitosis...



...but for argument sake we will include it,



...so, we do not forget about it.

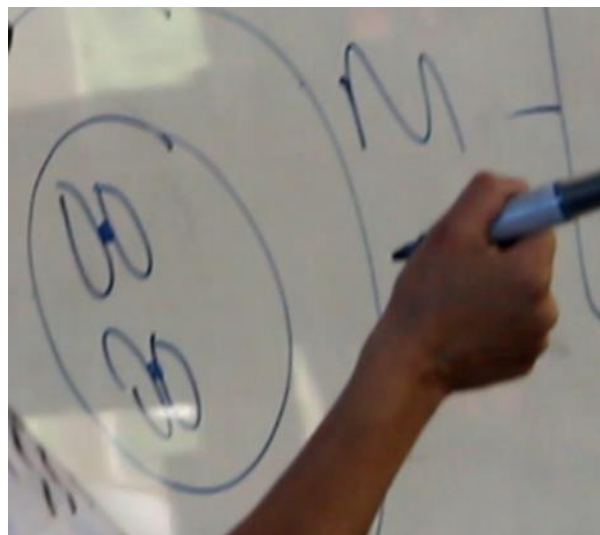
104. Okay, [pointing to words on the board] so this is mitosis.
105. So, prophase, metaphase, anaphase, and telophase, that is the actual mitosis.
106. Interphase is your [pause]
107. Khensani: Preparation!
108. Mrs Durand: Preparation, okay you all got that?
109. Ls: Hmm...
110. Mrs Durand: Right let us go to prophase.
111. [Writing on the board] What happens in prophase?
112. All that happens— can you all see the cell...do I need to move this?
[Holding her chair]
113. Ls: Yes!
114. Mrs Durand: [Moves the chair] Okay let me draw the cell here /inaudible/ here we go.
115. [Drawing on the board] Inside prophase, we have our nucleus.

116. Remember your DNA replication, inside this phase the chromatin—



THE duplicated chromatin network...It is going to become chromosomes...

[Pauses as she draws a chromosome on the board]



...joined by A centromere.

117. So, this is chromosO:me /as opposed/ to chromaTIds...you all remember that?

118. Ls: [Silence]

119. Mrs Durand: ↓You all look so LOST, THIS IS REVISION.

120. Ls: Ehh...

121. Mrs Durand: Okay, and we also going to have... centrioles forming on different / ? / and moving to the other pole.
122. **Now what happens in prophase?**
123. We are going to have, the nuclear membrane disintegrating.
124. Okay, we also going to write SPINDLE starting to form. / ? /
125. So, the spindle is going to form from the centrioles, or centroSOMES but keep it to centrioles otherwise you are going to get confused by the centris-- alright.
126. Now, what else is gonna happen here? [pointing to the diagram on the board]



127. COME think back, right we are going to write the nuclear membrane disappearing. [writing on the board]
128. Your chromo-- your no-- chromatin network is going to condense into chromosomes. [Pauses as she writes on the board]
129. I am just going to write, it condenses okay— chromosomes, [writing on the board] okay that stands for chromosomes.

130. I am going to have the centrioles moving to opposite sides and they form the spindles,



...you all remember that okay?

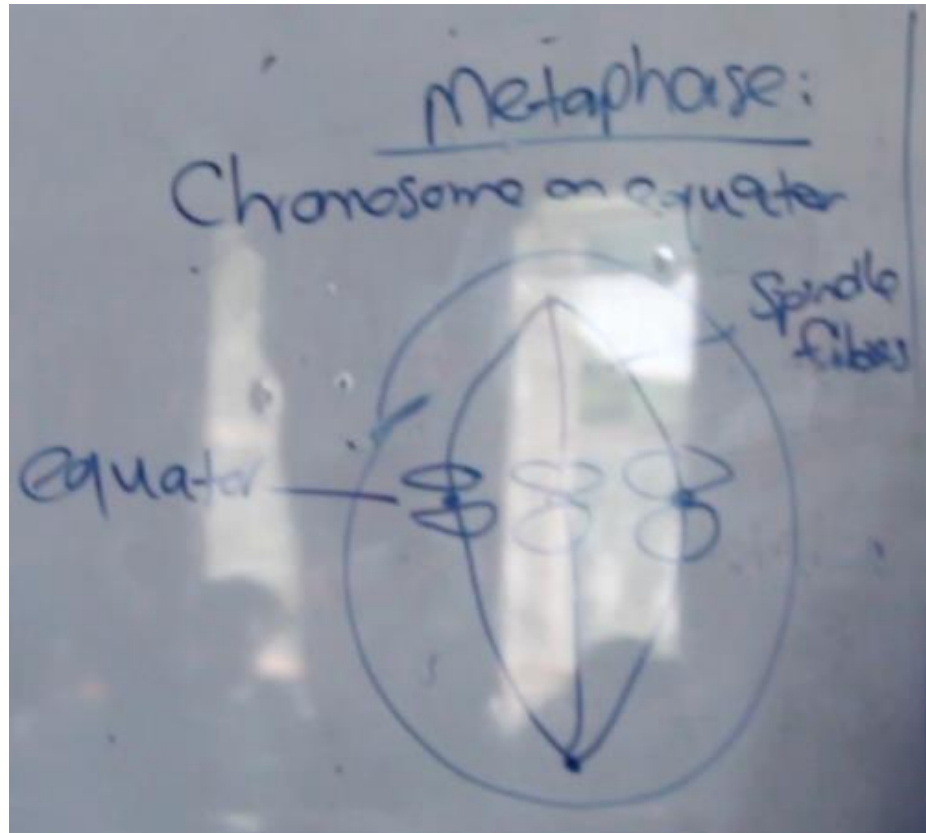
131. Ls: Yes!
132. Mrs Durand: Guys it is important that you know the phrases like this, it forms the basis of meiosis [pause] okay, you all got that?
133. Mrs Durand: What was the next phase?
134. Ls: Metaphase!
135. Mrs Durand: Right, what is going to happen in metaphase?
136. Okay [pauses as she writes on the board] in metaphase, those chromosomes if I am going to draw these things here, those chromosomes are going to lie on THE [pause] center plate.
137. [Writing on the board] What do we call this plate?
138. THE [pauses] equator, it is the equator of the cell.
139. In other words, in the middle of the cell.



140. Think of how the cell is being earth, with the equator separating us into two halves.



141. The SPINDLES are going to attach to the centro— [pauses] —meres, like that. [drawing on the board]
142. Okay [writing on the board] so, your chromosomes aligning on the equator [pause] meta- middle remember that, meta- midlle em... em... alright, you all remember that now?



