Full lesson transcript for Mr. Zulu of School C

Lesson 3: Genetics 17 June 2020

Details

- This lesson transcript represents 70 minutes of teaching time.
- A male black South African teacher was teaching the topic meiosis 23 male learner participants, all in grade 12.
- The lesson took place at a former model C Boys High School in Johannesburg East district in Gauteng on 17 June 2020.
- When used by the teacher, the learners' names have been changed to protect anonymity.
- The textbook utilised during the lesson is Focus Life Sciences: Grade 12 learner's book by Clitheroe, Dempster, Doidge, Singleton, Marsden, and van Aarde published by Maskew Miller Longman Pty. Ltd, South Africa.
- Used overhead projector, prepared and blank transparencies, laptop, projector, PowerPoint slides, white board, and white board markers.

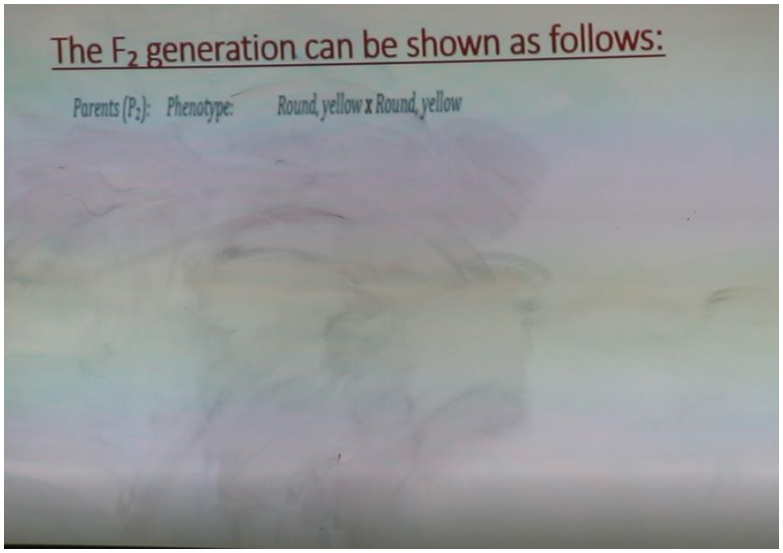
Transcription conventions

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/ warily/deeply, contently, swallowing, nodding, shaking head dance or movement

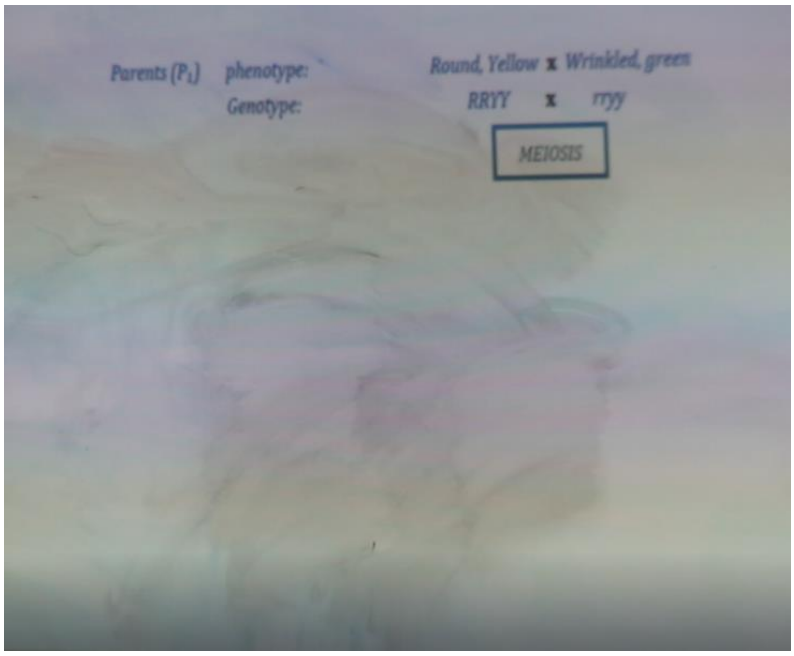
	towards/away
( )	Parenthesis around tone units indicate words spoken in a sotto voice under one's breath (in a very quiet voice)
,	Slight pause
?	High rising intonation
.	Falling intonation at the end of tone unit
:	Colon following a vowel, indicates elongated vowel sound or extending length of sound 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: DIHYBRID INHERITANCE/CROSS

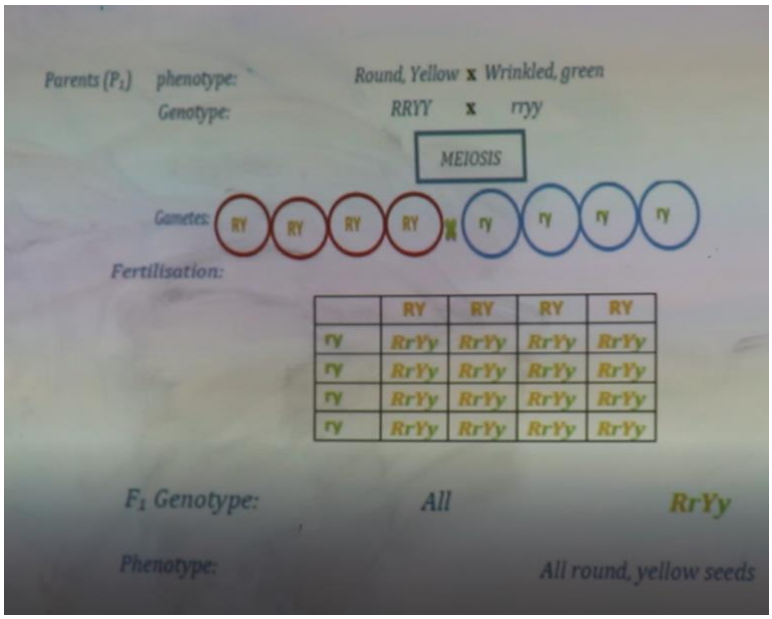
1. Mr. Zulu: Okay let us go through the statement together neh….it says “a he-- heterozygous round and yellow seed was crossed with a heterozygous round and yellow seed neh… Ehh… round is said to be dominant, okay round colour is dominant over the green colour okay”.
2. So, we are also given our alleles and how we should represent our gametes, okay.
3. So, we have R which is a capital letter dominant R representing round and then we have small letter r representing a wrinkled allele and yellow represented by a capital letter Y or dominant Y and a recessive y which is an allele for green neh…okay.
4. So, the first part we must do… it is like the P_2 of what we were doing the last time neh…



5. The P_2 which will be from the first parents.
6. These are the first parents we used last week neh!

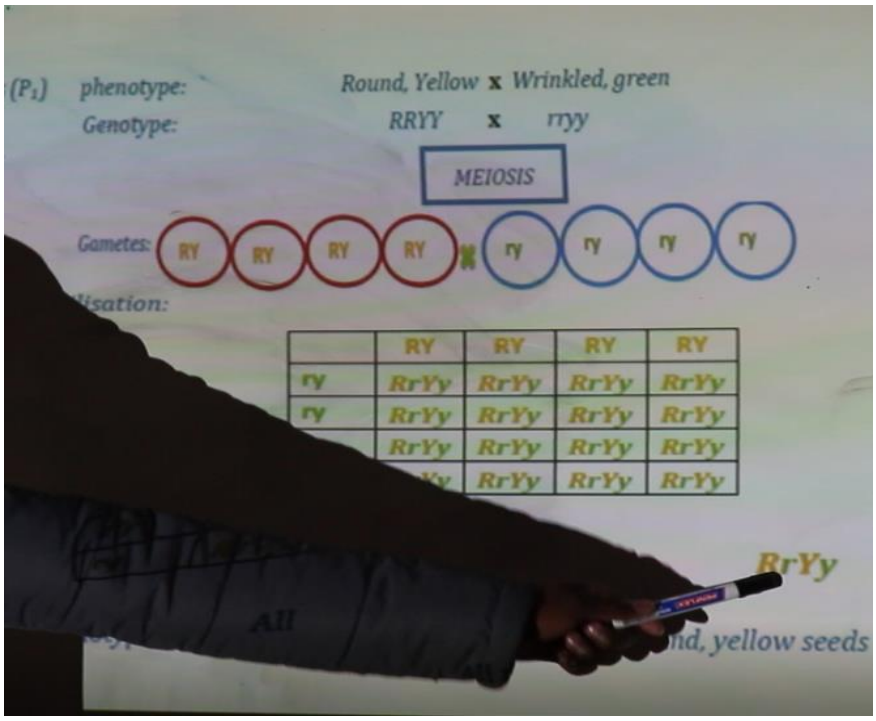


7. We started with the parent which is P1 with the phenotype which was round and yellow and then crossed with a wrinkled and green seed.
8. We have the genotypes and then from the genotypes ehh…or the alleles here we got meiosis okay.
9. At the end of meiosis, we are going to have gametes and then I said to you that we cross the gametes not the allele neh…and the gamete is not the allele neh…and from there we have the process of fertilization and I said it is better to use a punnet square because it is easier if you are working with dihybrid crossing unlike when you are doing the monohybrid cross neh!
10. Okay for monohybrid cross you can use a genetic cross or can even use a punnet square okay, but that one is the easiest.
11. So, for this one I suggest that you always use this which is the punnet square.
12. So, we have fertilization and then from fertilization we ended up having the genotypes for the first generation or F1 generation.
13. Then the genotype is dominant R, recessive r, dominant Y, and recessive y neh!
14. Okay, and we said the phenotype will all be round and yellow, all of them.



EPISODE 2: REVISION OF HOMEWORK

15. So, with your homework you just need to take this neh…okay. [Pointing]

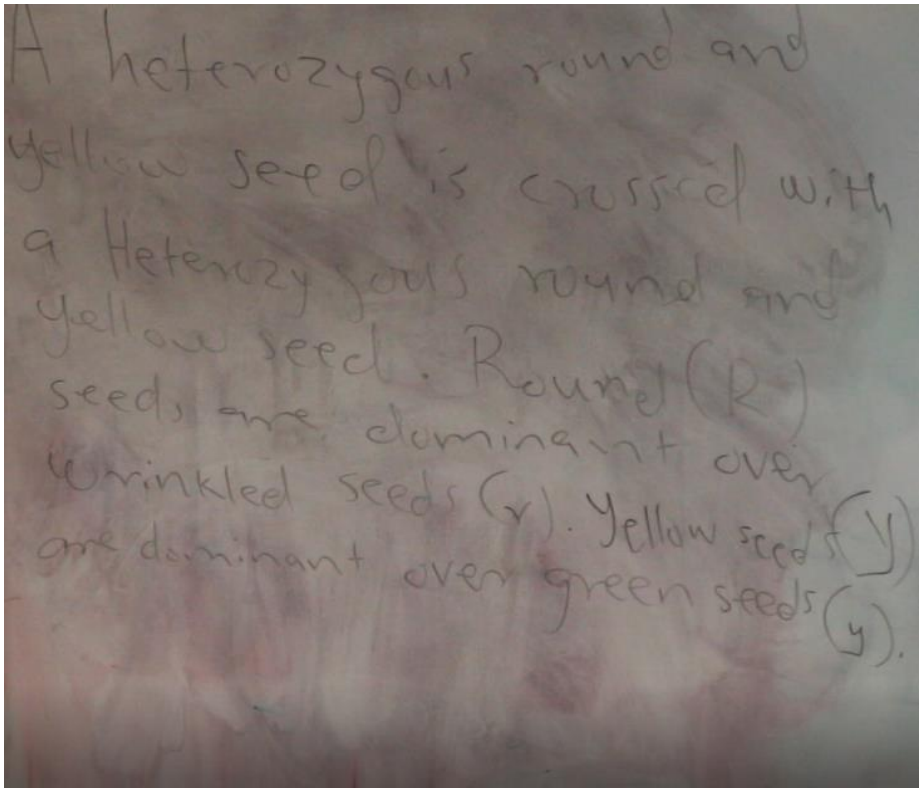


16. It is like you were taking the first generation and you are now making it the parent generation or the parents, okay.

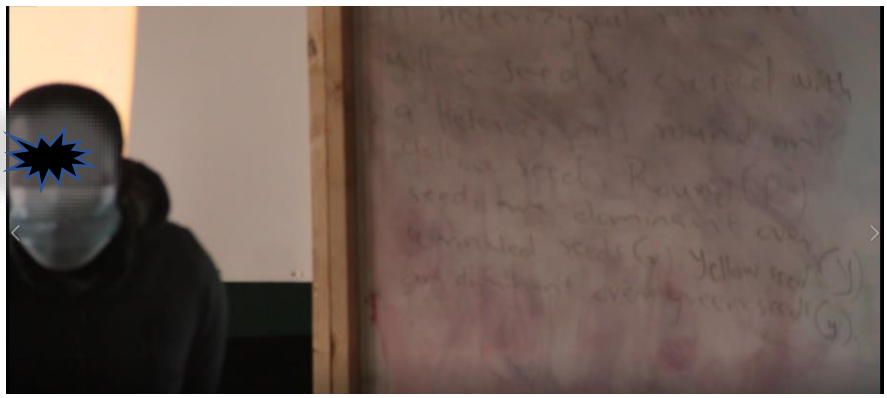
17. So…Let us start…

18. So how do we do our genetic…ehh…not genetics here?

19. Okay from this statement, we are now referring to this statement which was your homework.



20. What should we start with? [Using head]

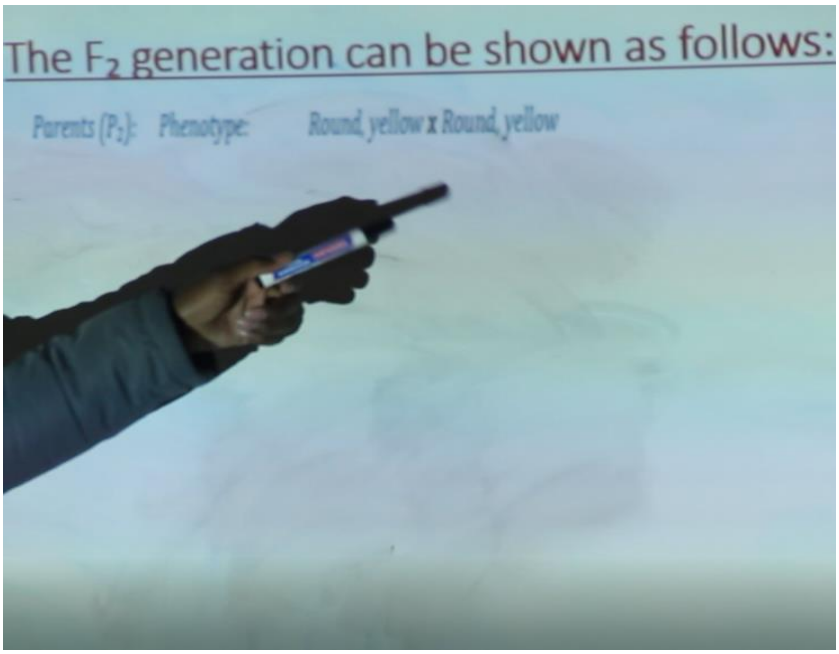


21. Thabani: Sir

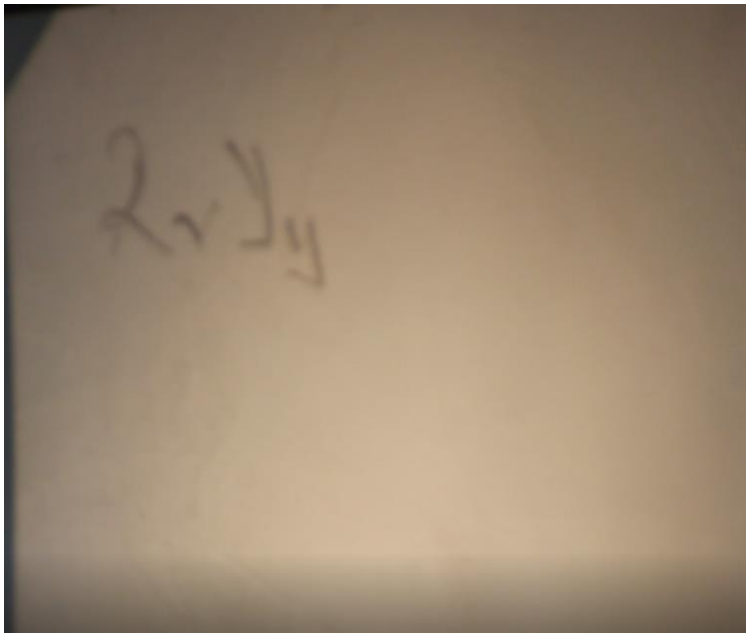
22. Mr. Zulu: Thabani

23. Thabani: Phenotype

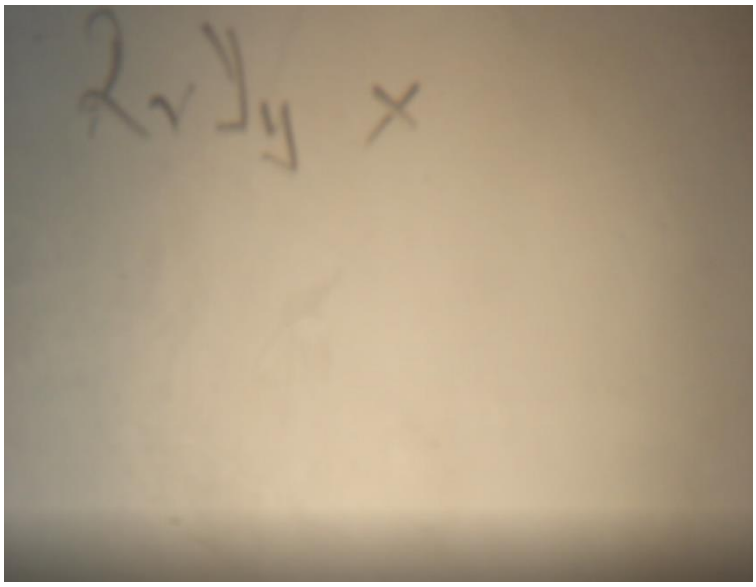
24. Mr. Zulu: Okay, so we already have the phenotype neh…the phenotype is round and yellow okay and then again it is round and yellow, okay.



25.		But from this statement it says heterozygous.
26.		So, which means they are both heterozygous for round and yellow, okay…so how are we going to do our genotype? Sinenhlanhla!
27.	Sinenhlanhla	Ehh…dominant R and recessive r.
28.	Mr. Zulu:	So, it will be… dominant r…
29:	Sinenhlanhla:	Recessive r
30.	Mr. Zulu:	Ehh… recessive r
31.	Sinenhlanhla:	Dominant Y
32.	Mr. Zulu:	Dominant Y
33.	Sinenhlanhla:	Recessive y
34.	Mr. Zulu:	…and recessive y.
35.		So, this will be our… first genotype…



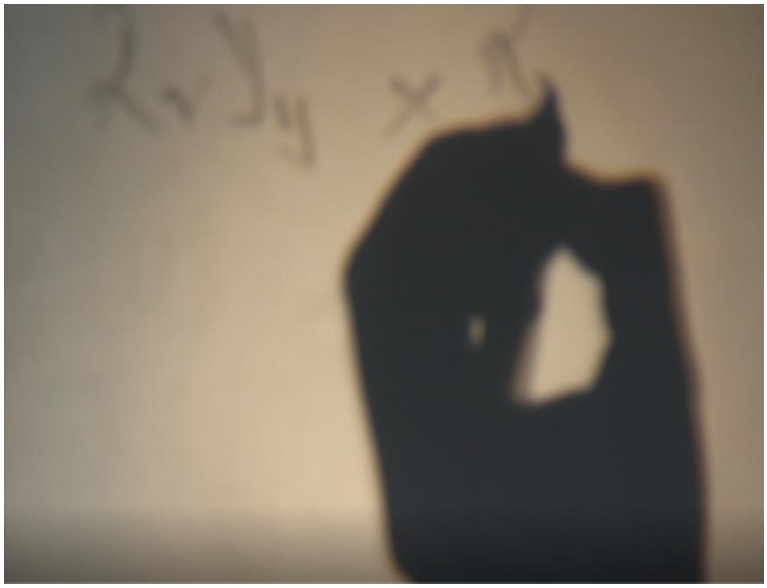
…and it will be crossed with what?



36. For round yellow as well? Peter

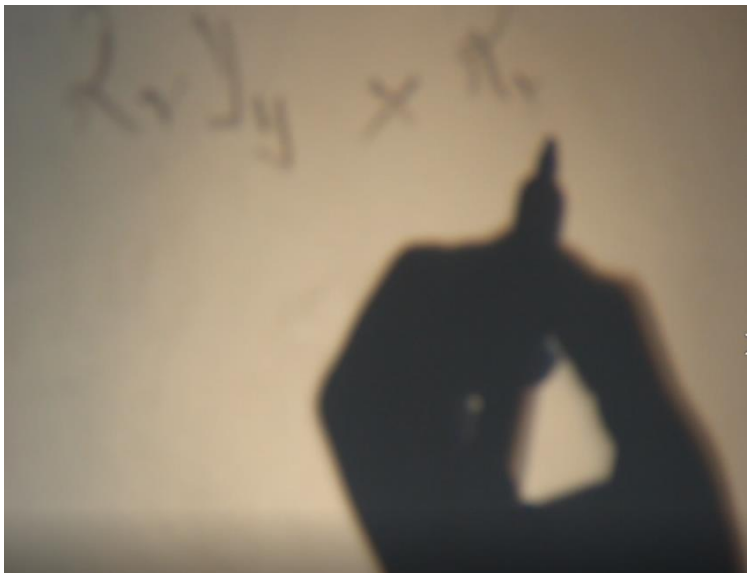
37. Peter: Dominant R!

38: Mr. Zulu: Dominant R.



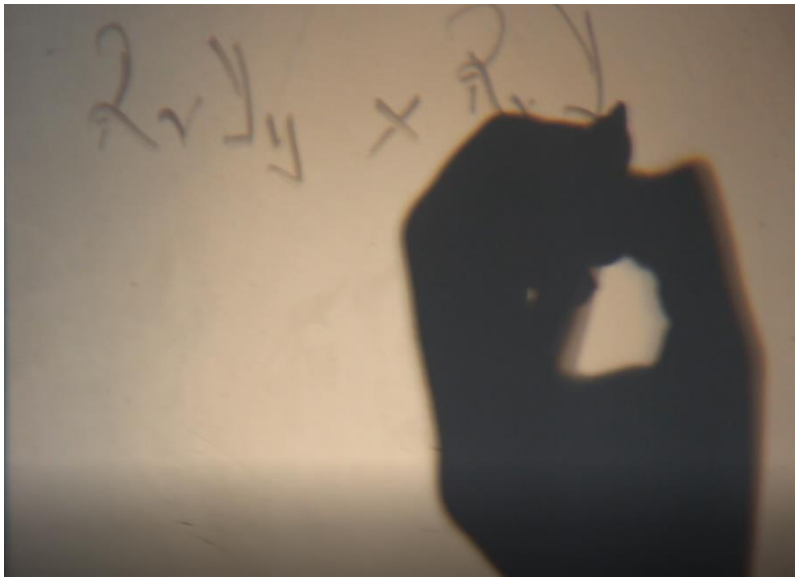
39. Peter: Recessive r!

40. Mr. Zulu: Recessive r.



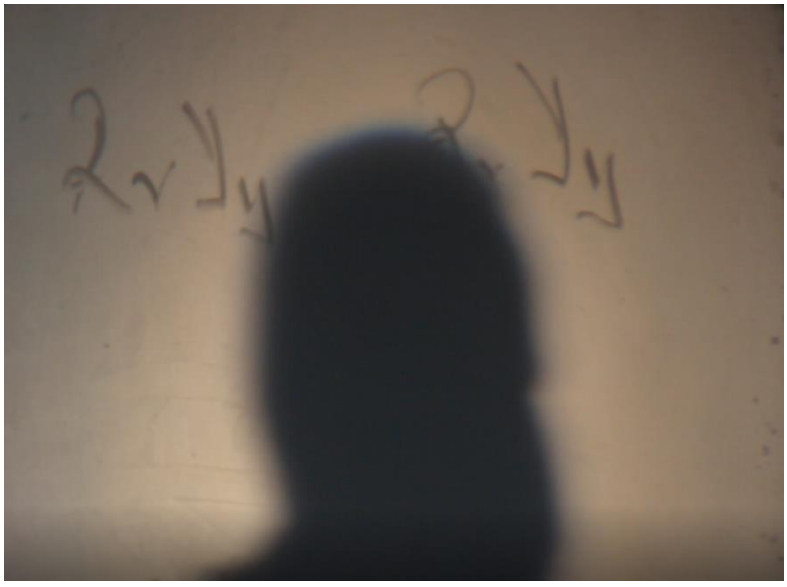
41. Peter: Dominant Y!

42: Mr. Zulu: Dominant Y.

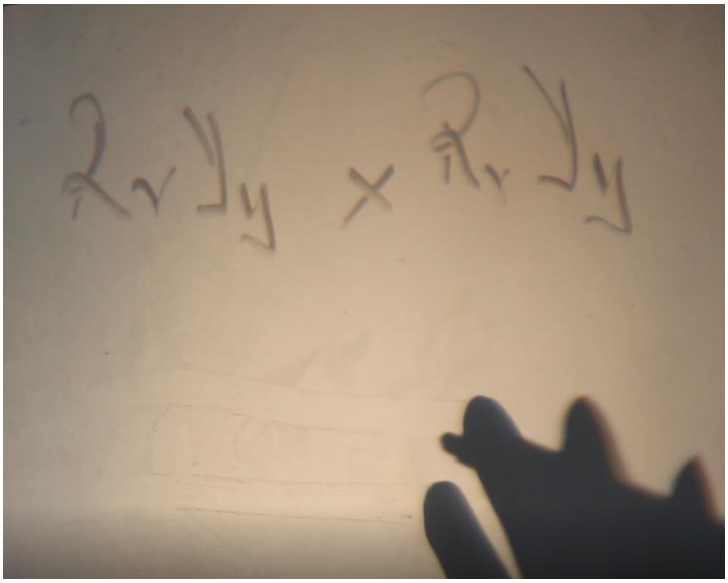


43. Peter: Recessive y!

44. Mr. Zulu: … and recessive y.



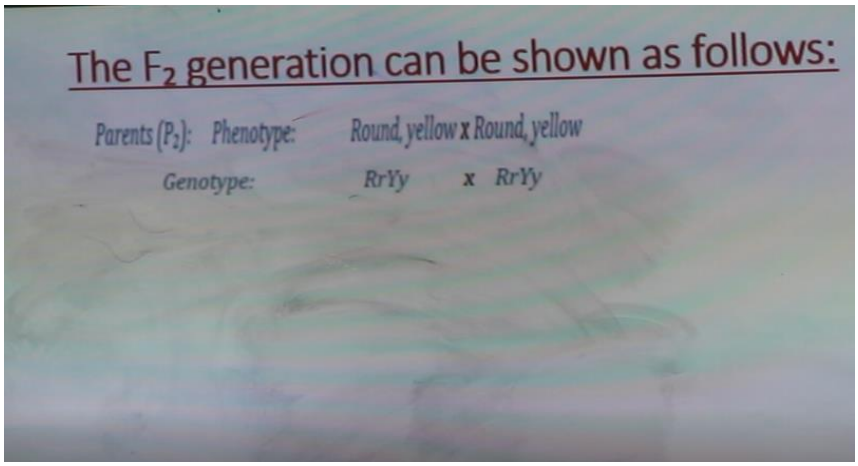
45. So, these are the genotypes neh… okay.



46. Please mark your work boy neh…please!

47. Right, so these are our genotypes.

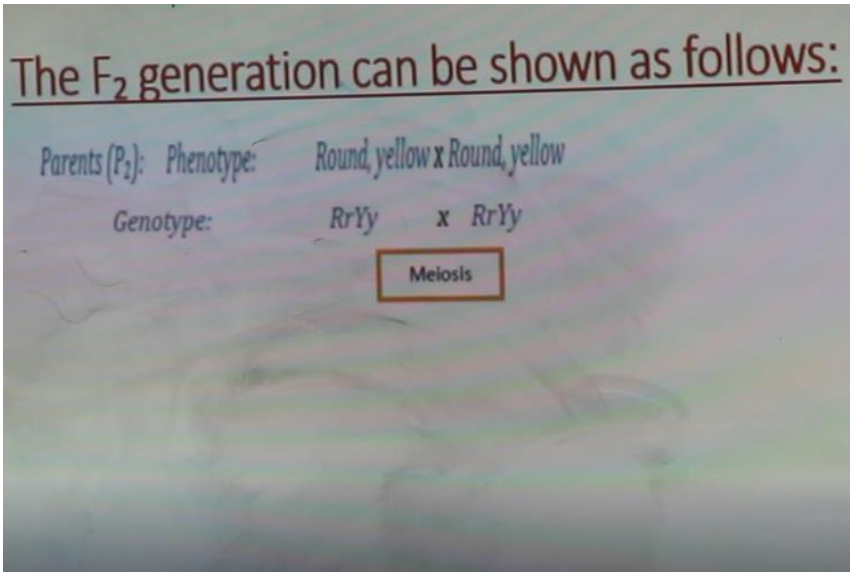
48. Right so for the first one it is dominant R and recessive r, dominant Y, recessive y firstly, dominant R, recessive r then we have dominant Y, recessive y.



49. Okay so we are done with the genotypes neh…What do we do next? Ehh…Yash!

50. Yash: Meiosis.

51. Mr. Zulu: Eeh… meiosis okay so, meiosis must take place.



Right so, we have our meiosis and then at the end of meiosis, what are we going to have? Amandla!

52: Amandla: We have the gametes.

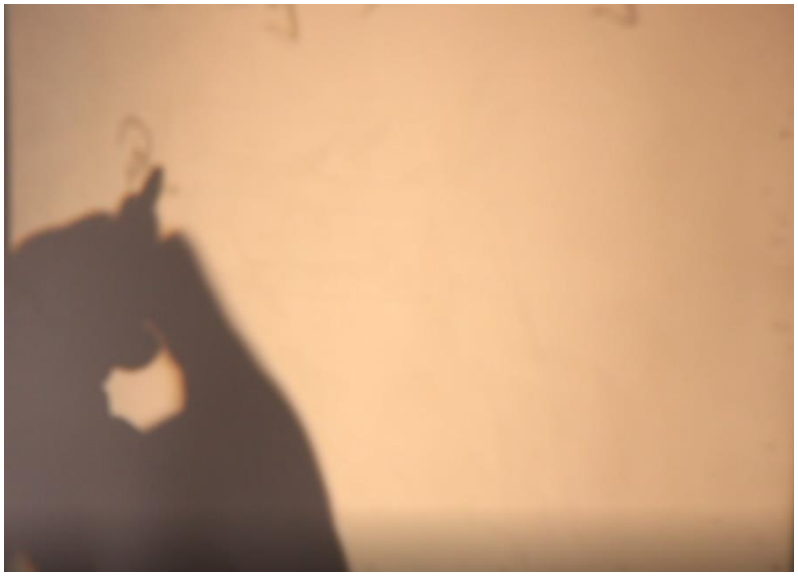
53: Mr. Zulu: We are going to have the gametes right, and how…how are we going to show these gametes?

54. Right, we have these phenotypes right neh…right we have the genotypes, they are there neh…and then now the process of meiosis to get the gametes.

55. So, how are the gametes going to be…Tanatswa can you give me your gametes please?

56. Tanatswa: Dominant R!

57. Mr. Zulu: It will be dominant R. [Writing]



58. Tanatswa: Dominant Y…

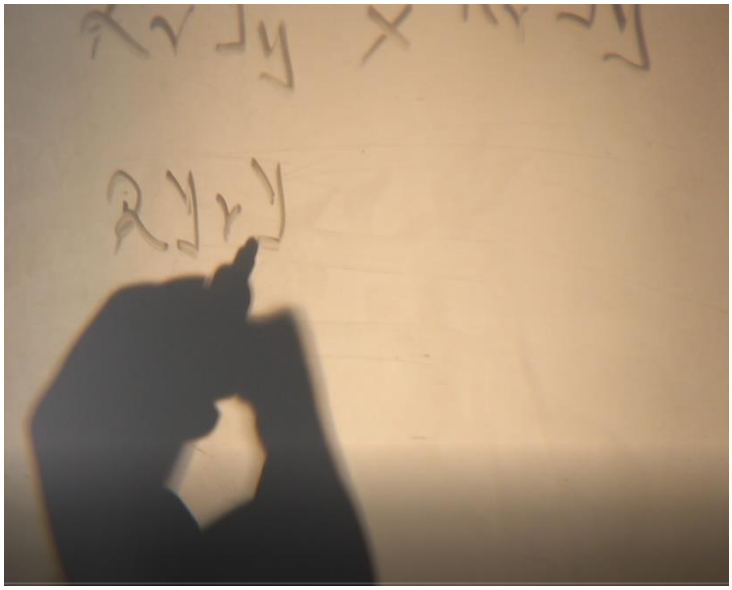
59. Mr. Zulu: Dominant Y. [Writing]

60: Tanatswa: Ehh… recessive r…

61. Mr. Zulu: Recessive r.

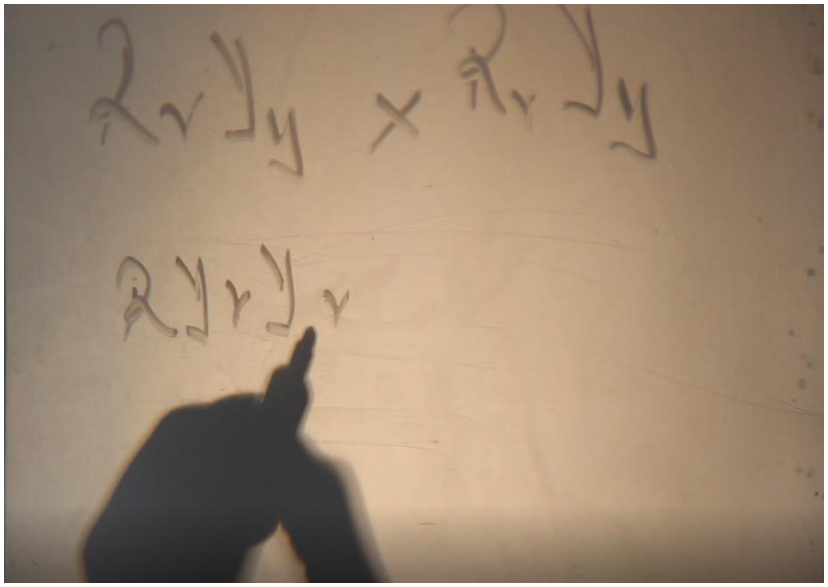
62. Tanatswa: Dominant Y…

63. Mr. Zulu: Dominant Y. [Writing]



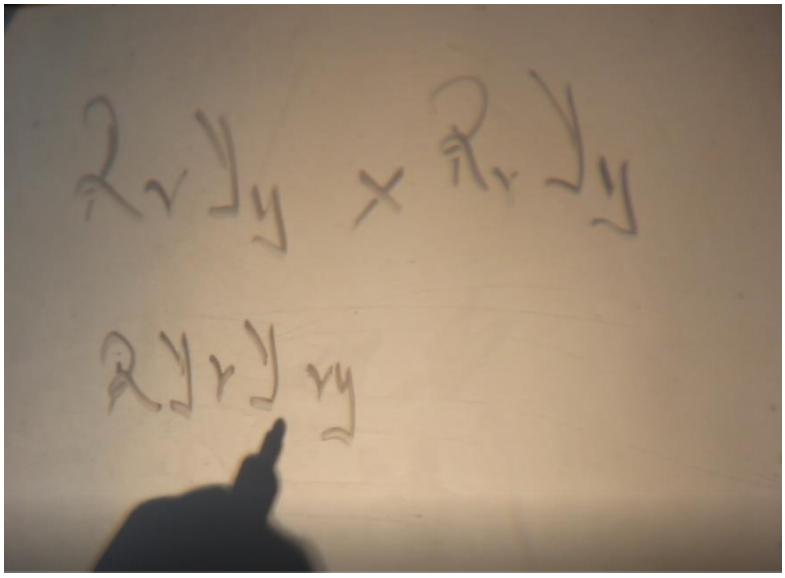
64: Tanatswa: Recessive r…

65: Mr. Zulu: Recessive r…



66. Tanatswa: Recessive y…

67. Mr. Zulu: …and recessive y.



Is it like this…do you all agree?

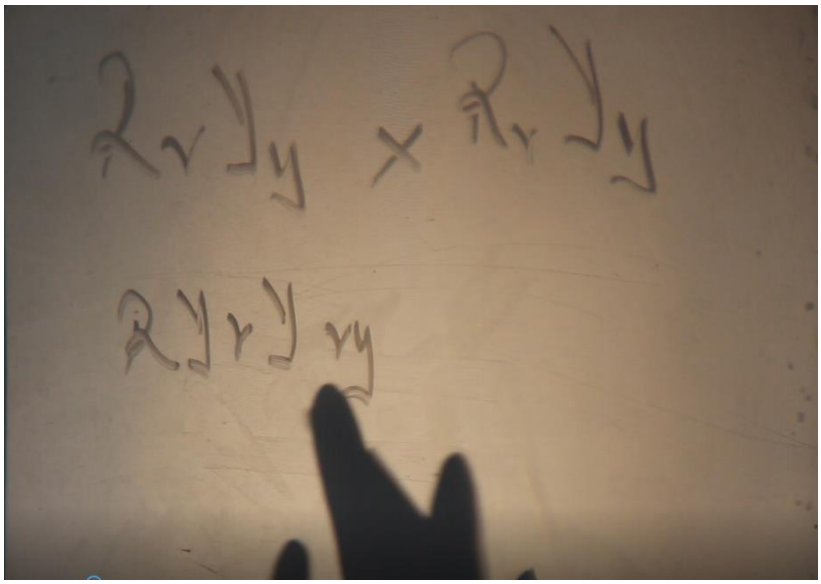
68. Ls: [Chorus] No!

69. Mr. Zulu: Okay, Yes!

70. What did you write?

71. Alfred: I said recessive y.

72. Mr. Zulu: Recessive y, this one?



73. Alfred: No, the second one

74. Mr. Zulu: Oh! Okay let us erase it, [erasing] okay… you said it is...

75: Alfred: Dominant R…

76: Mr. Zulu: Yes!

77. Alfred: Dominant Y…

78. Mr. Zulu: Dominant Y.

79. Alfred: Then, I said dominant R…

80. Mr. Zulu: Dominant R.

81. Alfred: Recessive y…

82. Mr. Zulu: Recessive y.

83. Alfred: Then, I said recessive r…

84. Mr. Zulu: Recessive r.

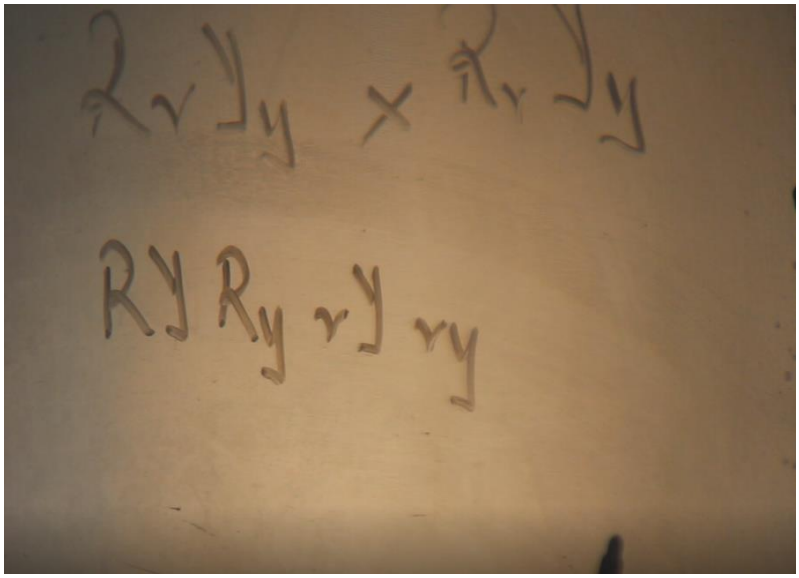
85. Alfred: Dominant y.

86. Mr. Zulu: With dominant y…

87. Alfred: Then, I said recessive r and recessive y.

88. Mr. Zulu: …and recessive y.

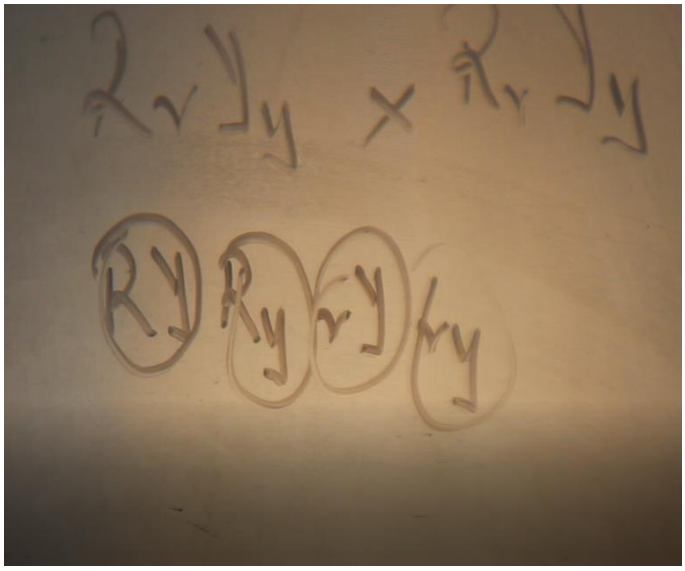
89. Is it like this?



90. Do you all agree?

91. Is that what you all got?

92. Alright remember to represent the gametes you must use the circles like this neh…so these are our gametes.

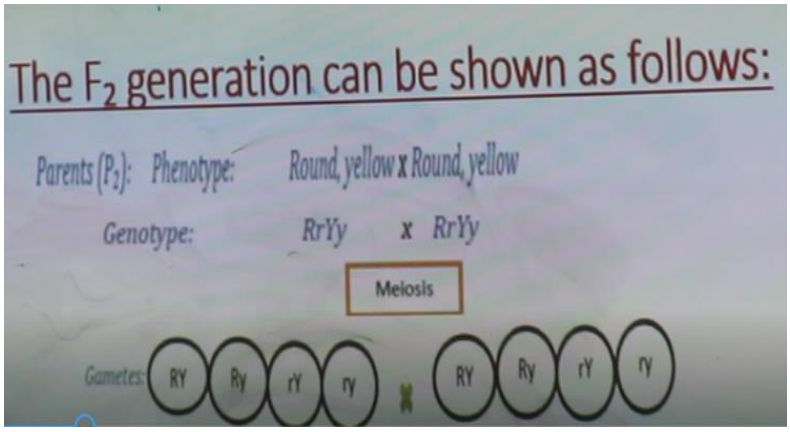


93. So, they will be the same for this as well.

94. So, let us check from this…right so…these are the gametes as you can see.

95. It is dominant R, dominant Y then we have dominant R and recessive y.

96. Recessive r then dominant Y and there is recessive r which is crossed with the same neh…



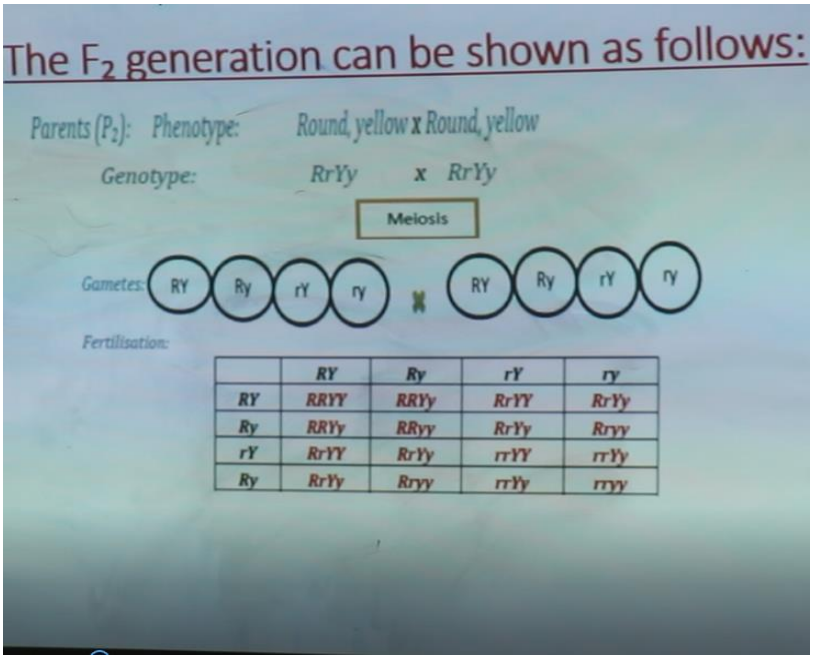
97. Okay, then what will be the next step we are done with the gametes?

98. Yes…Lazie!

99. Lazie: Fertilization!

100. Mr. Zulu: It is fertilization…okay so, for fertilization, I said we can use the punnet square.

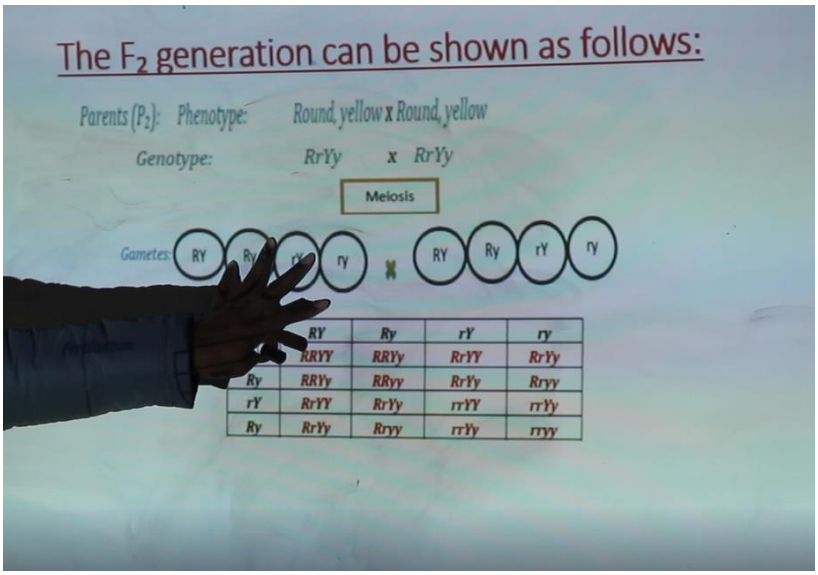
101. Right so because we will waste time, I will just put up mine neh…
[Putting a punnet square already done on the slide on PowerPoint]



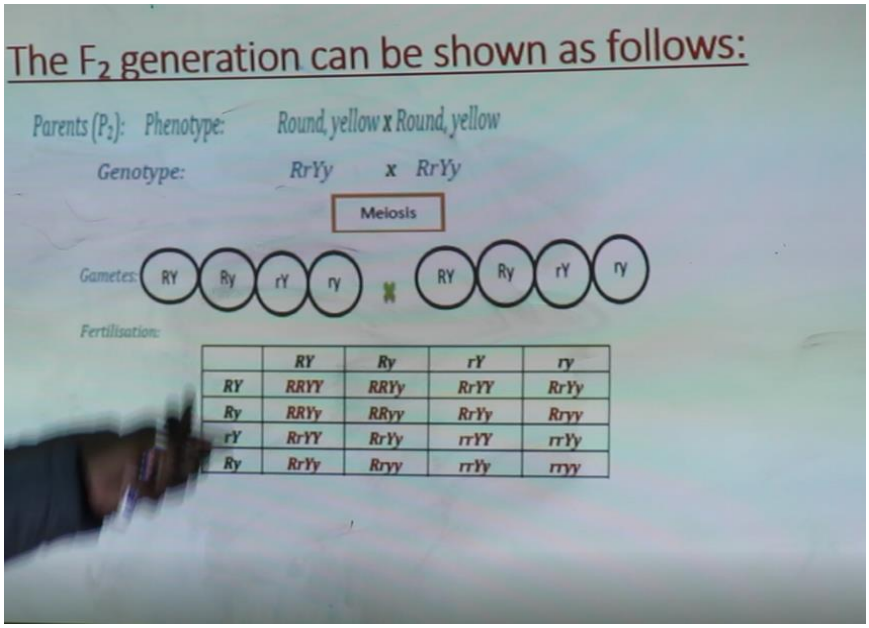
…and will you compare yours with this one.

102. So, fertilization has taken place, we use a punnet square.

103. So, it is simple you just take these…

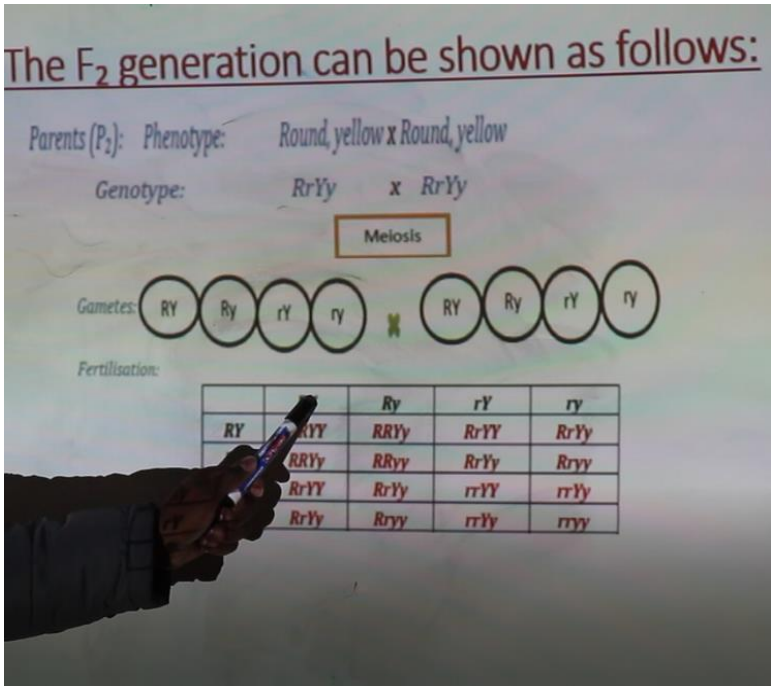


…and put them this side you put them anyhow, if you want you can put them here okay… [Showing on the diagram]

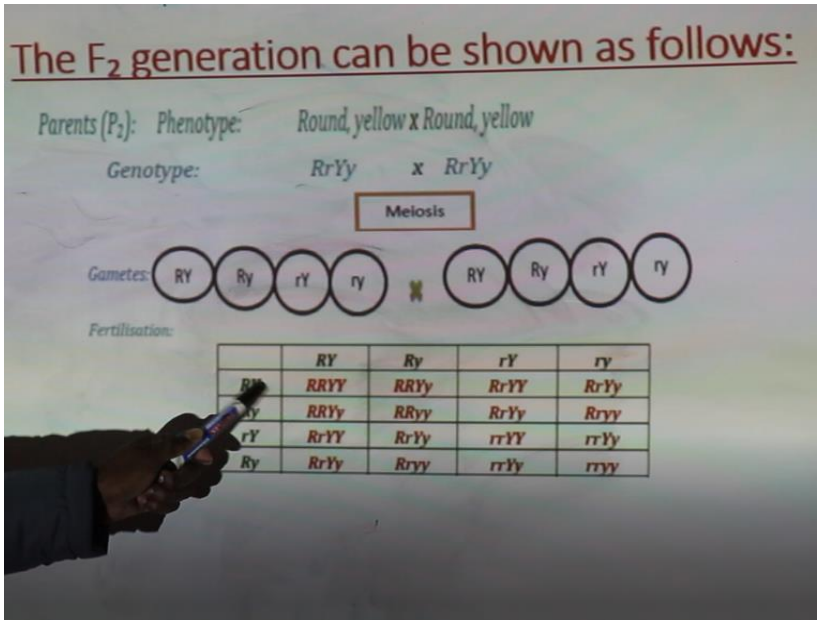


…you will get the same results.

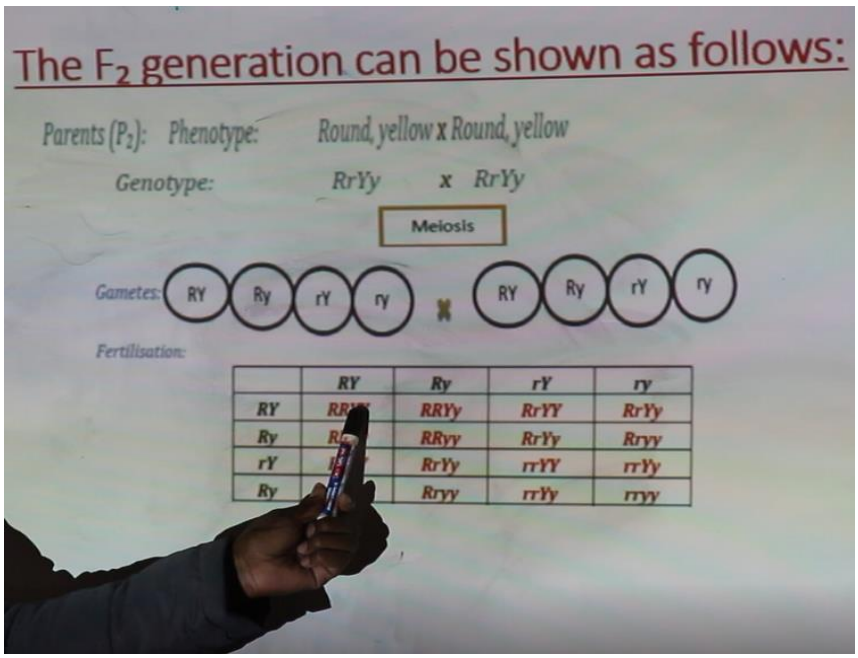
104: Right okay so, the first one is this…



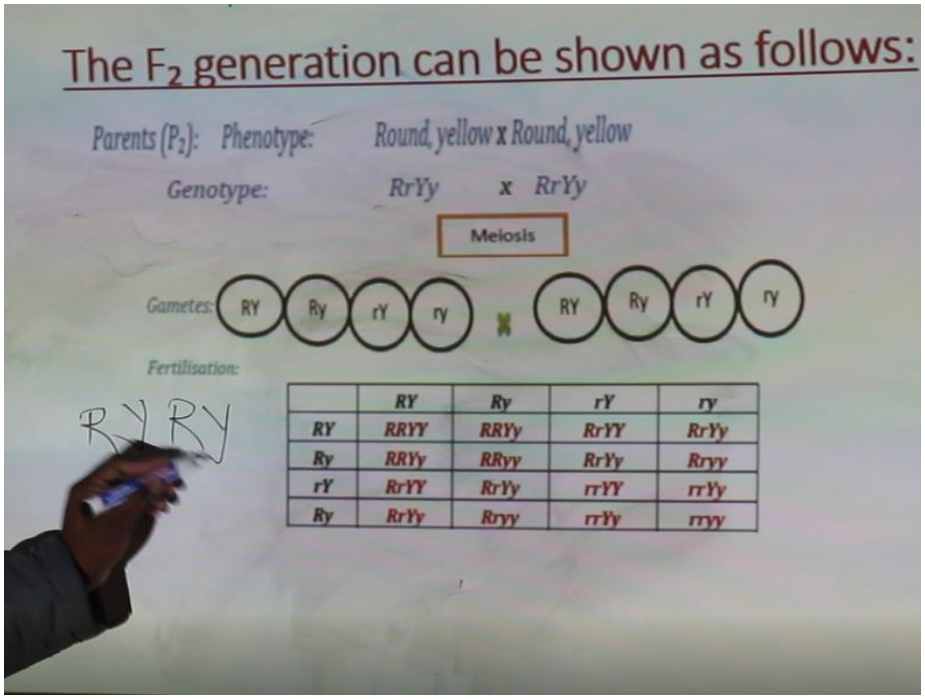
…and this…



…and we can all see they meet here neh…



105. Okay so you are going to have RR and yy…remember we cannot say it is RyRy.



…because will not make sense, it is not going to give us any colour or any shape of the seeds here, okay.

106. If it is R, Y, R, Y it does not make sense…so, R and R must be together then y and y.

107. It must always be in alphabetical order.

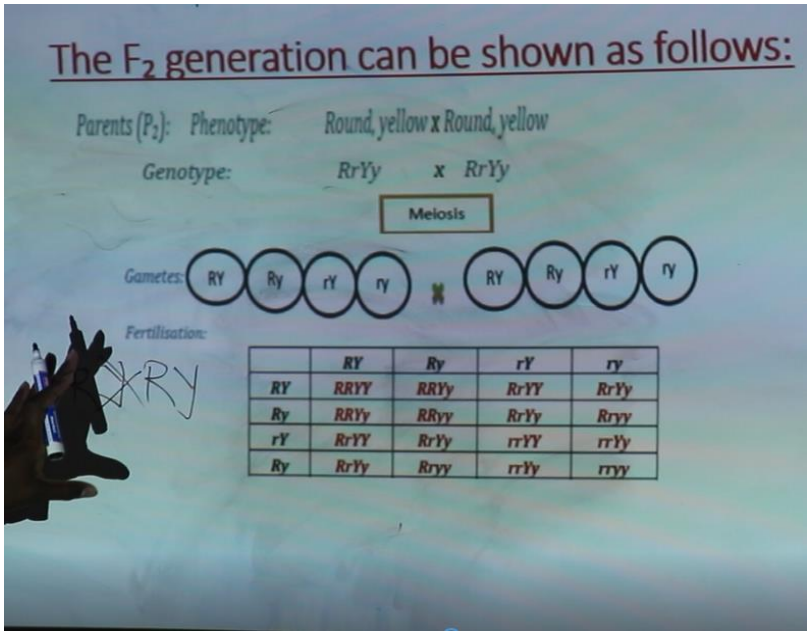
108. You cannot start with Y; you always start with r before y neh…

109. We start with a dominant one before a recessive allele.

110. Am I making sense?

111. Ls: Yes! [Chorus]

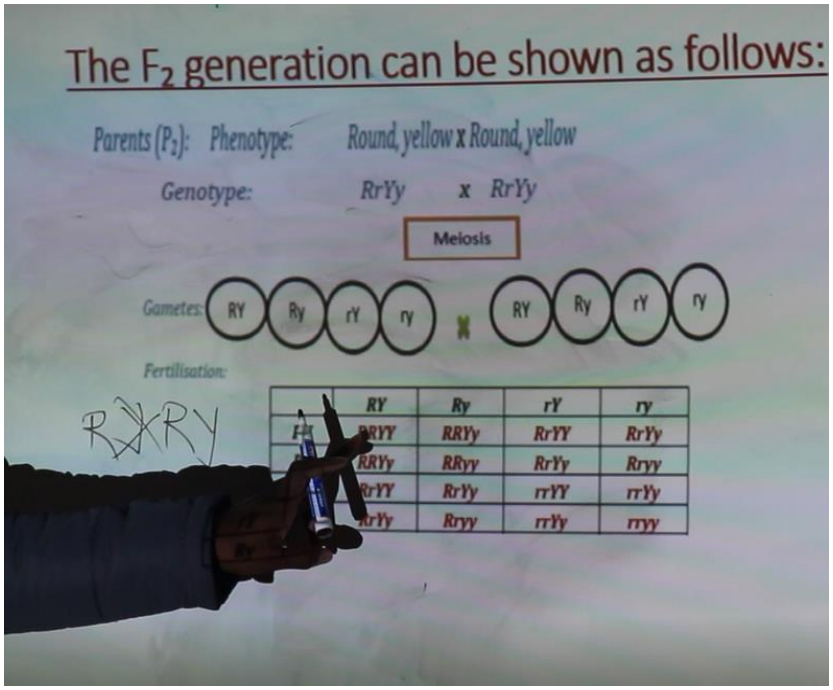
112. Mr. Zulu: Right, so this one is out. [Cancelling out]



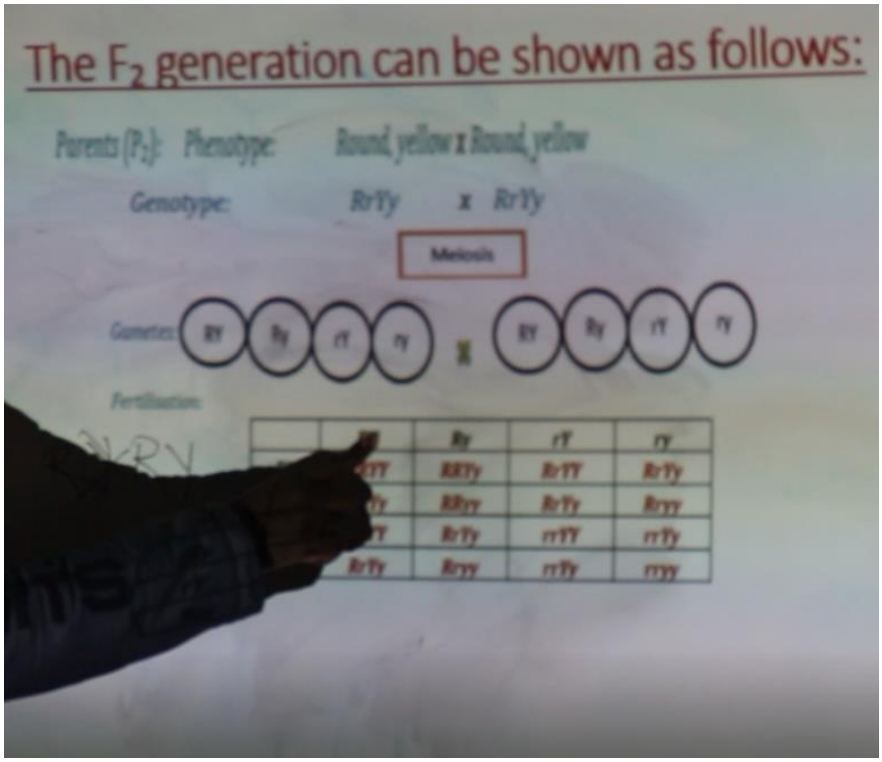
113. Okay we cannot do it like this.

114. If yours is like this please just mark yourself wrong for everything neh…for everything.

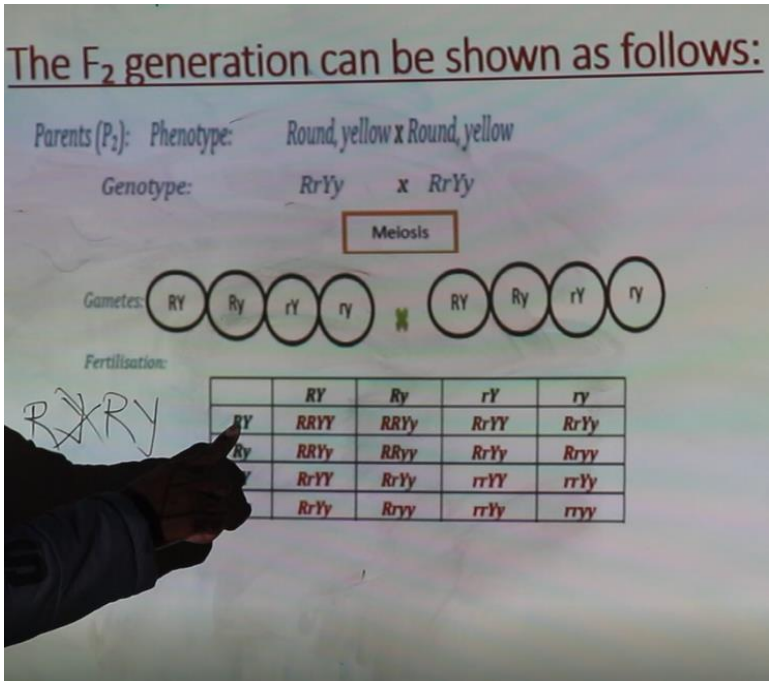
115. Right so, this is what you should do okay.



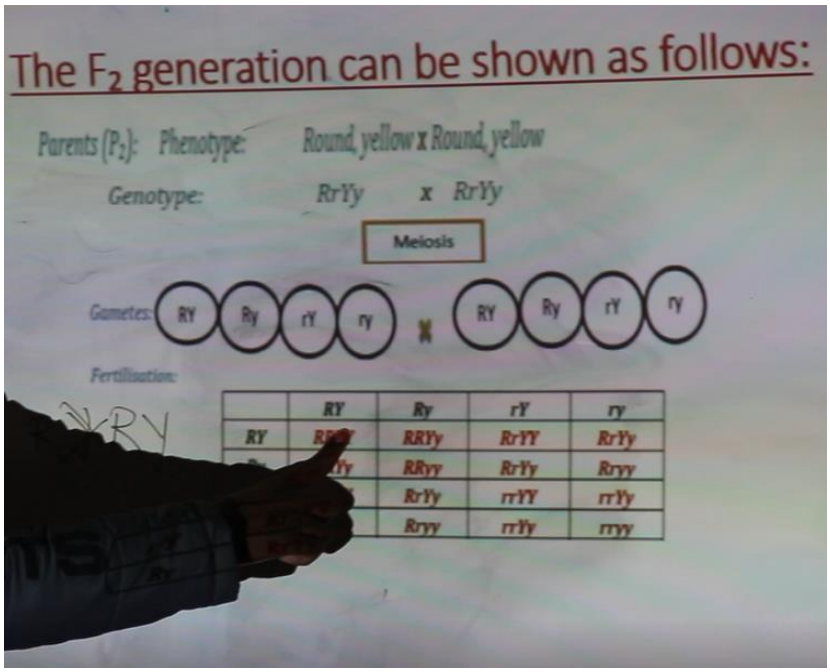
116. Then it may be RR, YY and we can all see where this comes from neh…you can all see where this is coming from…



…and this one…

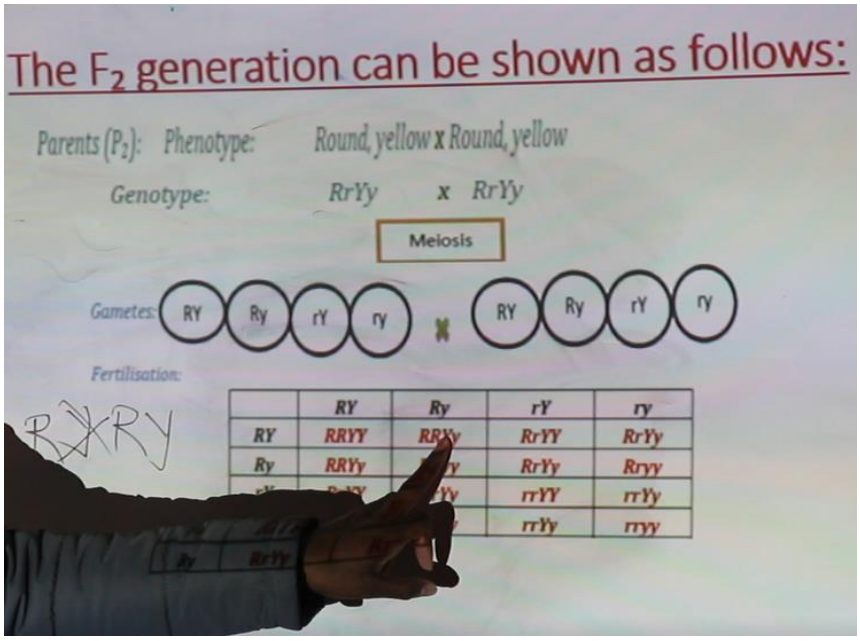


…. they both meet here okay.

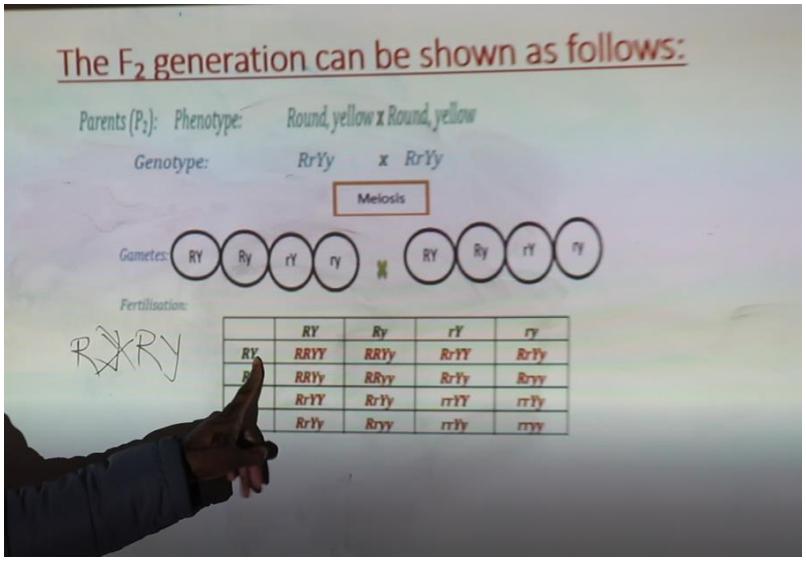


117. So, it will be a dominant R, dominant R and then we have a dominant Y which is this one and a recessive y which is this one.

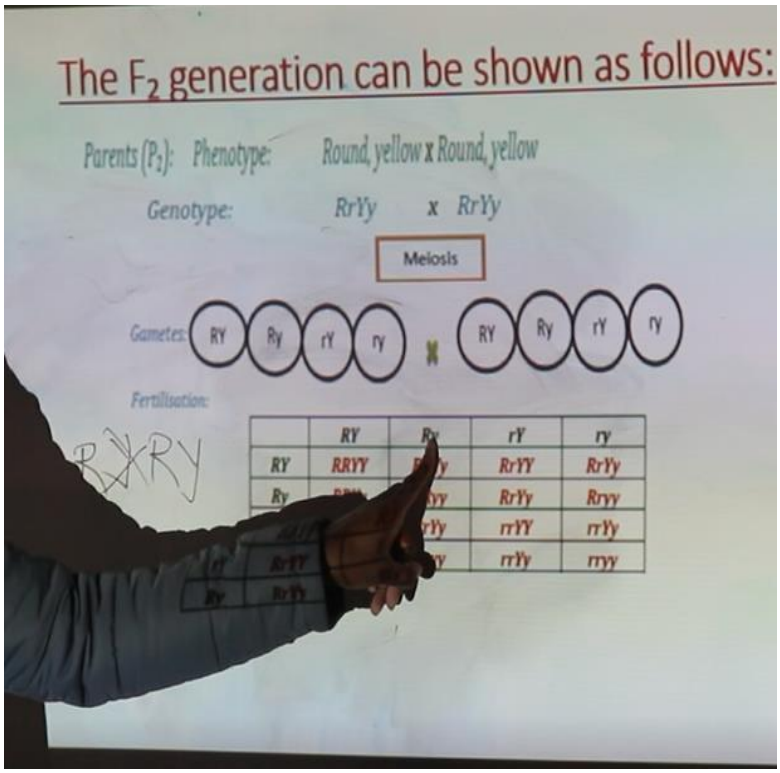
118. It is the same thing when you do this one…



119. So, it will be a dominant R, dominant R and then we have…we have dominant Y which is this one…

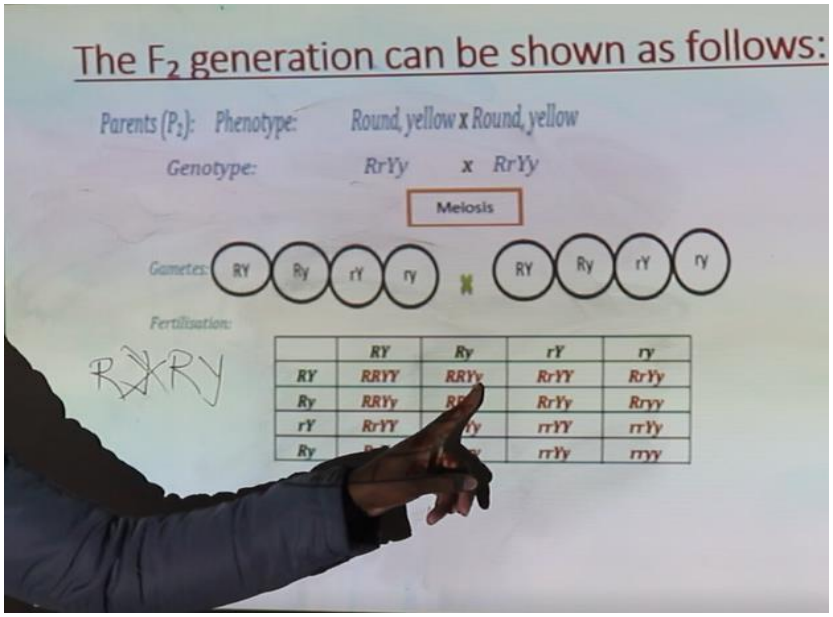


…and a recessive y which is this one…



120. Ehh…are we still following?

121. Okay, you can see; I did not start with a recessive y…



…but I started with a dominant one.

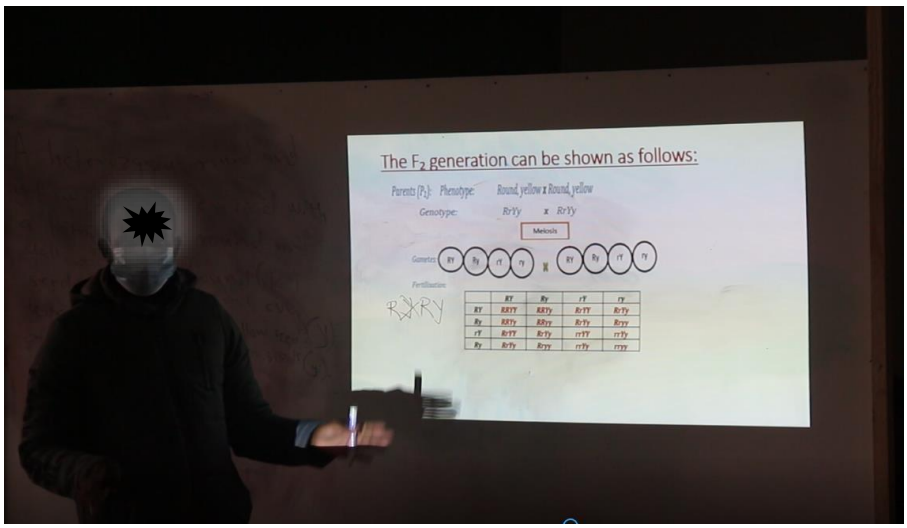
122. Okay, so that is how you should arrange these neh…

123. So, let us move on to this side, we can see that on this square we have this one.

124. Right so, we can see they both meet here okay.

125. So, it will be dominant Y and dominant Y.

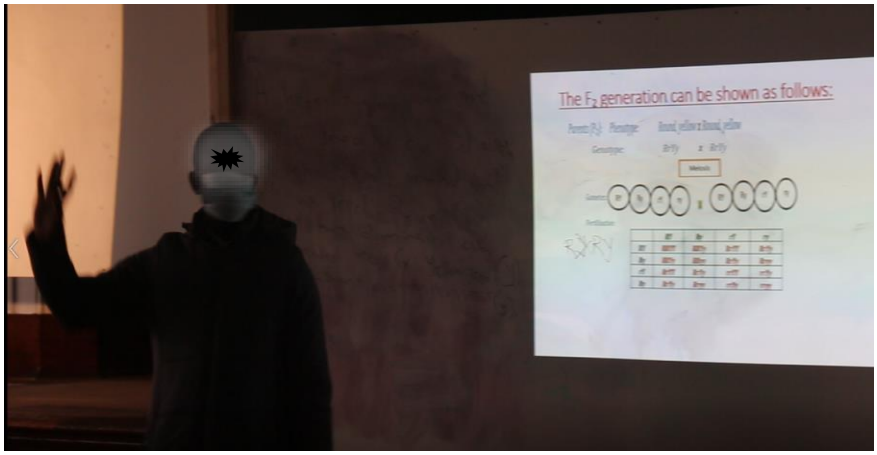
126. So, you just follow…



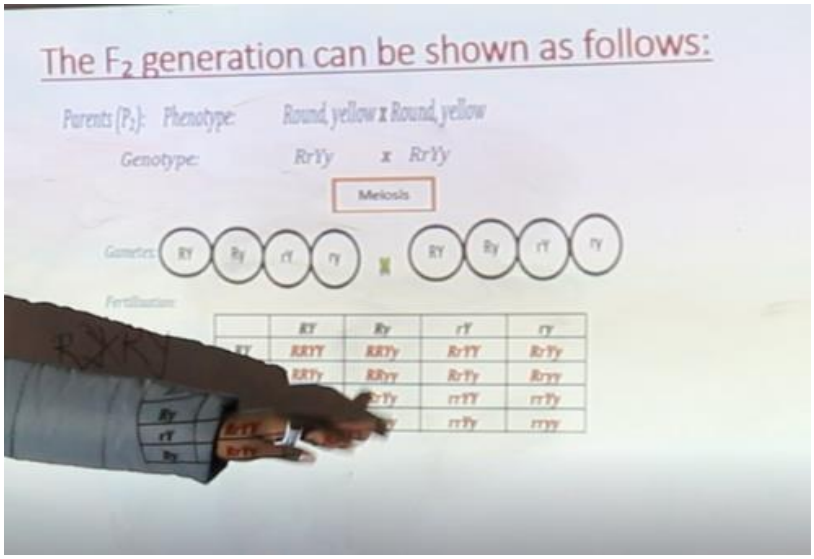
…the same method for all these okay.

127. You still all remember how to do it right…so, okay boys we are not going to go—

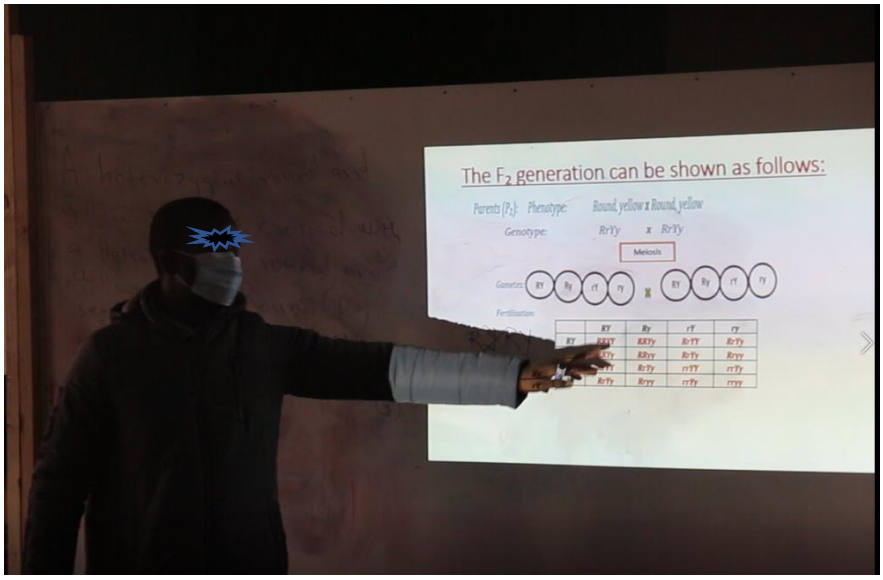
128. Right if yours is wrong, if there is anything that is wrong, can you raise your hand.



129. Please just compare your punnet square with this one. [Showing the punnet square on the slide].



130. If there is anything wrong with your punnet square…please just compare it neh…



…and check if there is something wrong.

131. This is what we are interested in …

[Silence]

132. Mr. Zulu: Yours? So, we have just one-person neh…okay.

133. So, it is one, two, three and four right.

134. The rest, everything is fine neh…okay.

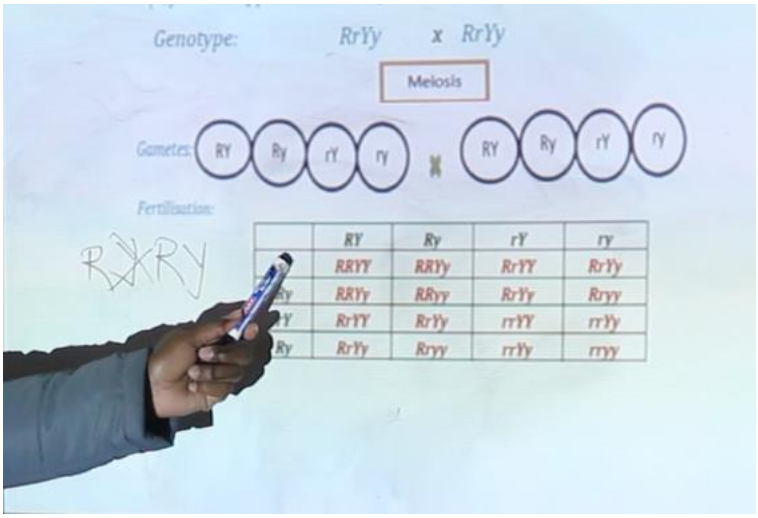
135. So, what was wrong Chief, what went wrong?

136. Alfred: / ? /

137. Mr. Zulu: Which one?

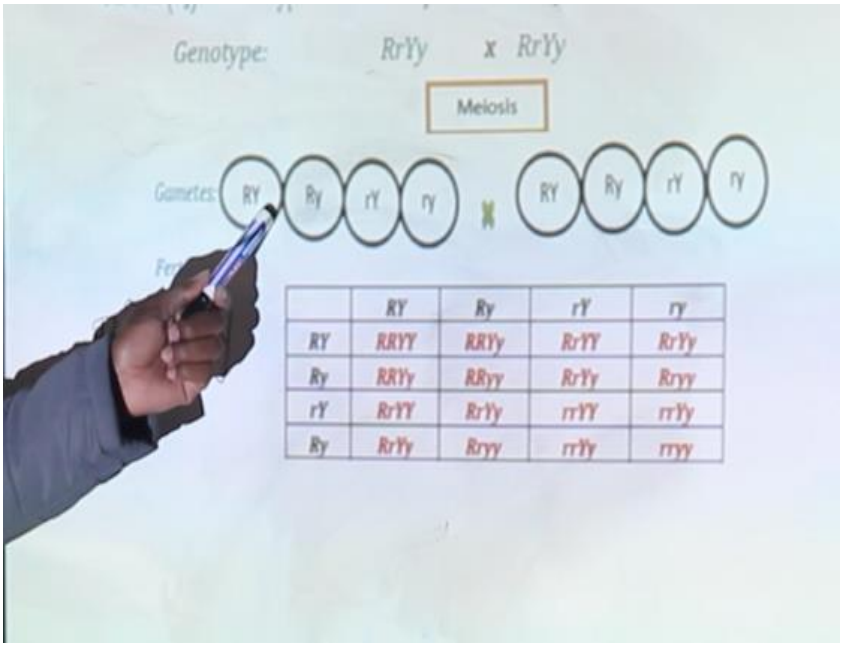
138. Alfred: / ? / Sir dominant R and dominant Y.

139. Mr. Zulu: Dominant R and dominant Y…this?

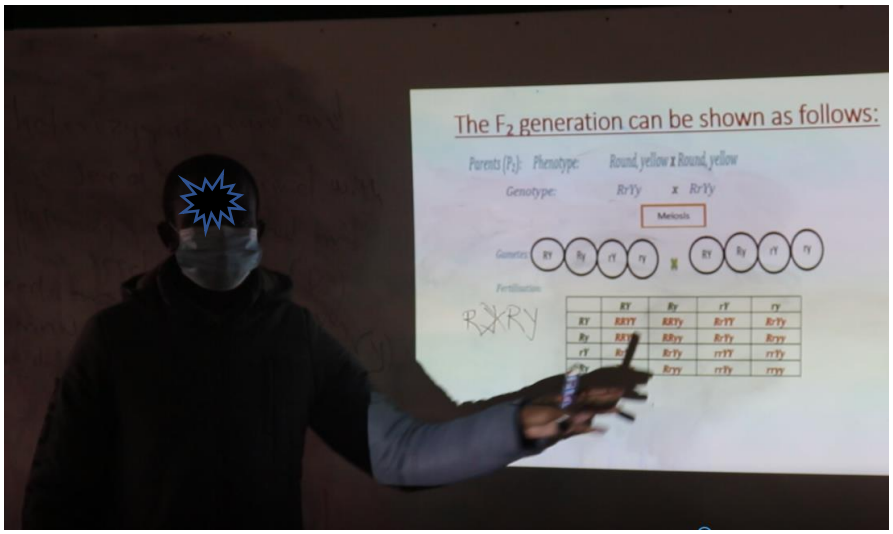


140. Alfred: / ? /

141. Mr. Zulu: Okay so, you made a mistake with your gametes? [Pointing]

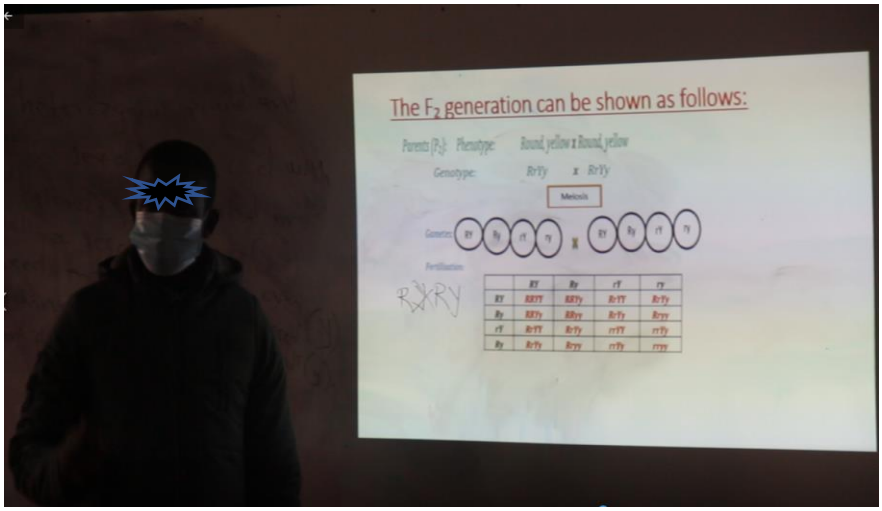


142. Okay / ? /…okay if you make a mistake here it means everything…



…will be wrong.

143. It means everything will be wrong,



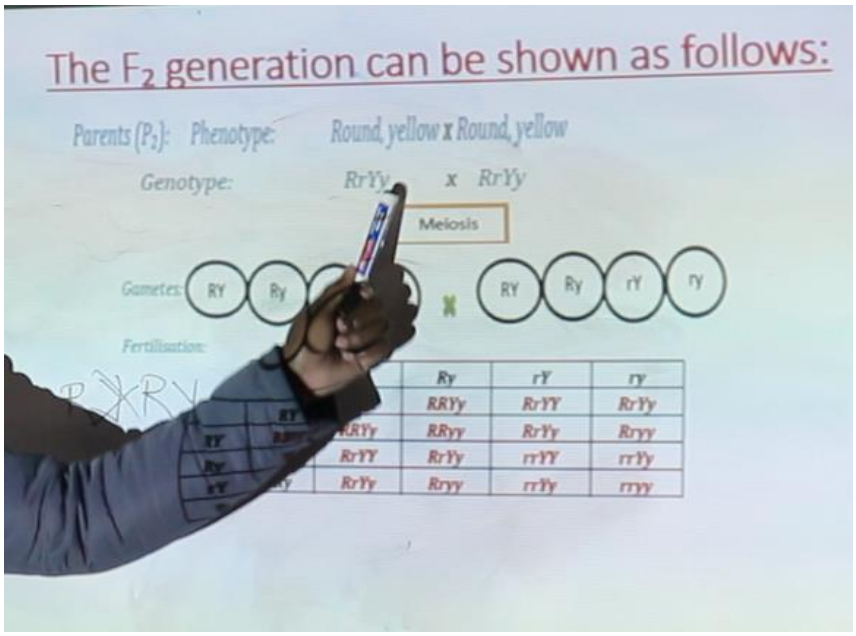
…so, make sure you get the gametes right before you do the punnet square.

144. If you make a mistake here obviously, it will affect ehh…fertilization, then your answer will be wrong okay.

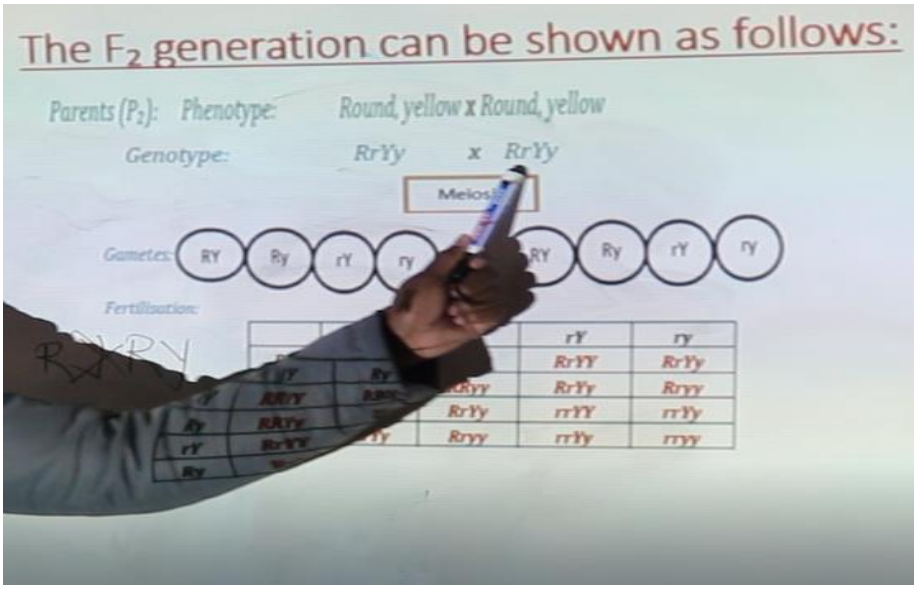
145. So, please make sure…you get this correct.

146. I said to you that with dihybrid crossing, it is like you are doing two types of crosses.

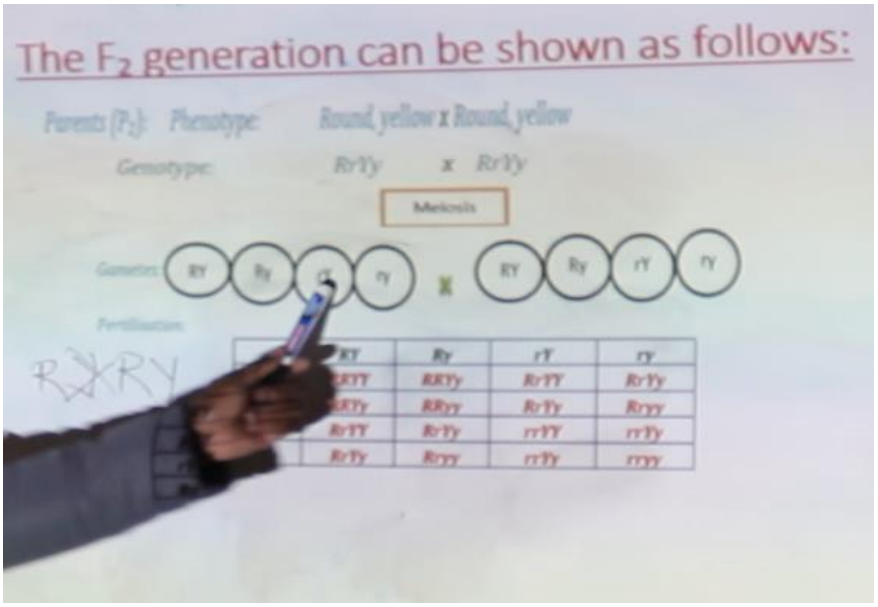
147. You start with a monohybrid crossing so, you do your monohybrid here…



…you know how to do crossing for monohybrids right neh…you do the crossing for this…

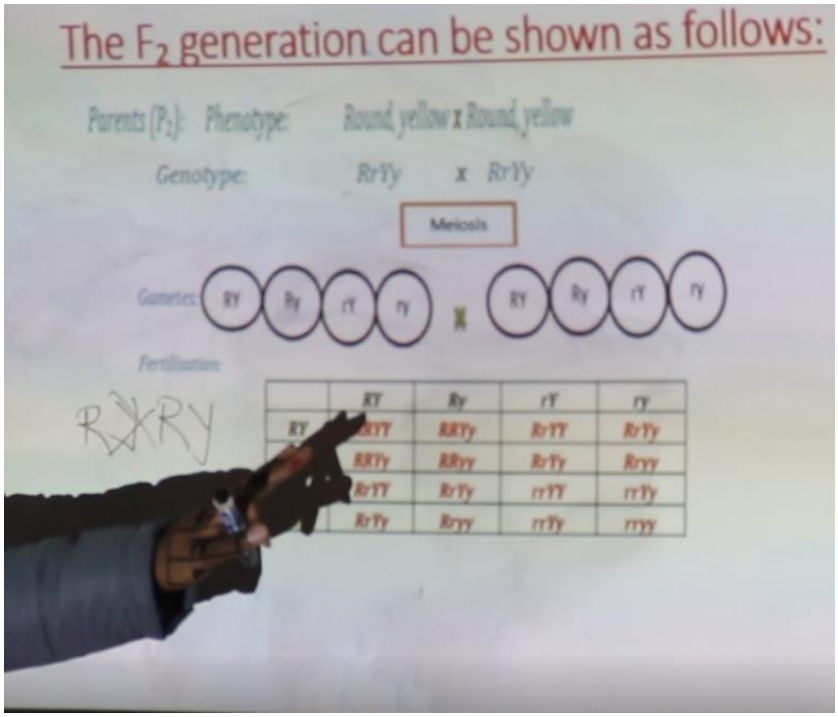


…so, you can end up getting these gametes neh!

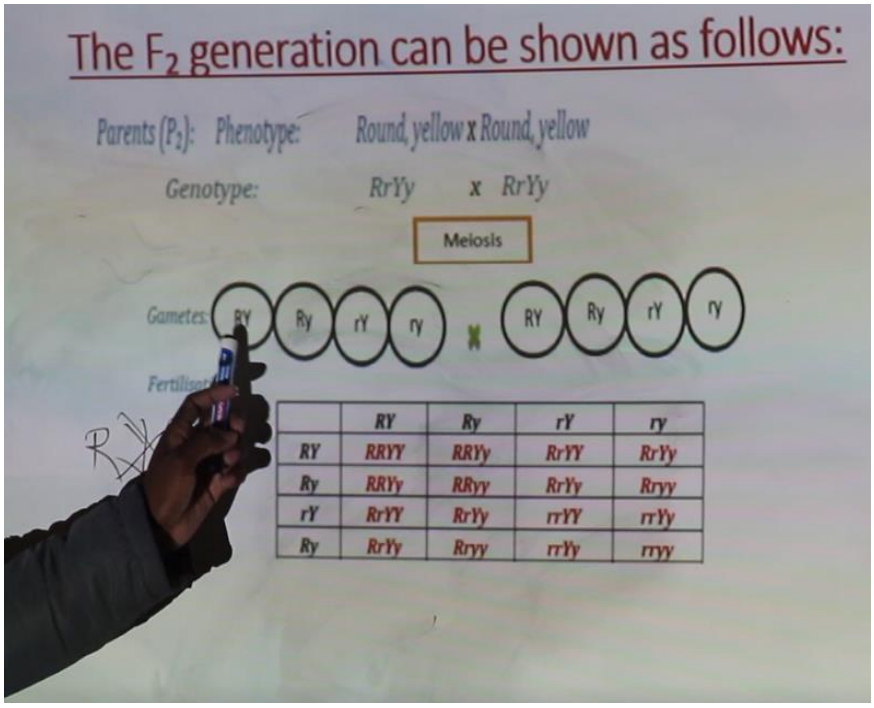


148. Right so, was that the only problem?

149. Okay, but ehh…I mean did you follow ehh… the steps for this one?



150. Okay so, everything is fine except that you got this wrong neh…



…okay, ehh… who else…Stephane? Yaah…

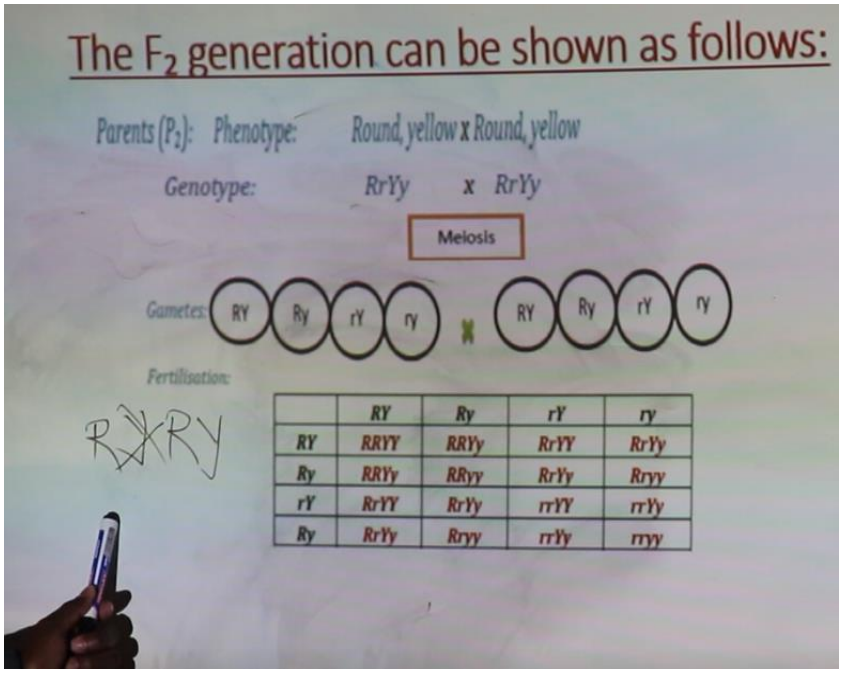
151. Stephane: [Inaudibe]

152. Mr. Zulu: It is the same thing so your— the gametes were wrong.

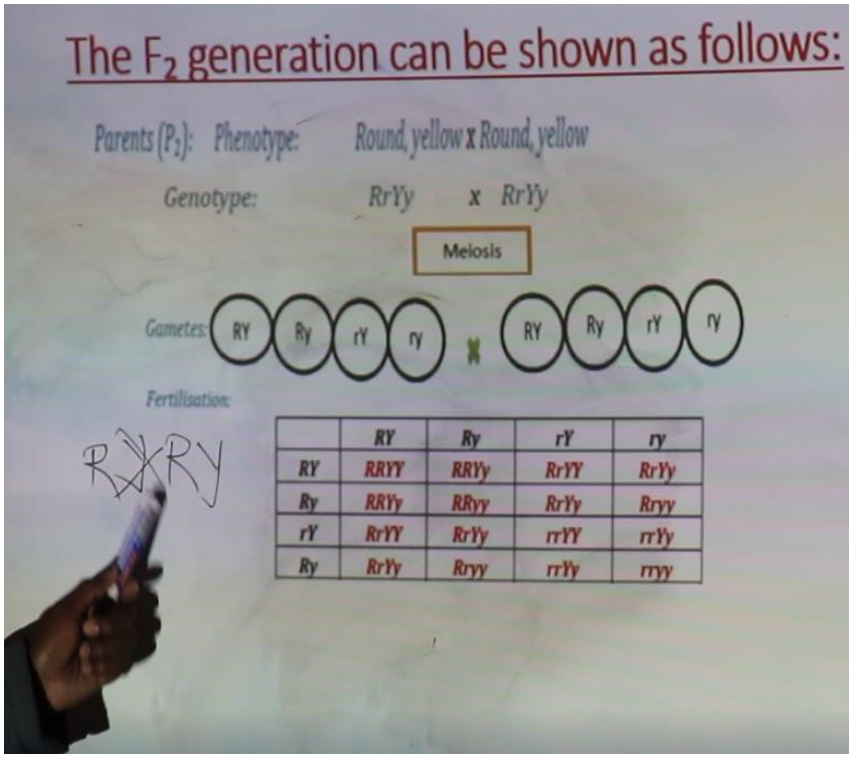
153. Okay, who else? Yes!