143. Ls: Yes!

144. Mrs Durand: Okay, your chromosome on the equator...

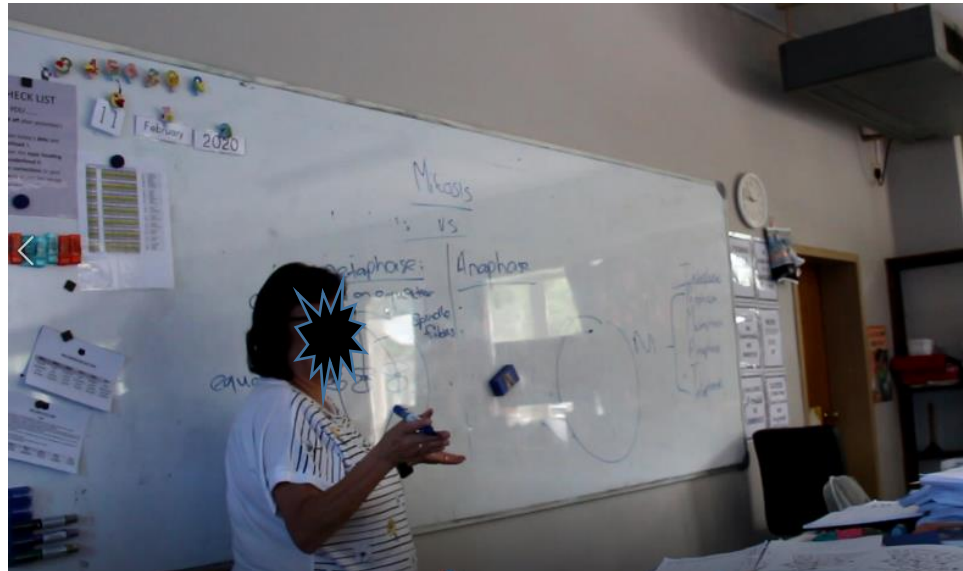
Okay next phase, [writing on the board] anaphase [erasing the board] ... in anaphase we are going to have the spindle fibres [labeling on the board] these are your spindles.

145. People, out of aah... interest do not just call them fibres,



...in the exam it must have the word SPINDLE with it.

146. Please note if you just write fibres they will mark you wrong.



147. [Sneezes]

148. Mrs Durand: You marked this question last year [referring to the researcher] and what did they say about this?

149. They must be very careful in how they label and word the things okay.

150. [Goes back to the board] Right in anaphase we are going to see— the person talking, I suggest that you keep quiet because you are disrupting the lesson.

151. Ls: Tom!

[Silence]

152. Mrs Durand: He is trying to hide behind that girl, this side next to you [referring to one boy] [will you] keep quiet.

153. There is a door behind me you decide / ? /

154. Okay, in anaphase you now have the spindle fibres [using hands to show contraction]



contracting and SEPARATES...



...the chromosome now into chromatids and each one is going to an opposite pole.

155. That is characterized by a big space in the middle of the cell [showing on the diagram on the board]



...and when you see this you would know; you actually have IT contracting.

156. So, actu-- your chromati— ds are moving to opposite poles.

157. [Writing on the board] A very easy one to remember.

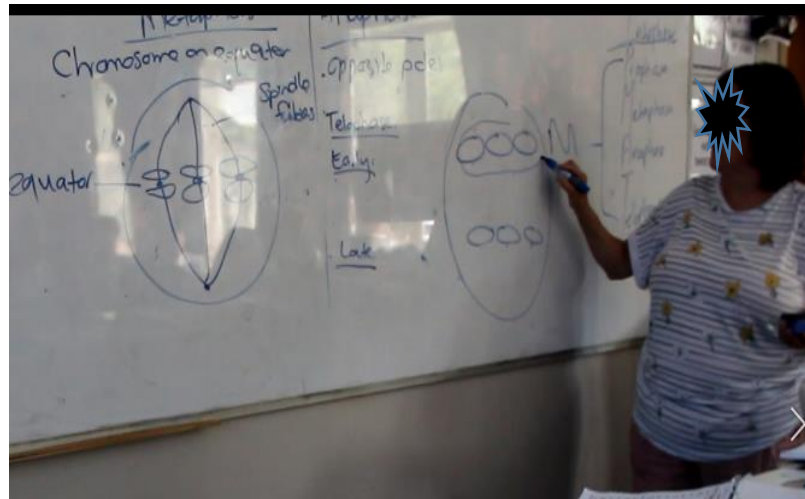
158. Now the last phase [pauses as she writes on the board] telophase, [pause]
we can al-- so do this in two parts.

159. We are going to do an early and we are going to do a late, right you remember early and late.

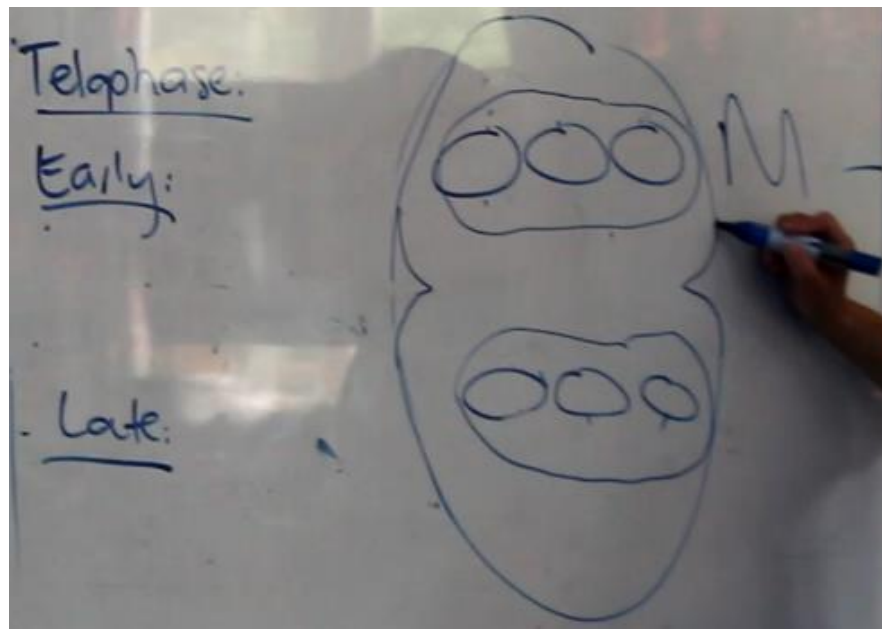
160. Ls: Yes!