154. Kabelo: Sir! / ? /

155. Mr. Zulu: Oh! Okay, so you said— you did it like this neh!



…so it was RY, RY okay…

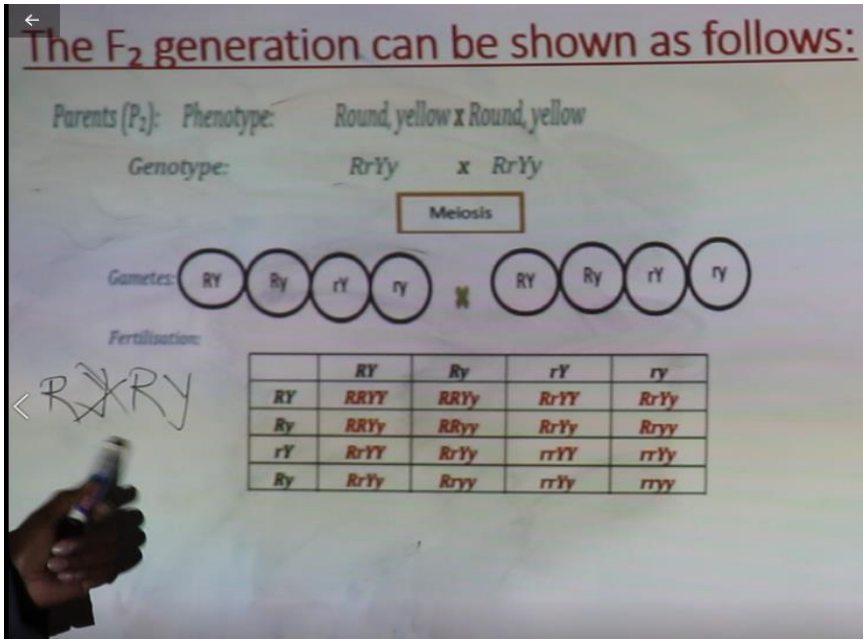


…but does it make sense now?

156. Okay, you see how you should do it because you will not get any colour…you will not get any shape.

157. Mr. Zulu: It is just a mix up of ehh… the alleles and they will not have a specific shape.

158. What colour is it? [Pointing]



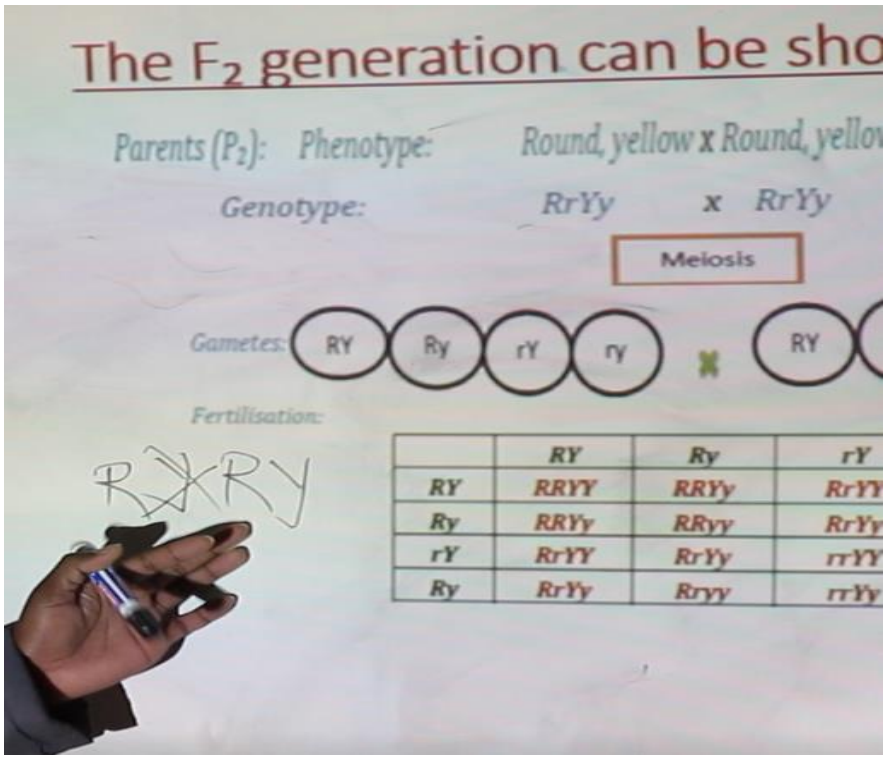
159. If a seed is like this, what are you going to say…Tshepiso?

160. Tshepiso: It is round yellow, round yellow.

161. Mr. Zulu: You cannot say it is round yellow, round yellow… No!

162. It is either round yellow and round and wrinkled or green uhm…I mean wrinkled and yellow, something like that.

163. But with this one…



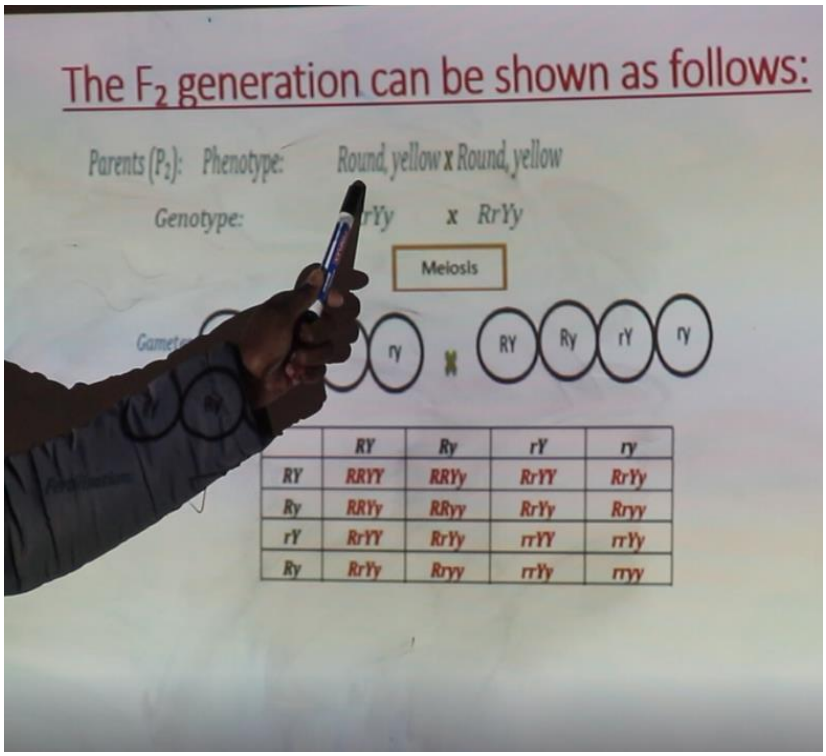
…ehh...it does not make sense, okay.

164. You cannot describe something by saying, it is round yellow, round yellow…you see.

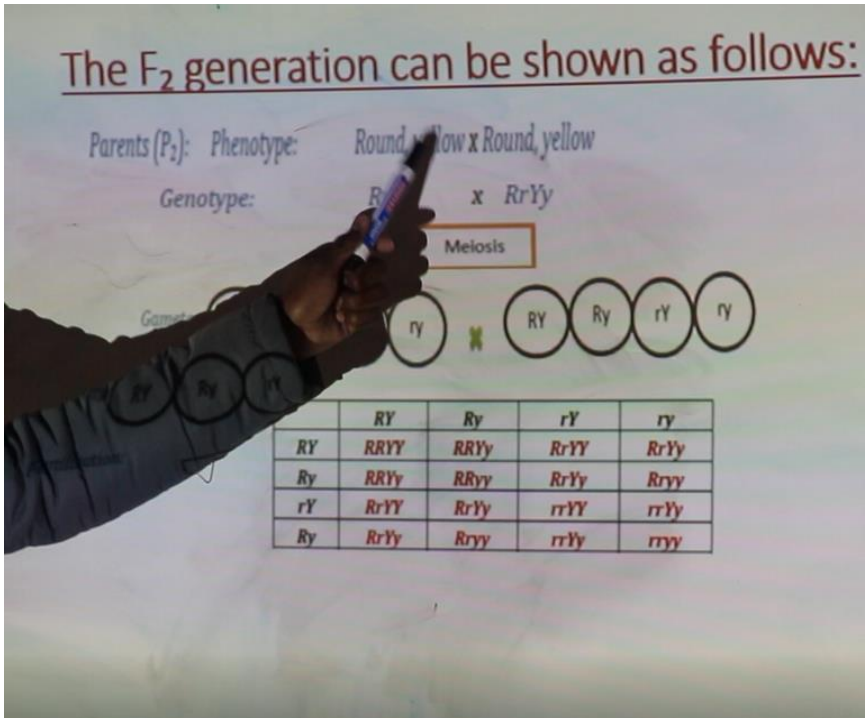
165. So, that is why you must follow the rules.

166. So, you start with R before Y but it will also depend on what you are given first.

167. Okay, from the sentence, you can see it is shape first…



…and then the colour will follow.



168. So, even with your… with your offspring it must be the same thing.

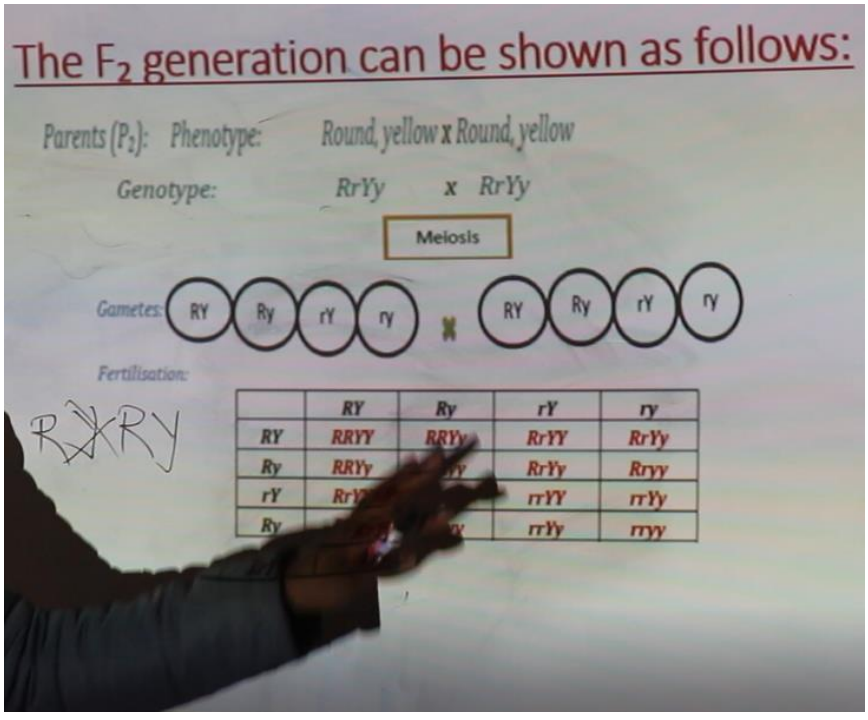
169. It must be colour before shape.

170. Right, okay ehh… boys you will get this handout neh!

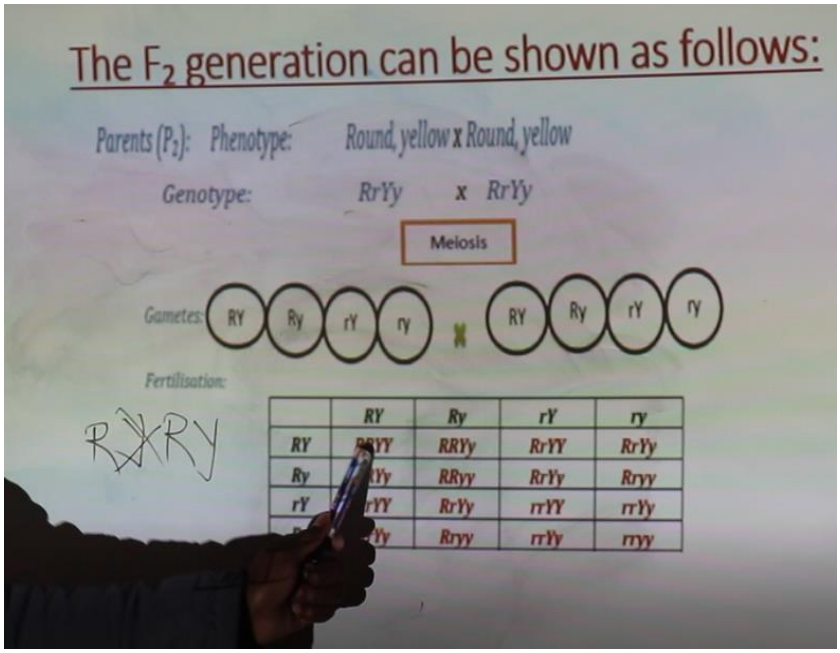
171. Right, we are done with the punnet square and then now the phenotype… I mean genotype for this generation.

172. Right, remember the genotype is okay.

173. So, you just take this as it is okay…



…and then you write it as the genotype okay or you… you must count for instance, all the genotypes that are exactly like this…

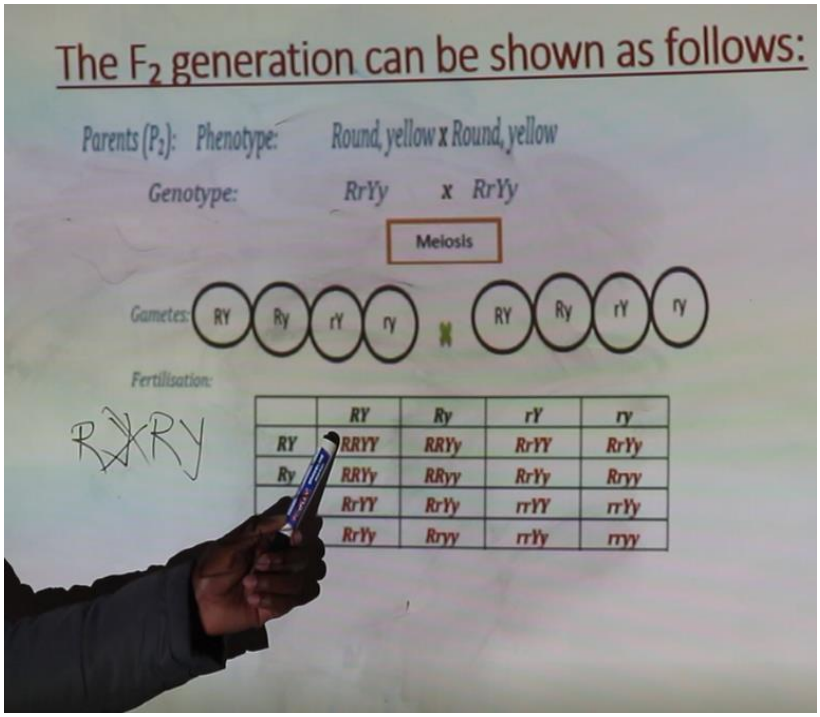


…and you just write, RR YY then move to those later like this…

…and you do the same thing right.

174. So, what will be the colour of this?

175. The first one… [Taping on it].

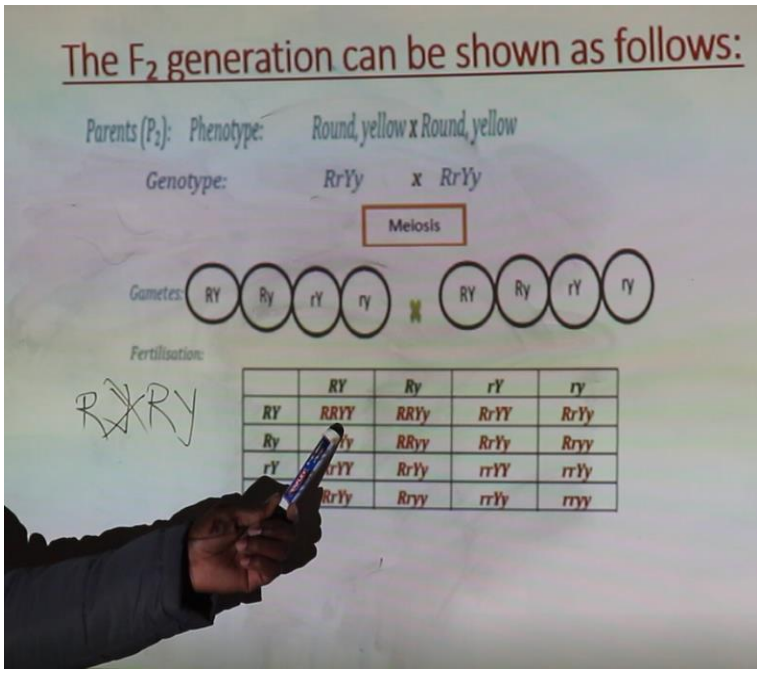


176. What is the colour, Tanatswa?

177. Tanatswa: Round and yellow.

178. Mr. Zulu: This will be round and yellow neh…okay, this is round and yellow.

179. Is it heterozygous or homozygous?



180. Ehh… Stephane!

181. Stephane: Round and yellow.

182. Mr. Zulu: This will be round and yellow neh…okay, this is round and yellow.

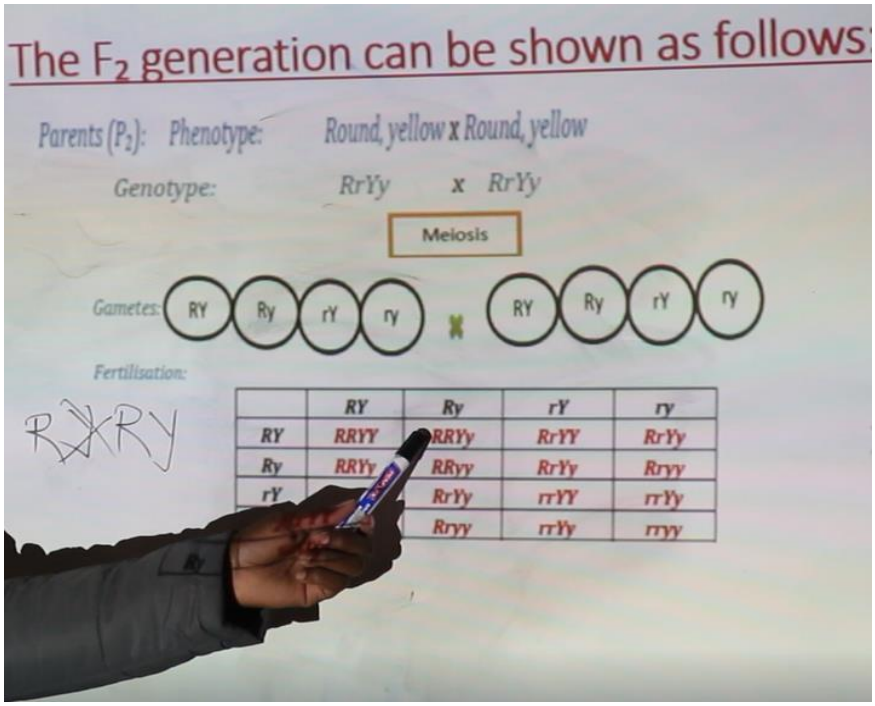
183. Is it heterozygous or homozygous situation?

184. Stephane: Homozygous.

185. Mr. Zulu: It will be homozygous okay…can you see, for round…. okay?

186. We have dominant R and dominant R.

187. So, that is homozygous and this homozygous and this is also homozygous okay and then what about this one?



188: What colour is this? Yes…

189. Thepiso: Round and yellow

190. Mr. Zulu: It is round and yellow….it is still and round and yellow okay.

191. Boys does it make sense?

192. Ls Yes!

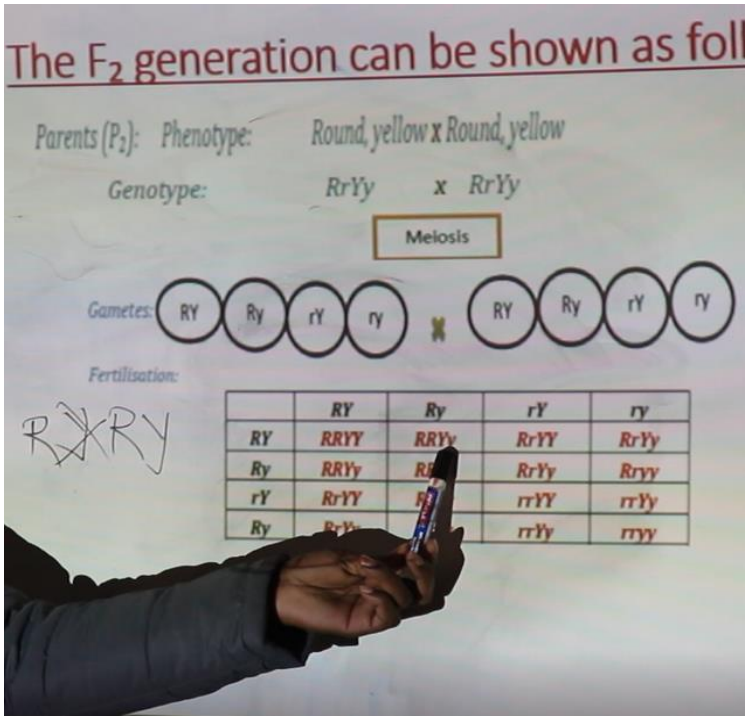
193. Mr. Zulu: Right, why are we saying round and yellow when we have this recessive.

194. Yes, Sanele?

195. Sanele: Sir, the… the dominant R will mask the—

196. Mr. Zulu: Yes, the dominant R will mask the effect of this neh…

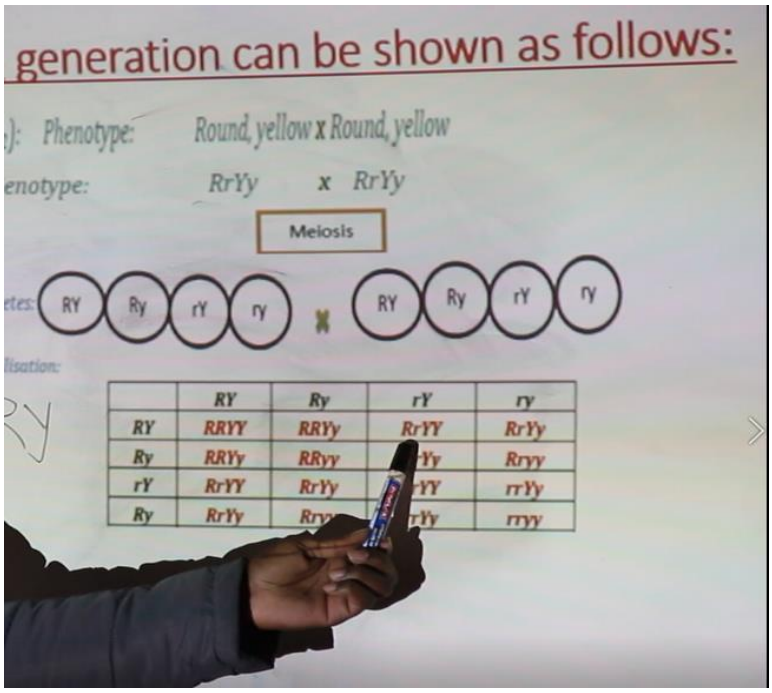
197. Okay, remember this is an allele for green.



198. It is there but it will not show in the phenotype.

199. That is why we said this one will be masked since it is recessive.

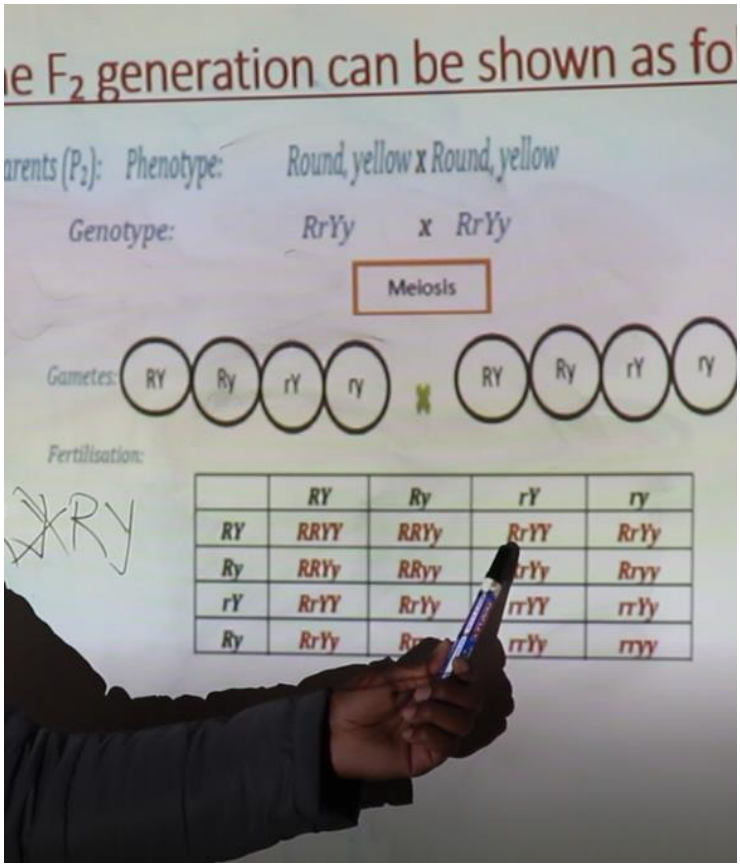
200. Okay, let us look at this one, what colour is this…Thabani?



201. Thabani: Round and yellow.

202. Mr. Zulu: It is round and yellow again.

203. Right so, again you can see that this is a heterozygous situation in terms of the shape okay.



204. So, this R…the dominant R will mask the effect of this.

205. Okay, for colour we do not have recessive allele okay.

206. So, that is why it is round and yellow.

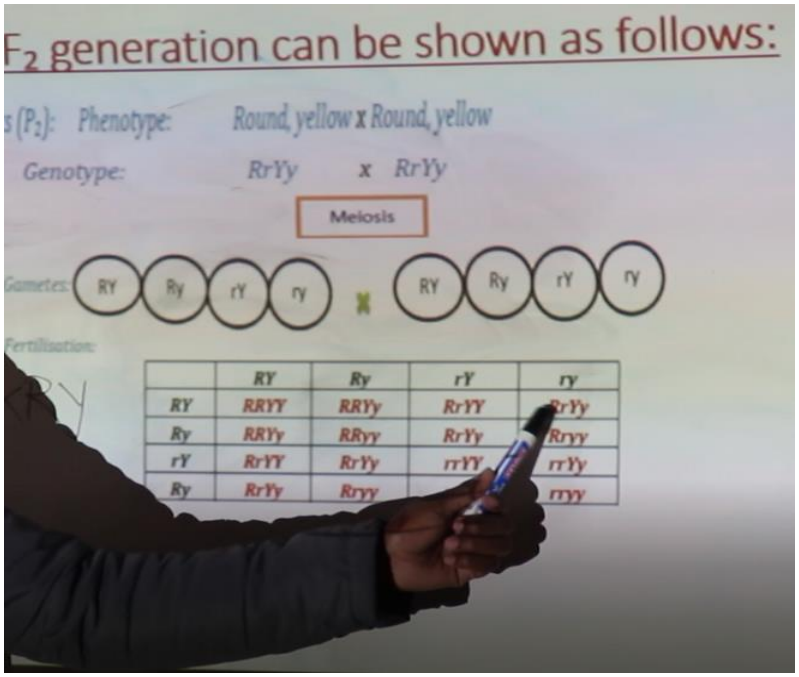
207. Let us move on to this one…Amandla what colour is this one?

208. Amandla: Round and yellow.

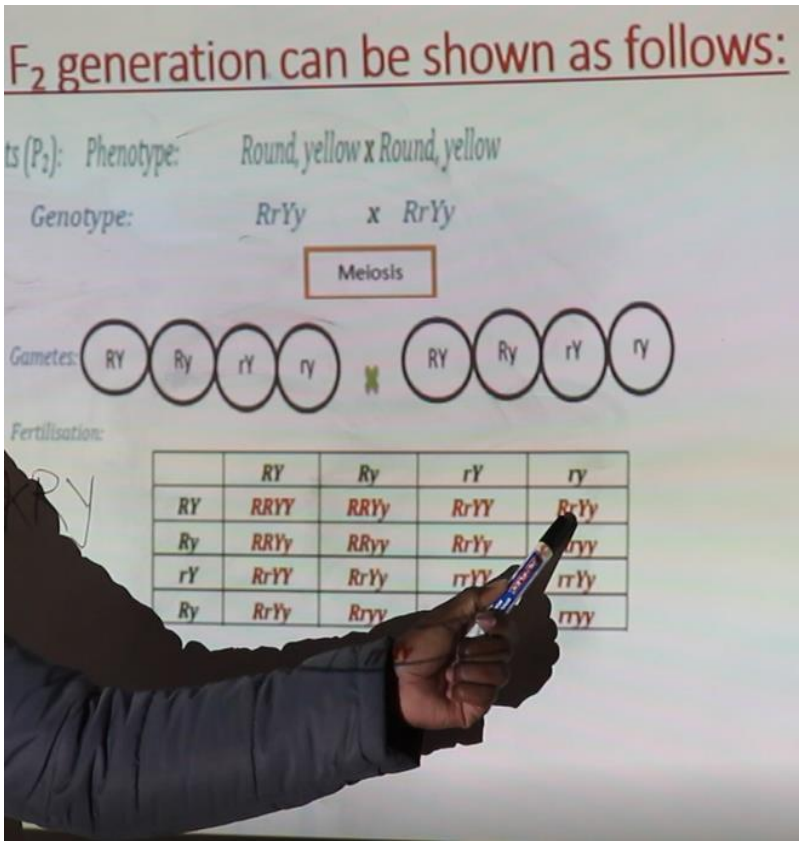
209. Mr. Zulu: It is round and yellow again.

210. Right and you can see that it is a heterozygous situation for both ehh…ehh…traits…or shape and for colour okay.

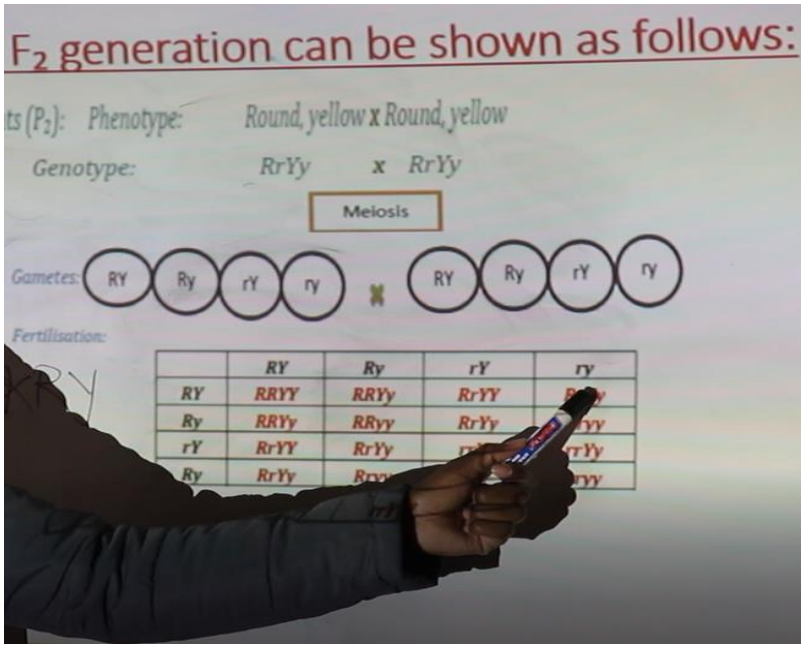
211. So, this…



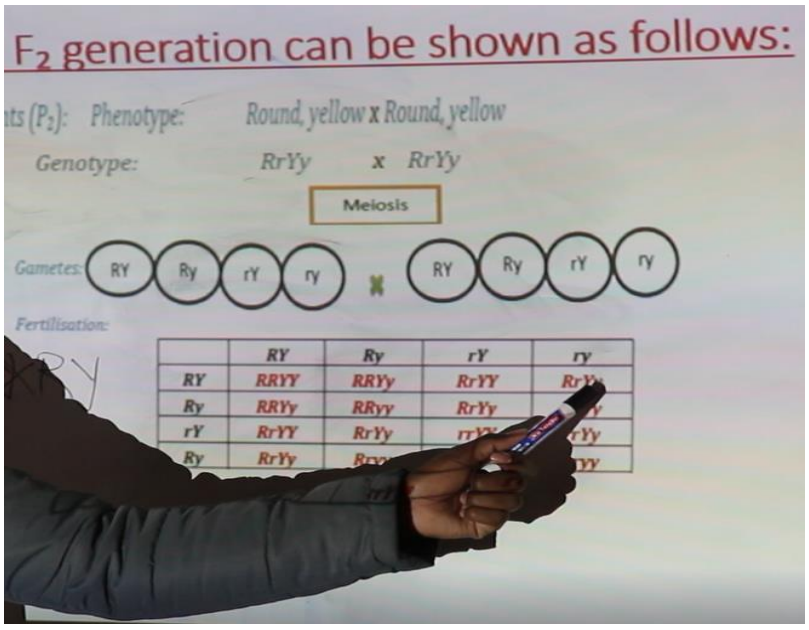
…will mask the effects of this…



…and again, this…

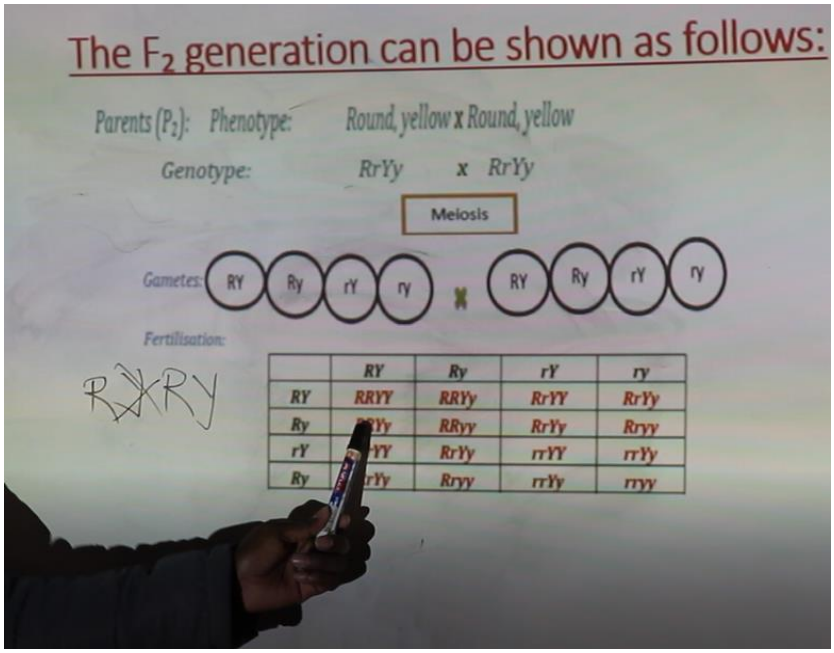


…will mask the effects of this.



212. So, that is why it is round and yellow.

213. Okay, let us move to this one now.



214. What colour is this Joseph…okay, what colour is this ehh… Joel?

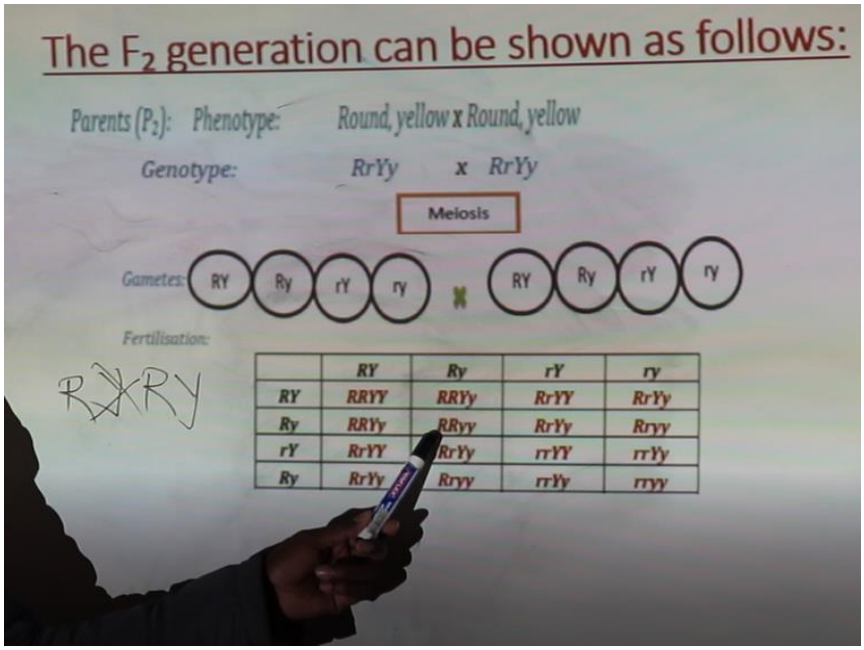
215. Joel: Sir, it is round…round and yellow.

216. Mr. Zulu: It is round and yellow…okay, do we agree?

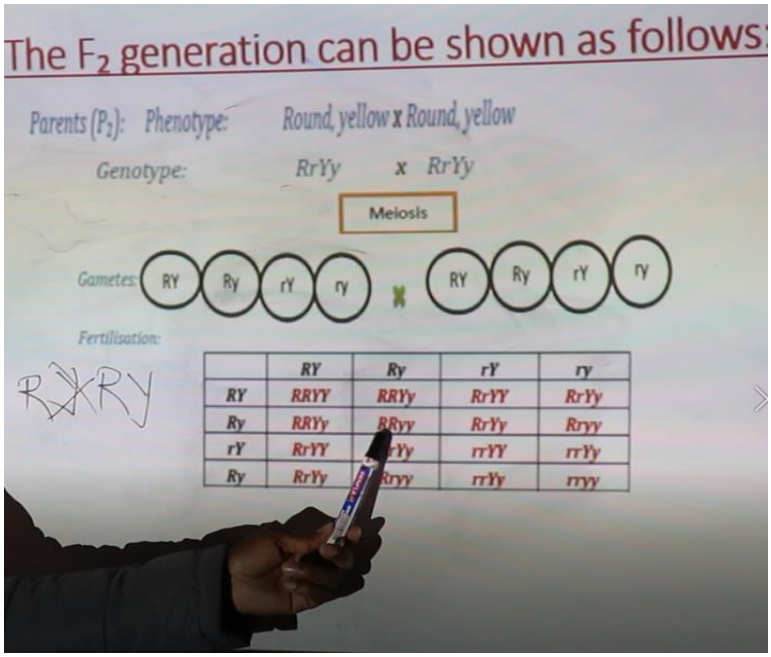
217. Okay, it is round and yellow, again, you can see that both alleles are dominant and this one is recessive so, it is masked.

218. So, it will be round and yellow.

219. What about this one?



220. Ehh…Sbu, this one?



221. Sbu: Round and it is not yellow.

222. Mr. Zulu: Sorry … it will not be yellow, so, what will be the colour?

223. Sbu: Green

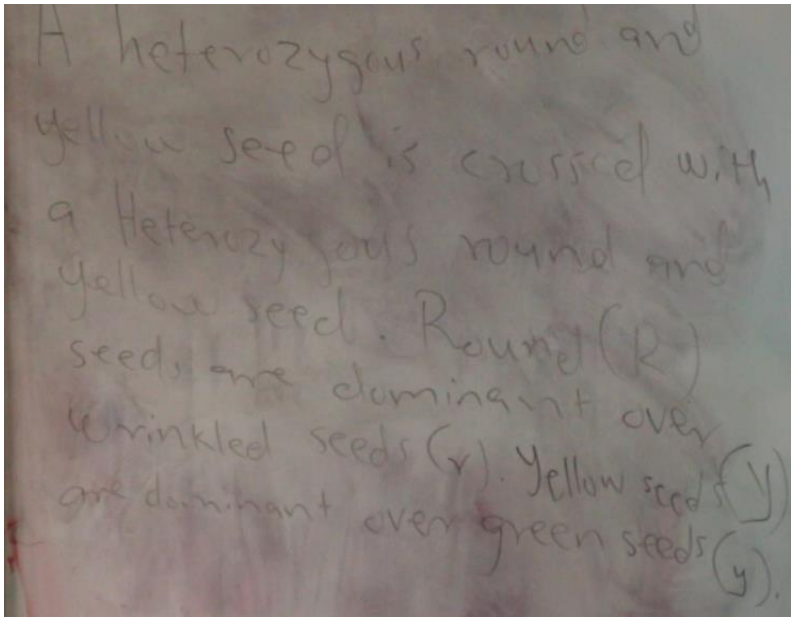
224. Mr. Zulu: Red?

225. Sbu: Green

226. Mr. Zulu: Yes! Green okay.

227. Sbu: Green

228. Mr. Zulu: Okay, because from our statement we are told that green is recessive neh!



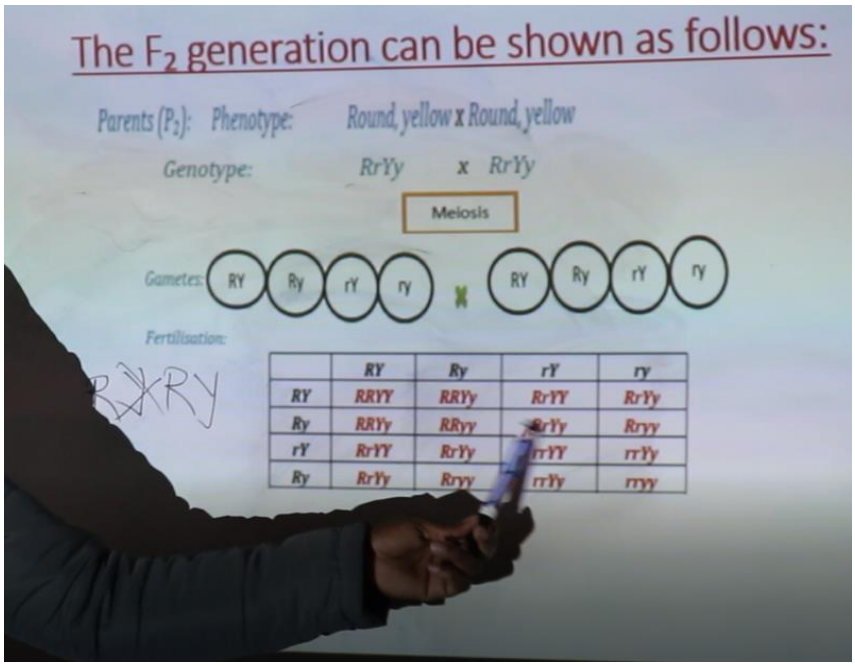
229. Okay, this will be round and green…okay which is something new okay.

230. So, it will be round and green because for colour we only have two recessive alleles, those alleles will show because there is nothing dominant that will mask the effect of the recessive alleles neh!

231. So, we do not have any dominant one here.

232. So, that is why the colour is green not yellow.

233. Then, moving onto this one… [pointing]



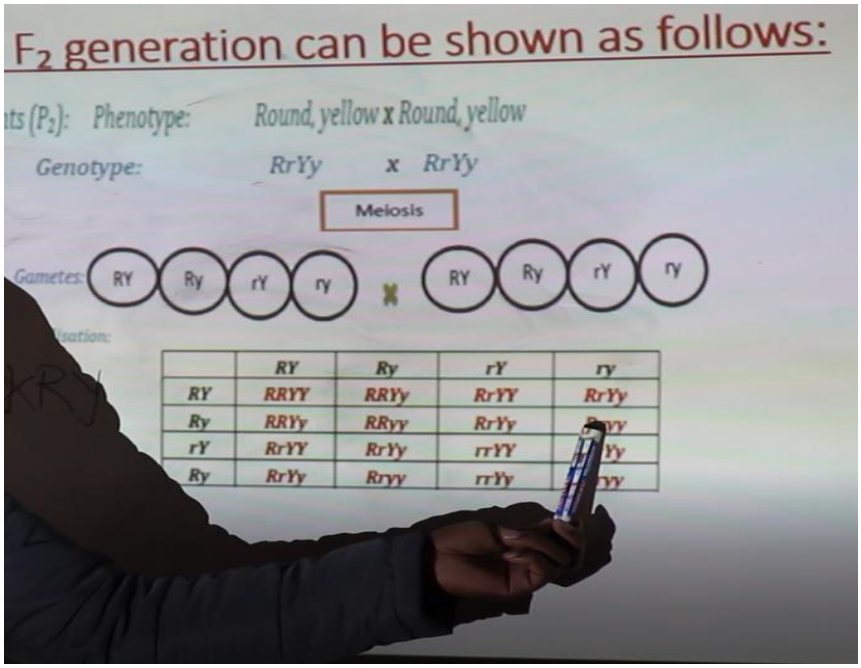
…what colour is this, Thakalane?

234. Thakalane: Round and yellow.

235. Mr. Zulu: It is round and yellow.

236. Right, again you can see this is a heterozygous situation.

237. We have dominant alleles and recessive alleles so, that is why it is round and yellow…and then this one…Sinenhlanhla?

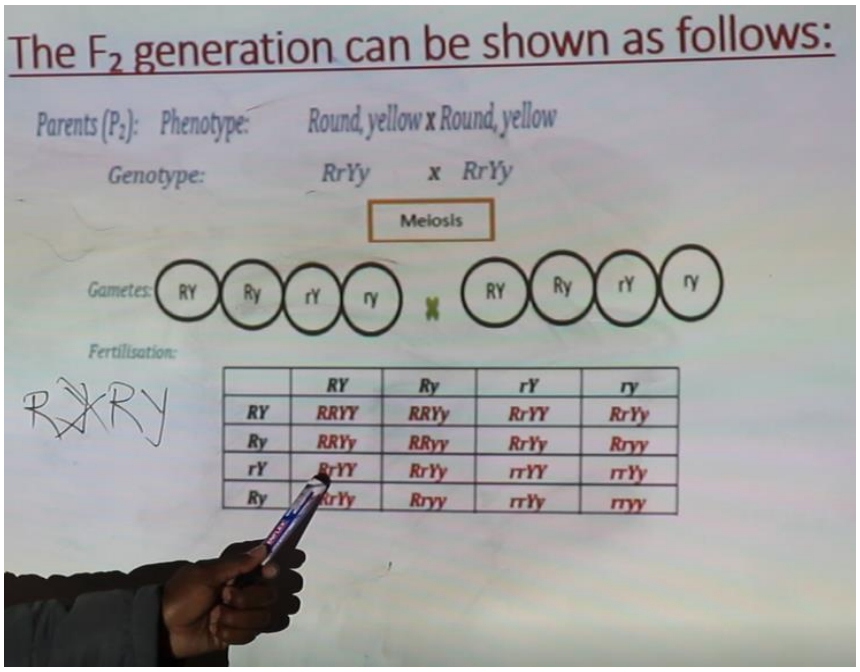


238. Sinenhlanhla: Round and green.

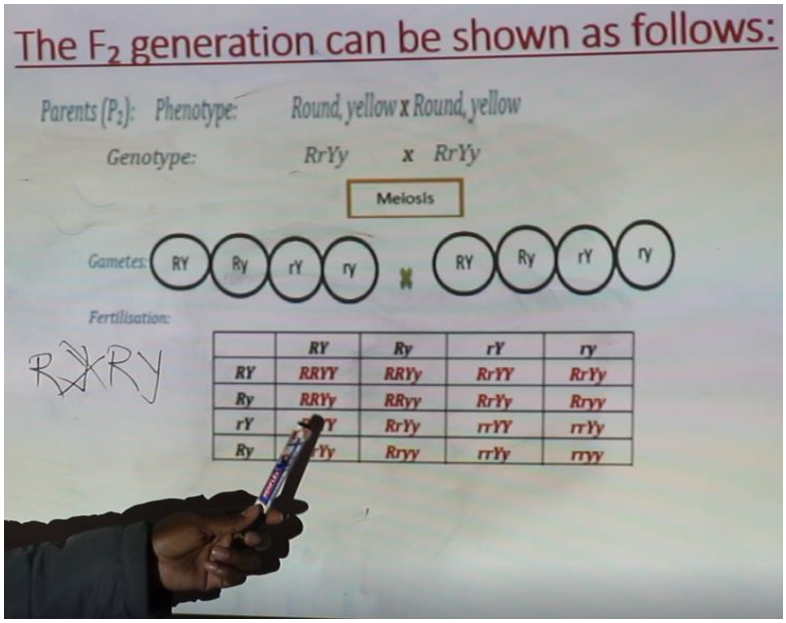
239. Mr. Zulu: This is round and green, okay and for round neh…there is a recessive allele, it is masked by the dominant one.

240. When we have recessive alleles, only then they will show, meaning that there is no dominant allele, okay.

241. So, that is why it is round and green…and this one?

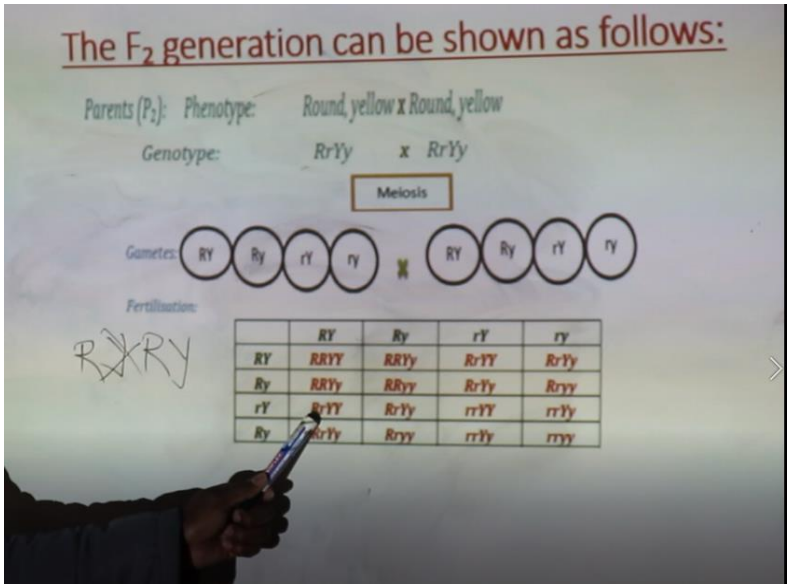


242. Ehh…Tshepiso, what colour is this? [Hitting the board with pointer]

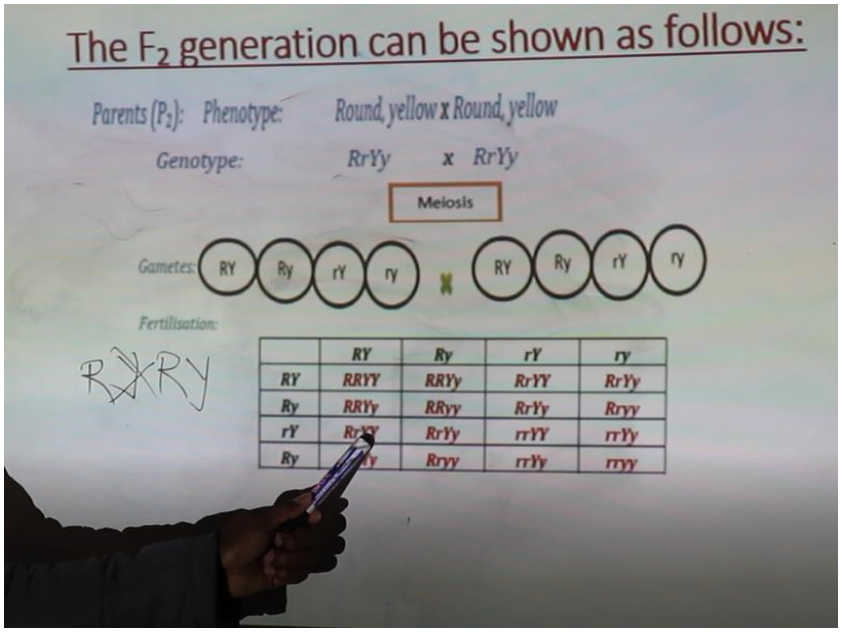


243. Tshepiso Round and yellow.

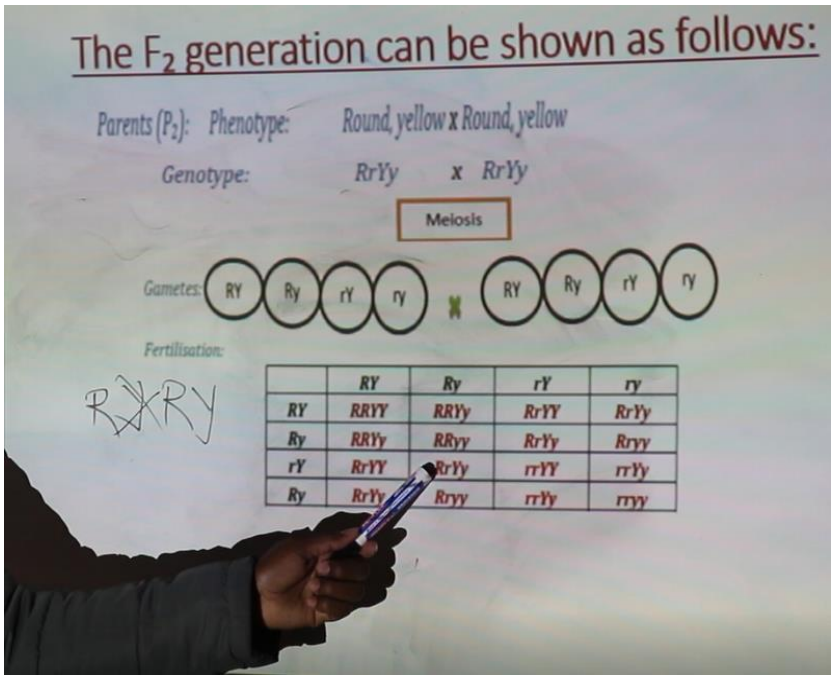
244. Mr. Zulu: This will be round and yellow okay, this is heterozygous…



…this is homozygous.

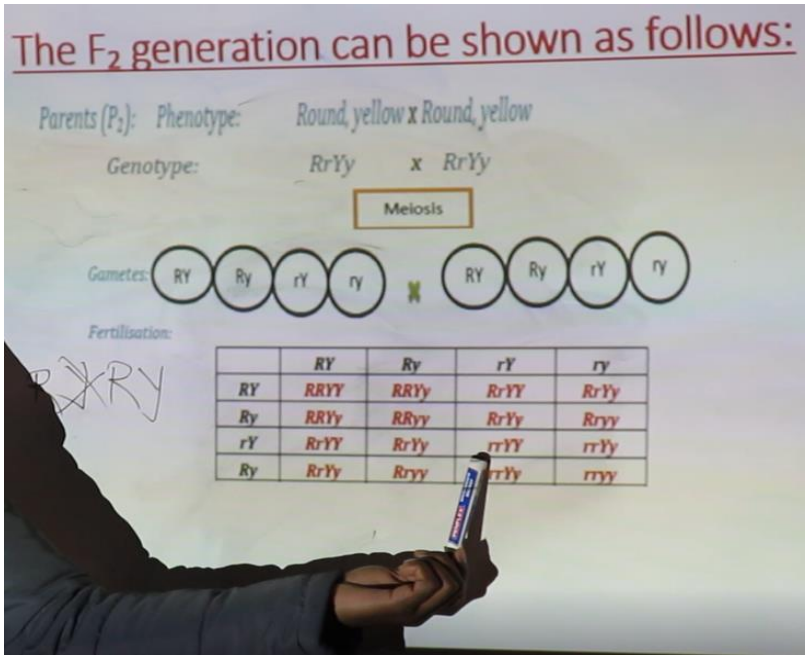


245. Okay, Ehh… Yash, this one?



246. Yash: Round and yellow.

247. Mr. Zulu: It is round and yellow again and then we have this one, what colour is this… Moore?



248. Moore: Round and yellow.

249. Mr. Zulu: Hee! This one? It is …

250. Moore: Round and yellow.

251. Mr. Zulu: Round and yellow… Oh! Chief, this is round but look at this…

252. Do we have any dominant allele here?

253. Okay then what colour, I mean what will be the shape?

254. Moore: Round and yellow. / ? /

255. Mr. Zulu: No! Yes…Sizwe!

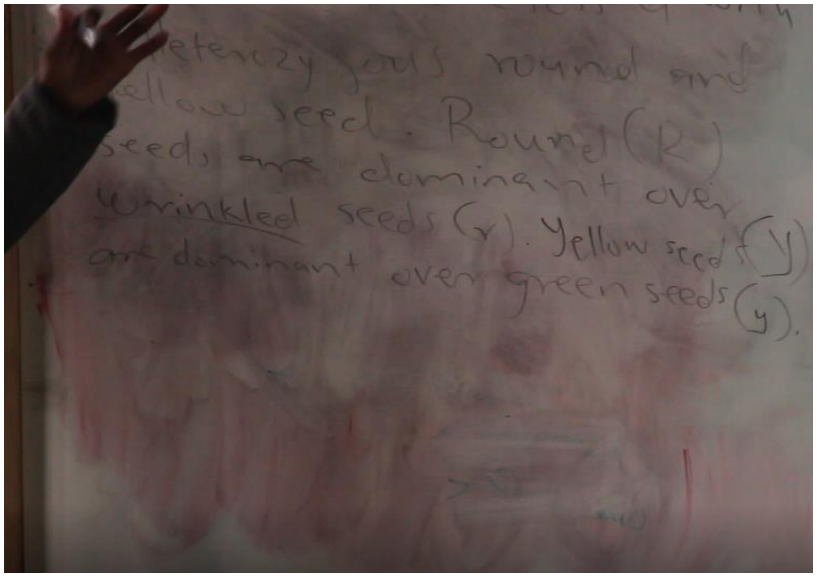
256. Sizwe: Wrinkled!

257. Mr. Zulu: It will be wrinkled okay…it will be wrinkled and yellow okay.

258. Why is it wrinkled?

259. Because we only have recessive alleles okay…we only have recessive alleles and if we have recessive alleles, there is nothing to mask, okay.

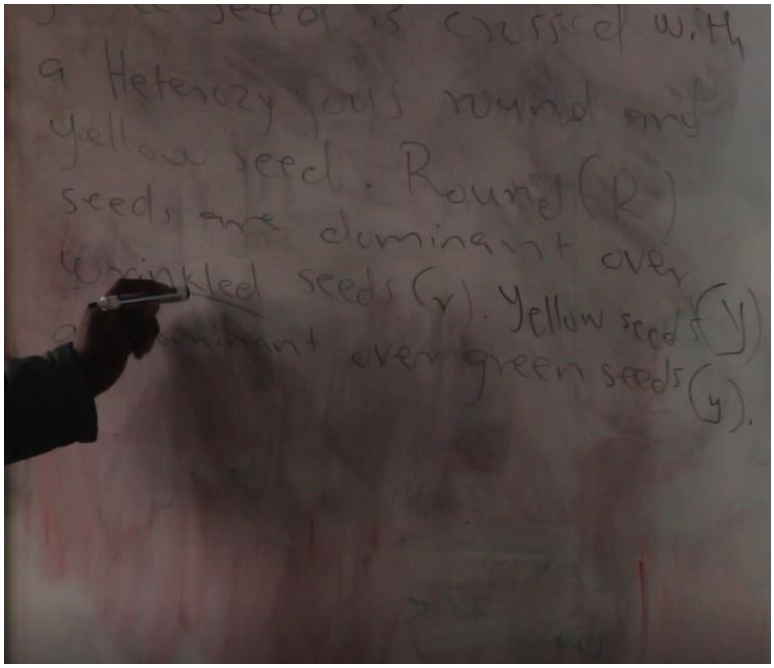
260. We were told from this statement, that we have wrinkled neh!



261. Okay, which— we have wrinkled seeds which are recessive to ehh…I mean to round.

262. Okay, so whenever you have a recessive allele only.

263. Then it will be that shape which is said to be ehh…recessive and then in this case it was wrinkled. [Pointing]



264. Okay, what about this part, I mean this one…John?

265. John: / ? /

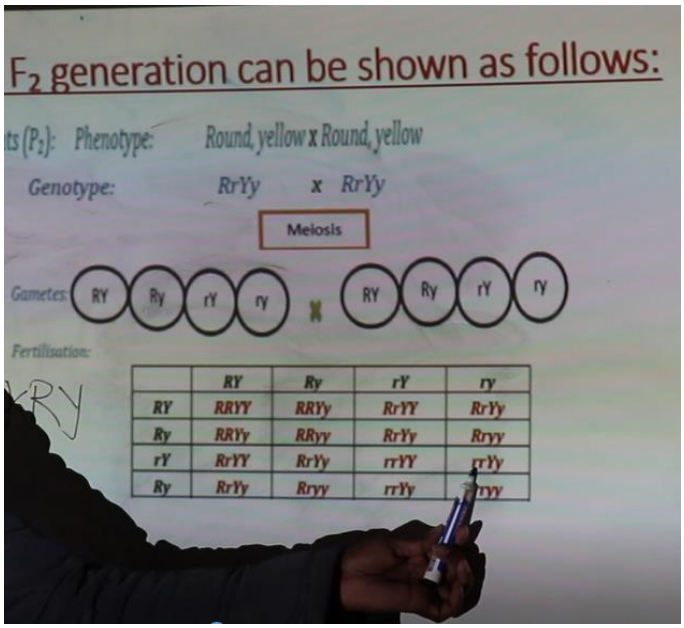
266. Mr. Zulu: It will be…wrinkled and … green yes! / ? /

267. Yes…you said it is wrinkled neh…why is it wrinkled?

268. John: / ? / There are two recessive alleles.

269. Mr. Zulu: Yes! We have two recessive alleles so that is why it is wrinkled.

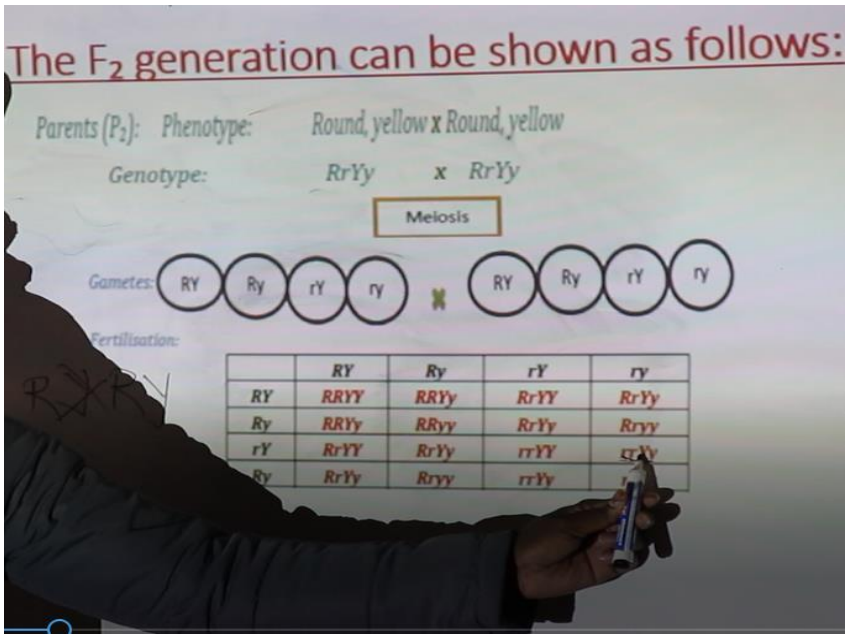
270. Let us look at this one.



271. Is this dominant or recessive? Yes! [Referring to a learner]

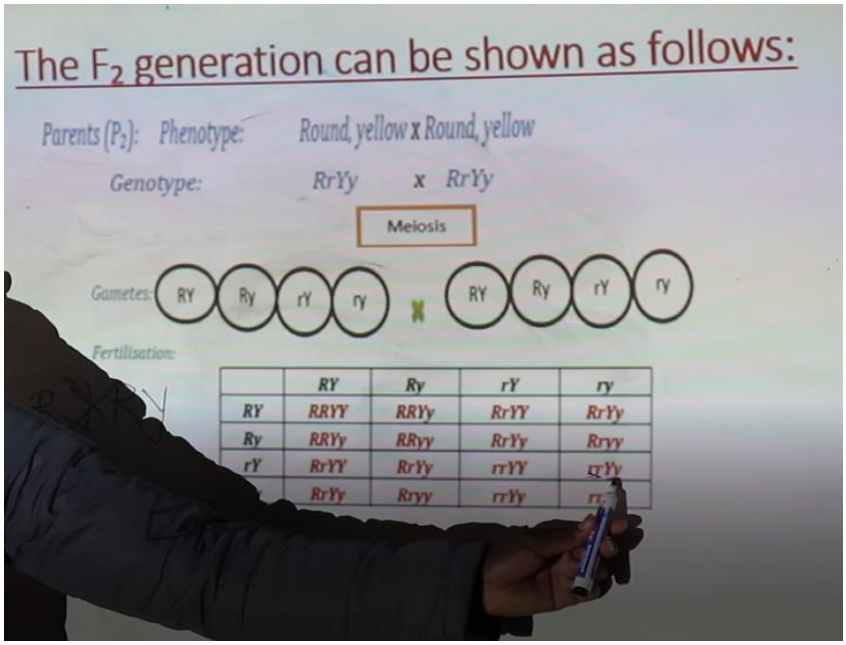
272. Andlile: / ? /

273. Mr. Zulu: No! This one, is it dominant or recessive?



274. Genius: / ? /

275: Mr. Zulu: What about this one?



276. Genius: / ? /

278. Mr. Zulu: That is correct!

279. Then what will be the colour if you have a dominant and a recessive one?

280. It will be …

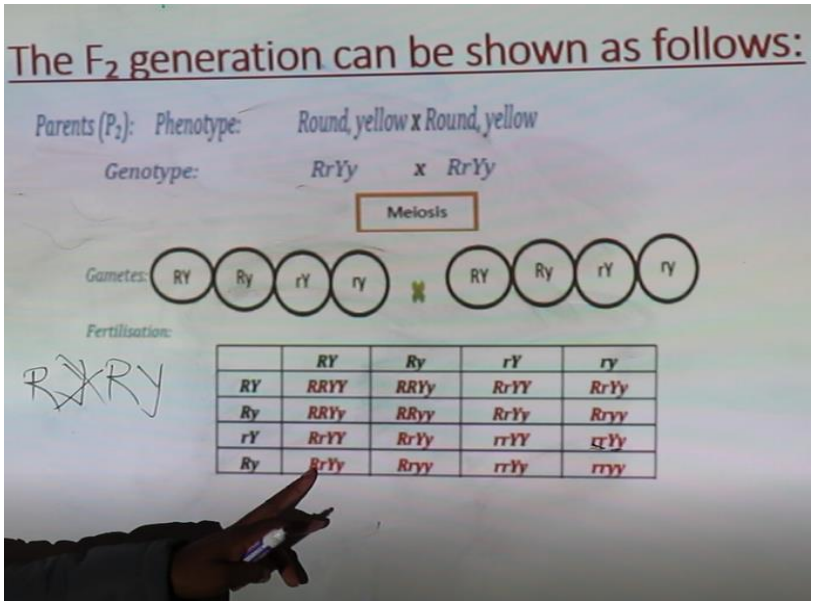
281. Genius: Wrinkled / ? /

282. Mr. Zulu: Yes! It will be wrinkled and yellow.

283. That is correct!

284. Okay, because we have this dominant ehh… Y which is masking the effect of green.

285. Okay, then let us move on to this one…



…yes…Sello!

286. Sello: Yellow!

287. Mr. Zulu: It will be… Ah! Chief you cannot just say yellow.

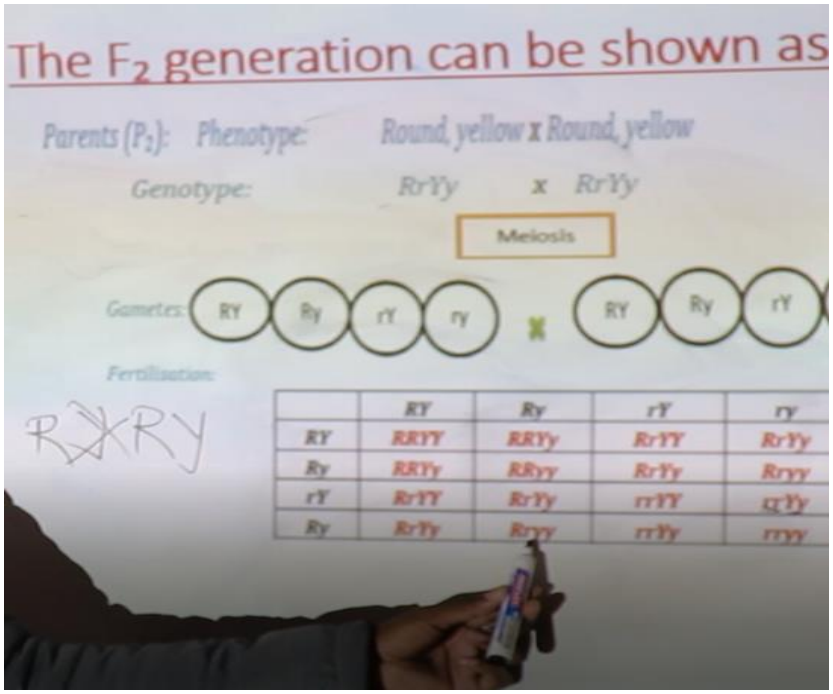
288. We have two things here…this is a dihybrid cross; you cannot just say yellow, it is not a monohybrid cross. Yes! [Referring to learner]

289. Sizwe: Round and yellow.

290. Mr. Zulu: This is round and yellow okay and we can see the alleles.

291. There is dominant and recessive, and it is the same thing for colour as well.

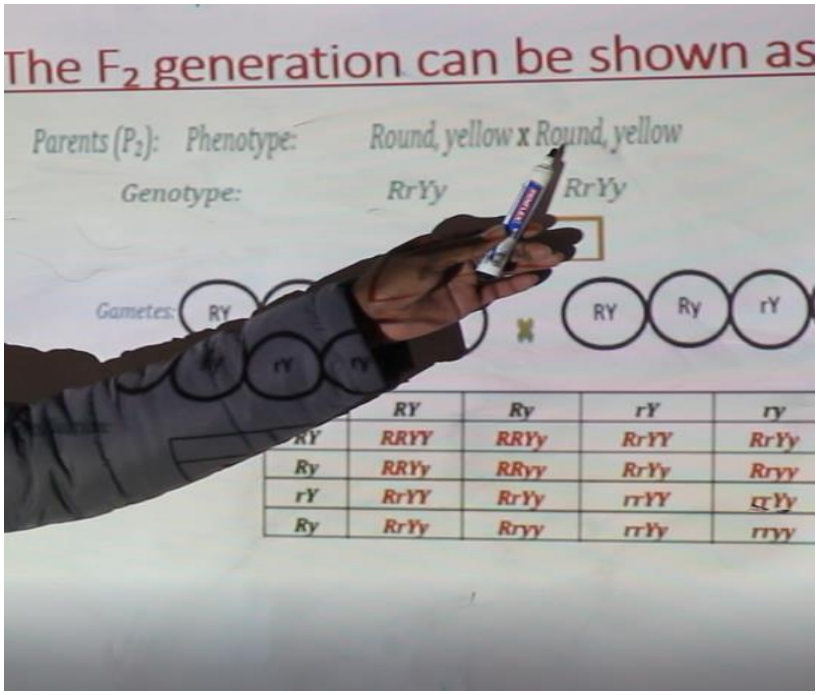
292. Right let us move to this one now ehh… Lwandle…this one?



293. Lwandle: It is yellow … it is yellow.

294. Mr. Zulu: No! You cannot start with the colour, Chief…. this is our phenotype neh!

295. This is round and yellow.



296. So, how can you start with yellow?

297. We cannot start with that, yes!

298. Sizwe: Round and yellow.

299. Mr. Zulu: This is round and…

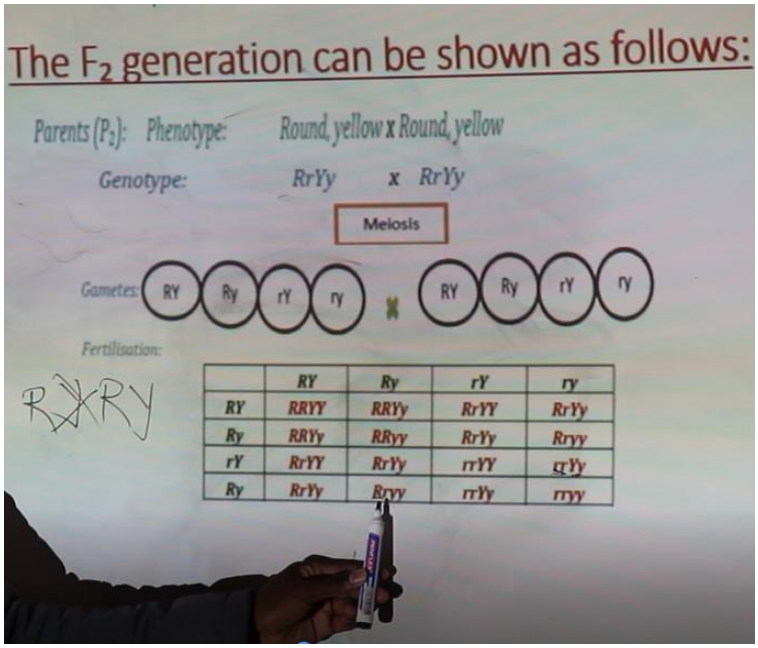
300. Sizwe: Wrinkled!

301. Mr. Zulu: Wrinkled okay…and this is wrinkled because we only have recessive alleles.

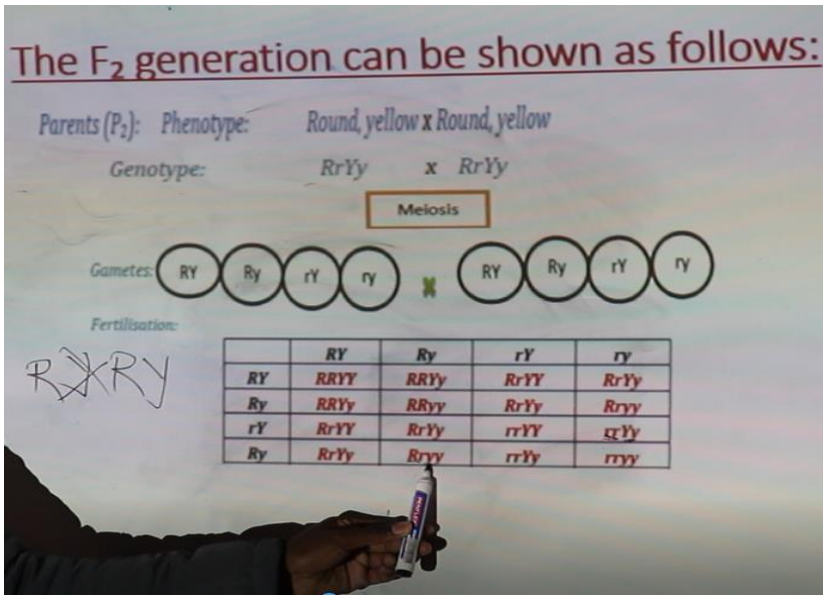
302. Let us look at this one, Sechaba!

303. Sechaba: Wrinkled and yellow.

304. Mr. Zulu: This is wrinkled…



…and yellow.



305. It is wrinkled because we only have recessive alleles.

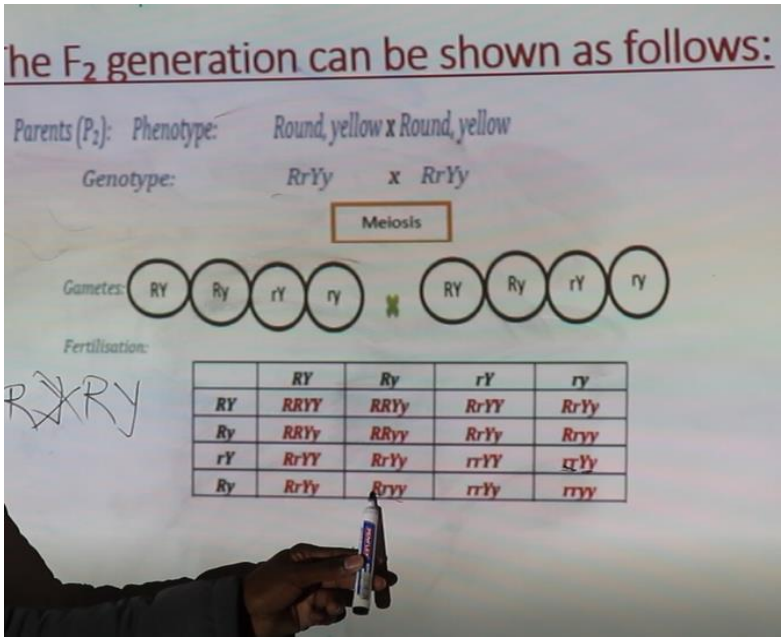
306. Let us look at this one, Sechaba!

307. Sechaba: Wrinkled, yellow.

308. Mr. Zulu: This is wrinkled and yellow.

309. Genius: It is wrong!

310. Mr. Zulu: This one?

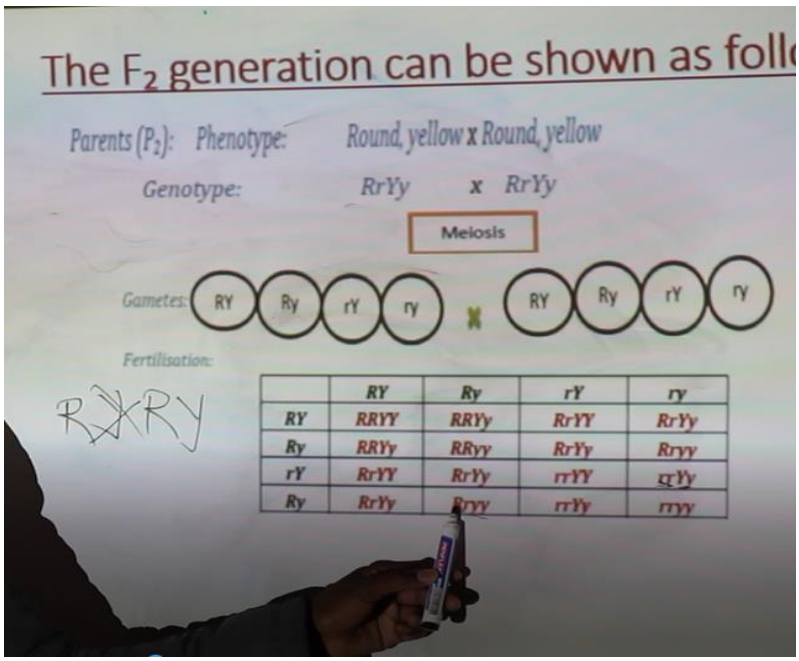


311. Genius: Yes!

312. Mr. Zulu: Okay, this is round and …

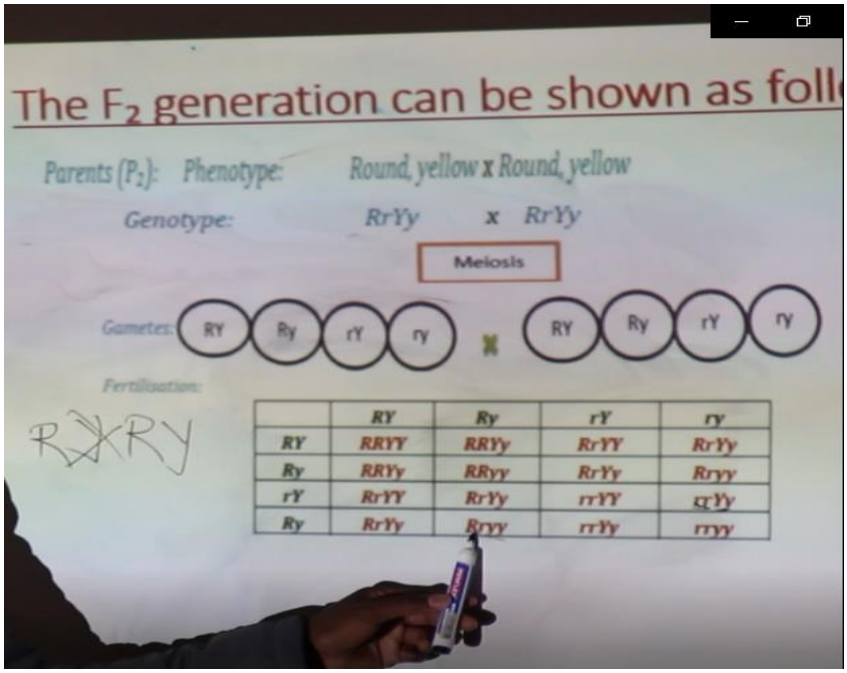
313. Genius: Green.

314. Mr. Zulu: Yes! Yes! That is correct, because we have this dominant allele neh!

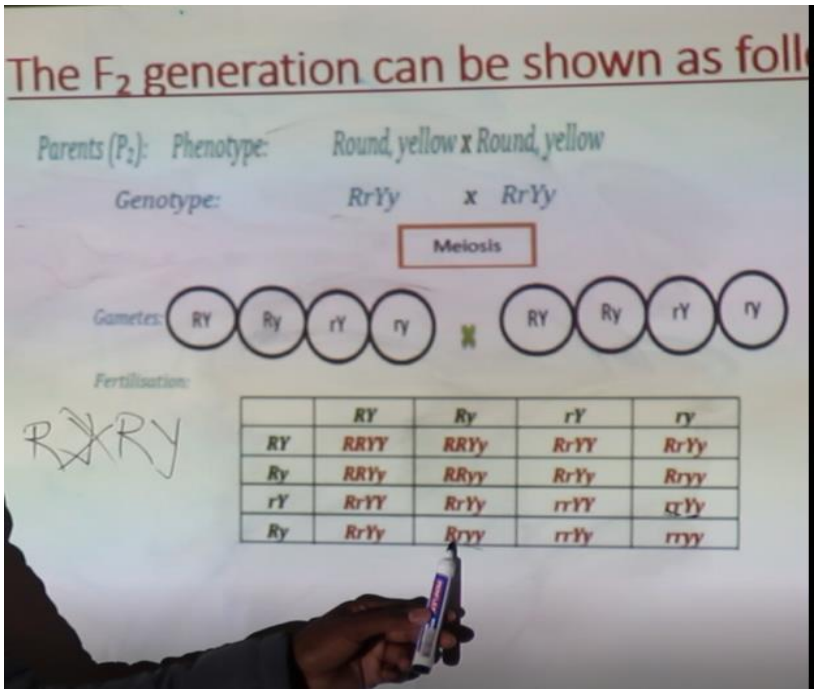


315. Okay so, that answer was not correct.

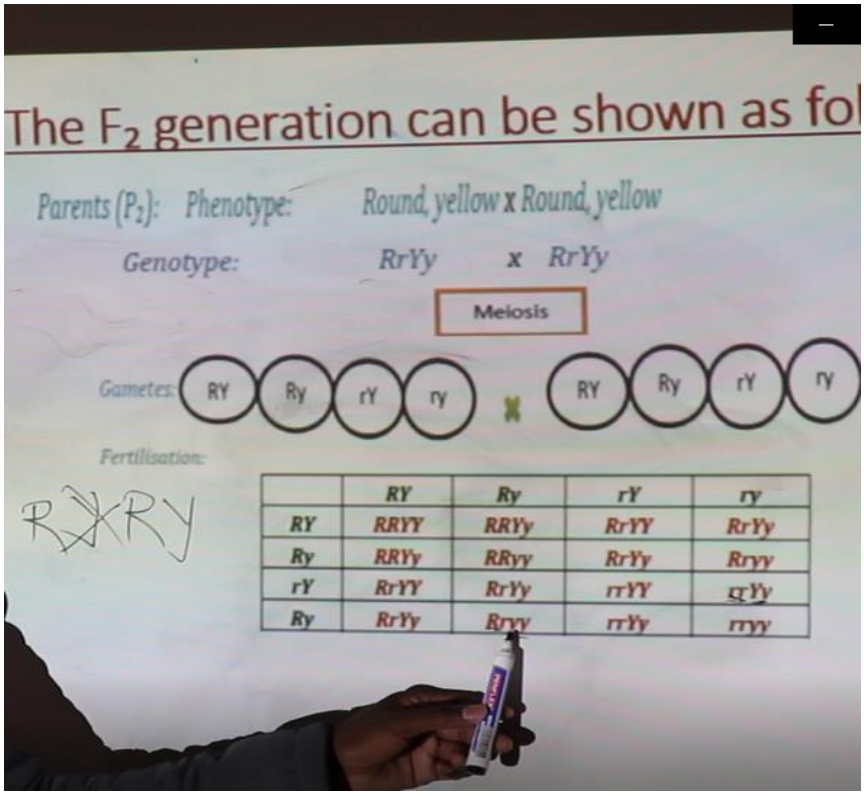
316. We have this dominant allele…



…so, this answer will be round…



…and wrinkled.

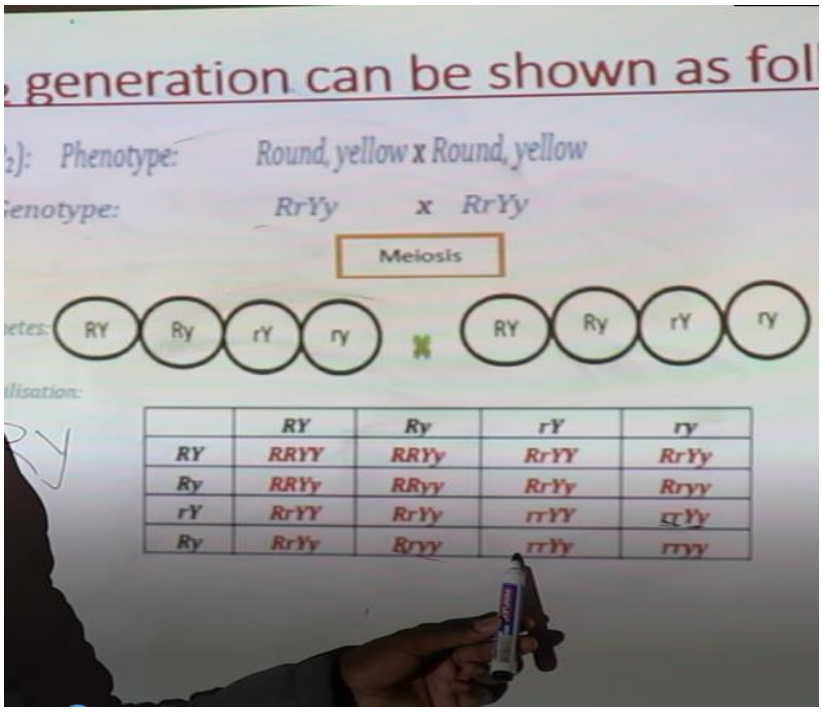


317. Genius: Round and green!

318. Mr. Zulu: Ahh…No! Round and green…round and green [laughing].

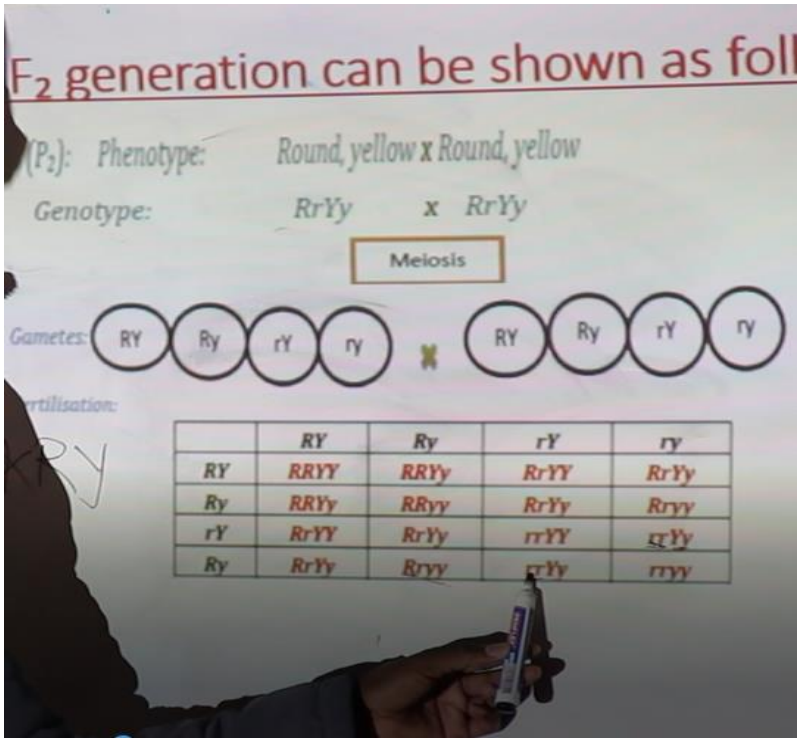
319. Okay, sorry about that!

320. So, let us move to this one…Sechaba!



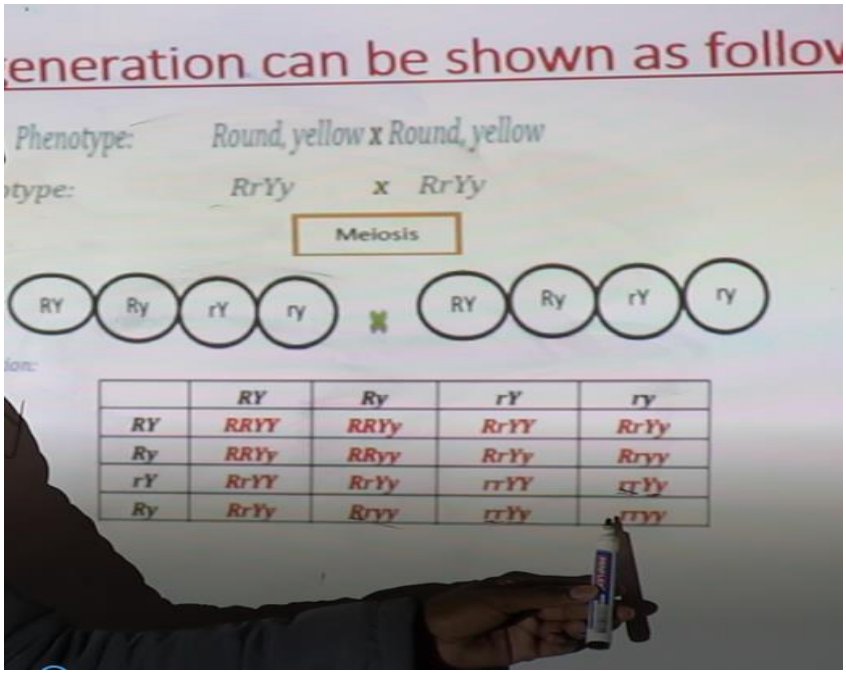
321. Sechaba: Round and yellow.

322. Mr. Zulu: This is round…



323. No! Wrinkled and … yellow, okay that is correct!

324. Then what about this one?



325. Mr. Zulu: Ahh…yes Elias?

326. Elias: Wrinkled and green.

327. Mr. Zulu: This one is wrinkled and green.

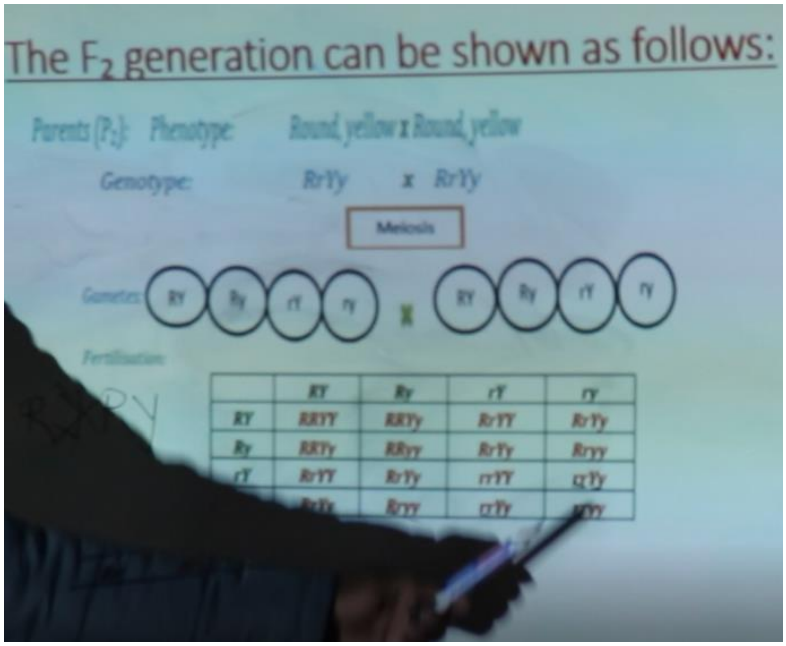
328. That is correct okay!

329. Before we move to our…genotypes or to our phenotypes.

330. How many offspring will be wrinkled and green? Yes! [Referring to a learner]

331. Tshepiso: One!

332. Mr. Zulu: It is only one neh…which is this one.



333. How many will be wrinkled and yellow? Ahh…Sbu!

334. Sbu: One!

335. Mr. Zulu: Wrinkled and yellow? No! Sechaba!

336. Sechaba: Two!

337. Mr. Zulu: It is two…do you agree?

338. Ls: No!

339. Lazie: / ? /

340: Mr. Zulu: It is three…do you agree?

341. Can we count?

342. Ls: Yes!

343. Mr. Zulu: Ahh…so, for wrinkled and yellow we have this…and this one…

344. It is two, do you agree?

345. Ls: Yes!

346. Mr. Zulu: Yes! Pele!

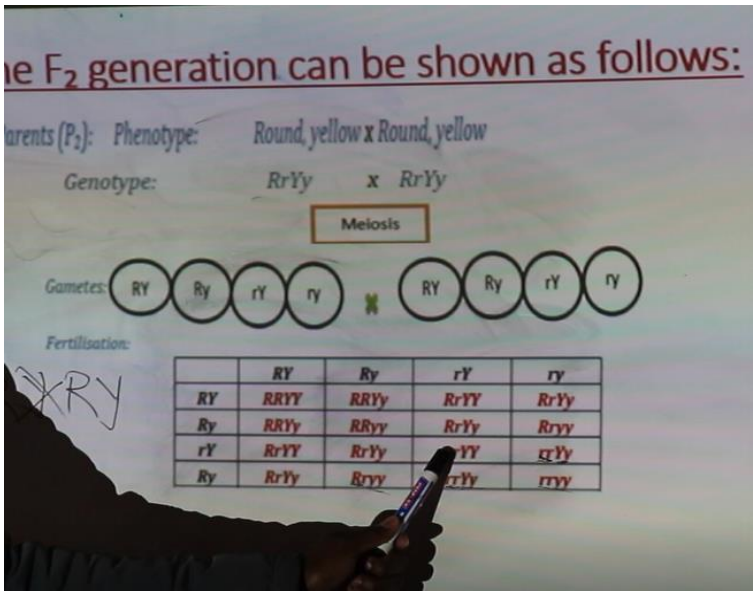
347. Pele: Three!

348. Mr. Zulu: It is three, do we agree?

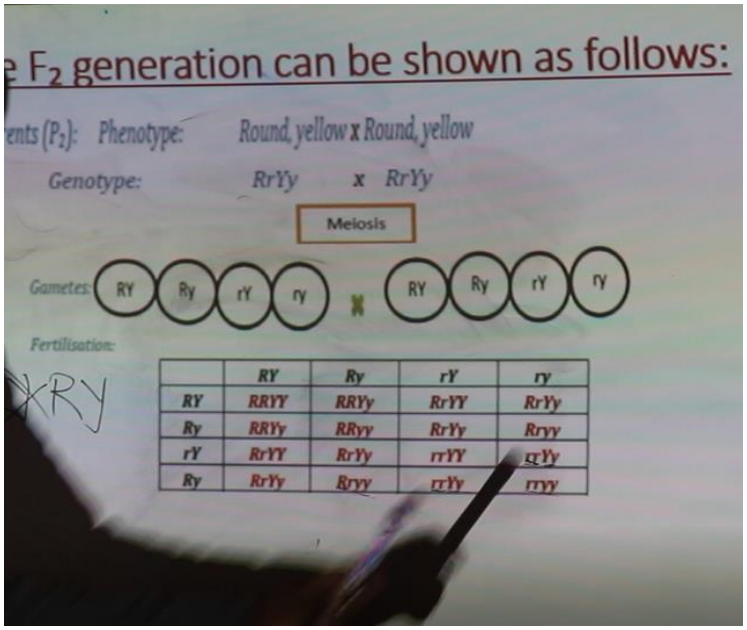
349. Ls: Yes!

350. Mr. Zulu: Can we count?

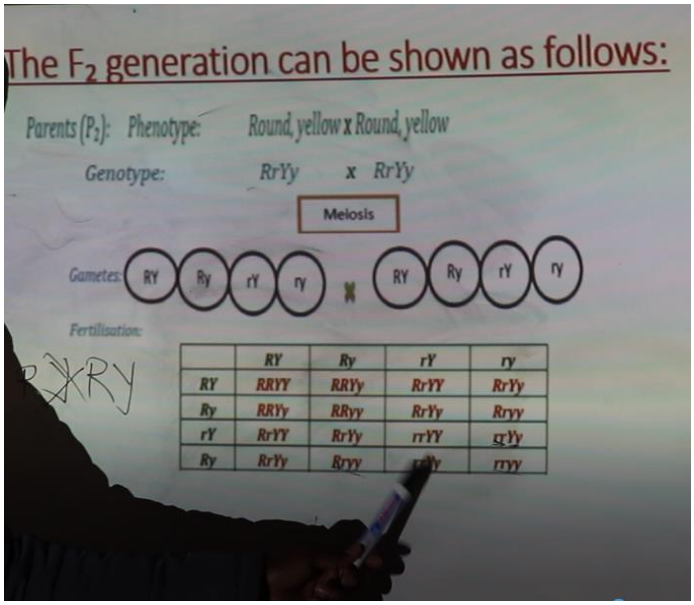
351. Right so, for wrinkled and yellow ehh…we have this… [pointing to the board] which is this one…



…two…



…and three okay…



…so, it is three neh!

352. Okay round and yellow, yes! [Referring to learner]

353. Sizwe: Nine!

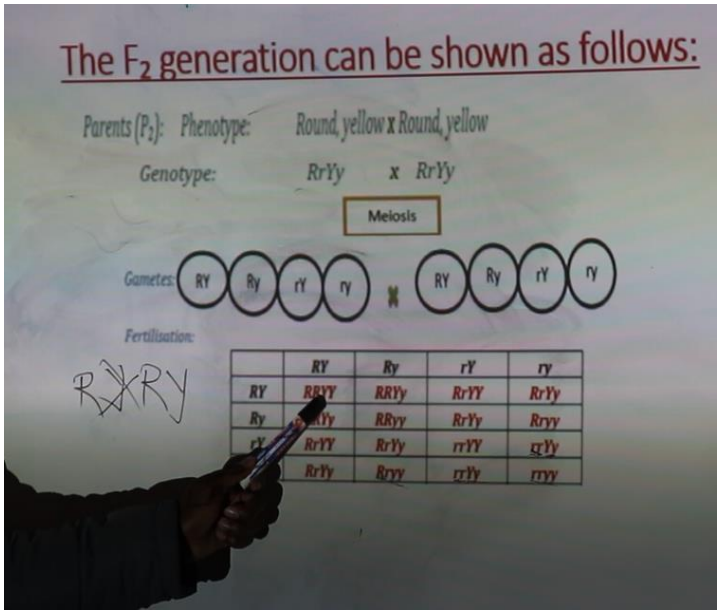
354. Mr. Zulu: It will be nine!

355. Ls: Yes!

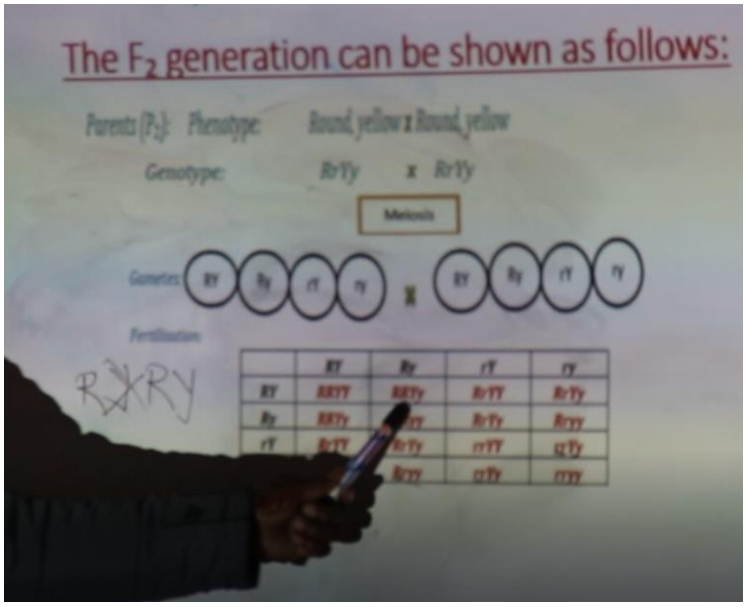
356. Mr. Zulu: Do we all agree?