161. Mrs Durand: So, I have my cell... [erasing spindle fibres from the diagram on the board] your spindles have sort of now disintegrated and disappeared alright, and two things are going to happen here.

162. You are going to have [drawing on the board] a nuclear envelope forming around there and a nuclear envelope forming here.



163. But apart from that, we are going to have invagination of the cell happening [showing that on the diagram on the board]



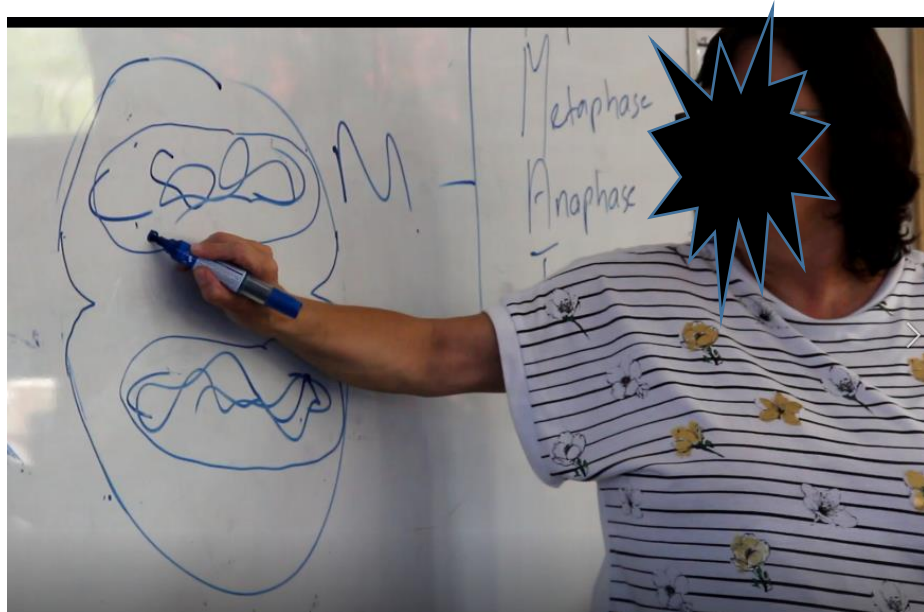
164. What is that invagination going to cause?
165. In the animal cell is gon-- where your cell divides into two.
166. Now once your nuclear envelop is formed [drawing on the board] this unwinds [erasing]



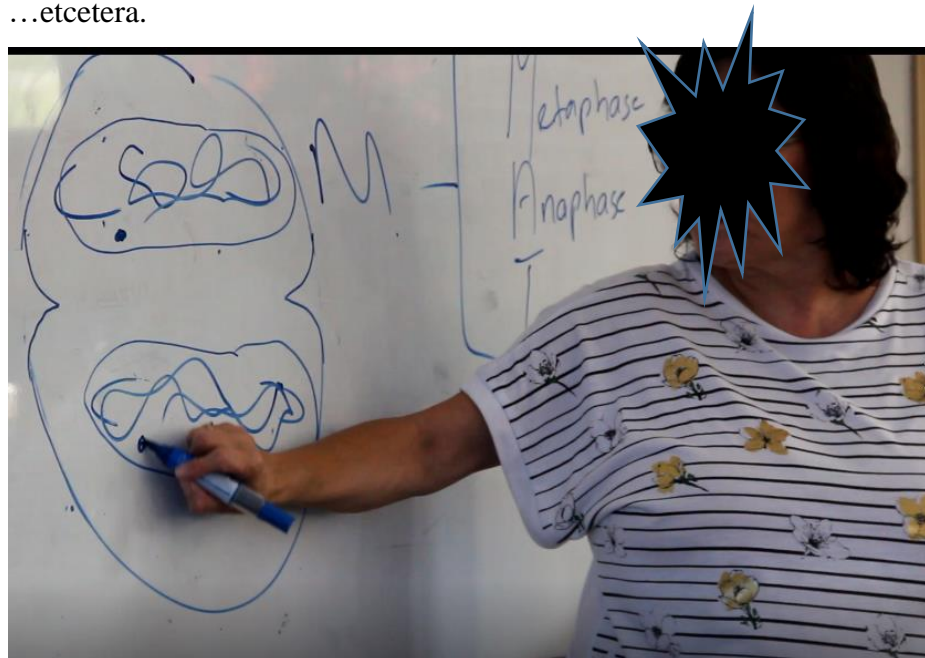
and becomes chromatin network now we are going to call them chromatin network.



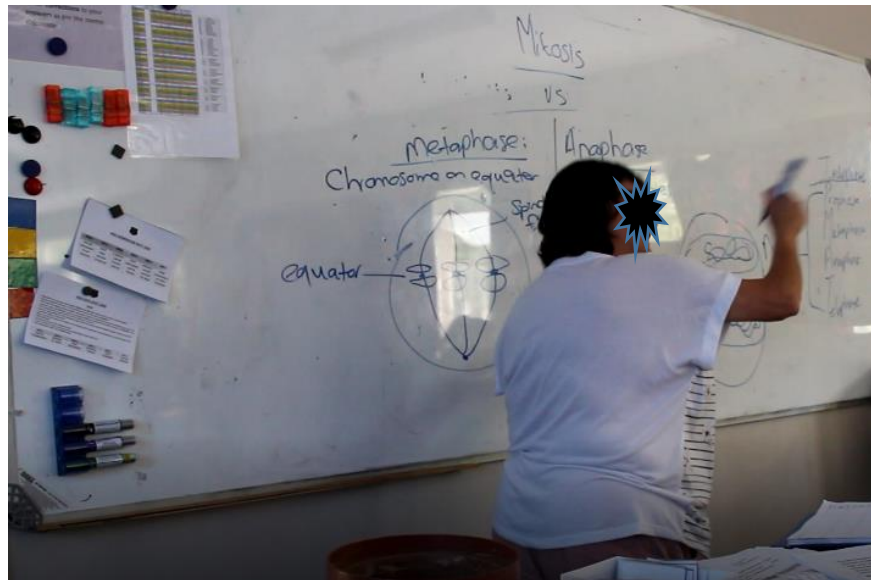
167. So, the chromatin network is going to unwind, and become the strands, [drawing on the board] strands inside the chromosome.
168. You also going to have your organelles div-- now dividing into two parts, you are going to have your nucleolus forming [showing it on the board]