357. Let us all count!

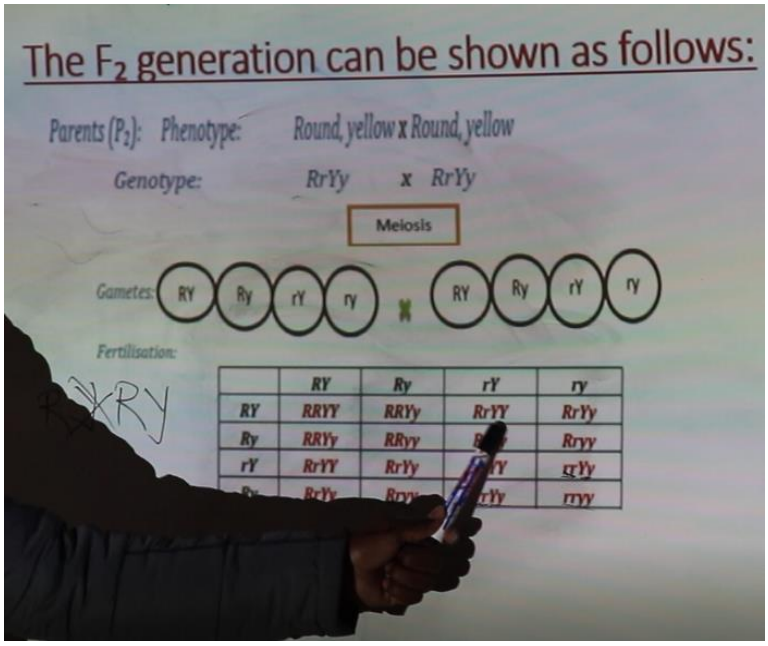
358. This one will be one…

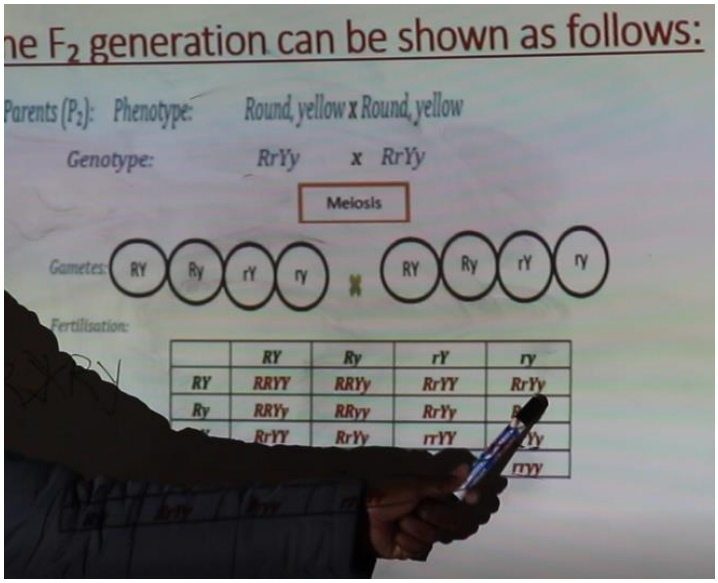


…two…

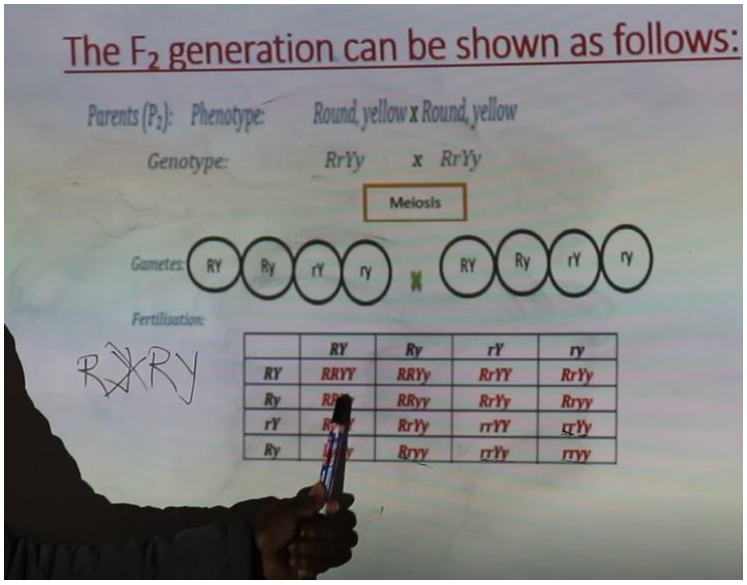

The F2 generation can be shown as follows:
Parents (P1): Phenotype: Round, yellow x Round, yellow
Genotype: RrYy x RrYy
Meiosis
Gametes:
Fertilisation:

…three…

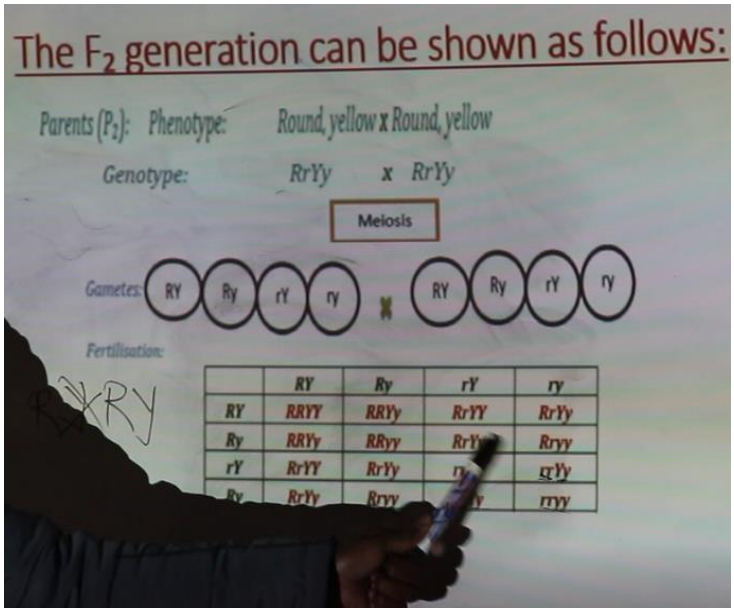

The F2 generation can be shown as follows:
Parents (P1): Phenotype: Round, yellow x Round, yellow
Genotype: RrYy x RrYy
Meiosis
Gametes: RY Ry rY ry x RY Ry rY ry
Fertilisation:
RY Ry rY ry
RY RRYY RRYy RrYY RrYy
Ry RRYy RRyy RrYy Rryy
rY RrYY RrYy rrYY rrYy
ry RrYy Rryy rrYy rryy


ne F_2 generation can be shown as follows:
Parents (P_2): Phenotype: Round, yellow x Round, yellow
Genotype: RrYy x RrYy
Meiosis
Gametes: RY Ry rY ry RY Ry rY ry
Fertilisation:
RY Ry rY ry
RY RRYY RRYy RrYY RrYy
Ry RRYy RRyy RrYy Rryy
rY RrYY RrYy rrYY rrYy
ry RrYy Rryy rrYy rryy

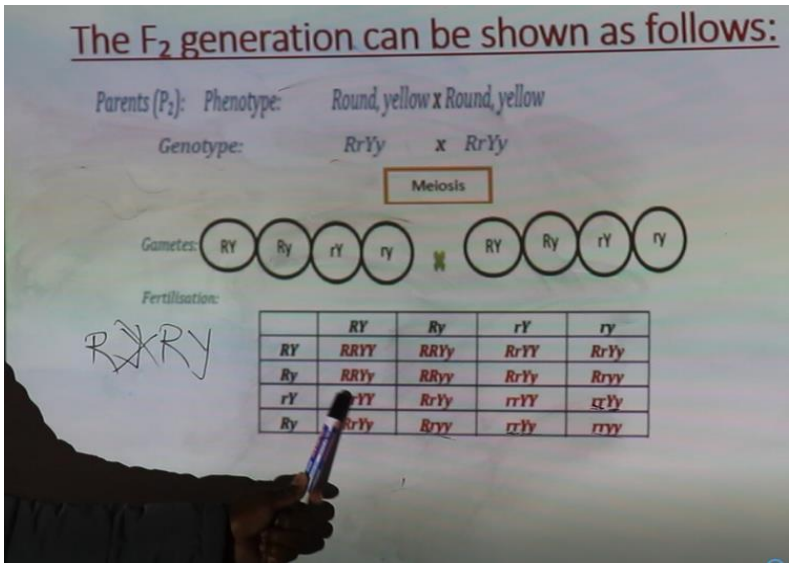
…five…


The F_2 generation can be shown as follows:
Parents (P_2): Phenotype: Round, yellow x Round, yellow
Genotype: RrYy x RrYy
Meiosis
Gametes: RY Ry rY ry RY Ry rY ry
Fertilisation:
RY Ry rY ry
RY RRYY RRYy RrYY RrYy
Ry RRYy RRyy RrYy Rryy
rY RrYY RrYy rrYY rrYy
ry RrYy Rryy rrYy rryy

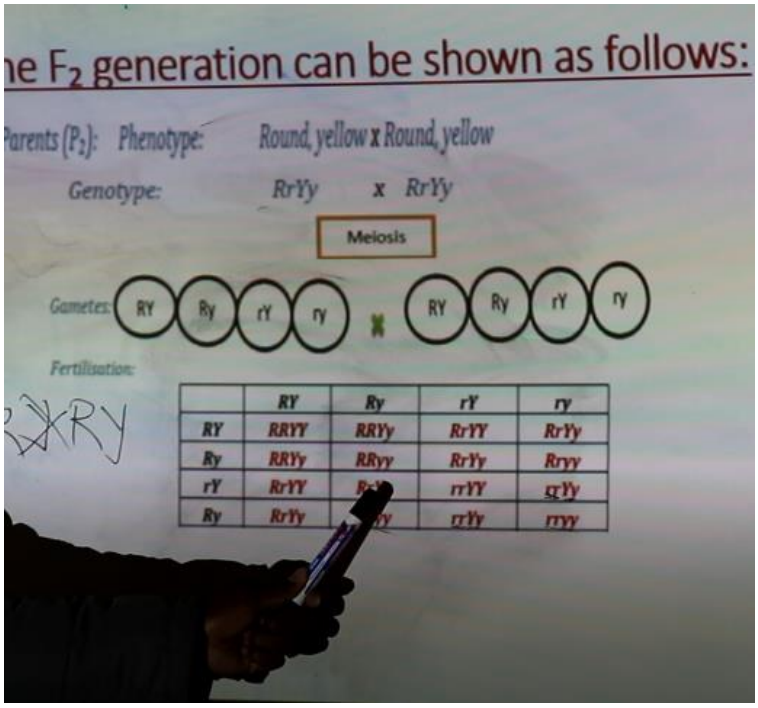
…six…


The F2 generation can be shown as follows:
Parents (P2): Phenotype: Round, yellow x Round, yellow
Genotype: RrYy x RrYy
Meiosis
Gametes: RY Ry rY ry x RY Ry rY ry
Fertilisation:
RY Ry rY ry
RY RRYY RRYy RrYY RrYy
Ry RRYy RRyy RrYy Rryy
rY RrYY RrYy rrYY rrYy
ry RrYy Rryy rrYy rryy

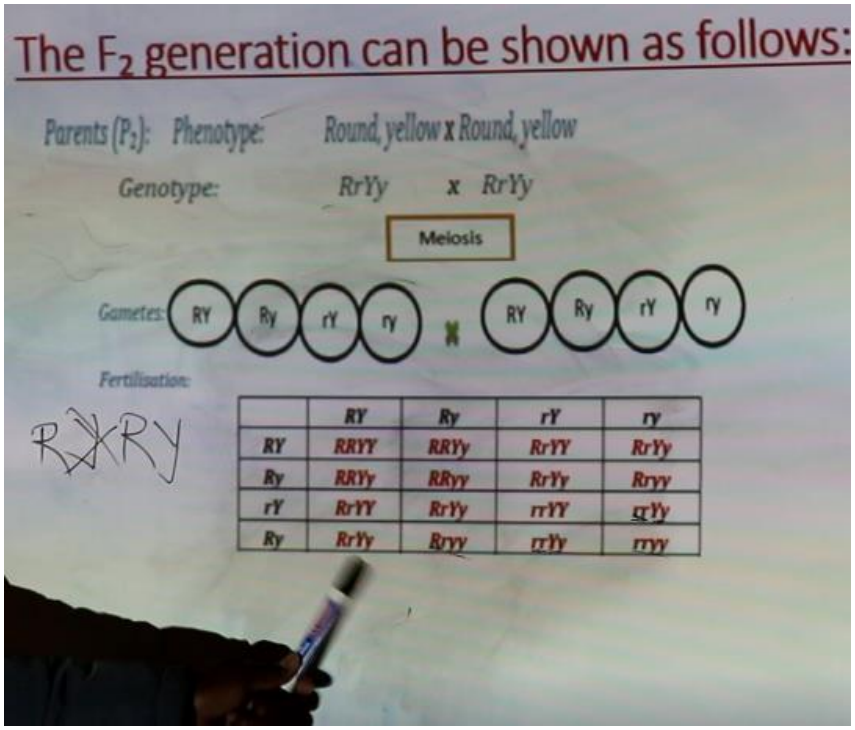
…seven…


The F2 generation can be shown as follows:
Parents (P2): Phenotype: Round, yellow x Round, yellow
Genotype: RrYy x RrYy
Meiosis
Gametes: RY Ry rY ry x RY Ry rY ry
Fertilisation:
RY Ry rY ry
RY RRYY RRYy RrYY RrYy
Ry RRYy RRyy RrYy Rryy
rY RrYY RrYy rrYY rrYy
ry RrYy Rryy rrYy rryy

…eight…

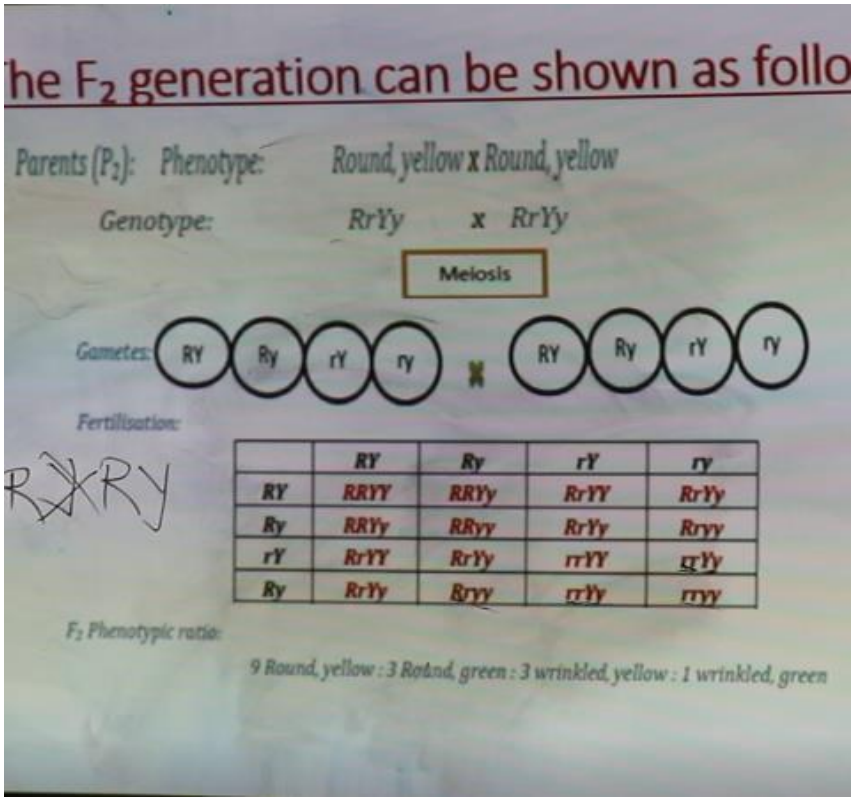


…nine….

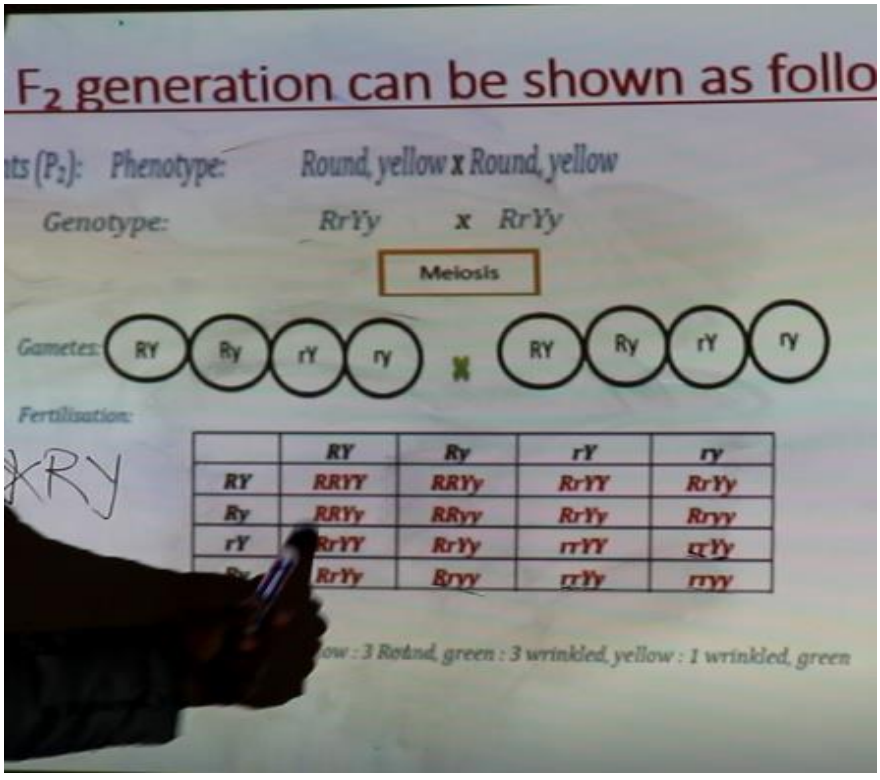


359. So, that is correct!

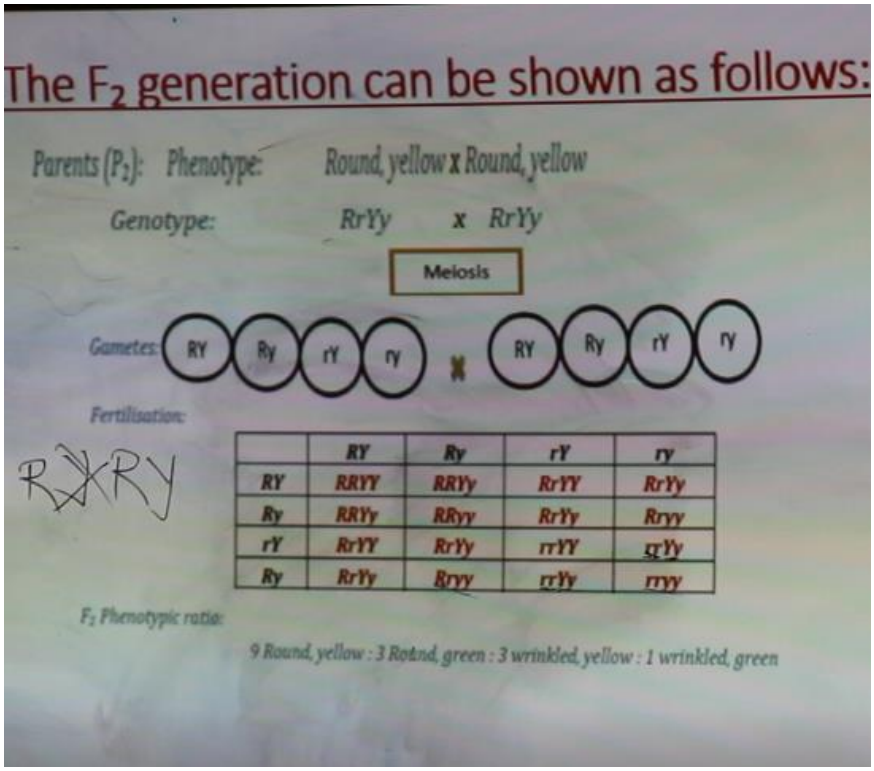
360. Right, then the last part.



361. Okay so, I am only showing you the phenotype neh…the genotypes are here…



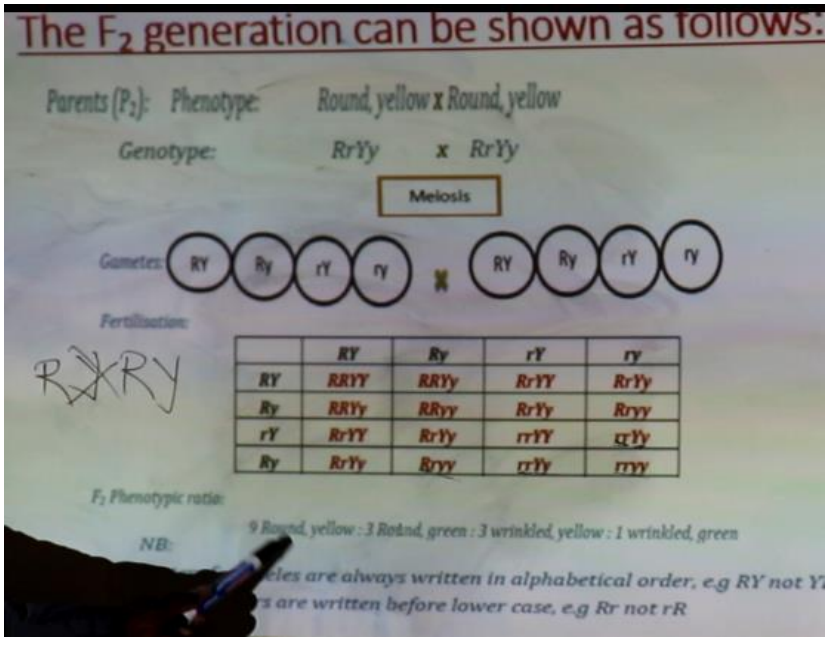
362. But remember as part of the steps, you must include that…you must rewrite all these.



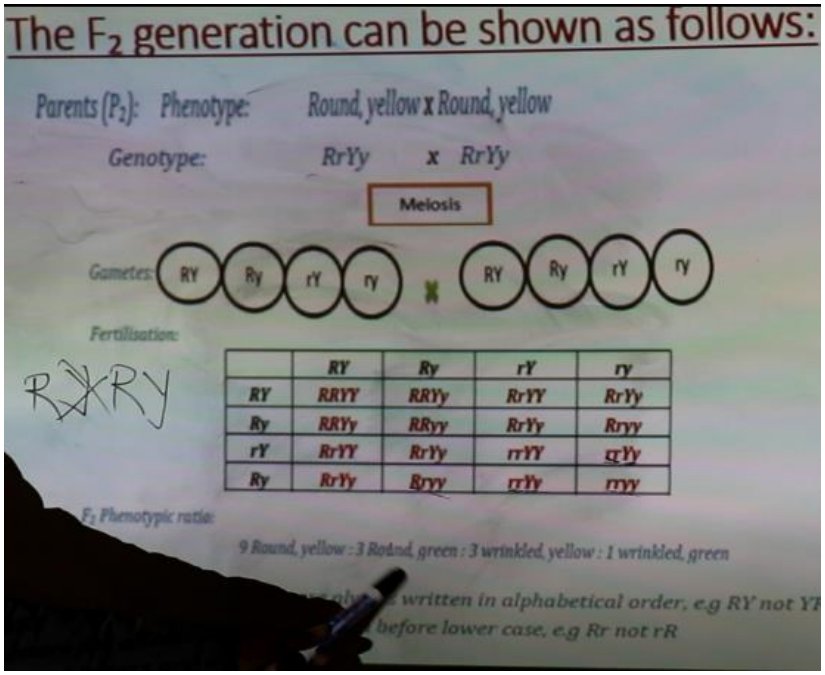
363. Okay, it is about sixteen.

364. I know it is a long process, but it has to be done neh!

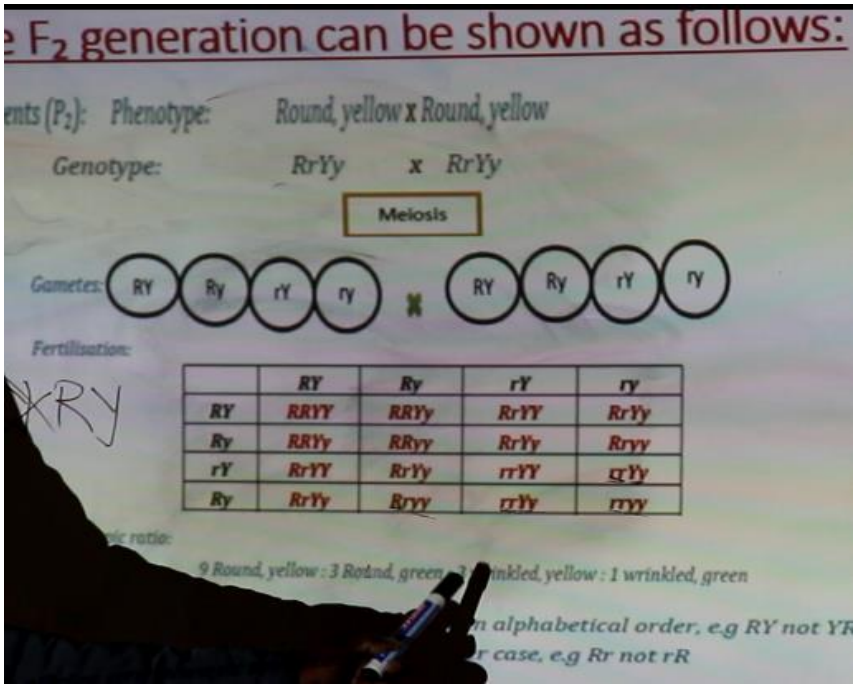
365. Okay, so we have nine that are round and yellow…



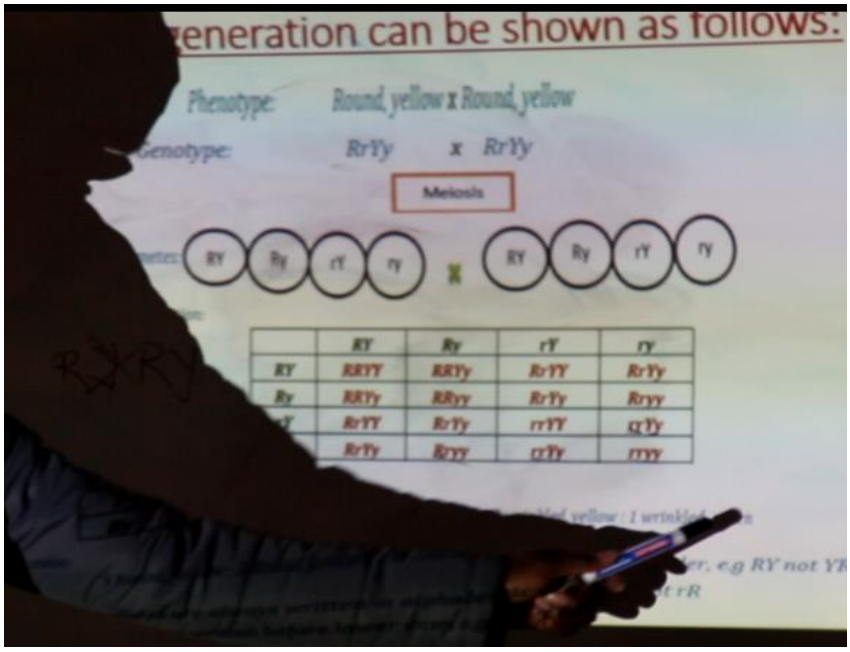
…three that are round and green…



…then three that are wrinkled and yellow…



…and then one that is wrinkled and green [pointing to the board]

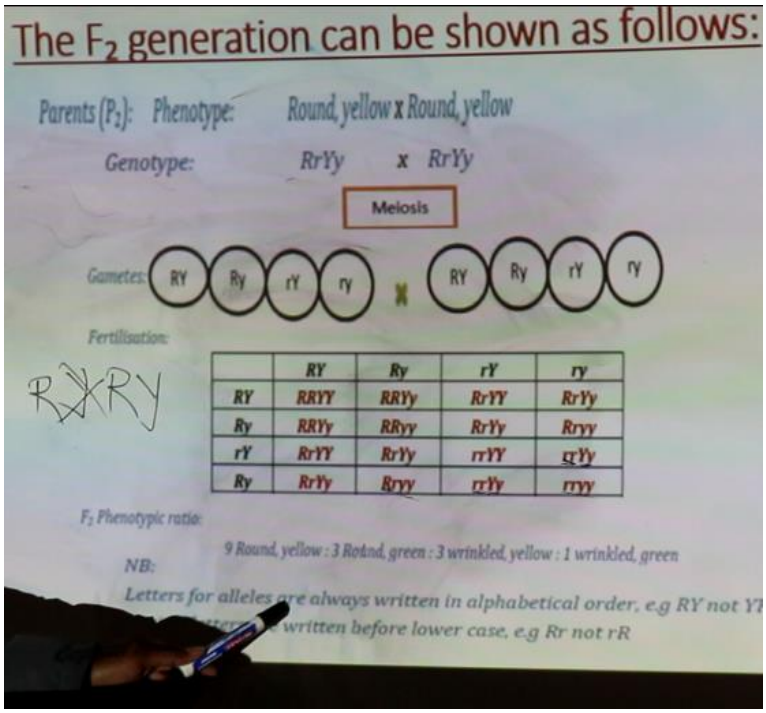


…which is the ehh… last one okay boys.

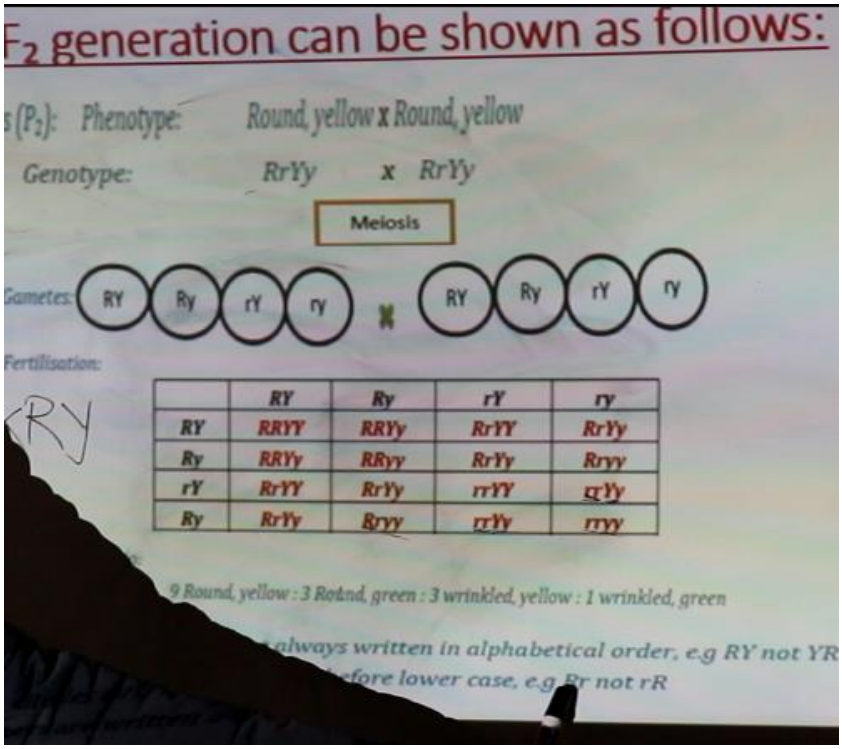
366. Ehh… I think we are done!

367. NB or note! Letters for alleles are always written in alphabetical order e.g. RY not YR okay.

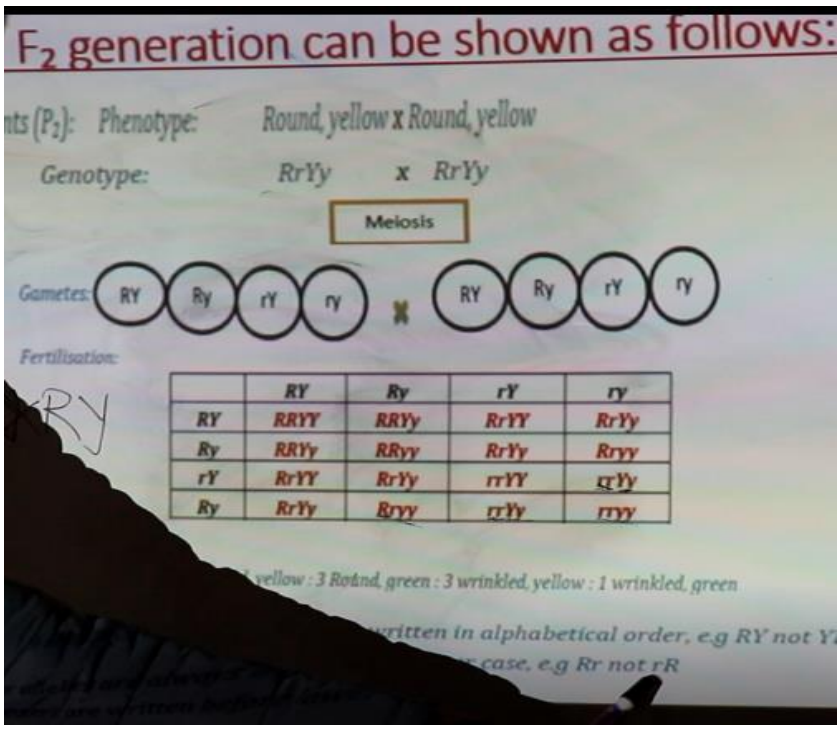
368. So, it must be in alphabetical order.



369. Then capital letters are written before lower case, right so, for example we have dominant and recessive…



…not recessive and dominant not like this…a recessive and dominant okay…



… does that make sense?

370. Tshepiso! The letters are written first for example, we have a dominant and recessive not a recessive and dominant one okay.

371. Boys we are done!

372. We did this last time.

EPISODE 3: GENETIC LINEAGES/PEDIGREE

373. So, let us move on now to what we call dihybrid crosses.

374. The genetic lineages. [Silence]

375. Right, boys this is a new topic, but it is related to what we have been doing.

376. It is still part of genetics and inheritance and it is the last topic before we move on to 'Responding to the Environment' neh!

377. Okay so… ehh… before we move on to this one if you have any questions on dihybrid crosses raise your hand and ask then we can start with our new topic.

378. If you have any questions on dihybrid crosses or if there is anything that you did not understand raise your hand and ask then we can move on. [Silence]

379. Right so, we are all fine for now neh!

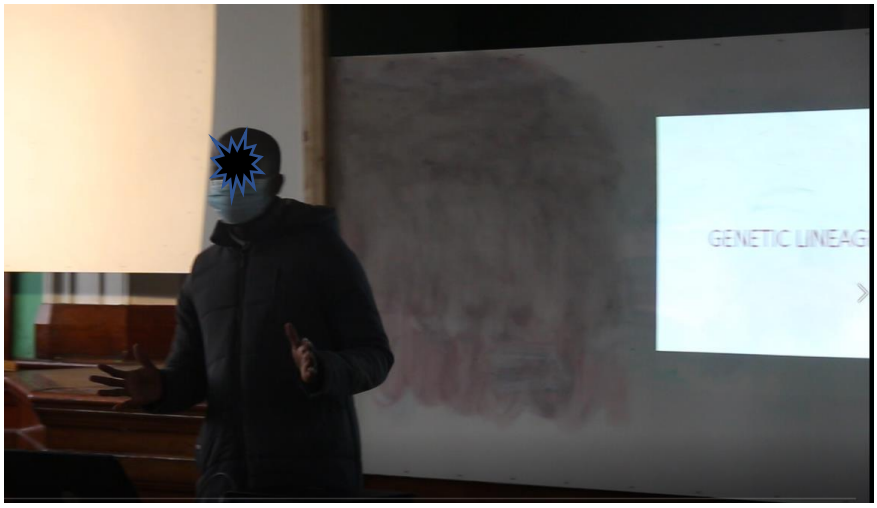
380. Alright so… let us do this one [silence] / ? /

381. Boys do you all have your textbooks?

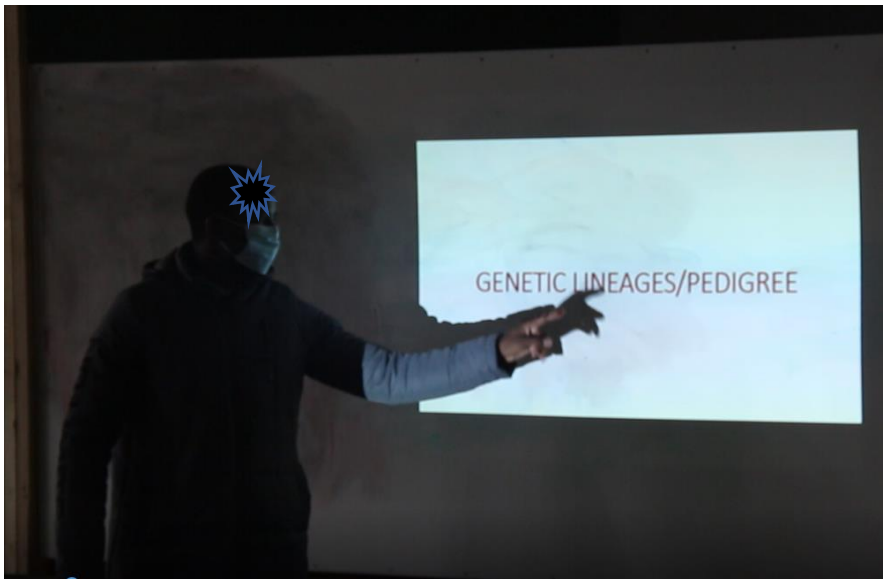
382. Yes, okay because after this there is an activity that you must do and remember you are not supposed to share anything. [Spraying and erasing the board] [Silence].

383. Let us just wait for it, let us give it about two minutes then if it does not work then we use the board. [Waiting for slide ppt computer to start working] [Principal walks in and starts speaking to the boys].

384. Okay boys, can we start?

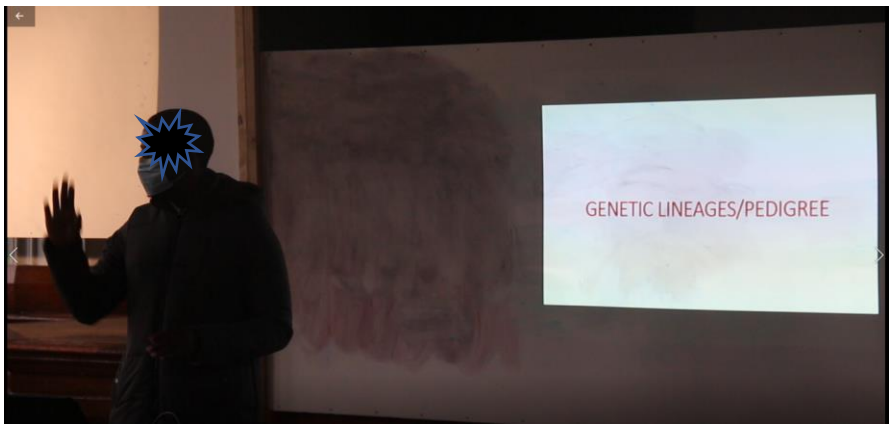


385. Okay, so we are moving this topic which is genetic lineages or pedigree or pedigree diagrams neh!



386. Right ehh… boys do you have any idea of what a pedigree genetic lineage or if you have any idea?

387. Please can you raise your hand…



…and tell us, yes Sinenhlanhla!

388. Sinenhlanhla / ? /

389. Mr. Zulu: It is… according to the family or according to the genetics.

390. Yes! That is correct!

391. Okay, this is sort of like a tree, but it is not a tree as such neh!

392. We call it a genetics diagram or ehh… a pedigree diagram.

393. Right, but it is not like an actual tree.

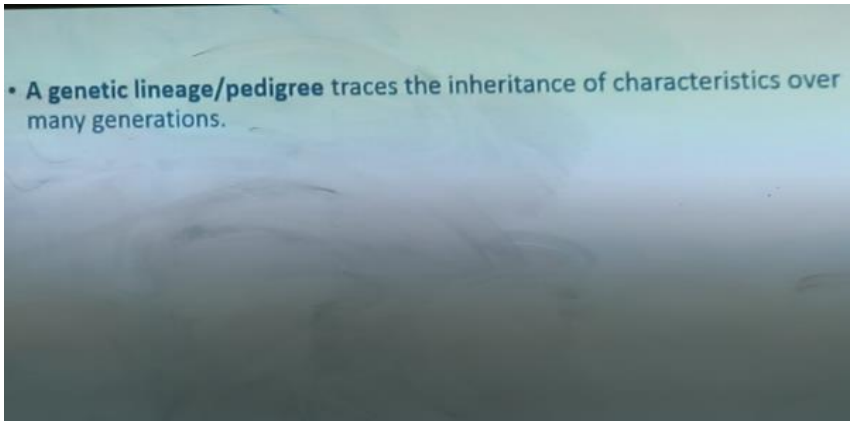
394. It is just that there are many links…

…to trace for each ehh… albinism but it is not only about albinism.

395. There are many other genetic ehh…

…disorders that can be traced using a genetic diagram,

…it traces characteristics over many generations.



396. So, it can happen that for example ehh… your great ehh… grandmother had albinism but only one in your family has ever shown that ehh...albinism.

397. Then you find that maybe your child has albinism.

398. Does that make sense?

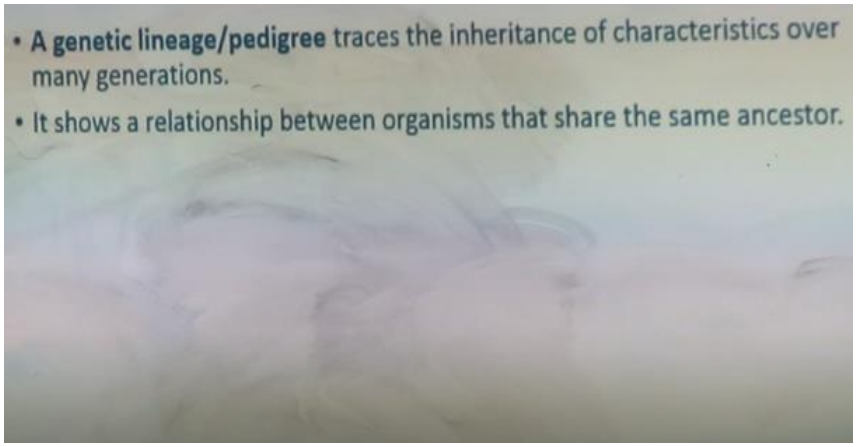
399. Okay, but then we can use a pedigree diagram or a genetic lineage to trace where the gene came from neh!

400. It can happen that maybe you have never seen anyone in your family that has albinism and then you have a dad with albinism.

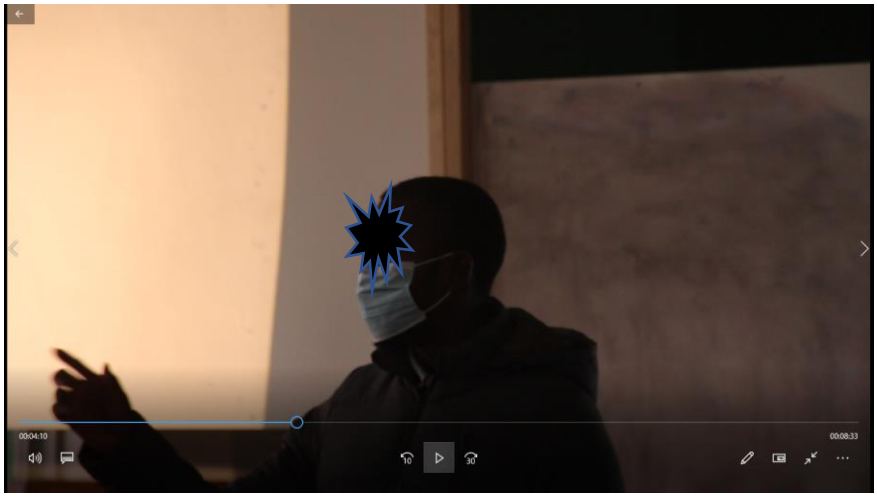
401. That can be traced back right, it can be traced back and we can see who… who ehh… passed on that gene that has albinism… in the family neh!

402. Right, but you get to understand once you start doing the actual diagram.

403. Right, it shows the relationship between organisms that share the same ancestor…



…it will show the relationship between organisms that ehh… share the same ancestor we can use a genetic lineage to… find out about a particular gene …



…or allele that has been passed on.

404. Right ehh… even with different organisms we can use this.

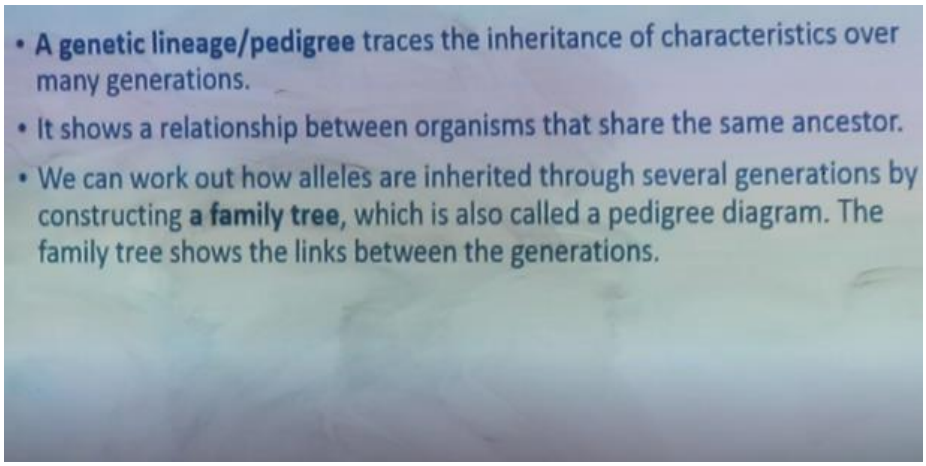
405. It does not necessarily have to be humans only; you can do this for instance dogs.

406. We can look at things like monkeys.

407. So, it can be any organism.

408. It does not necessarily have to be humans, but we will be focusing more on humans, okay.

409. Then we can work out how alleles are inherited through several generations by constructing what we call a family tree.



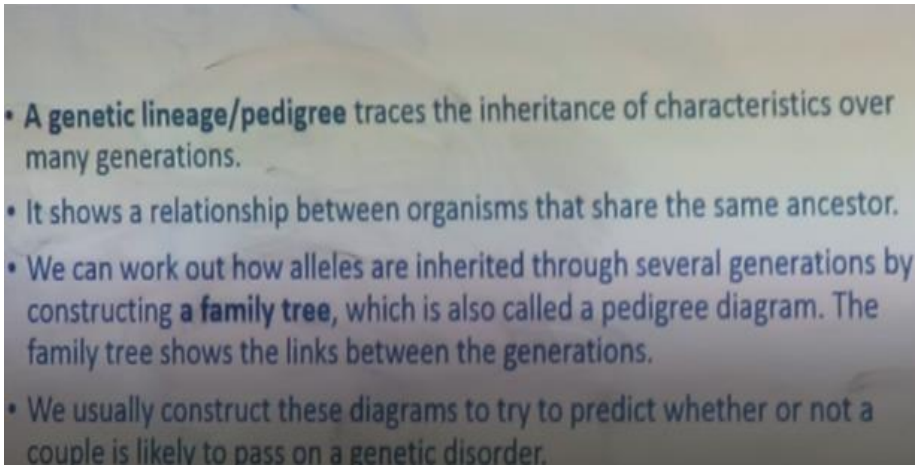
410. A family tree is the same as a pedigree diagram, but difference is that a family tree is just an English term, okay.

411. So, you must use the scientific term which is a genetic lineage or pedigree diagram.

412. Are we still following?

413. Ls: Yes!

414. Mr. Zulu: We usually use diagrams to try to predict whether a couple is likely to pass a genetic disorder even in terms of cancer.



415. You know that cancer can be genetic so, we can use a pedigree diagram to check if a couple can pass on a gene for cancer okay.

416. It can happen that maybe no one…

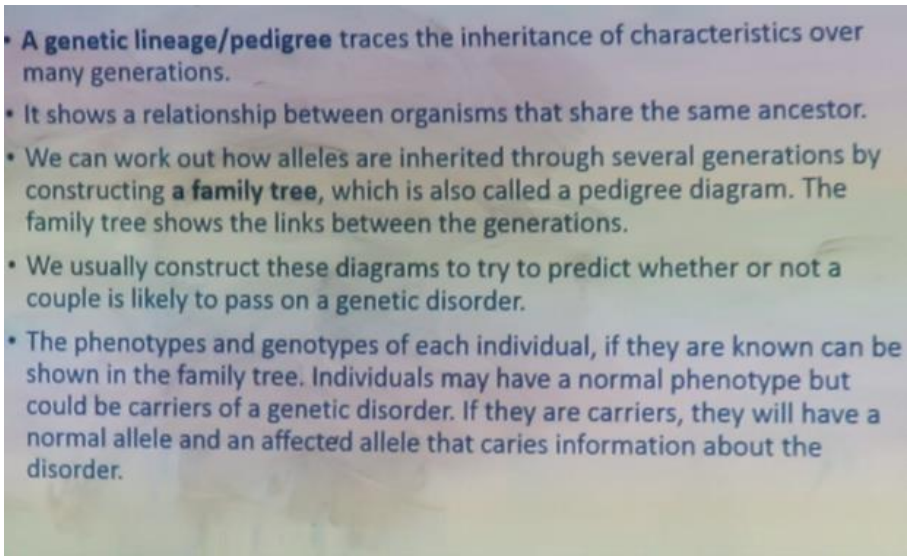
… in the family gets that gene okay, remember we are always working with probabilities in Life Sciences especially when it comes to genetics and inheritance.

417. Okay, how likely is it for a particular gene…

…or a particular allele to be passed on to the next generation okay.

418. Then the phenotypes and genotypes of each individual…you already know what a phenotype is okay, you know what a genotype is.

419. So, the genotype and phenotype of each individual if they are known they can be shown in the family tree.



420. Right, if you know the phenotypes you can show them in the family tree, and we are going to look at how you can show these in the family tree okay.

421. It is related to what we were doing with genetic crosses but is not like you are doing genetic crosses again neh!

422. Ehh…individuals may have a normal phenotype but will be carriers of a genetic disorder.

423. You still remember what a carrier is?

424. Like a carrier for colour blindness, a carrier for haemophilia okay.

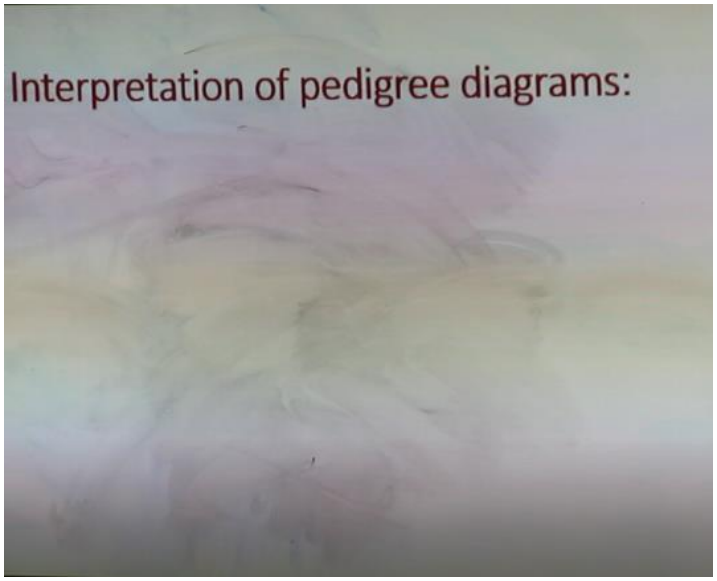
425. So, it can happen that a person looks normal, but the person is carrying a gene that can affect the next generation neh!

426. If they are carriers, they will have normal alleles and the affected allele.

427. So, if it is normal it will be a dominant allele.

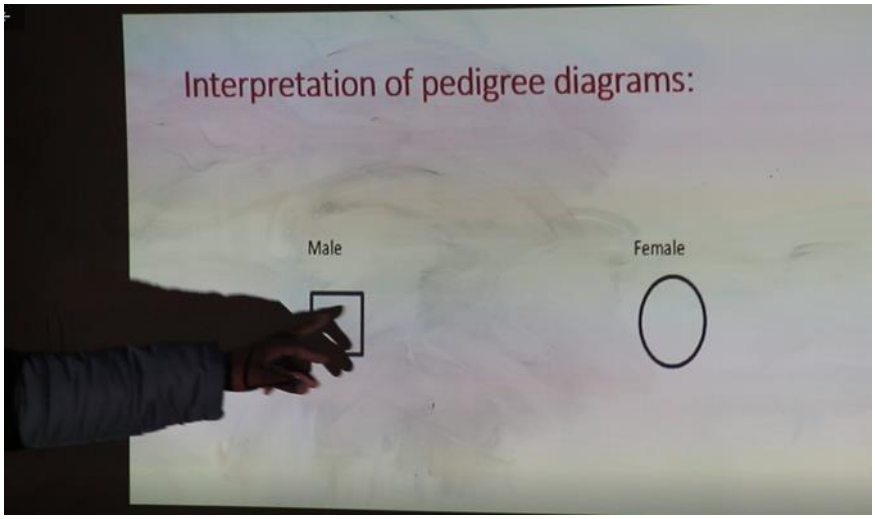
428. Then if it is affected it will be recessive.

429. Ehh…then interpretation of pedigree diagrams.



430. So, how do we interpret these pedigree diagrams.

431. Right, a male is represented by this one [showing]



…and a female, it is a circle.

432. Right, but if that square is not shaded…

…it means the male is normal okay, but if it is shaded it means that the is a disorder.

433. Let us say for example, this is shaded.

434. If it is shaded it means that the is something wrong okay.

435. The disorder is showing in that person but for a carrier this will be the phenotype okay.

436. For a normal male this will be the phenotype. [Showing]

…okay because we said a carrier is just carrying the disorder, but it is not affecting that person okay.

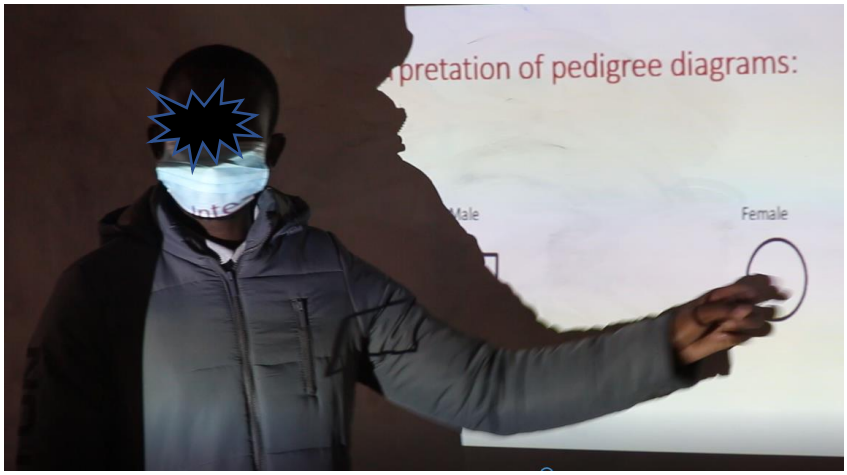
437. Let us say it is shaded…a round that is shaded in green.

438. I am using any random, it does not mean that all the pedigree diagrams will be shaded in green neh!

439. If there is a disorder it can be any colour.

440. It can be grey, it can be black, it can be any colour right.

441. If this is shaded then it means a female [showing]



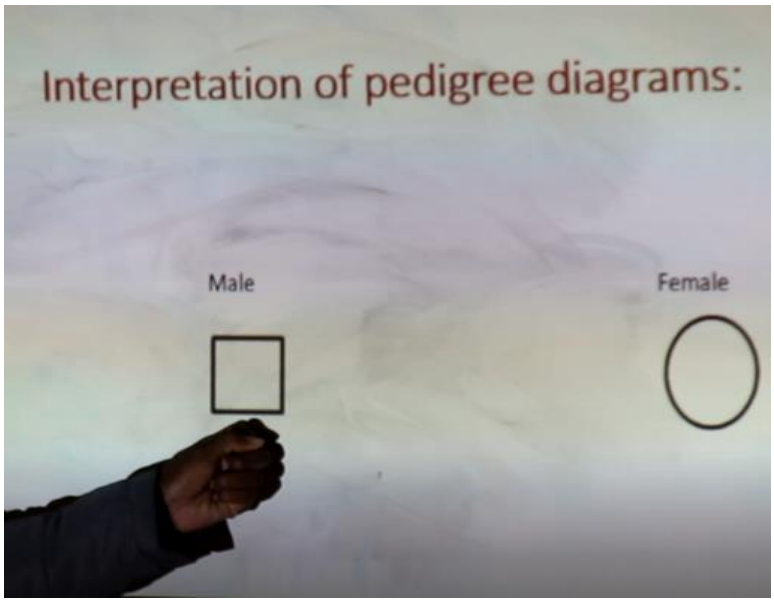
…is affected, but it is clear like this.

442. Then a female is not affected.

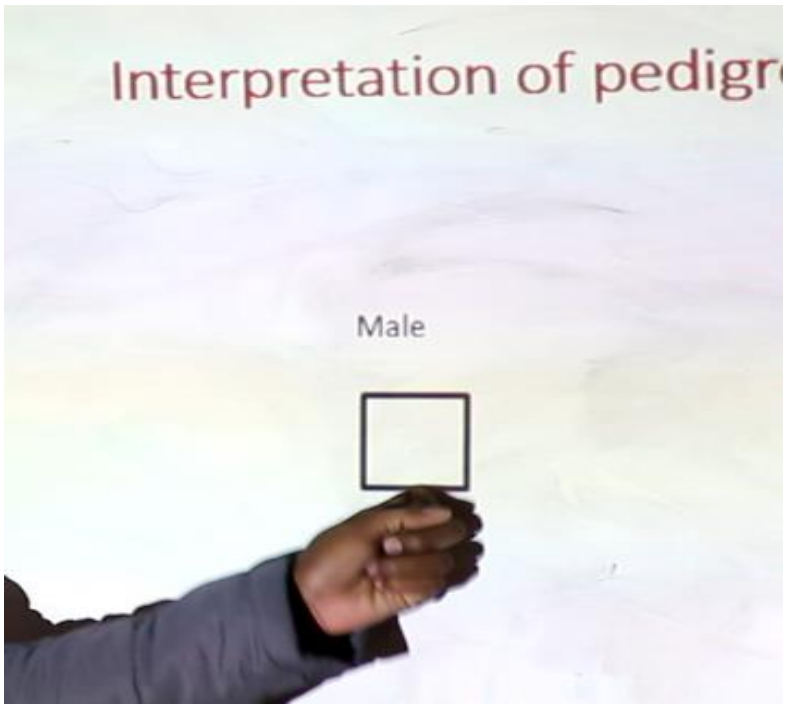
443. Does it make sense?

444. We differentiate using ehh… colours and shapes.

445. If it is a square, it is a male…



…or if it is clear like this [showing]



…then it means it is a normal male…

…or it can happen that a male is a carrier and we know that a carrier will not be affected by a recessive allele neh!

446. A carrier will look normal okay.

447. As I said with albinism for example it does not mean that for you to have a child with albinism, you must also have ehh… the abnormality which is albinism.

448. It can happen that you and your partner…

…look normal but then…

…in your genes you have that recessive allele…

…which can contribute to…

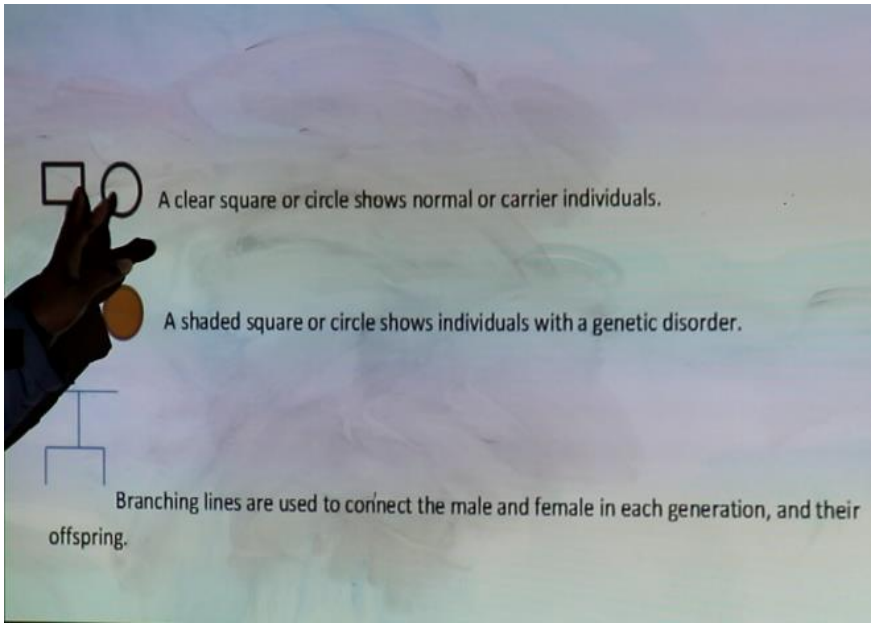
…albinism.

449. Are we following?

450. Right…okay this is explained already.

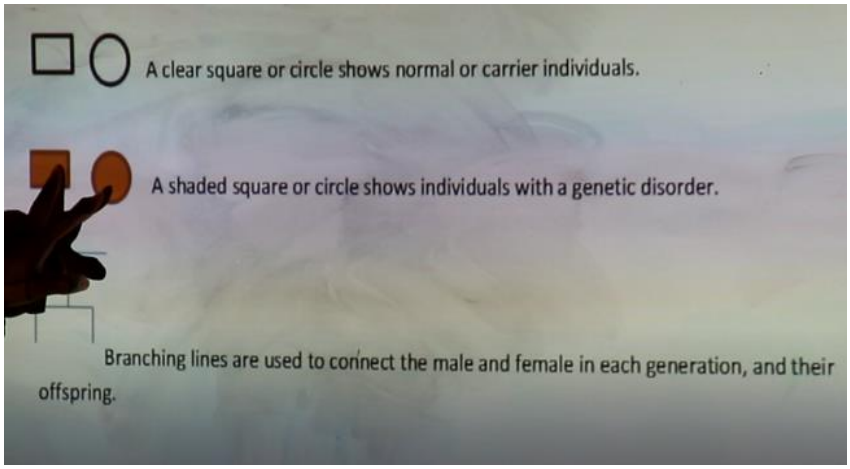
451. A clear square or circle shows normal or carrier individuals.

452. If a person is normal this is what we are going to have.

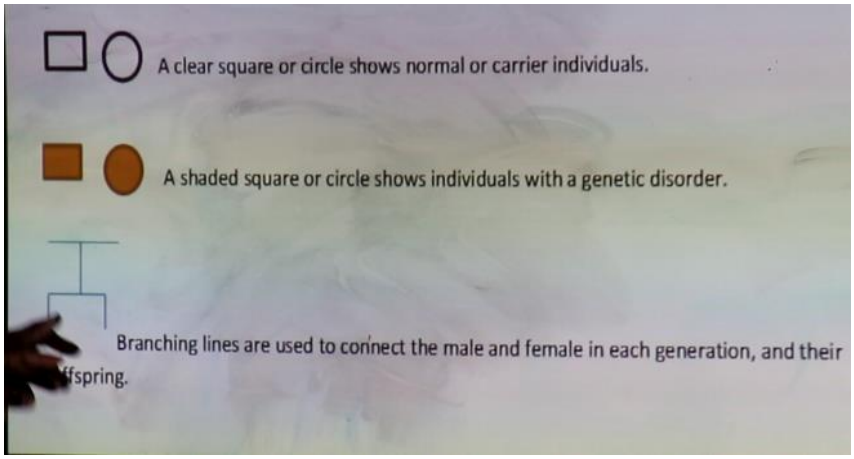


453. A shaded square or circle shows individuals with the genetic disorder.

454. So, if it is shaded it means there is a disorder as you can see here [showing].



455. These shapes are now shaded, and we use these links to connect the male and female including the generations and their offspring okay.

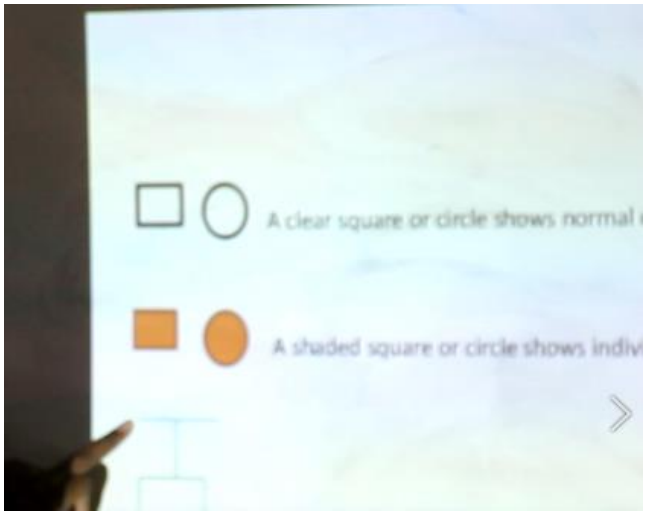


456. Since, we are focusing on humans, we use male and female right.

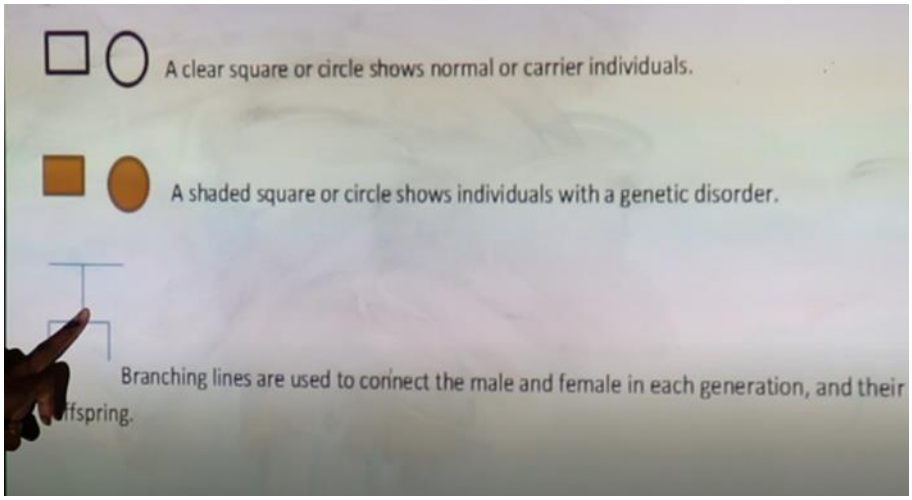
457. Remember that for an offspring to be formed we need two people…

…and these two people will be connected by these two lines.

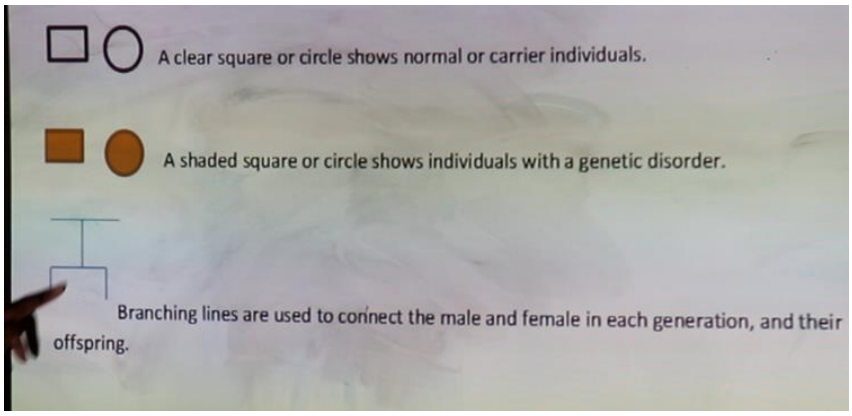
458. For example, let us say this is you and your partner neh…



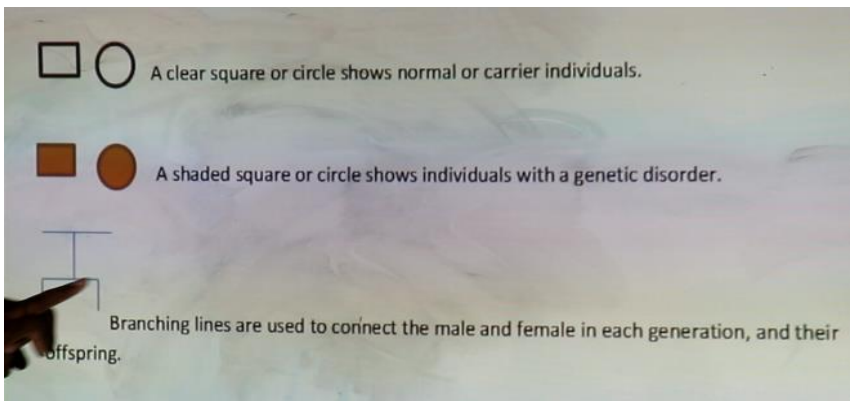
…and then you know that you produce offspring of course so, this line….



…is leading to your offspring…



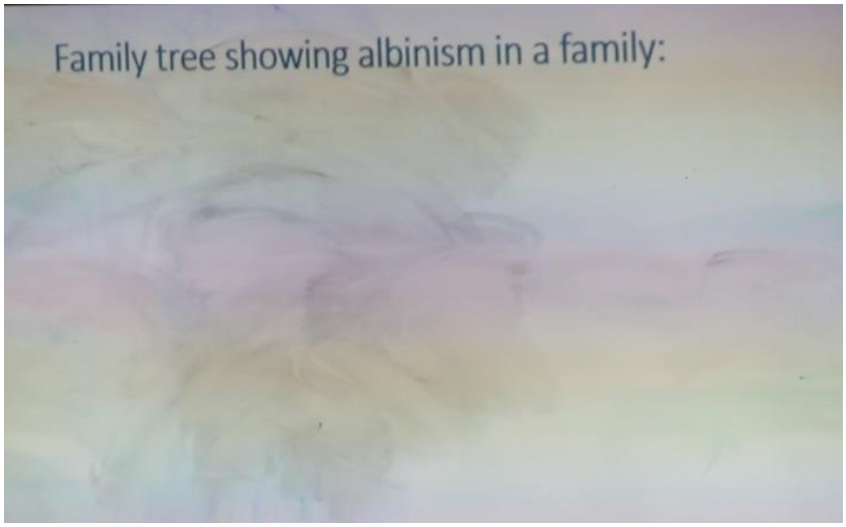
… maybe this will be your first child, and this will be second child.



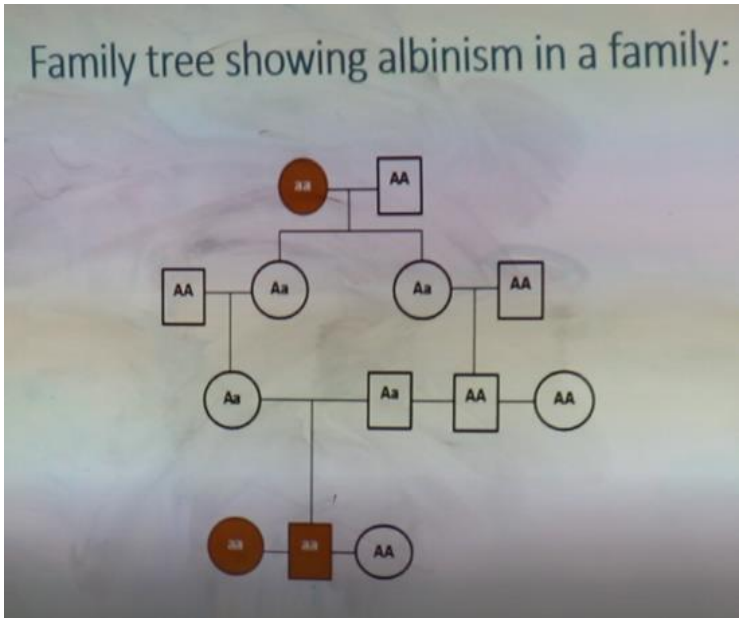
459. So, the lines are used to connect the family members okay.

EPISODE 4 : FAMILY TREE AND ALBINISM WITH GENOTYPE GIVEN

460. Then a family tree showing albinism in a family…



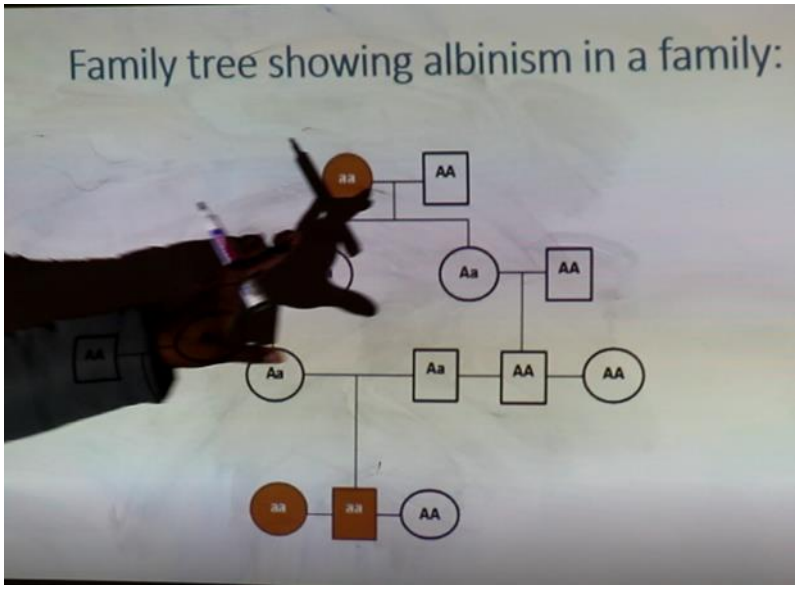
…so, we are going to do this family tree together as a class neh!



461. Then there will be activity whereby you have to ehh… this is your own okay.

462. It will be about ehh… five questions out of your textbook. [Something happening outside].

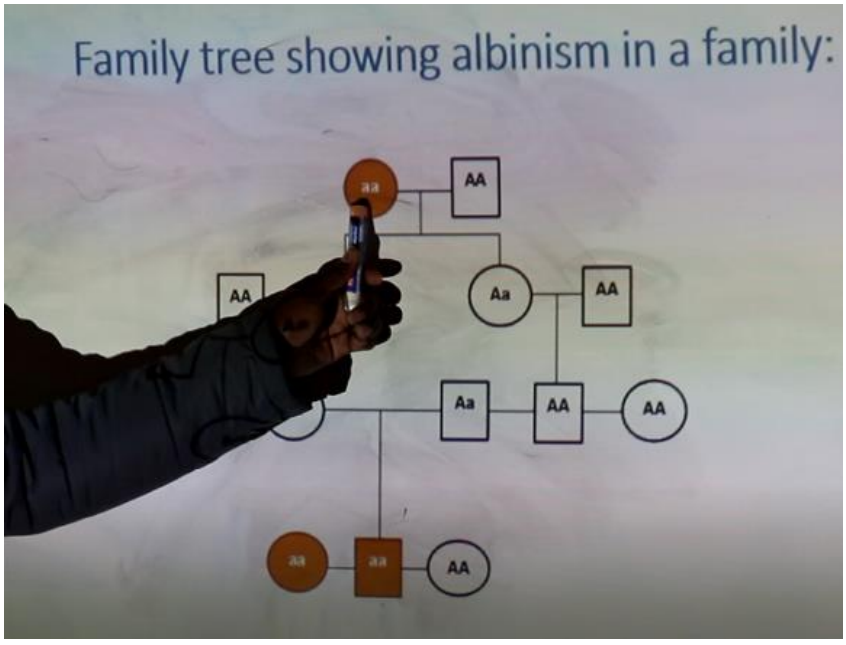
463. Okay, so this is your family tree it does not mean that all your family trees will be like this…



464. The most important thing for you here is to know how to interpret a family tree or a pedigree diagram okay.

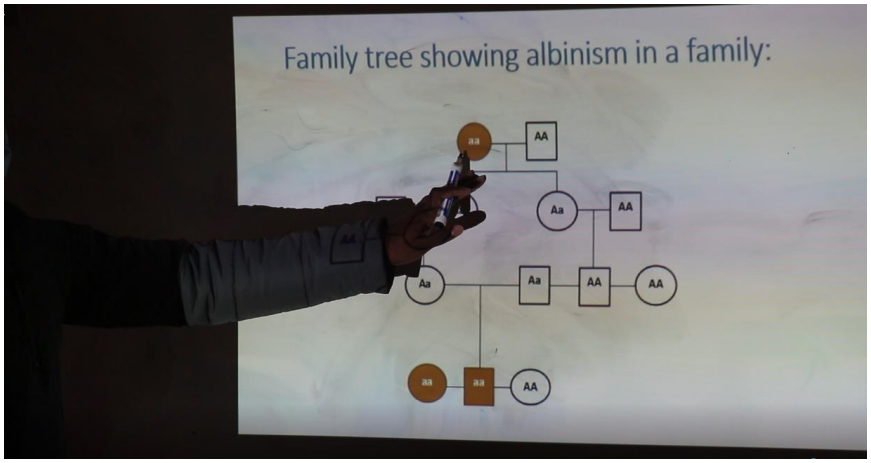
465. That is the most important thing!

466. Remember we said this is shaded, then it means there is a disorder neh!



467. If it is not shaded then that person is normal or that person is a carrier.

468. Right so, this is showing albinism neh… and you can see we are also given the genotype neh…



…for this individual and again it does not mean that you will always be given the genotype.

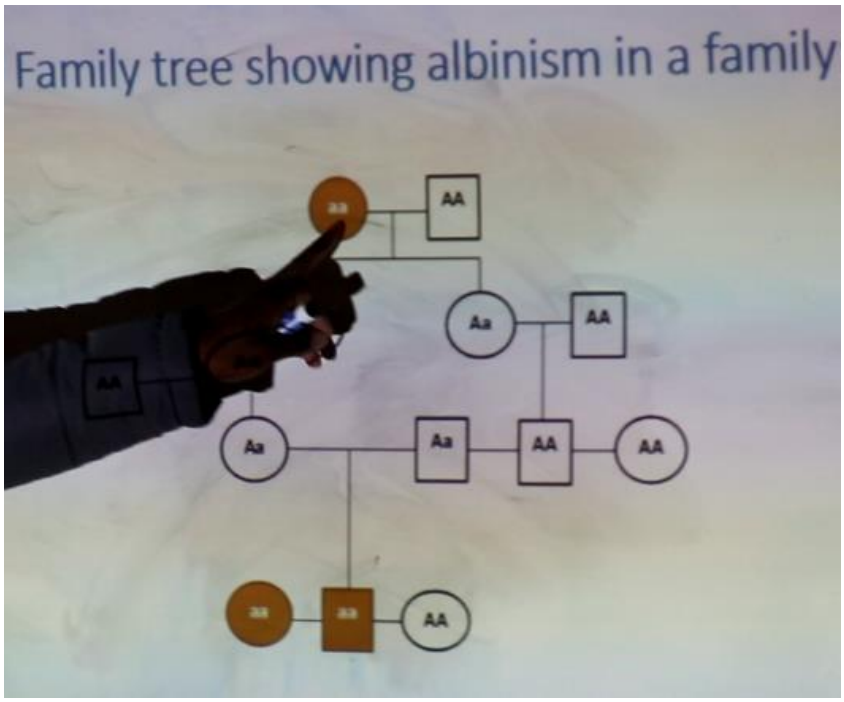
469. It can happen that they do not give you any genotype.

470. Then you will have to predict okay.

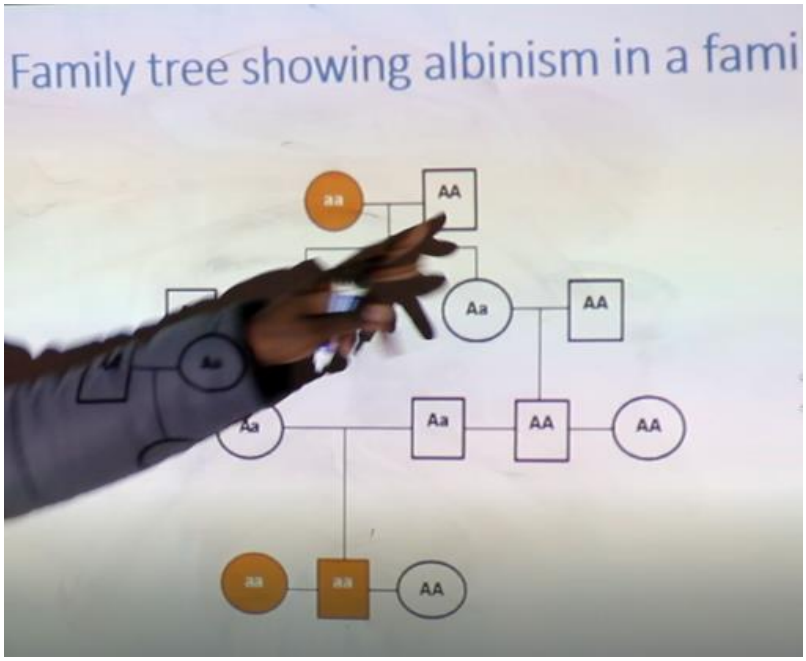
471. You will have to use what we call monohybrid crosses in conjunction with this, then you get ahm…the alleles for this person okay.

472. Am I making sense boys?

473. Right for this one we can see; we can all see… we can all see that for this person has albinism okay.



474. This one is normal okay.

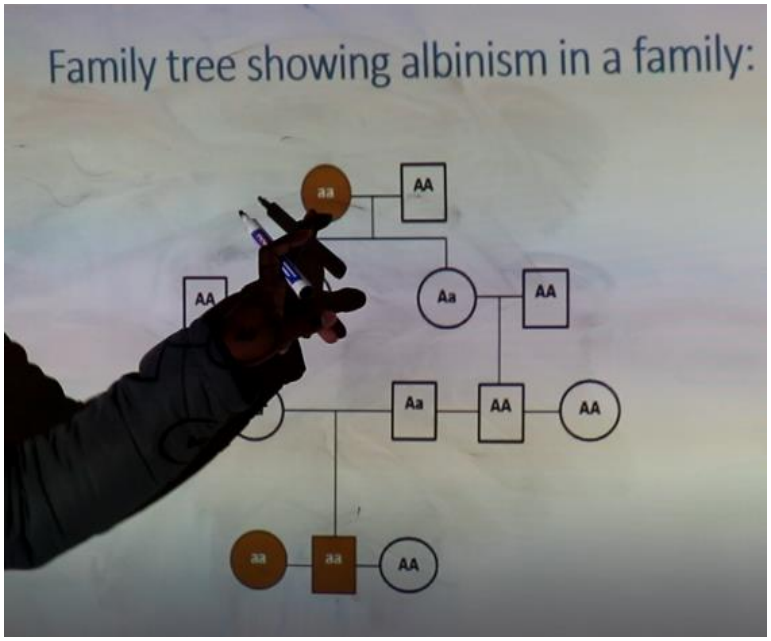


If for example, this person was the carrier it was going to be like this neh!

475. If this person was a carrier, we can all see that the alleles are both dominant neh!

476. Okay, this person cannot be called a carrier [spraying and erasing].

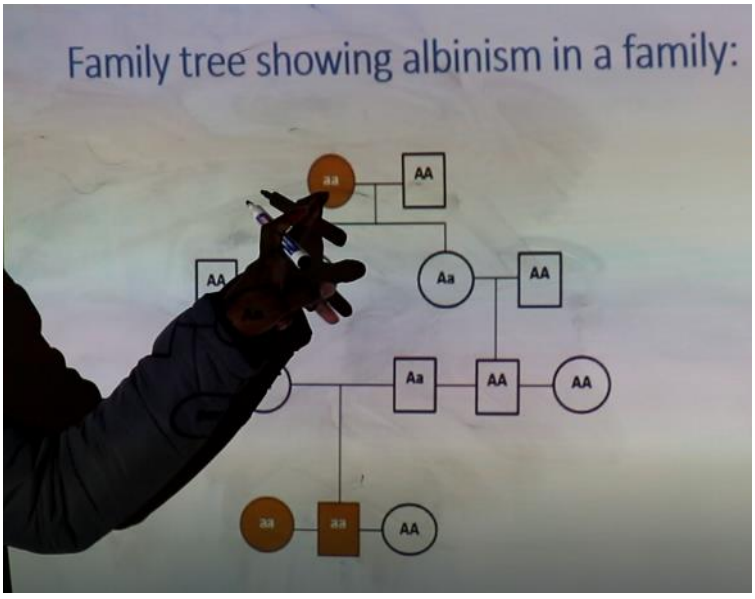
477. Right is this male or female?



Yes? [Referring to a learner]

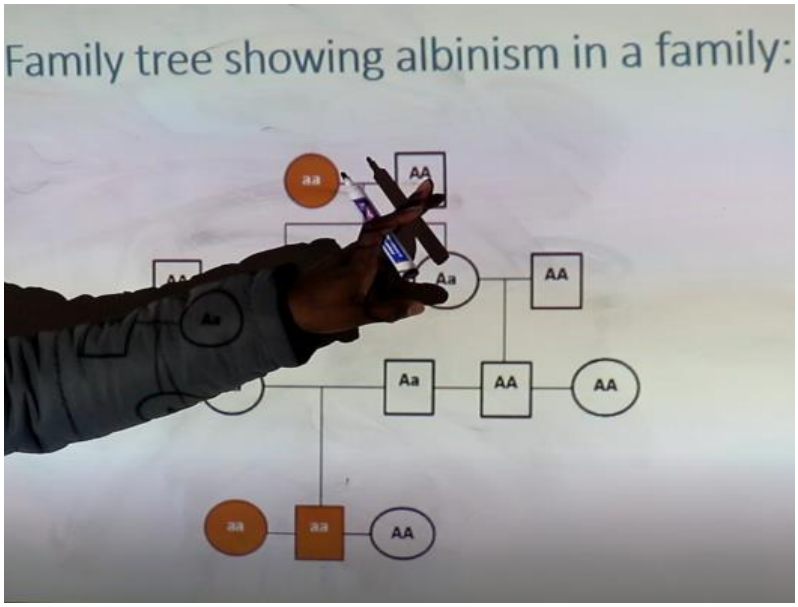
478. Elias: It is a female!

479. Mr. Zulu: It is a female, remember we said that a circle is representing a female and if it is shaded just like this one then it is an affected female.



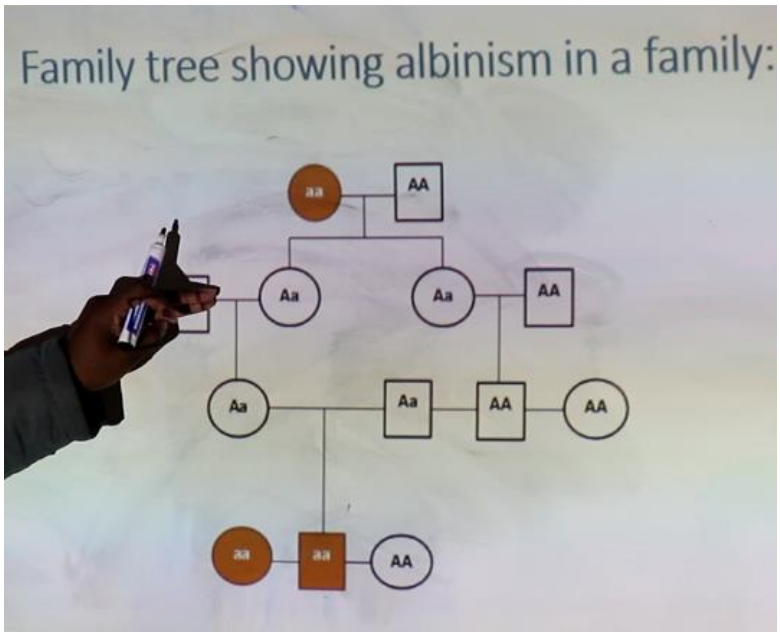
480. So, this female has albinism.

481. Then the husband, the husband is fine everything is normal okay.

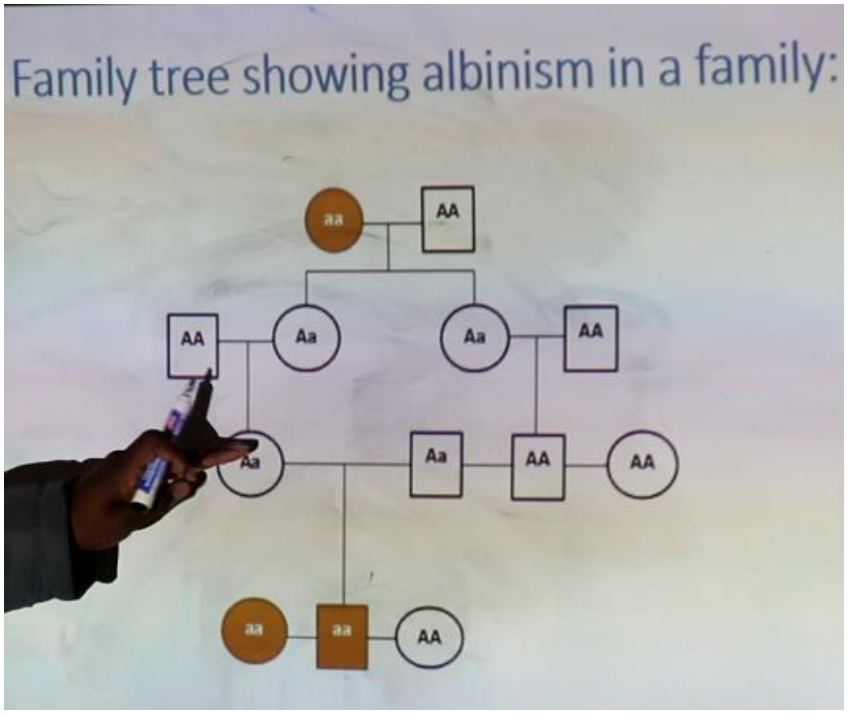


482. Can you see the generations?

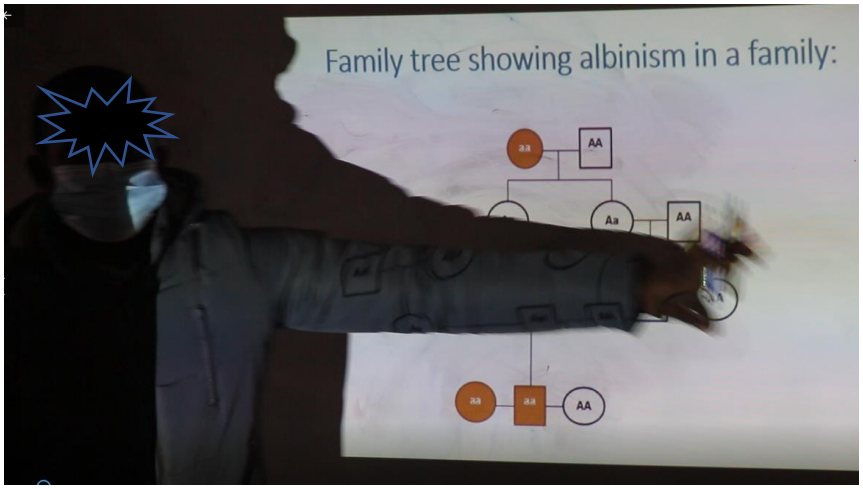
483. One…the first generation…



…this will be the second generation.



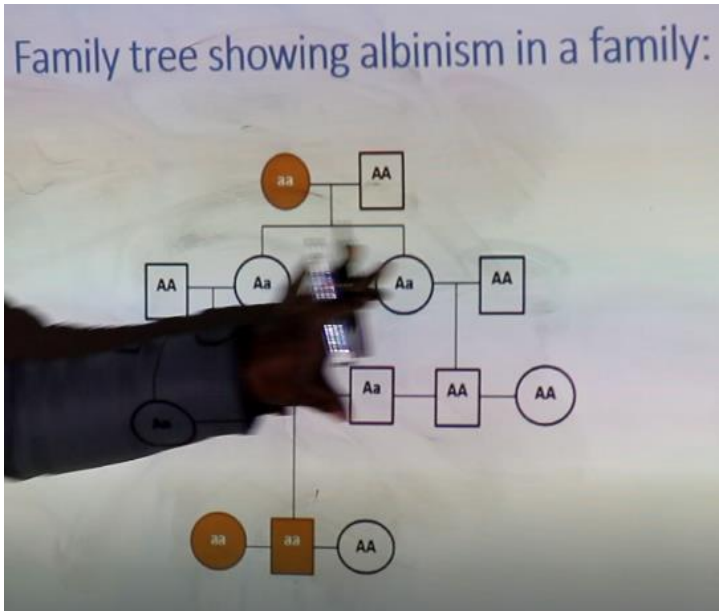
484. No one has albinism here,



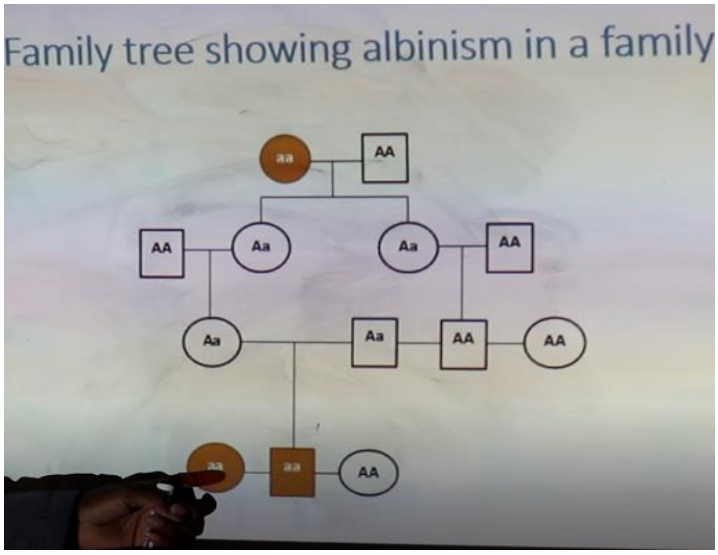
…but we can trace this albinism back and we can see where it started neh!

485. You can all see that.

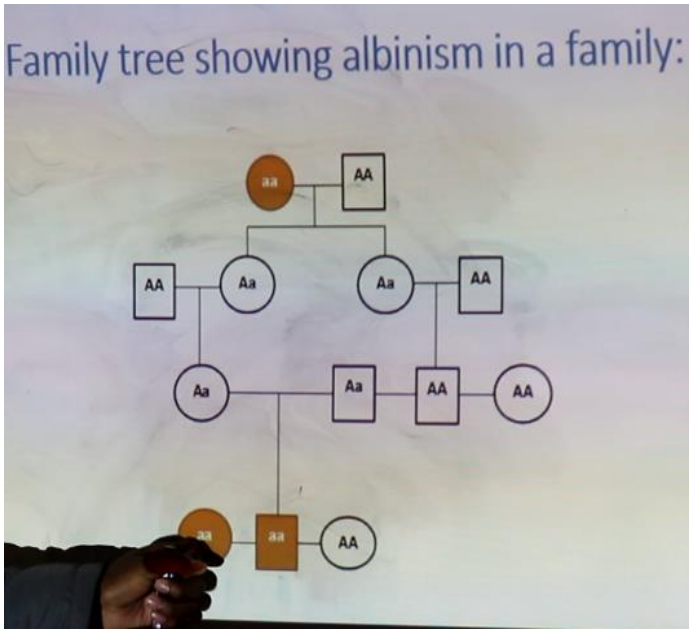
486. In fact, it started here, but no one in this family had albinism neh!



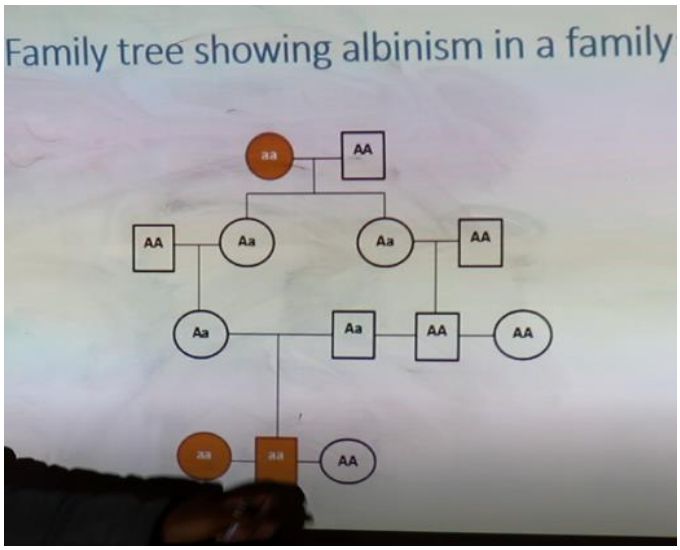
487. Okay, it is just that this last generation…



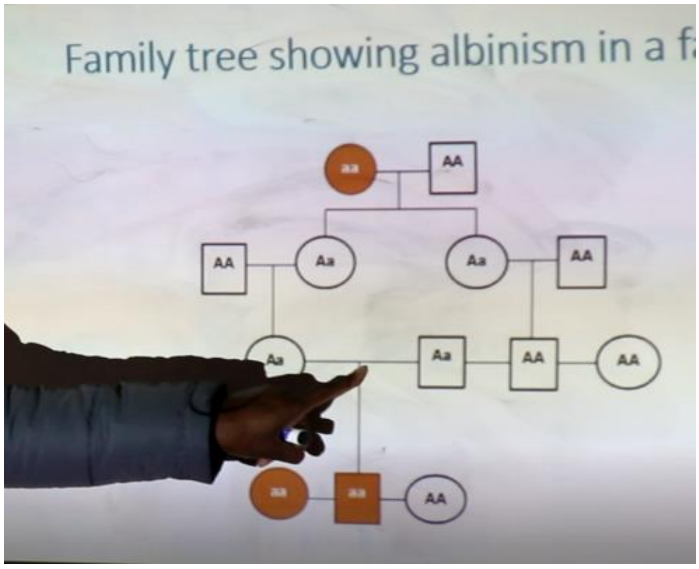
…one…



… two they have albinism…

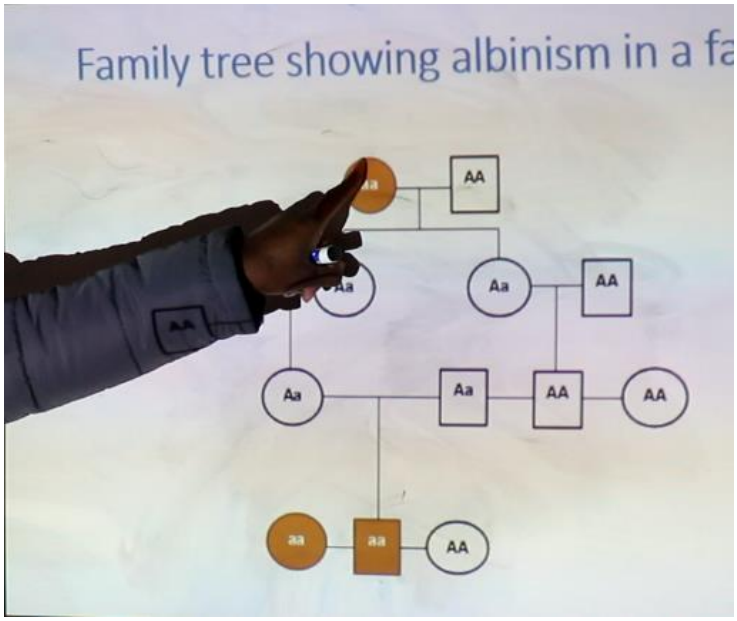


…and we can trace this albinism back…

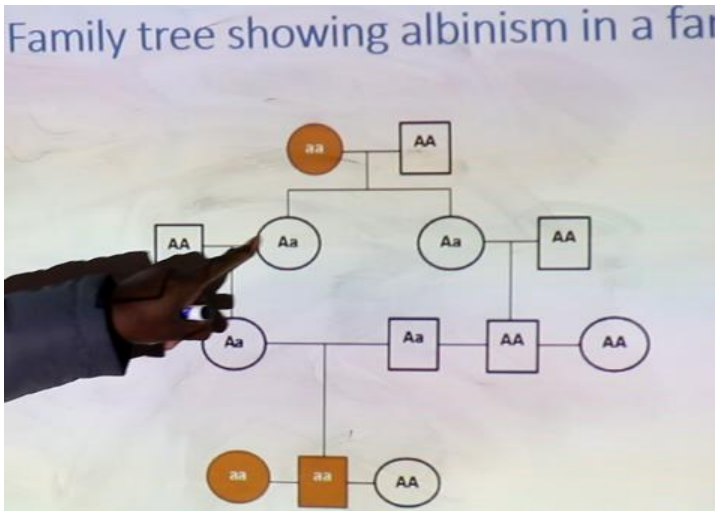


…and you can see where it started [showing].