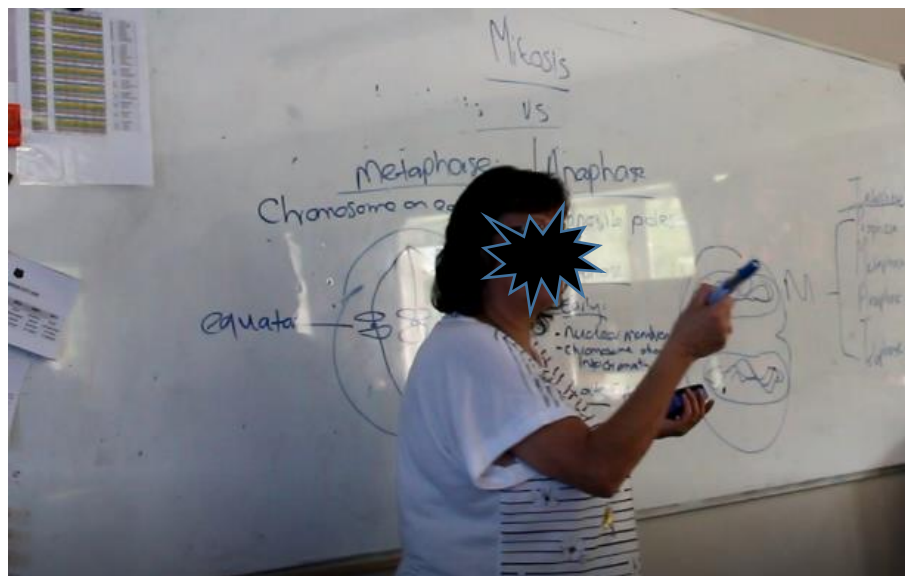
...etcetera.



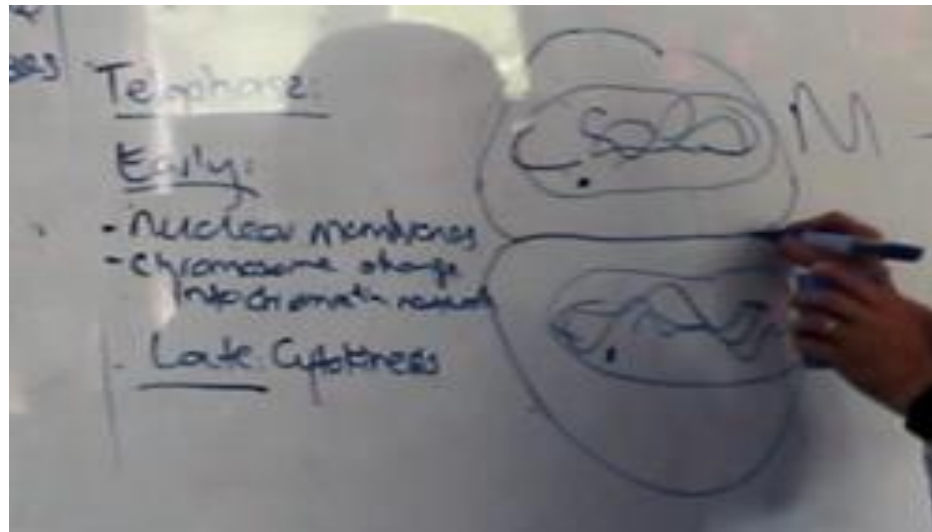
169. That is in early [pointing to the diagram on the board] okay so early, you have your membrane forming again-- MEMBRANES they are two forming now, okay.
170. Your chromosomes are going TO change into chromatin network. [drawing on the board].
171. ↑Now when it comes to LATE telophase.



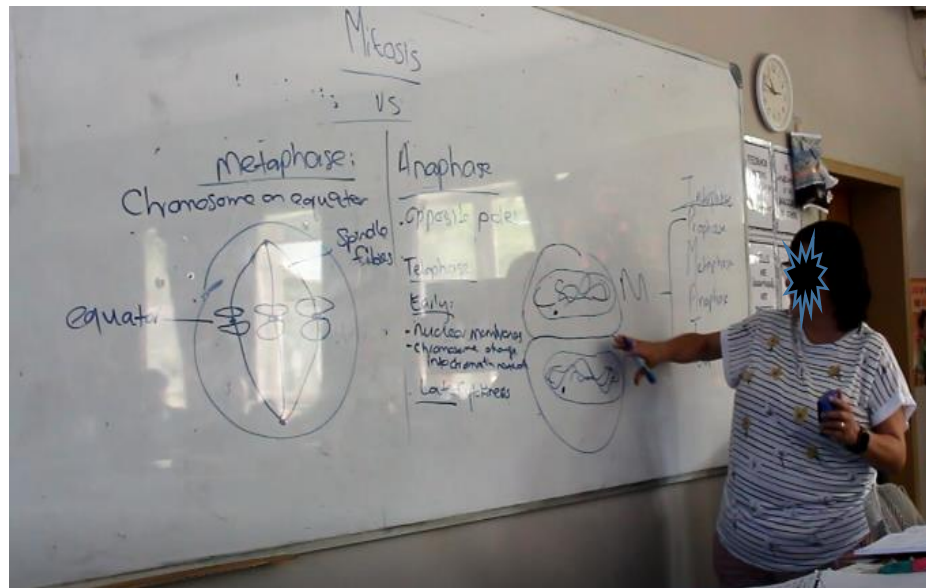
172. Late telophase is what we are going to it call cytokinesis.
173. What is that referred to as— [writing on the board] cytokinesis, what is cytokinesis?



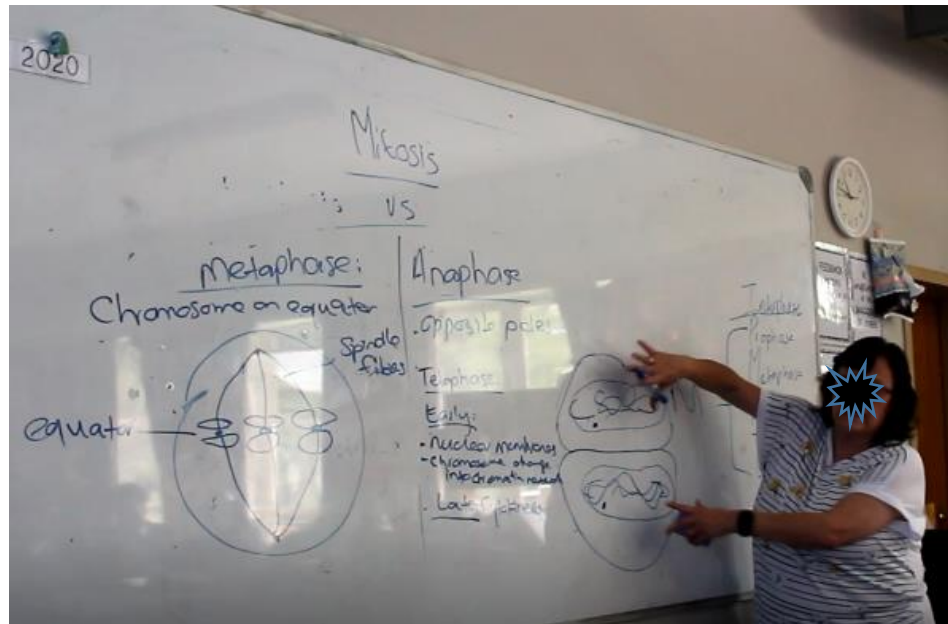
174. Splitting of THE... [pauses]
175. Ls: [Chorus]
176. Mrs Durand: ...cyto:plasm.
177. In other words, this is going to break... [showing that on the diagram on the board]



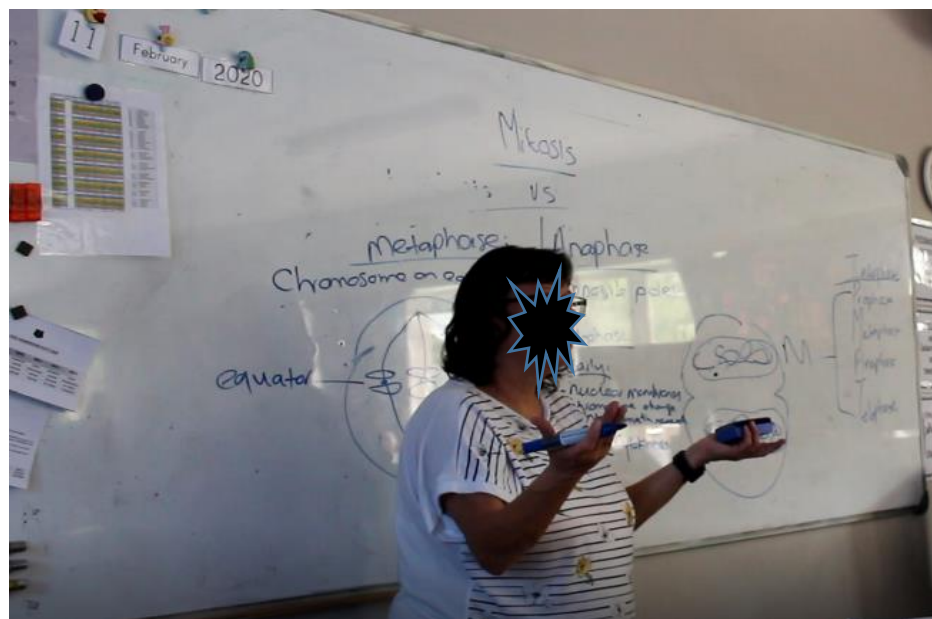
...look, forming a total band...



...and I am now going to have two cells.



178. There are my two cells formed so, cytokinesis occurs which is the splitting of THE...



...cytoplasm.

179. Now we have two new cells that will go through the cell cycle, they will grow and now can prepare for cell division themselves okay.

180. Any question?

181. Khensani: Ma'am

182. Mrs Durand: Yes!

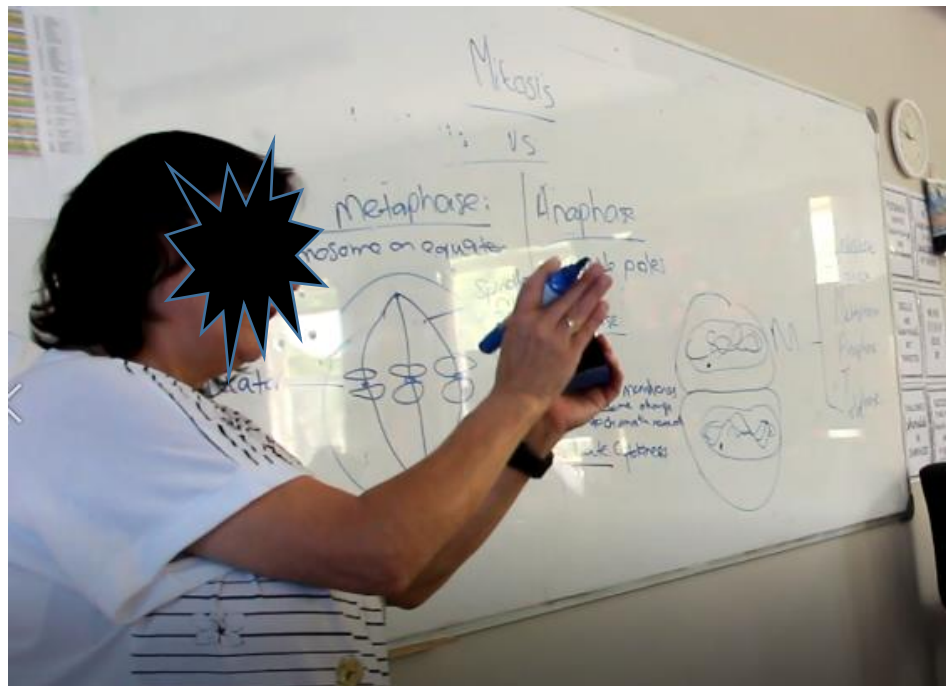
183. Khensani: ... [Clearing throat] for anaphase the opposite poles, what is that?
184. Mrs Durand: Poles!
185. Khensani: It is poles oh, okay.
186. Mrs Durand: Yah, you are supposed to know my handwriting.
187. Khensani: Sorry!
188. Mrs Durand: Any questions? [pauses] guys / ? / quick recap about what is very important about cell division. [Pause]
189. Okay, now once we have done this, we know what happens in mitosis because one part of meiosis is similar to mitosis.



190. But then it is just that there are other things happening in meiosis which do not happen in here, which we are going to go through.
191. But again, we going to go through our terminology now, that is very important [pause] for to...



understand because this terminology...



some of them will be used...



...when we do genetics as well.

192.

So, in between now...