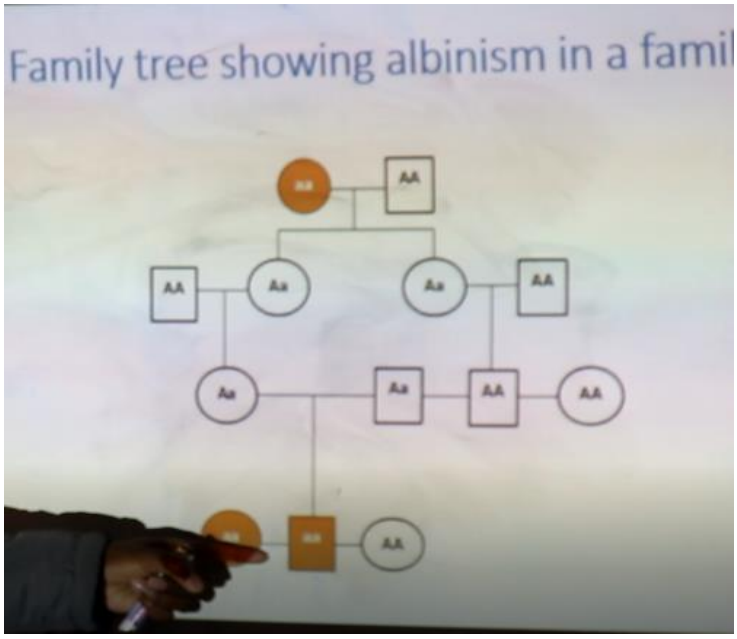
488. We can see that in fact it started here…



…but no one in this family had albinism neh…



…okay it is just this last generation…

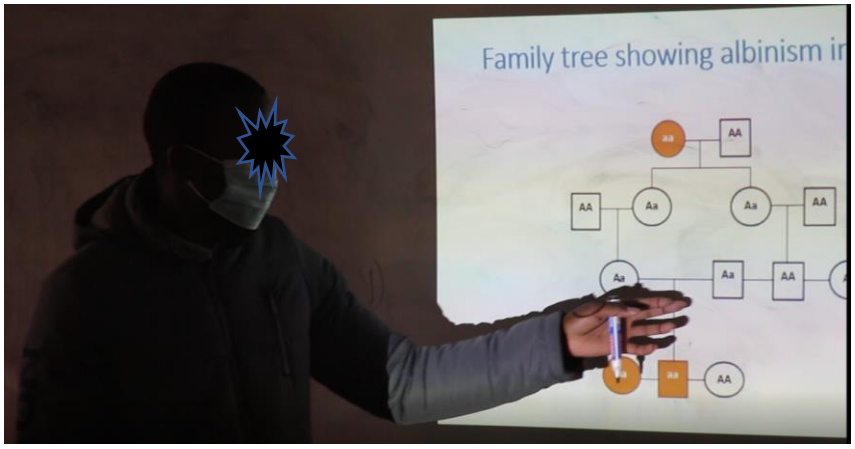


…where it started to show, and we can trace it back.

489. Even with cancer or any other…

…disorder which is genetic.

490. It can be trace like this neh!



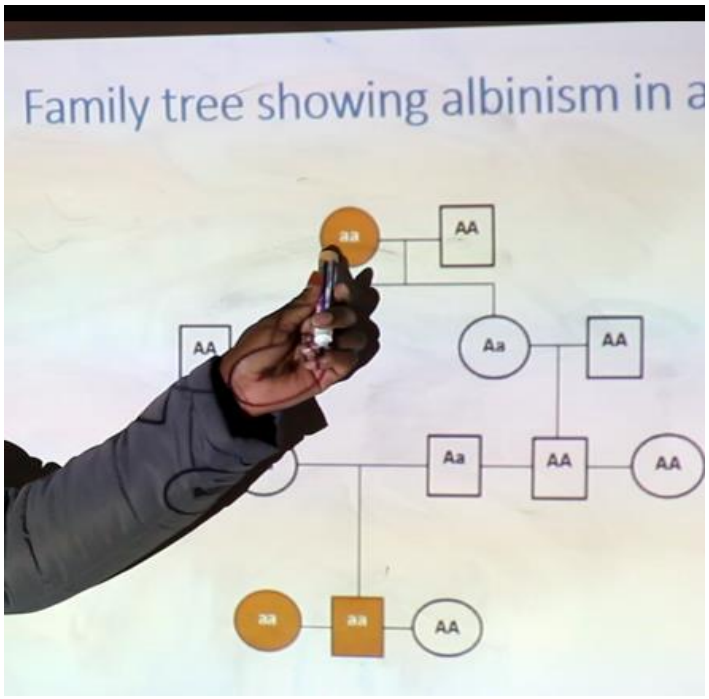
491. It does not mean that if you have and then it is just a mutation.

492. It can happen that it started back…

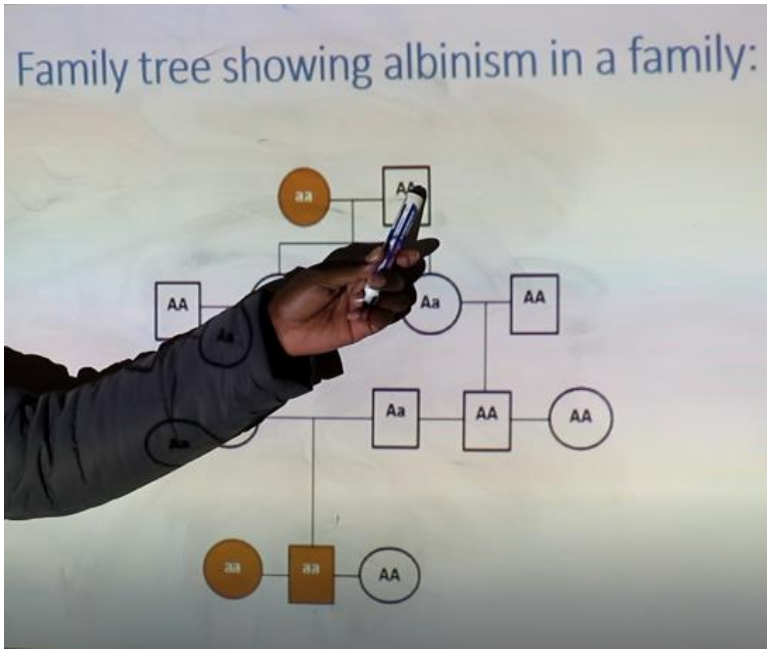
… or maybe you do not even know the person who gave you that gene for that disorder neh!

493. Right so, can we start now.

494. Right, we said this is a female and she is affected she has albinism.



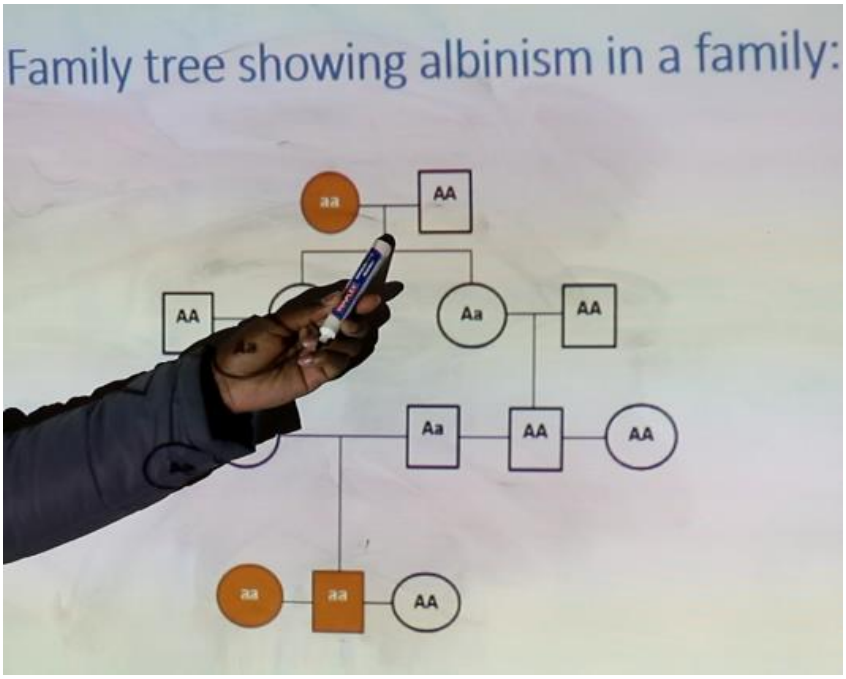
495. Her husband is normal…



…and then we have these lines.

496. They are linking the two because this is the husband and the wife.

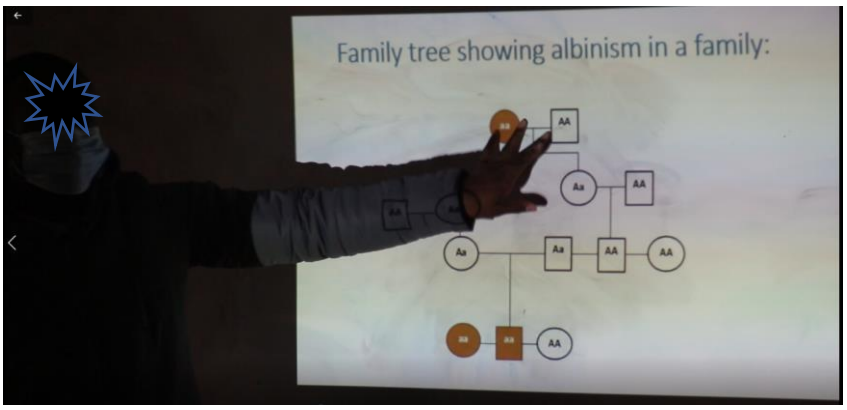
497. Right, and we have this line which is linking their kids/



498. How many offspring…

…or how many kids do we have?

499. Right, we start from here…

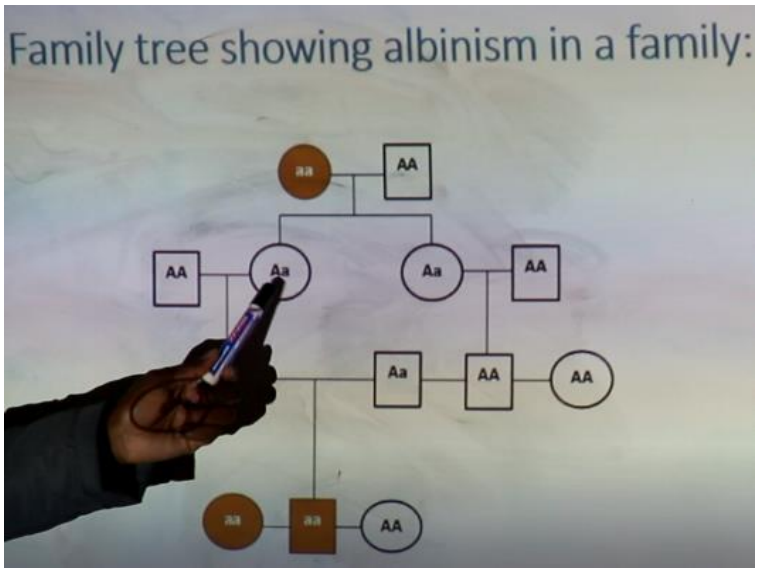


…and then we have this line which will show us the kids.

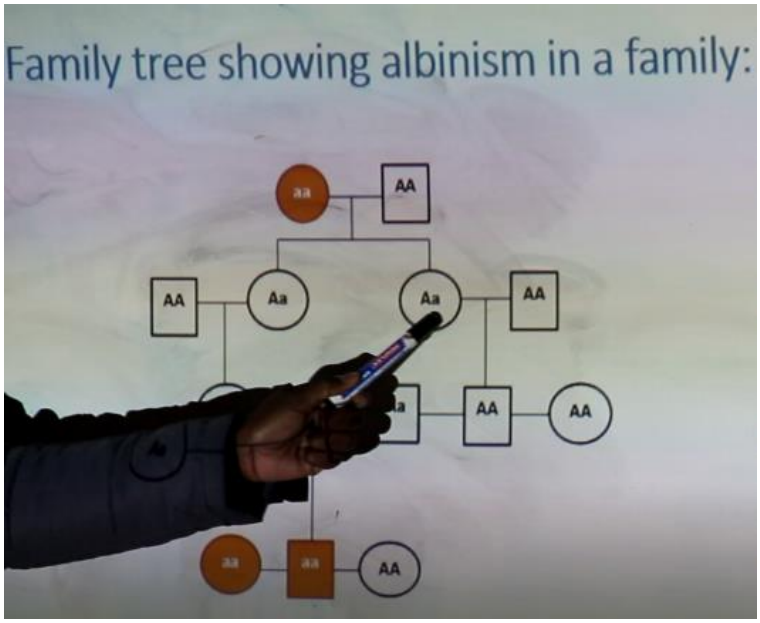
500. How many kids do they have? Yes, Alfred!

501. Alfred: Two / ? /

502.	Mr. Zulu:	It is two, do you all agree?
503.		Okay, if you have a different answer raise up your hand please!
504.		Okay, what if I say it is four, am I wrong?
505.	Ls:	Yes
506.	Mr. Zulu:	Why? Yes! [Referring to a learner]
507.	John:	/ ? /
508.	Mr. Zulu:	Which one?
509.		This one?
510.		This one? [pointing]
511.	John:	/ ? /
512.	Mr. Zulu:	Which one? Yes! [Referring to a learner]
513.	Sizwe:	It is not extending…
514.	Mr. Zulu:	Yes! It is not extending to this neh…okay.
515.		So, it means they only have two.
516.		One…

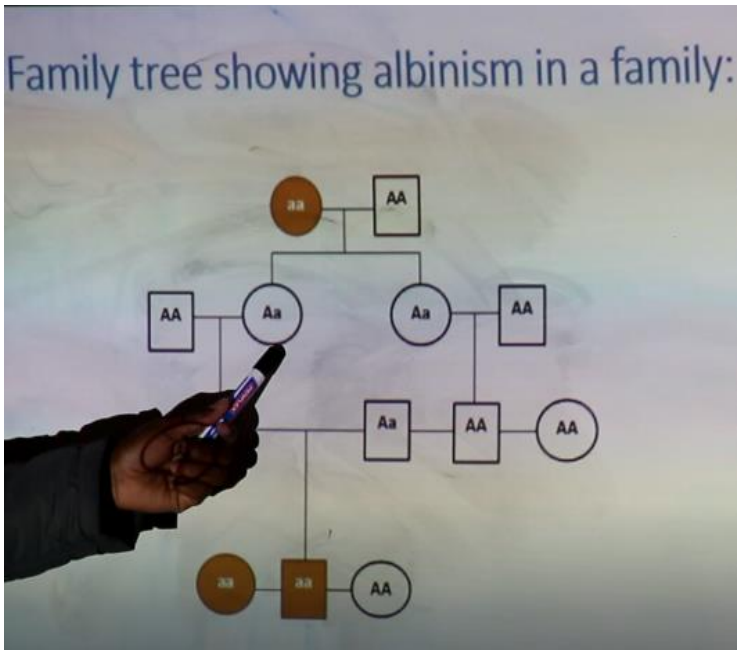


…two neh!

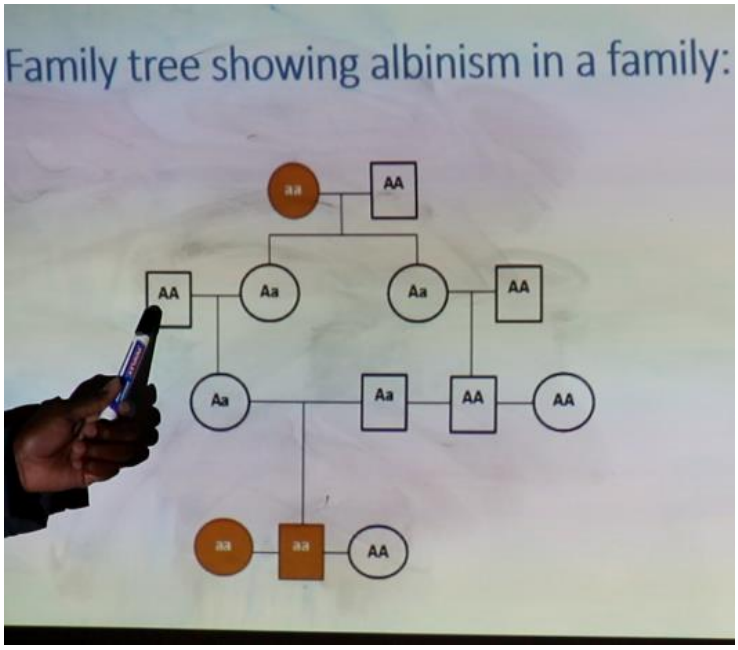


517. Am I making sense?

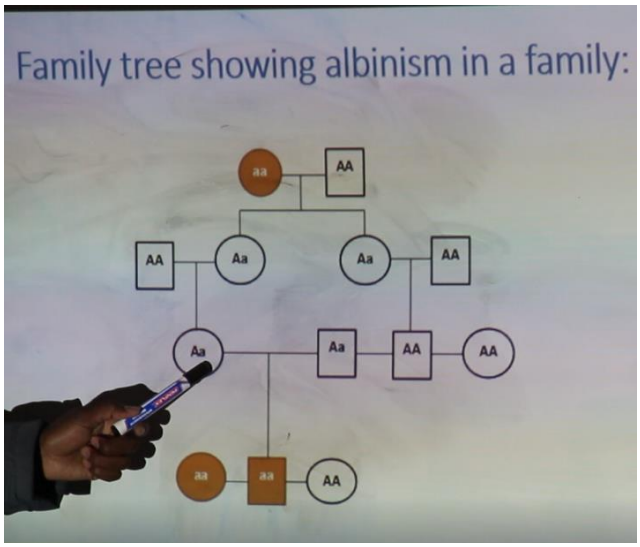
518. Right, they only have two and you can see this is a female.



519. It means this female got married or now has a partner…a male partner.



520. Okay, they now have their own offspring right…



…and from these… from these two how many kids do they have? Yes! [Referring to a learner]

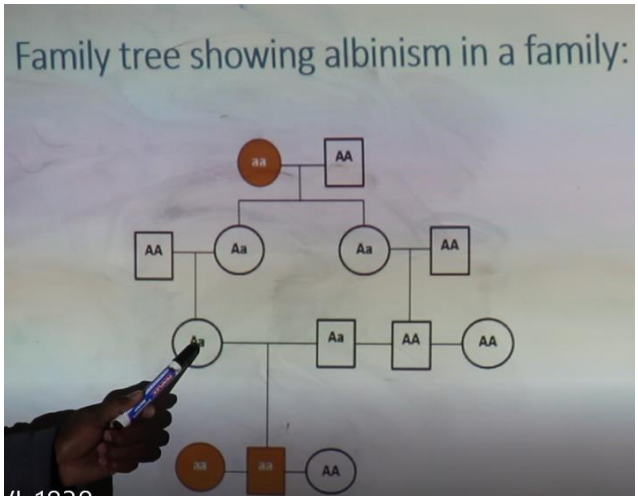
521. One!

522. Is it one?

523. Do you agree?

524. Ls: Yes!

525. Mr. Zulu: Yes, it is one!



526. This one only and again we can see this female has a partner.

527. This one and how many kids do they have? Yes! [Pointing to a learner]

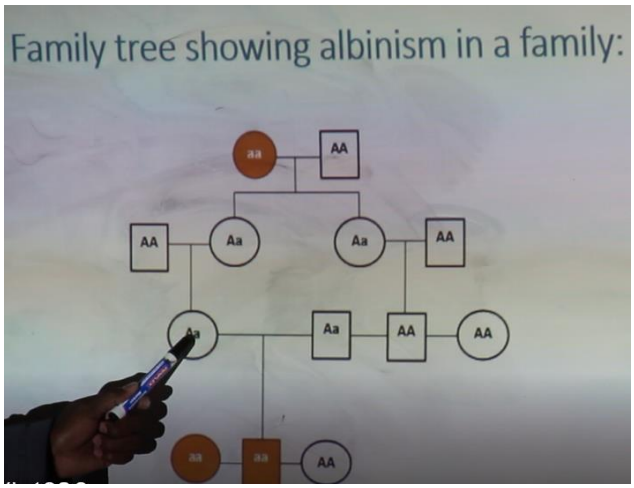
528. Thabani: Three! [unclear]

529. Mr. Zulu: It is one, two, three because it is coming from this line neh… okay.

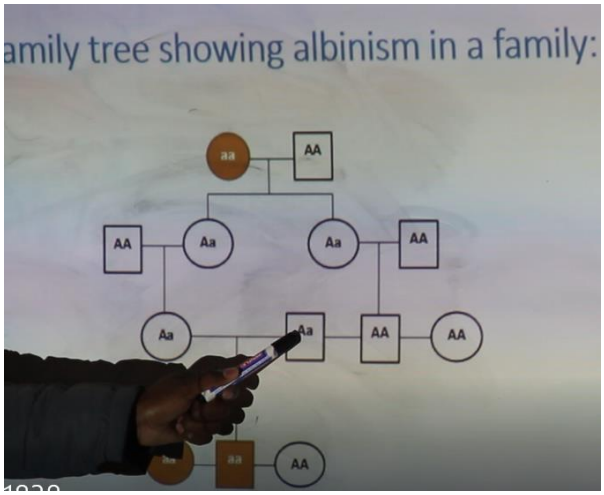
530. Are you following?

531. Ls: Yes!

532. We can also see that this female…



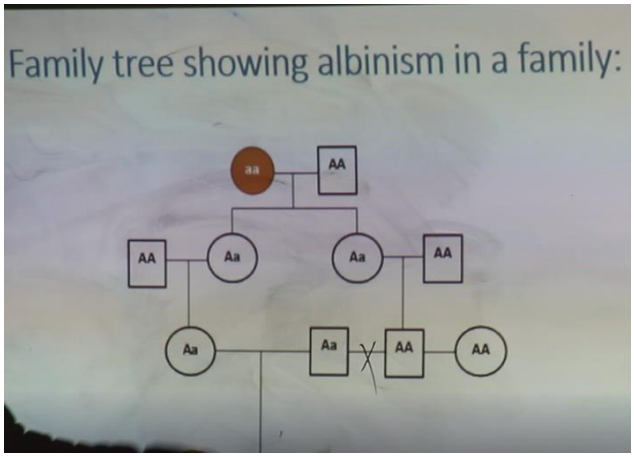
…has a partner…



…and the partner looks normal and how many kids ehh… do they have? Yes! [Referring to learner]

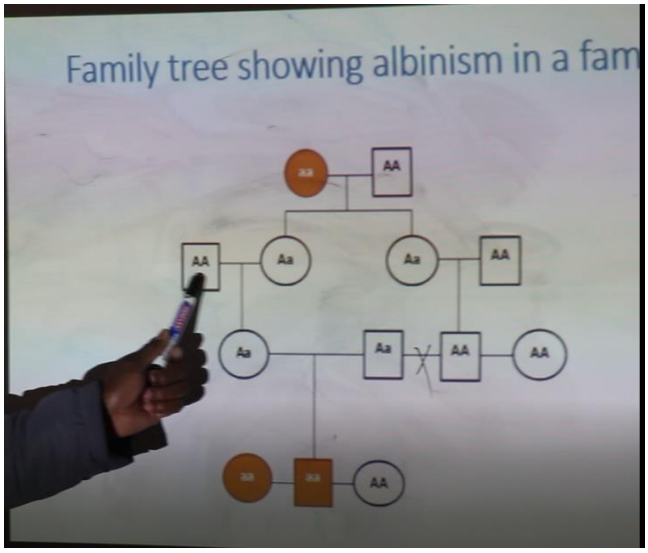
533. Amandla: One!

534. Mr. Zulu: It is one neh…okay this line is not supposed to be there… [Crosses out line]

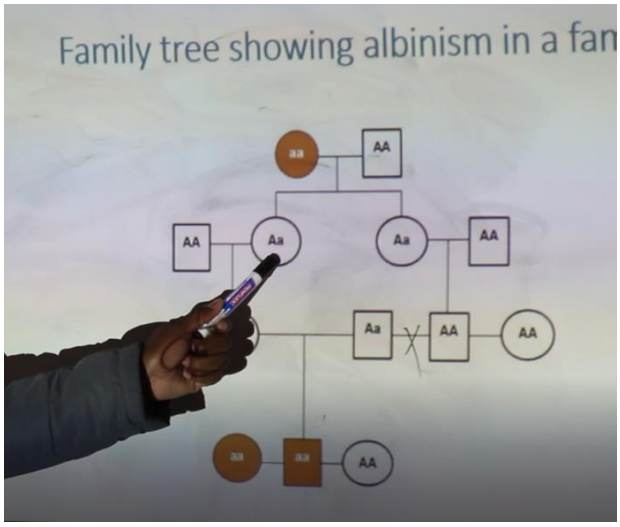


…okay right so, they have got one…then they mate, they do not have any offspring neh!

535. Right, so again from this we can see this one met this one…

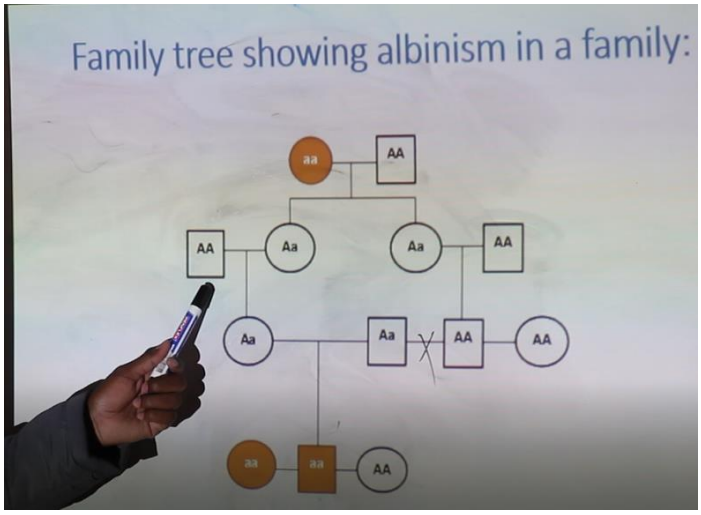


…and this person…

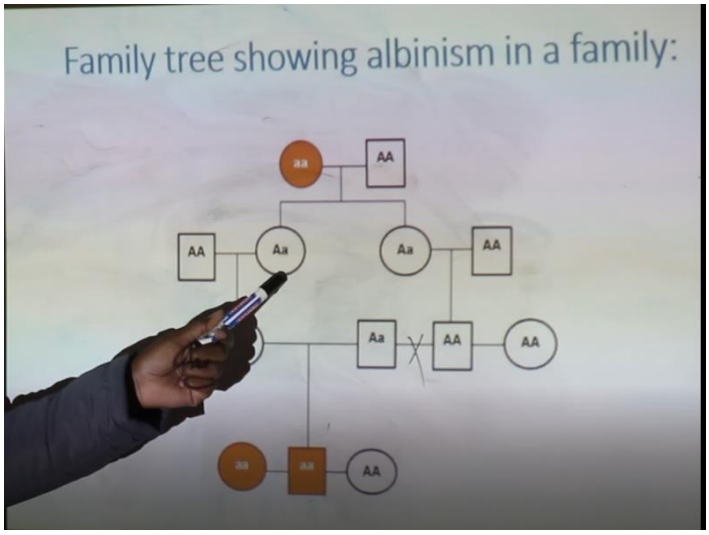


…look normal okay and we can see he does not have any gene or any allele for albinism but this one inherited this allele from here, can you see?

536. This person is normal in terms of the … the phenotype remember we shade to show the phenotype.



537. This person looks normal okay, but he is carrying an allele for albinism…



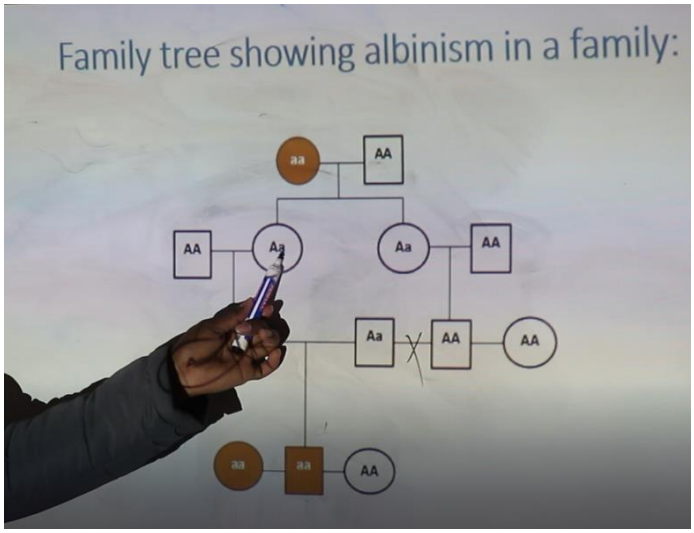
… and we call this female a carrier meaning that she is carrying an allele for albinism, but it is not showing in the phenotype.

538. She looks normal, the skin colour is fine.

539. Right are we following boys?

540. Chief are you still here?

541. Right, and then we have a child okay, if you look at this child… this child has inherited one allele from the father and one allele from the mother and the allele that was inherited from the mother is this one [showing].



542. Can you see?

543. It is an allele for albinism, the recessive.

544. So, that is why the child's genotype is like this neh!

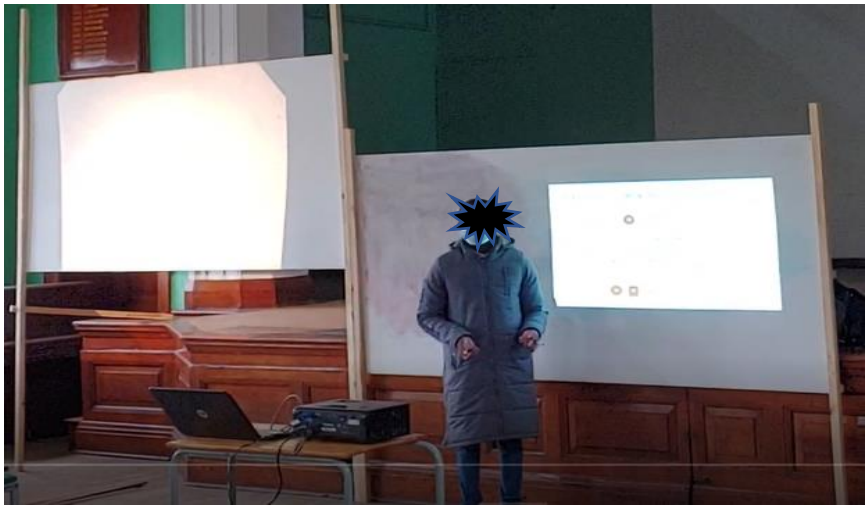
545. Then from here this child now meets a partner okay and this partner is also carrying an allele for albinism.

546. They both look normal but are carriers.

547. Does it make sense?

548. Ls: Yes!

549. Mr. Zulu: They are carriers,

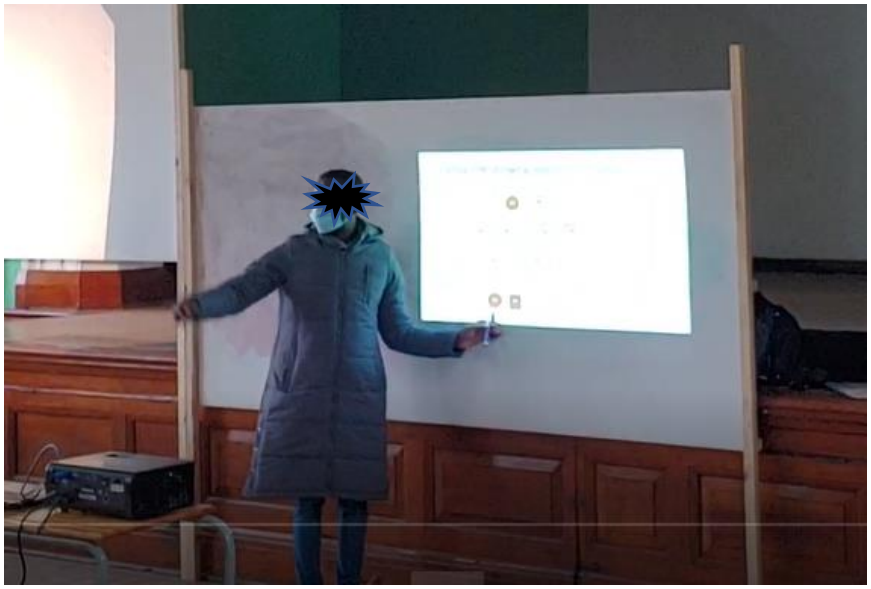


…because they look normal in the phenotype that why it is not shaded but when you look deep down into what we call genotype you can see that they are carriers neh… because they are carrying this recessive allele for albinism okay.

550. So, they have kids now, how many kids do they have?

551. We said three neh…one, two and three.

552. Let us look at the first one… is this a boy or a girl?



John!

553. John: Girl!

554. Mr. Zulu: It is a girl, okay with albin-- albinism…

…okay, you see these scientific terms…yes, John!

555. John: / ? /

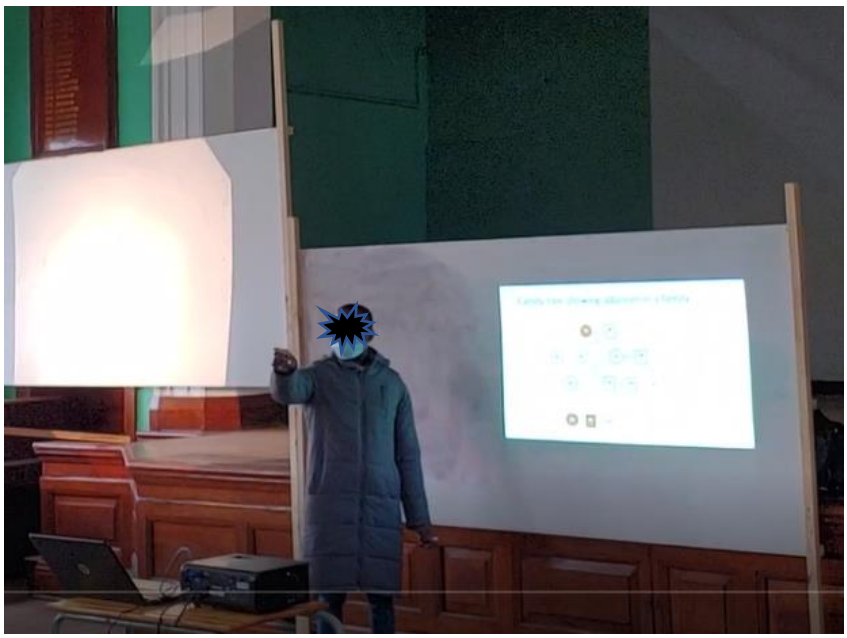
556. Mr. Zulu: Hee!

557. John: Affected.

558. Mr. Zulu: So, she is affected, or this girl has albinism neh…and how do you know?

559. Let us say for instance, we did not have any alleles here.

560. How were we going to know that this one has albinism ehh…Elias?

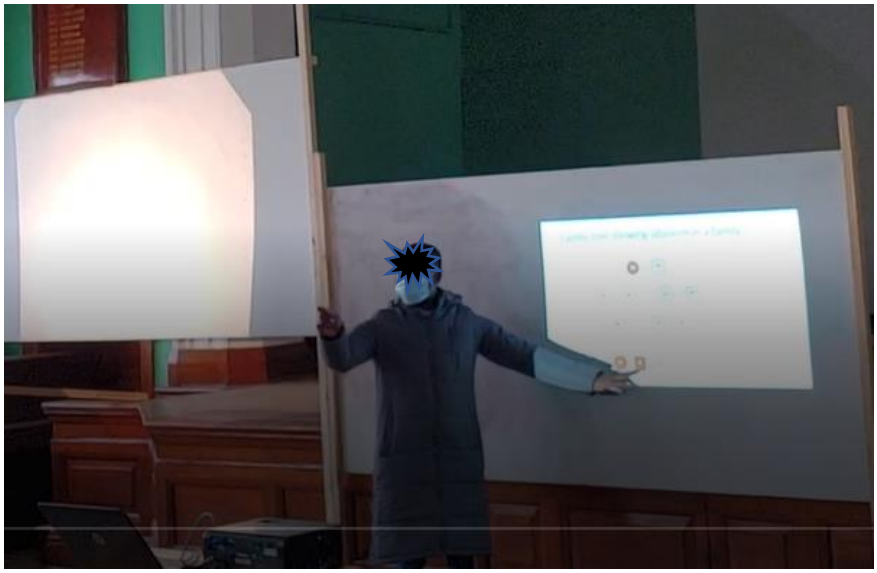


561. Elias: Sir it is shaded!

562. Mr. Zulu: Shaded neh! Yes, that is correct!

563. Remember we use shading to show the phenotype.

564. The this one? Ehh…



…Joel!

565. Joel: It is a male Sir!

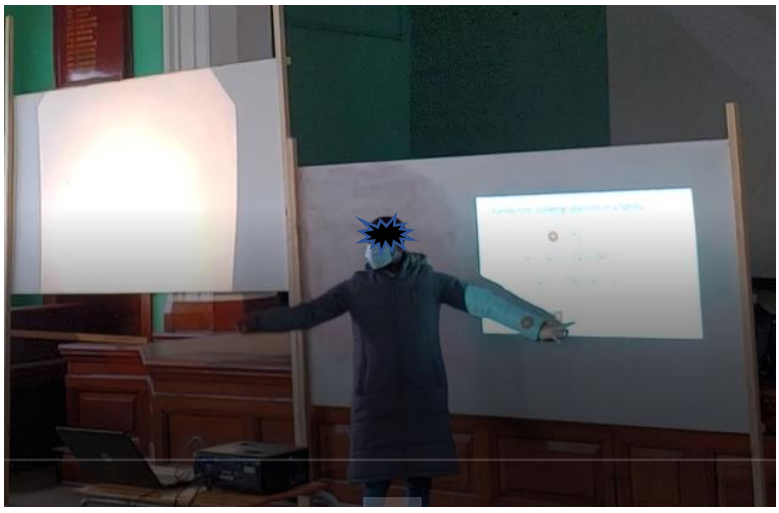
566. Mr. Zulu: It is a male okay.

567. Describe it… describe this male, how is this male?

568. Joel: With albinism.

569. Mr. Zulu: A male with albinism neh!

570. Then we have this one,



…Genius!

571. Genius: Female!

572. Mr. Zulu: It is a female neh…a female…

573. Genius: She is okay

574. Mr. Zulu: But you will not write okay.

575. Ls: [Laughter]

576: Mr. Zulu: Right, normal female ehh…this is a normal and the reason why we are saying this person is normal…

…is because of the genotype but remember we are not always going to get ehh…these genotypes given.

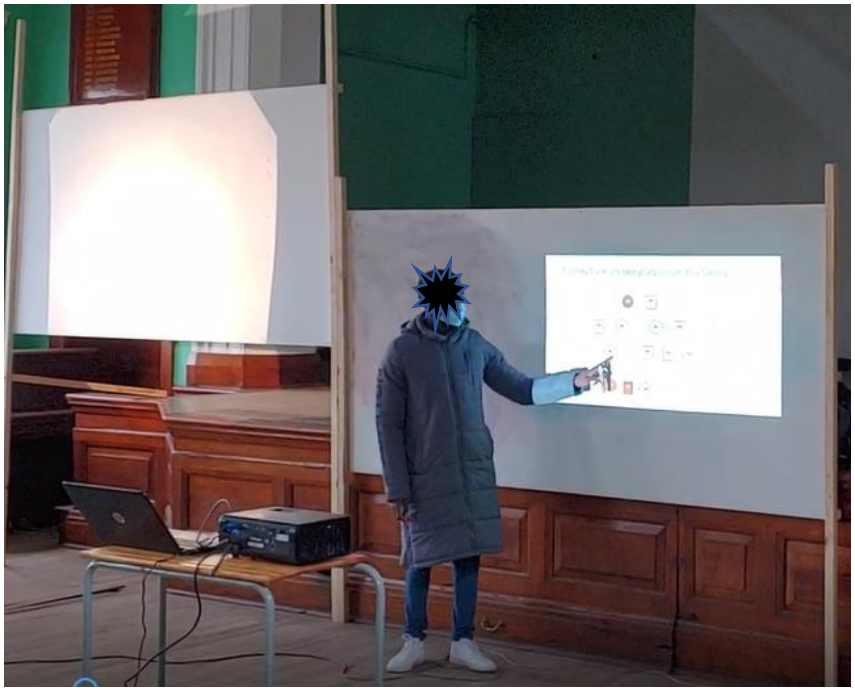
577. Maybe they can just give the genotypes for one…

or they will not even give you for any and you will be asked to give okay…predict all the genotypes okay.

578. Are you following?

579. Okay so, how do you end up having these two with albinism?

580. You can trace it from here…

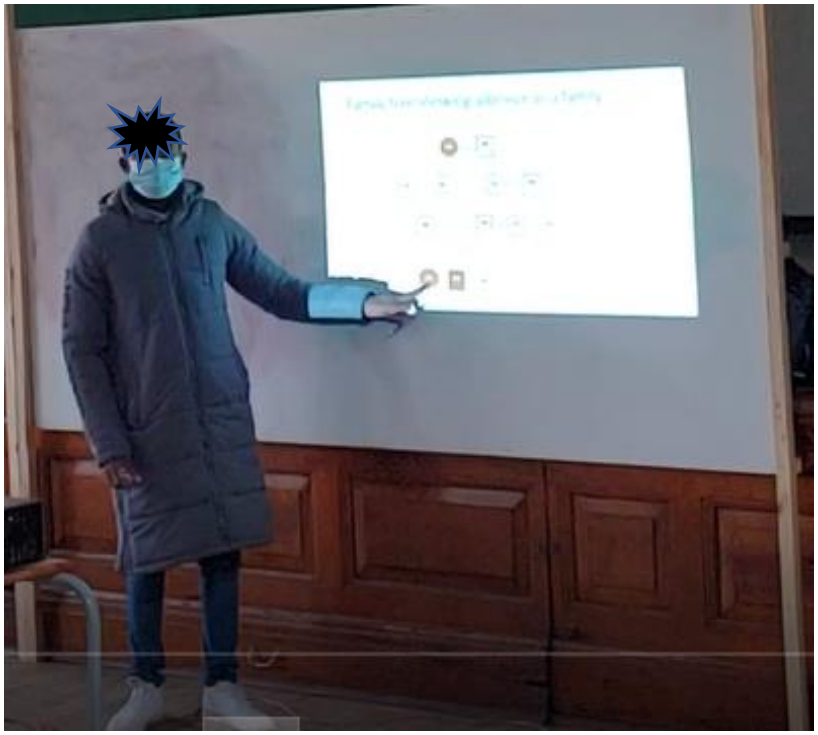


…and we can see that this parent is a carrier.

581. There is a recessive allele and this one is a carrier right.

582. There is a recessive allele and this child…

…happened to inherit this allele and this one, that is why she…



…is has got albinism…a:nd this…one?

583. It is the same thing; this man inherited the recessive allele from the father and recessive a recessive allele from the mother that is why he got albinism okay.

584. This one did not inherit the recessive alleles so, this one only inherited this dominant allele and this one, that is why he is normal.

585. Are we following?

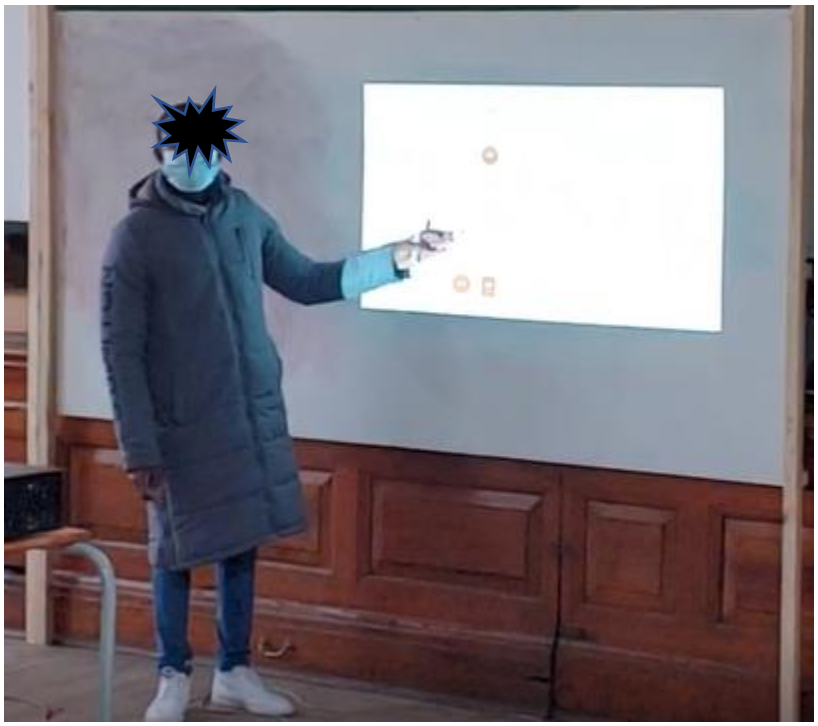
586. Right, if you have questions raise your hand…

… before we do another one and then you will have to do another one on your own.

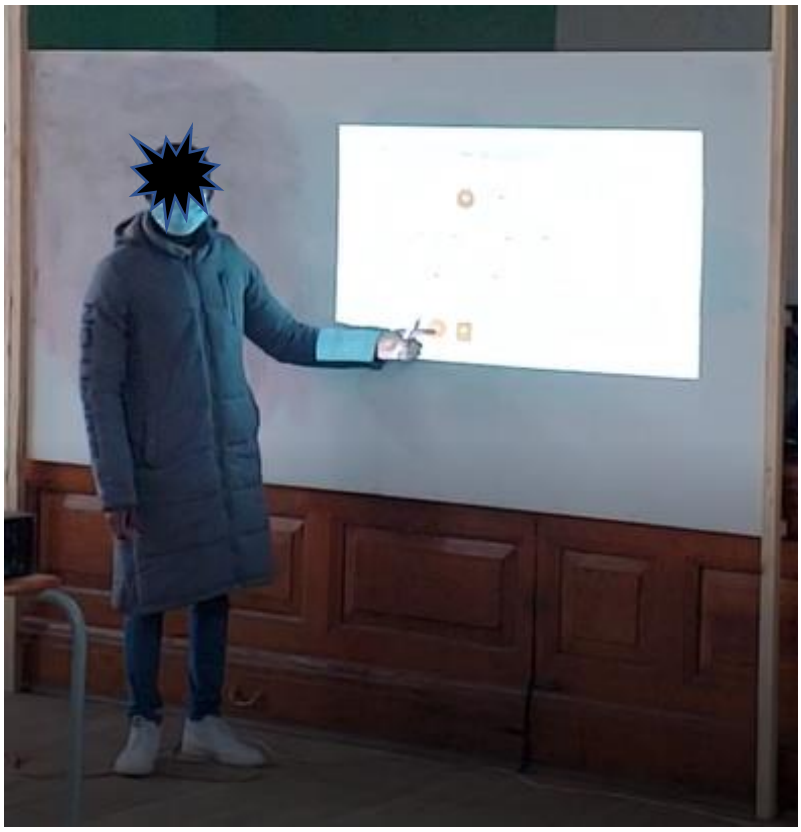
587. So, we are still fine for now?

588. Okay so, you can just ignore this one, you can ignore it okay because we are interested in how this albinism ehh…was passed on.

589. We can see two generations.



590. No albinism showing but this last…



…generation is showing albinism and we can trace it from here…

…but with this individual for example, this one is not from the…this family okay.

591. This one is from a different family.

592. It means that from this family, there is a history of albinism okay it just that now he met a person with I mean who is carrying an allele for albinism.

593. That is why their kids have albinism.

594. Are we following?

595. Okay, in real life boys, we know that ehh…couples that look normal

…okay.

596. They can have a child…

…that has albinism…they are both dark…

… in complexion, but they end up having a child that has albinism.

597. It is because of this…

…it can be traced using a pedigree diagram just like here.

neh!