...what we are doing ehh... mito-- meiosis and genetics
we are going to do reproduction.



193. So, we are going to refer to this...

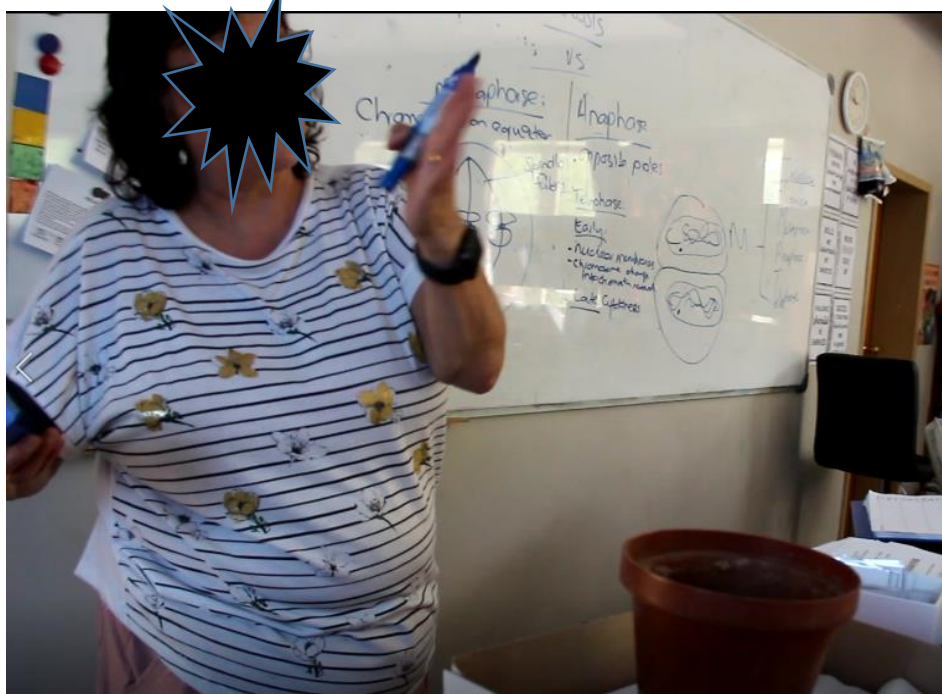


...in reproduction as well.

194. So, you need to know the terms please, again the topics are not isolated topic.



195. One follows the other,



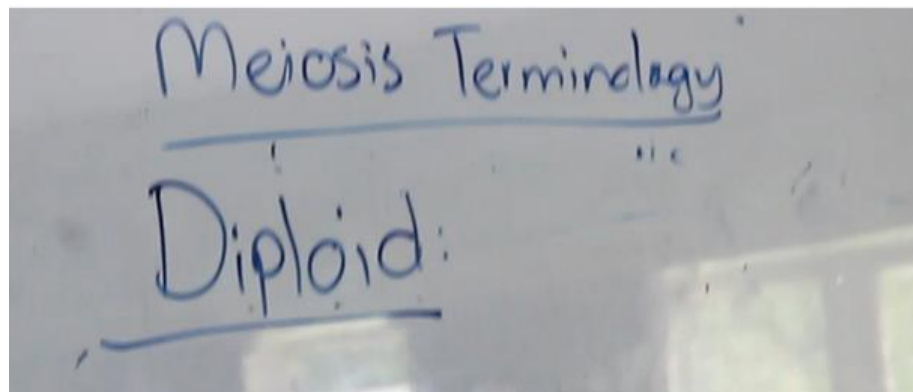
...there is pattern that you will see [pause]

ALRIGHT.

196. Can I wipe this off?

197. Ls: Yes!

198. Mrs Durand: ↑ We are now going to focus on the terminology that we need for meiosis, some of which will be similar here, but I am going to give the actual term and the definition.
199. Please make sure that you copy this DOWN.
200. Incidentally before the bell goes, my class tomorrow we have an afternoon lesson, ALL your DNA ehm...worksheets will be marked tomorrow afternoon.
201. Ls: [Complaining]
202. Mrs Durand: You better have them ready for tomorrow afternoon.
[Learners making noise]
203. I did not tell you to talk, the fact that I turned around does not mean you talk. [Pause]
204. Okay, our terminology that we are going to use-- is first— I am going to write them in order.
205. Diploid which I already mentioned [pauses as she writes on the board] okay, so this is meiosis terminology [writing on the board].



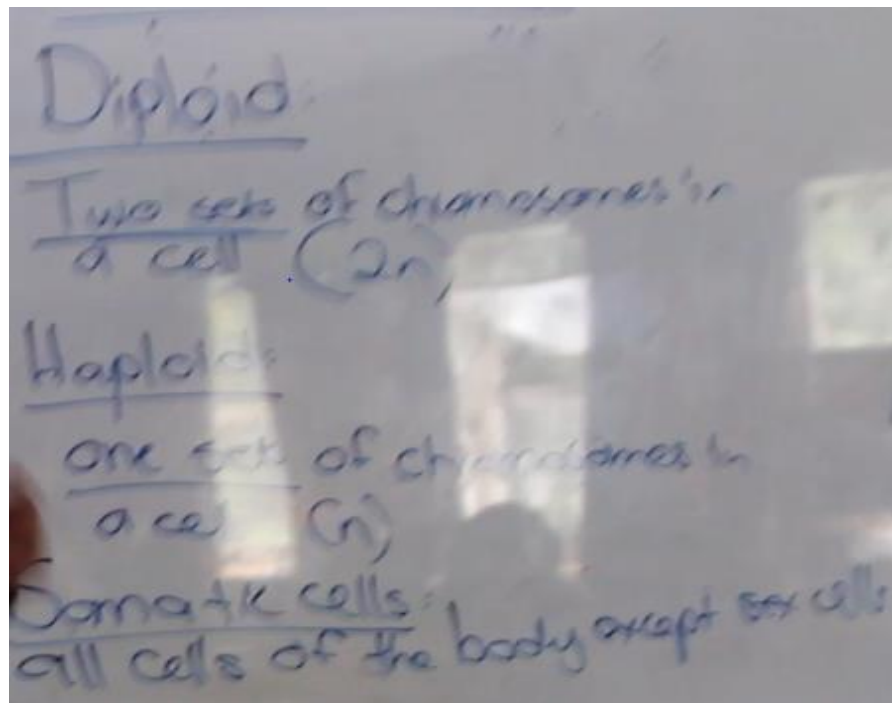
- [Learners copying terms into their workbook]
206. There is still a person mumbling and you are irritating me [stops writing and looks at the learners].
207. Okay, [writing on the board] we can call these two sets of chromosomes in a cell [pauses] [learner coughs] and we refer to this as $2n$, double the number.
208. Then we are going to have haploid [pauses as she writes on the board] okay, we going to refer to this as just n .

209. In other words, HALF the number of chromosomes.

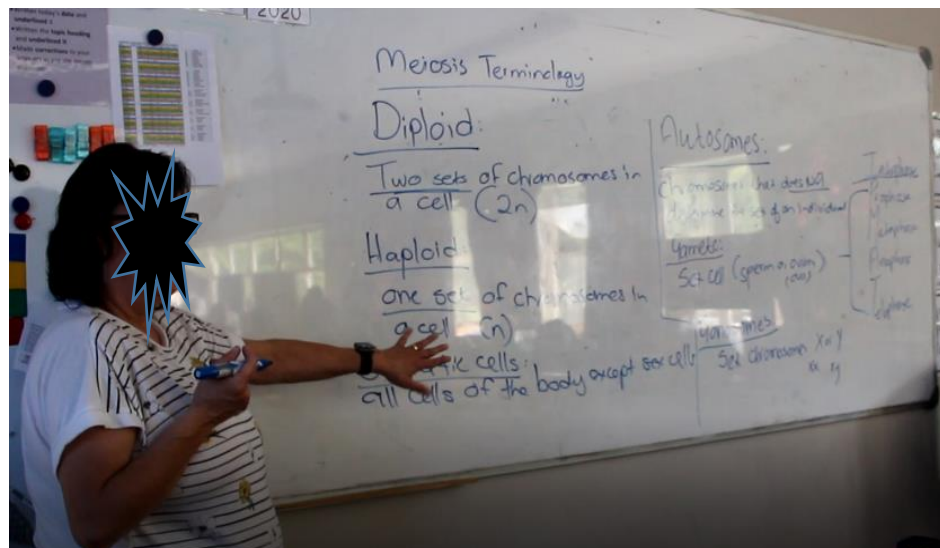
210. We also going to look at again somatic CELLS [pauses as she writes on the board] ↑all cells of the body EXCEPT for the sex cells. /



211. Okay [writing on the board]

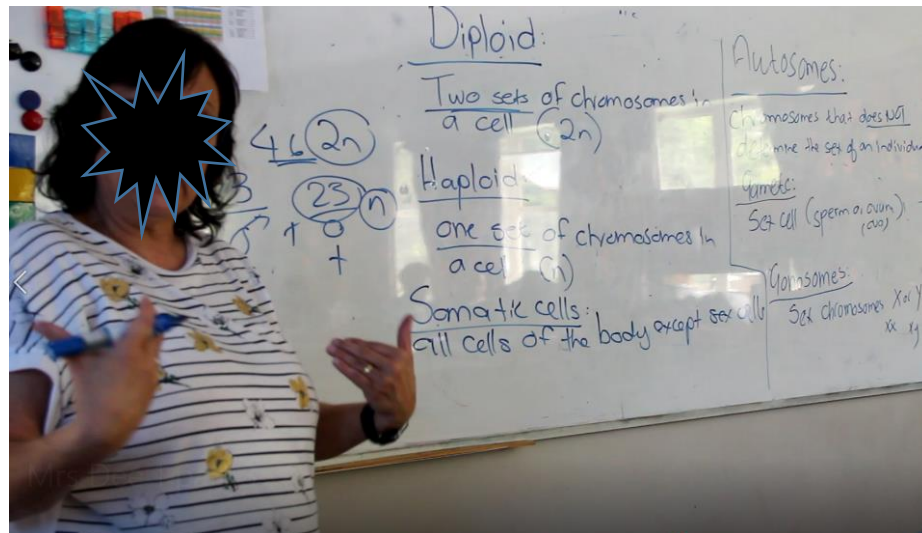


- ...there is one, two three terms already. [Looks into her book]
212. I am going to continue this side. [Erasing the board]
213. I am going to use the term autosomes. [Writing it on the board]
214. [Holding her notebook and reading] "It is a chromosome that does not determine the sex of an individual".
215. I am going to come back to why I am saying that okay, [pauses as she writes on the board].
216. The we gonna have gamete [pauses as she writes on the board] [Looks into her notebook] THAT IS A SEX CELL GUYS, it is either a sperm or an ovum, ovum singular, ova plural alright singular here okay and ova plural.
217. Then we have gonosomes, these are the SEX chromosomes of an individual...
218. That is either a X or a Y okay, male XY-- will be female XX, male XY [writing that on the board].
219. Okay you got that [Puts the book down and pointing to the terms on the board] very important terminology that we will be using and there are others coming as well.

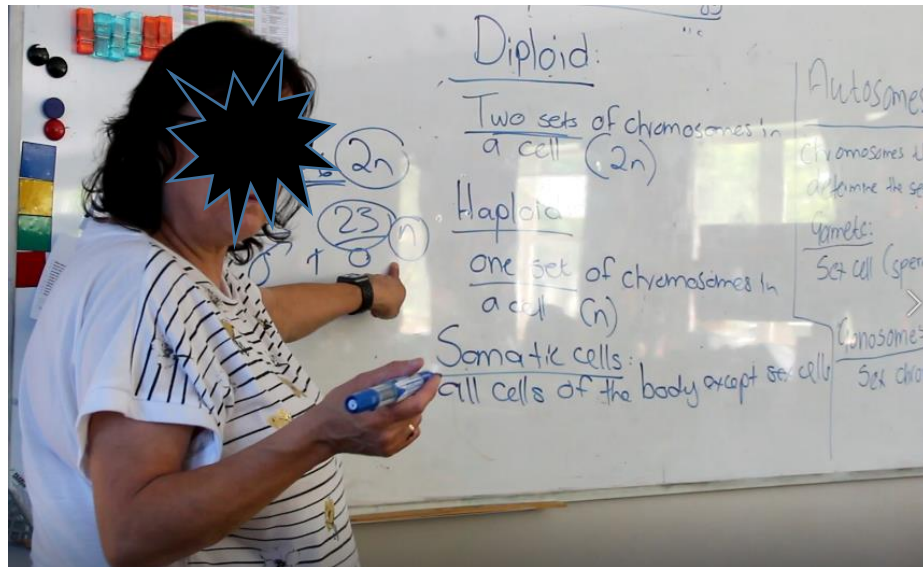


220. There is going to be things like chiasma ehm--
221. Ls: Hmm...

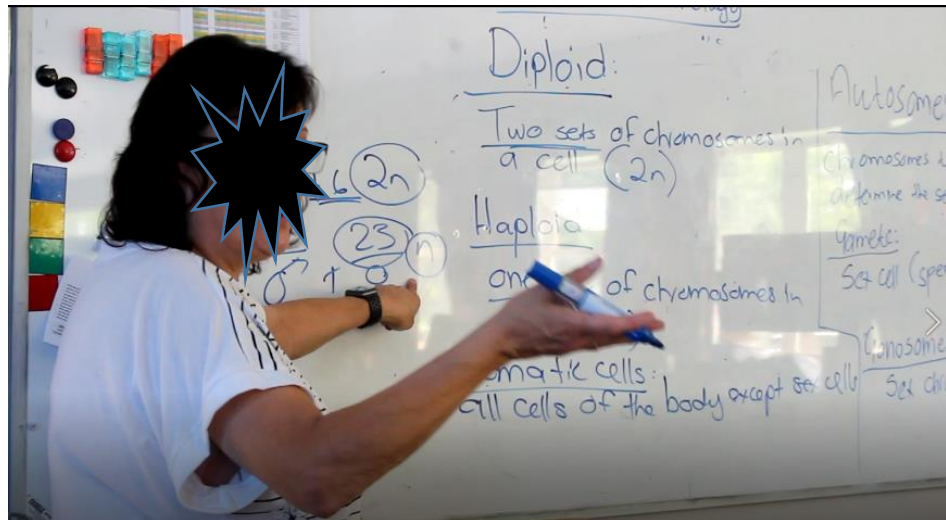
222. Mrs Durand: Yes! There are a lot of terms that are extremely important for now you need to understand this.
223. Okay when you talk of diploid, I am going to refer to the human body.
224. How many chromosomes do you have in your body?
225. Ls: 46
226. Mrs Durand: You have got 46 all over your body, 23 it is from you father, 23 it is from your mother [writing on the board]
227. You are going to see in-- in meiosis how this is going to work, how you going to be made and why you are different from your brothers and sisters.
228. Why you are so unique in your makeup, okay it is going to happen here.
229. ↑Now THAT is where the diploid is going to come in, [writing on the board] this is where the haploid is going to come in.
230. Okay, so one set will be haploid, two sets will be diploid...in other words, you are diploid organism, over your body...



...but in your ehm... sex organs, your testis, or ovaries you are going to be the haploid.



231. That is going to be the result, either a sperm...



...or an ovum.

232. Any questions from that?

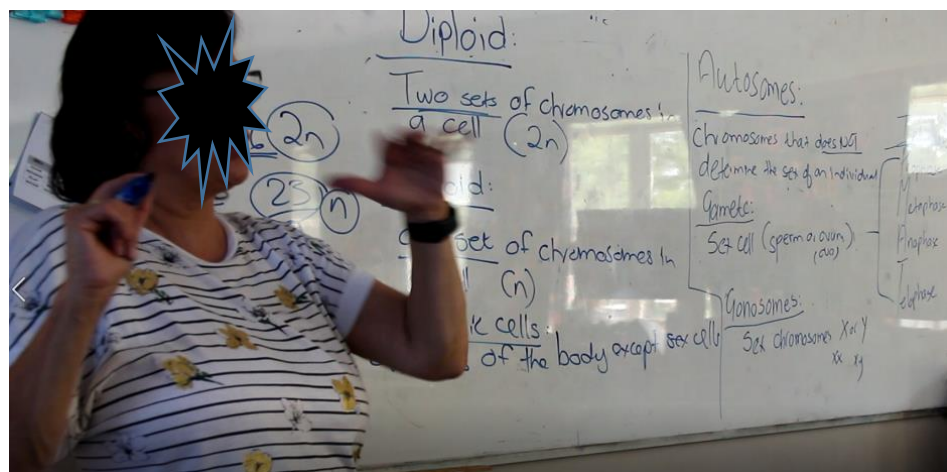
[Silence]

233. Okay, so the important terms for now here [pointing to the terms on the board] and there are going to be added on the list.

234. My kids if really want to, leave the rest of this page blank...



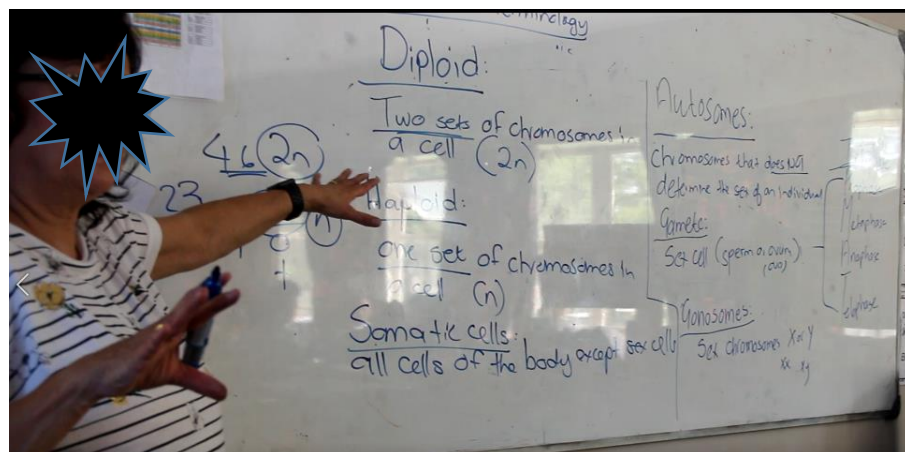
...that you can just keep on filing...



...in your terminology there okay.

235.

So, do not rule off after this we will just keep on adding onto the list okay [using hands]



236. [Checking time] Are there any questions?
237. At the back, questions...this side questions...
238. Can you now recap what you have done in grade 10?
239. Ls: Yes!
240. Mrs Durand: Straight forward, if you were in my class, we made cards hey...
241. Khensani: Yaah... we did.
242. Mrs Durand: ...yaah... we-- had cards, where we did part of mitosis ahm...
both classes, it was not ready this morning, but I got you diagrams of
mitosis.
243. It is a worksheet, my kids I expect you, when I hand it to you tomorrow
that it will be done.
244. Okay, so during ehm--
245. Right, the bell is about to ring in a minute, finish quickly off, but you are
not talking [coughing] you are not talking at all.
[Learners start talking]

THE END