598. Then we are done!

EPISODE 5: PROBLEM INVOLVING ALBINISM WITH NO GENOTYPE GIVEN

599. So, boys we are now going to another one whereby ehh… there is no genotype given.

600. Right, let us say we have… is this a male or female?

601. Then we have a male which means they are an item, then they have kids…they have three neh!

602. So, it is two boys and one girl neh!

603. This one has albinism and we are asked about the genotype of the parents, what are you going to say?

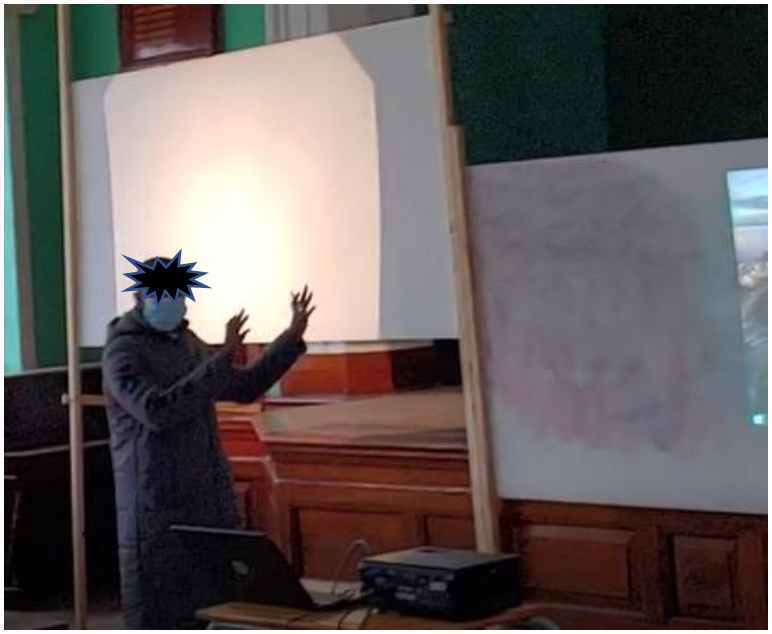
604. Albinism, you use A neh…

…for the genotypes.

605. Who can give me the genotypes of the parents?

606. Right boys, can you see that we do not have any allele…

…given here we are just given the shapes…



…and…there is one that is shaded, meaning this one is affected.

607. This one has albinism [silence] yes,

Joel!

608. Joel: Dominant A and recessive a.

609. Mr. Zulu: Sorry!

610. Joel: The female.

611. Mr. Zulu: The female so, it will be…

612. Joel: Dominant A…

613. Mr. Zulu: Dominant A and…

614. Joel: Recessive a.

615. Mr. Zulu: Do you agree?

616. Ls: Yes!

617. Mr. Zulu: Right, then here? Yes!

618. Joel: Dominant A and recessive a.

619. Mr. Zulu: Dominant A and recessive a…okay, ehh…is this correct, boys?

620. Ls: Yes!

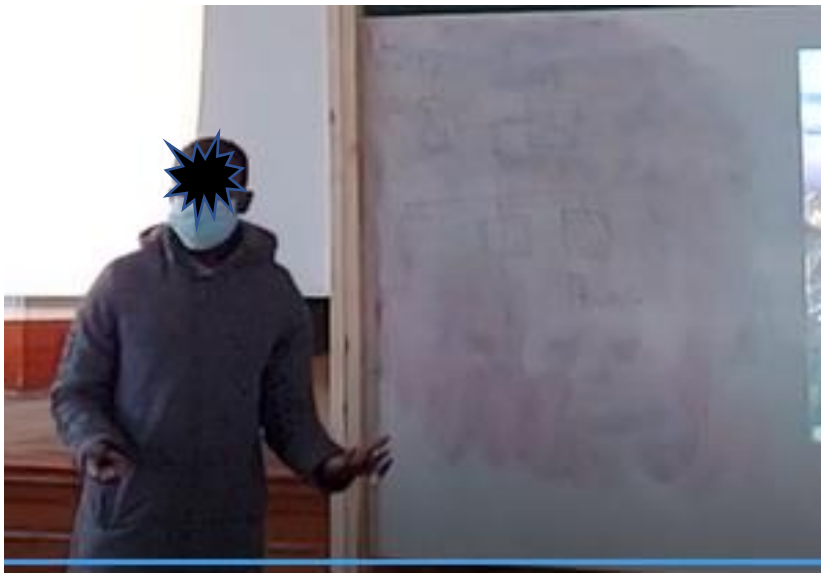
621. Mr. Zulu: Okay, there is no way that this couple can have a child that has albinism if there is no recessive allele, if for example this one was like this neh…and this one was like this okay.

622. Where they going to have any child with ahh…albinism, yes or not?

623. Ls: No!

624. Mr. Zulu: No! They were not, because each child was going to inherit a dominant allele and a recessive allele.

625. Then the recessive allele…



…was not going to show.

626. They were all going to be carriers neh…

…they were all going to be carriers right, lets erase this neh! [Erasing]

627. Right can you give me the genotypes for this one…yes, Elias… for this one with albinism what will be the genotype?

628. Elias: / ? /

629. Mr. Zulu: How can you say that there is dominant A, if it is a person with albinism?

630. Elias: Recessive a, recessive a.

631. Mr. Zulu: So, recessive a, recessive a.

632. So, the genotypes will be like this [showing] these will be the alleles of the individual okay.

633. So, we are always sure…

…of the alleles of the individual that is affected.

634. The only alleles that we will not be sure of are these two.

635. We cannot be sure okay.

636. We cannot be sure; it can happen that maybe this one will inherit only dominant A okay.

637. Like this [showing] it can also happen that this individual inherited a dominant A and a recessive a…recessive one.

638. Remember, these alleles come from the mother and father…

…right so, we are not sure of this…of these two.

639. So, their allele can be like this but there is no way we can have recessive alleles here because they are not shaded meaning they do not have albinism, okay do you have any questions?

640. Raise your hand and ask before I give you an activity right… [silence]

EPISODE 6: LEARNERS SOLVING GENETIC PROBLEMS ON LINEAGES

641. Right, pages ninety-six to ninety-seven okay.

642. You must do that activity, solving genetics problems on genetic lineages right, can you do number one.

643. Then we will do the question together / ? /.

644. If there is anything confusing, raise your hand and I will assist.

645. Thakalane: / ? /

646. Mr. Zulu: Yes!

[Learners writing]

EPISODE 7: DISCUSSING/REVISING GENETIC PROBLEMS ON LINEAGES

647. Mr. Zulu: Ehh…it was mentioned that for a person to be normal a square or that circle must be clean and anything that is shaded there is a disease.

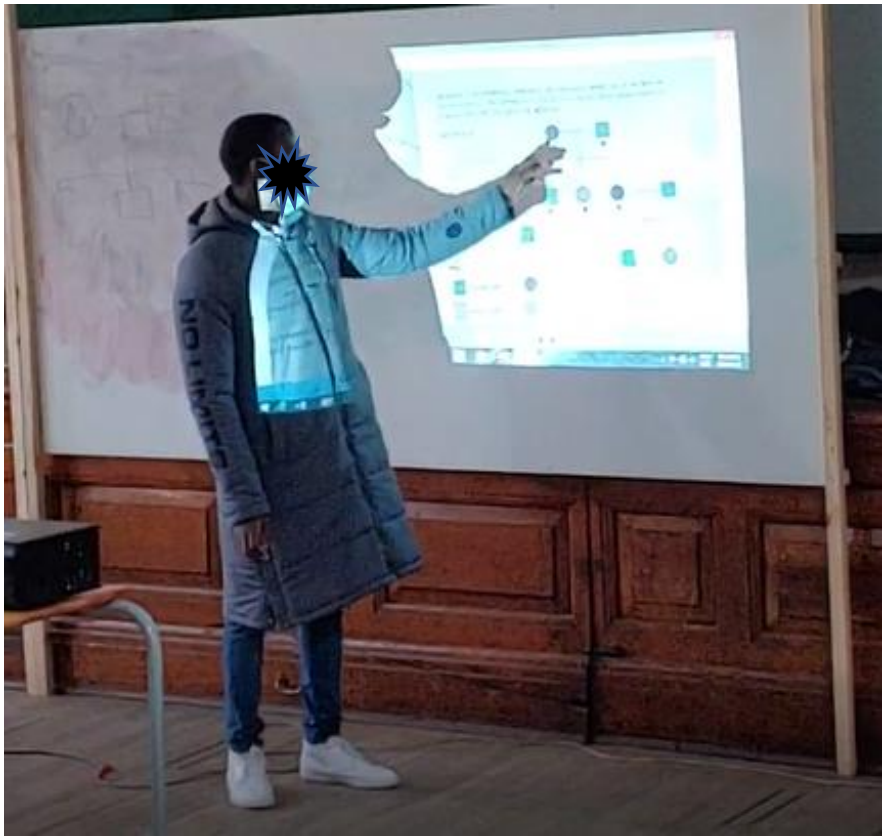
648. So, it is very important to read the question and check for any extra information that is given.

649. Just like here we have a key, so this is a normal male.

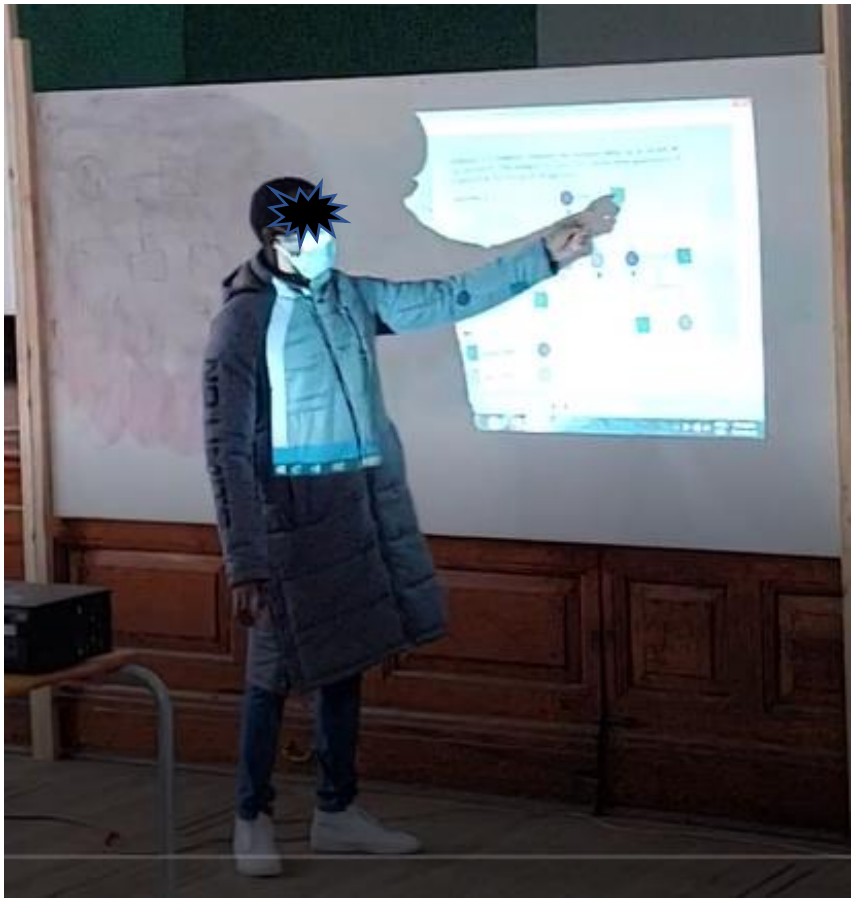
650. We are told that a normal male is grey in colour ehh…then albino male ehh…it will be this colour, I do not know what this colour is but let us just call it light green.

651. Then we have the normal female and then albino female will be this colour right.

652. So, our first generation, if we look at our first generation, we have a normal female…

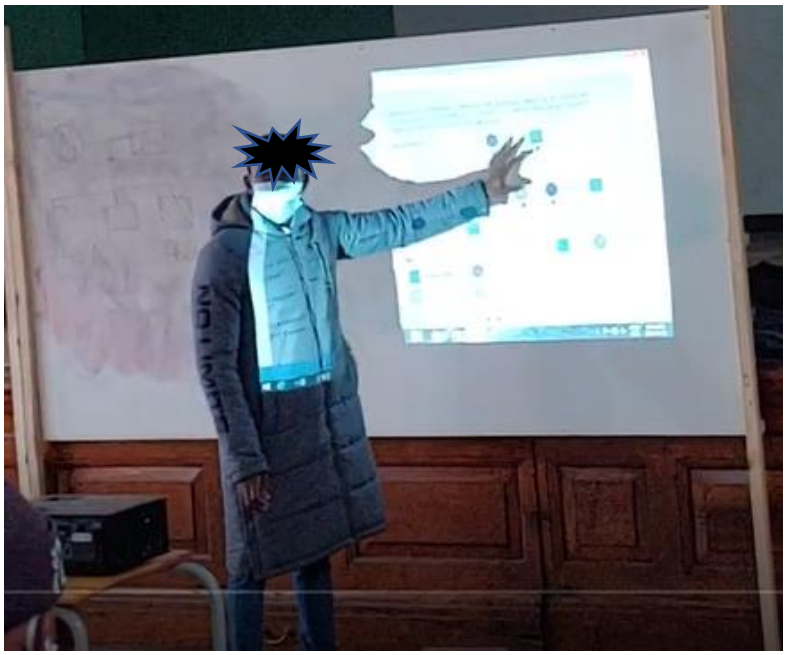


…and a normal male okay.



653. Second generation we a normal female…

…and a normal male okay but ehh…they are from this one,



…one, two, three they are from this same family and we can see that this meets this one from a different family and have a child.

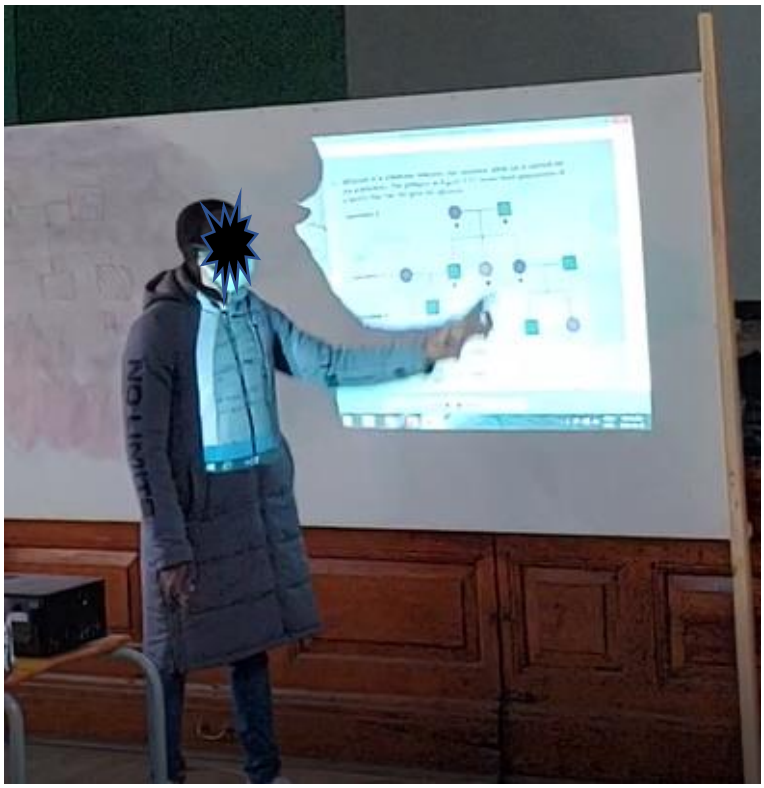
654. Right, this one does not meet anyone,

…but we got this one…

…meeting this one…meeting this one from a different family and we can see that we end up having ehh…two right, and this one

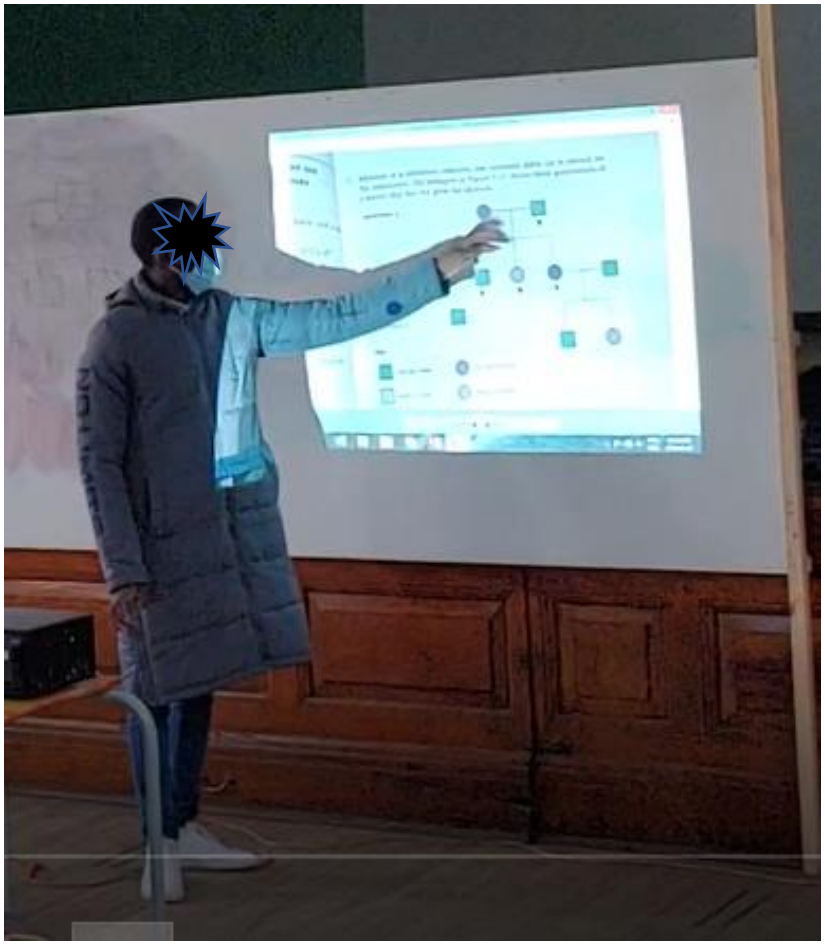
…has albinism.

655. This one…

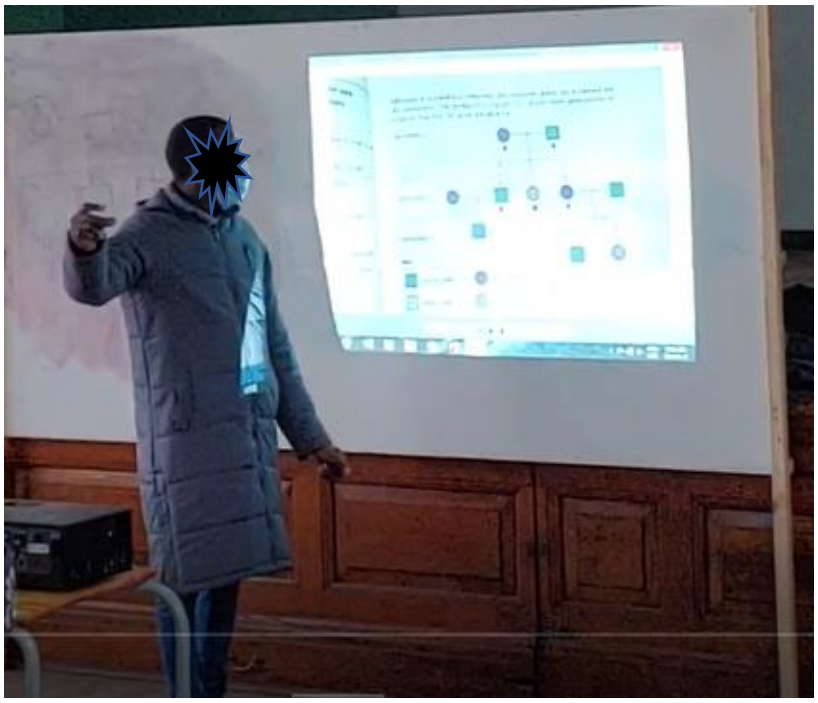


…also has albinism.

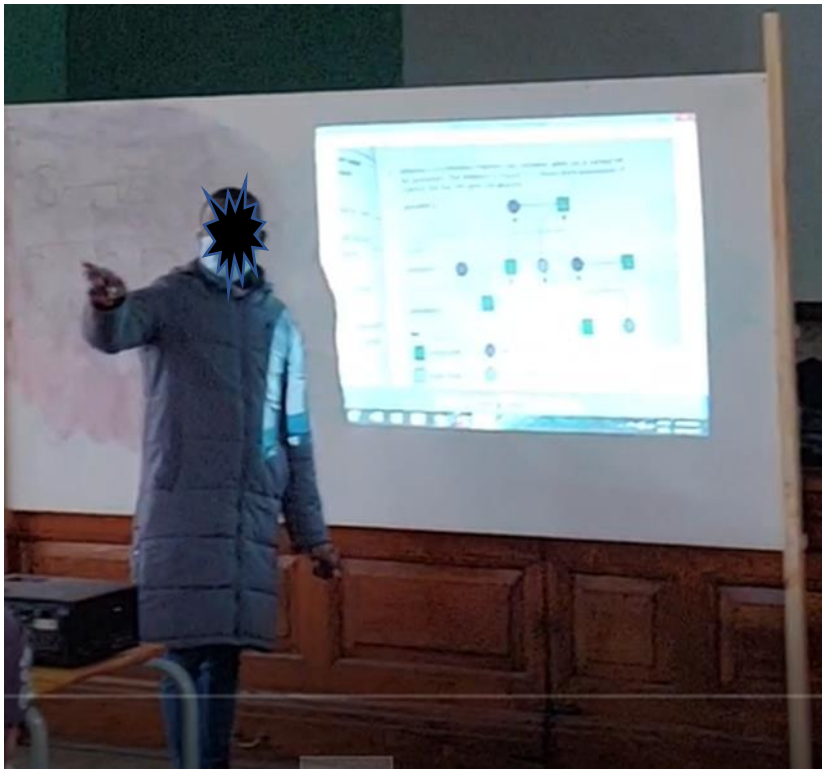
656. Right, ehh…boys you can guess ehh…the genotypes for these two…



…ehh…



…Joel!

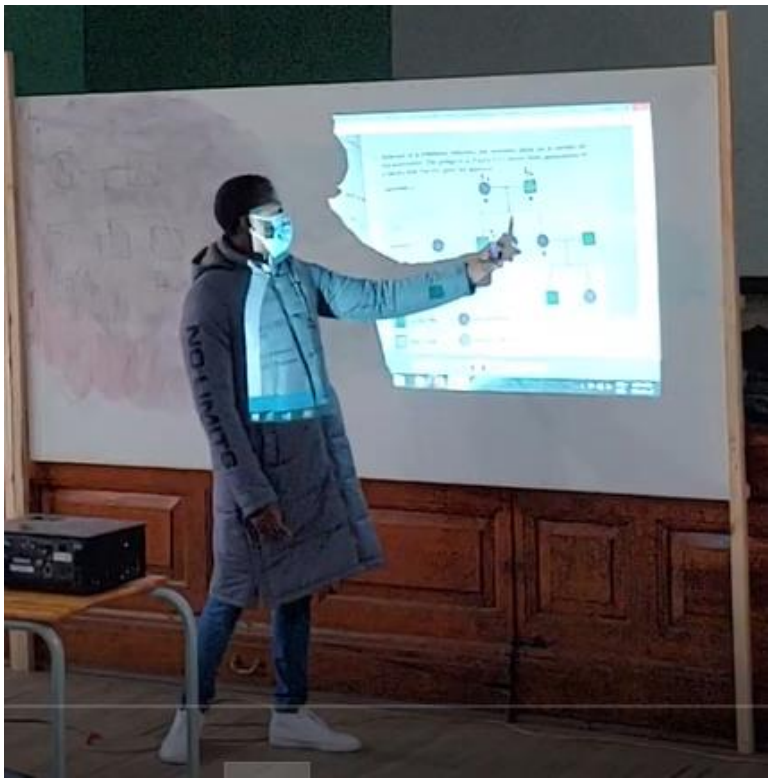


657.	Joel:	Sir, it is a dominant A…
658.	Mr. Zulu:	Yes!
659.	Joel:	…and a recessive a.
660.	Mr. Zulu:	So, you are saying that it will be …a dominant…
661.	Joel:	A and a recessive a.
662.	Mr. Zulu:	Yes, and then here?
663.	Joel:	It is the same.
664.	Mr. Zulu:	It is the same thing. Boys does it make sense?
665.	Ls:	Yes!
666.	Mr. Zulu:	Right! There is no way neh…

…that they can have a child with albinism if their genotypes are not like this neh!

667. So, it was easy to guess this one.

668. Right, then for this one,



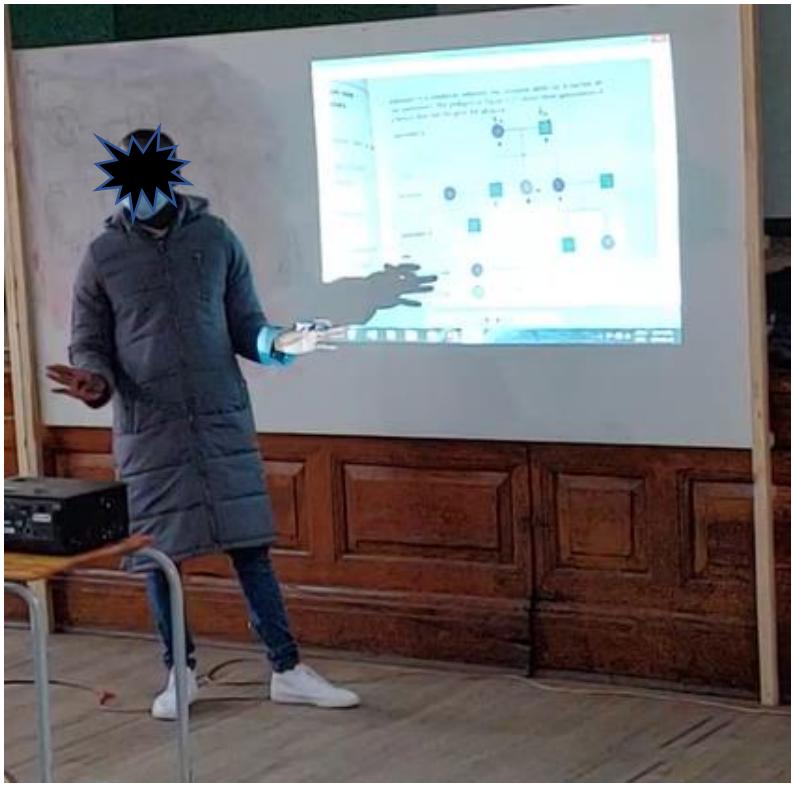
…what will be the genotype…ehh…

…Elias!

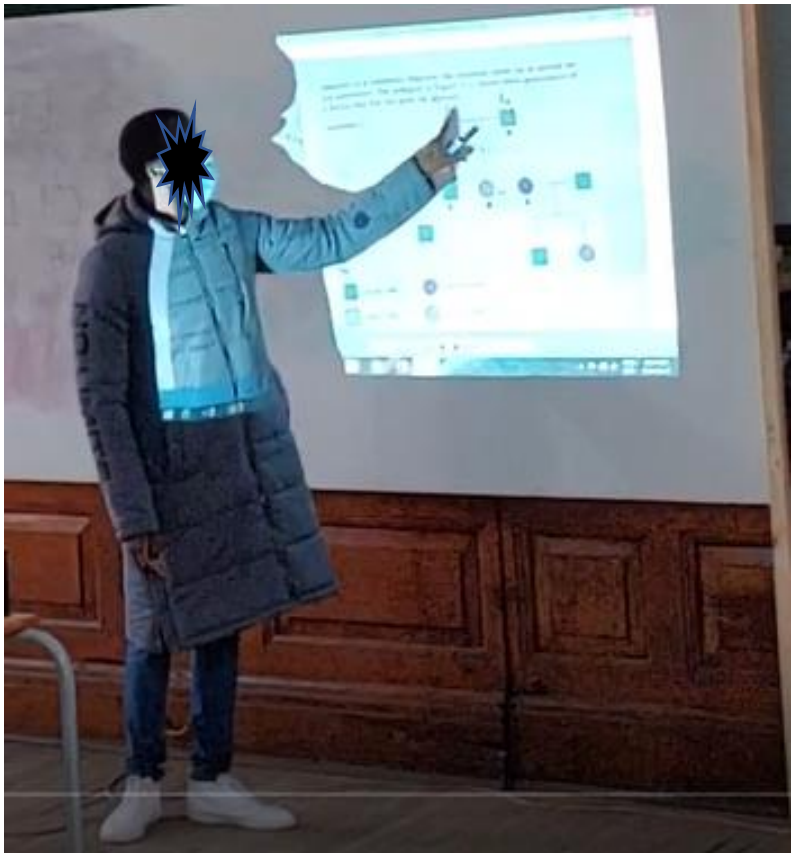
669. Elias: Recessive a and recessive a.

670. Mr. Zulu: It will be recessive a and recessive a.

671. Okay we are not sure about this, all that…those that show as normal we are not sure of their genotype…

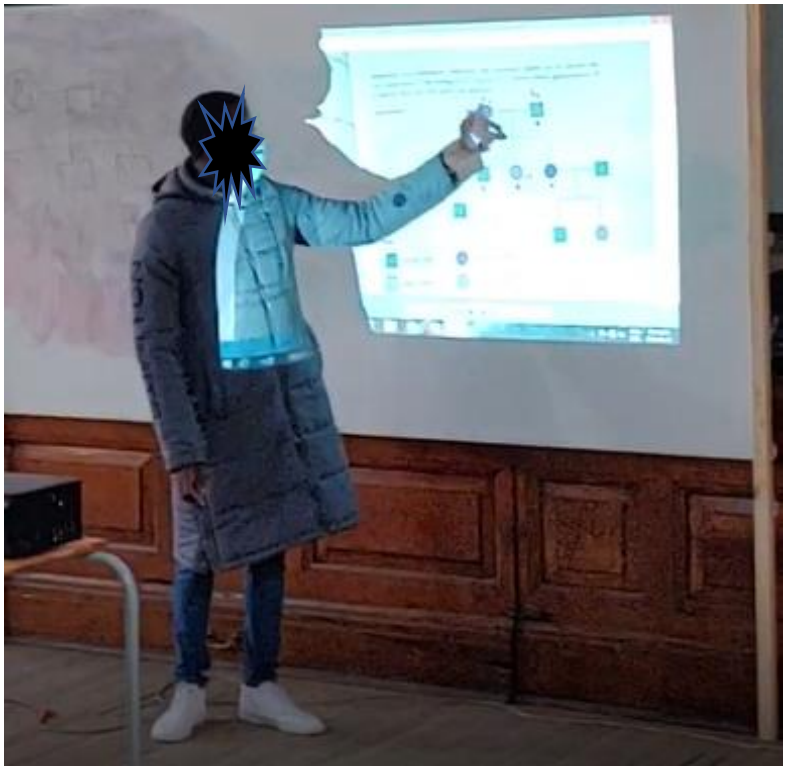


…because it can happen that they only inherited the dominant one.

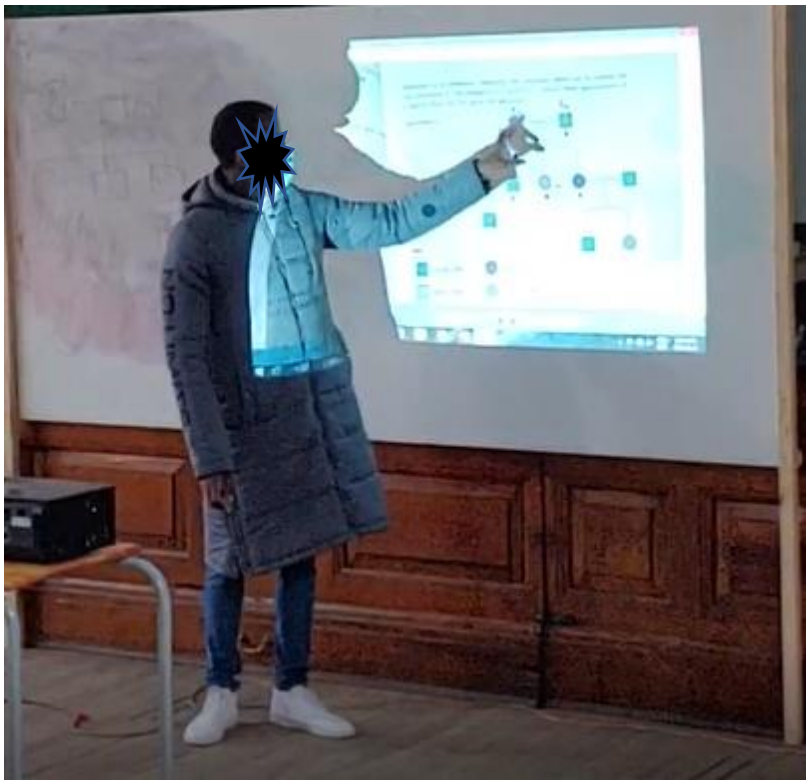


672. It can happen that it is a dominant and a recessive one.

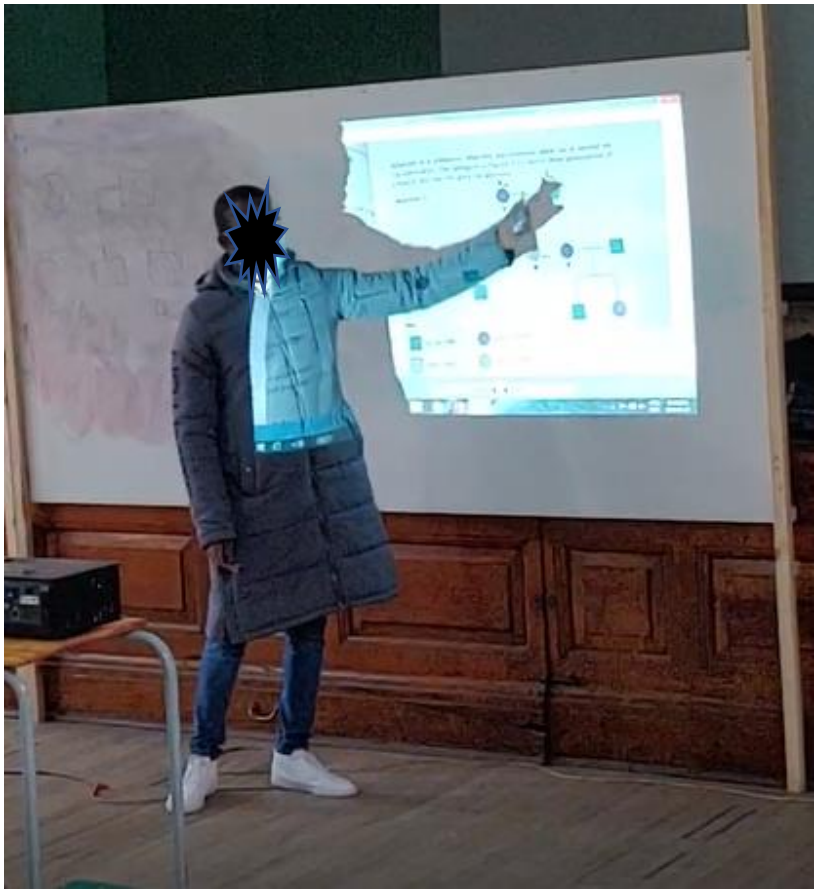
673. So, that is why it is showing as recessive…so we can conclude that...



…the female here…



…and male…



…were carriers okay.

674. Remember…

…a carrier is normal, that is why it is normal here, normal female, normal male okay because the albinism does not show / ? /.

675. Alright so, we can only guess these ones okay and then for this person…

…whatwill be…the genotype?

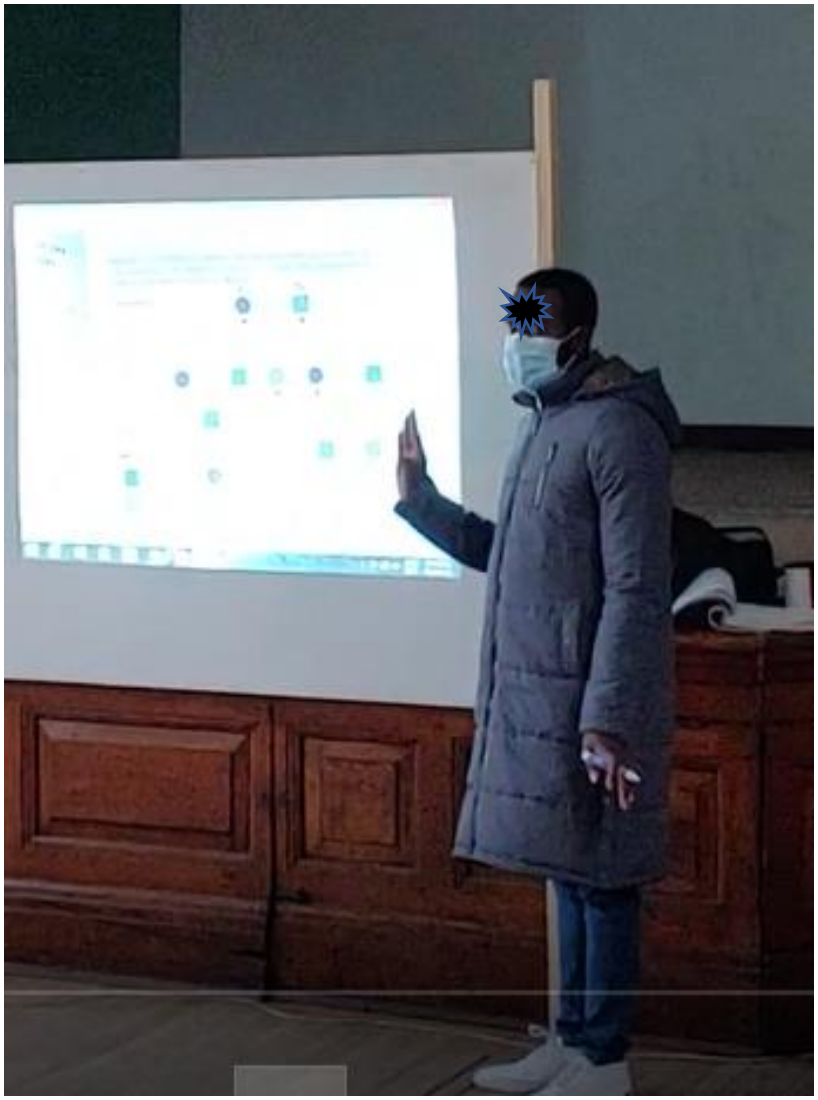
676. That boy there,

…chief, Sinenhlanhla, the phenotype for this one?

677. Sinenhlanhla: Recessive a.

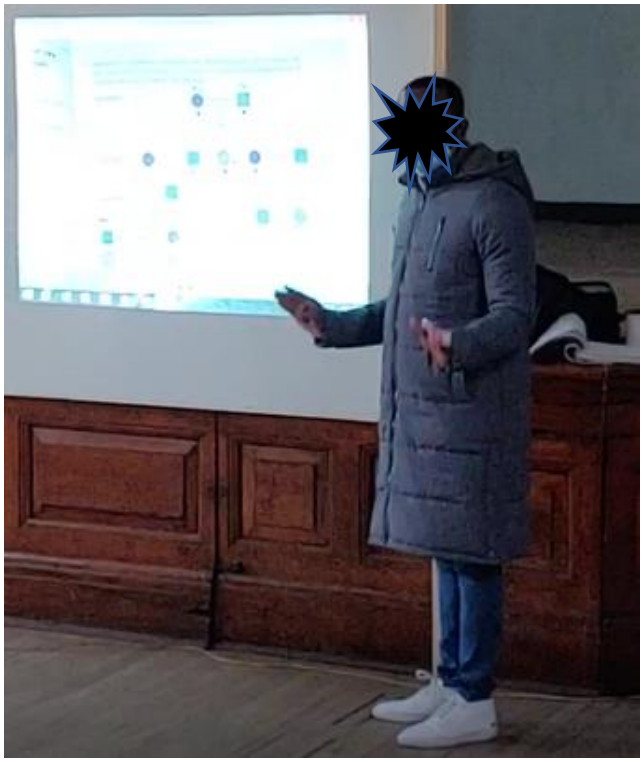
678. Mr. Zulu: Recessive a and recessive a neh… so, it will be like this [showing].

679. Do we all agree?



680. Okay, yes boys it is easy to guess these ones…not to guess.

681. We are not guessing; we are sure…



…because this one…

…has albinism and for a person to have albinism both alleles must be the same okay.

682. That is why we can get this one.

683. Okay, and again we can get the alleles for this one okay because these are their offspring okay.

684. So, what will be the allele for this one?

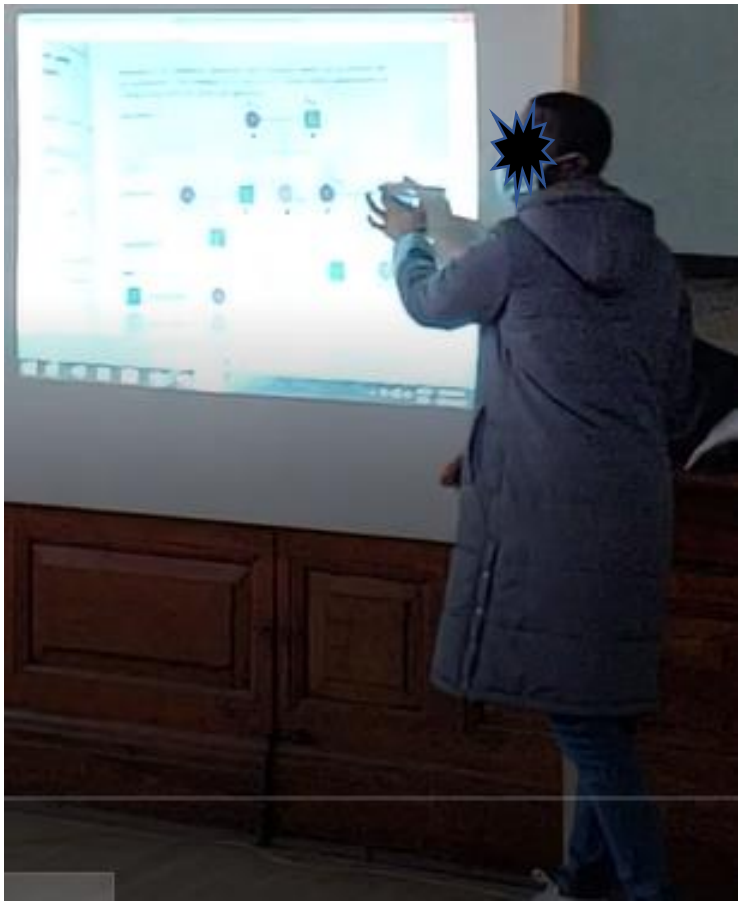
…Amandla!

685. Amandla: Which one sir?

686. Mr. Zulu. This one!

687. Amandla: Sir, it can be-- can be dominant A and…
688. Mr. Zulu: Dominant A.
689. Amandla: Dominant A.
690. Mr. Zulu: Dominant.
691. Amandla: No! Recessive a.
692. Mr. Zulu: Recessive a okay.
693. This one is wrong.
694. There is now way that they can have a child with albinism if ahh…the alleles are homozygous dominant neh!
695. So, one must be [erasing board] recessive.
696. Right, so this one is wrong. [Showing]

697. Okay what about this one?



…John!

698. John: Dominant A and a recessive a.

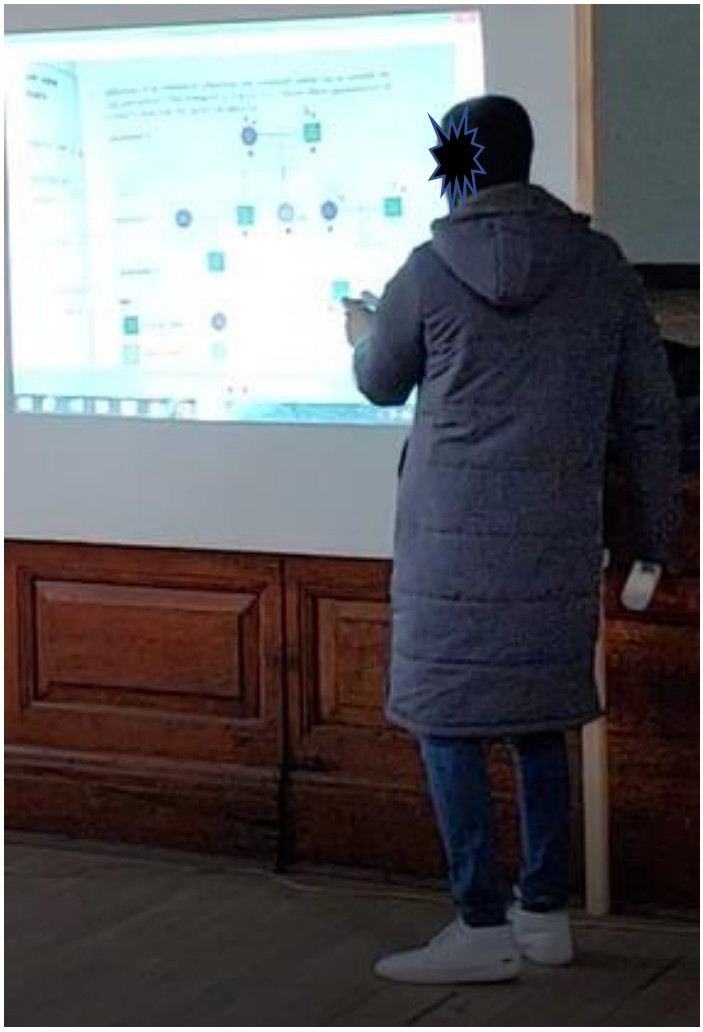
699. Mr. Zulu: Dominant A and a recessive a okay.

700. There is no other possible…

…allele for these two because they have a child with albinism, and it means that ehm…they are heterozygous neh…okay.

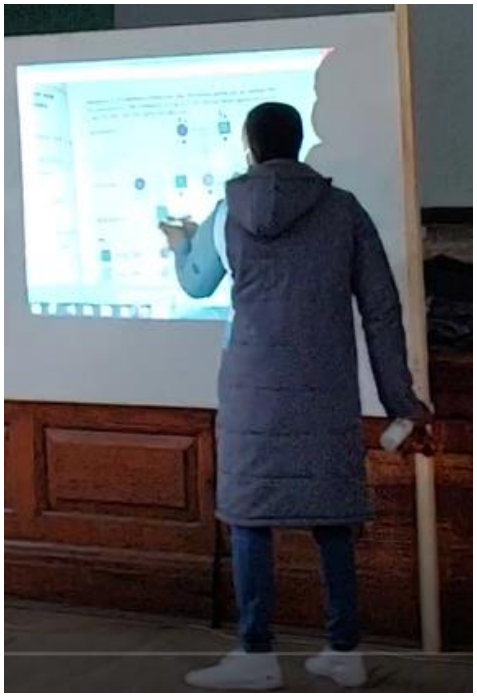
701. So, they are carriers, these two neh!

702. The only one that we do not know here is this one…



…okay we are not sure.

703. Okay, it can happen that this person only inherited [showing]



…this or it can happen that it is like this neh!

704. It is the same thing that these three, with this one we cannot be sure but with 1, 2, 3, 4, 5, 6 we are sure okay.

705. Does it make sense?

706. Right now, let us look at the questions.
Number one or a) it says, are the grandparents of the third generation…heterozygous or homozygous? Ehh…Sello!

707. Sello: Heterozygous!

708. Mr. Zulu: Heterozygous, do you agree?

709. Ls: Yes!

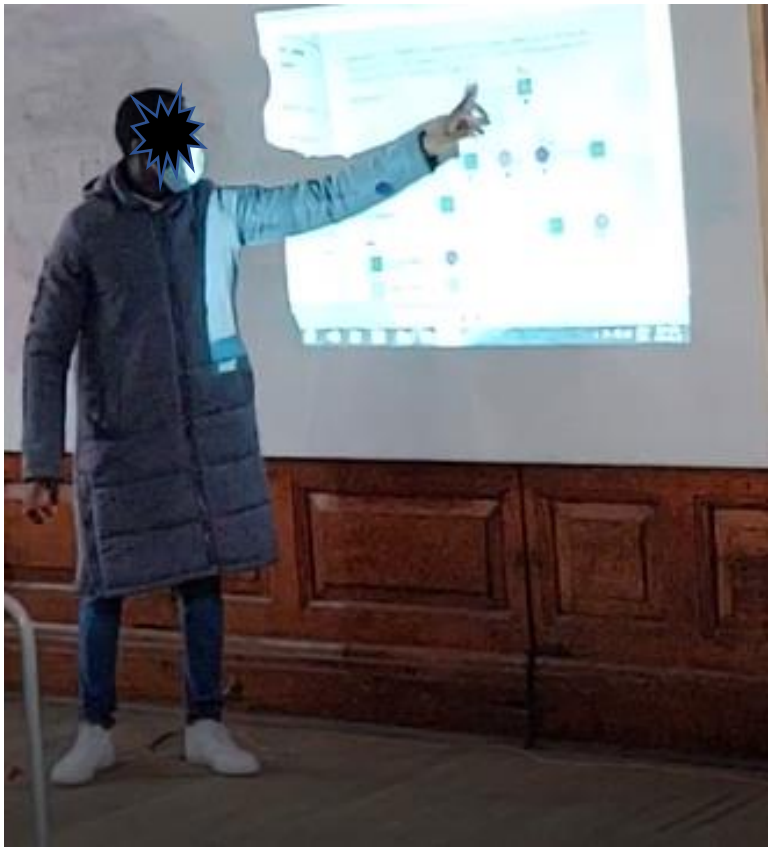
710. Mr. Zulu: Right third generation neh!

711. This is the third generation [showing]

…and these will be their parents…

…and the grandparents neh!

712. Right so, you can all see this is homozygous neh…



…this is also heterozygous.

713. So, the grandparents are heterozygous.

714. Let us move to b); ehh…explain your answer in a) … explain your answer in a) Moore!

715. Moore: Because the alleles are not the same.

716. Mr. Zulu: The alleles are not the same ahh…no!

717. That is not how you should explain that neh!

718. Remember we are tracing…

…this allele for albinism.

719. It means that both parents are heterozygous. Yes! [Pointing to a learner]

720. Thabani: I think because both parents are carriers.

721. Mr. Zulu: Both parents are carriers…okay it is partially correct. Yes!

721. Sinenhlanhla: Because of the three children one has albinism.

722. Mr. Zulu: Ehm.

723. Sinenhlanhla: Because out of the three children, one has albinism.

724. Mr. Zulu: One has albinism remember; you are explaining that heterozygous situation of the grandparents.

725. Sinenhlanhla: Yes!

726. Mr. Zulu: Okay because they had…

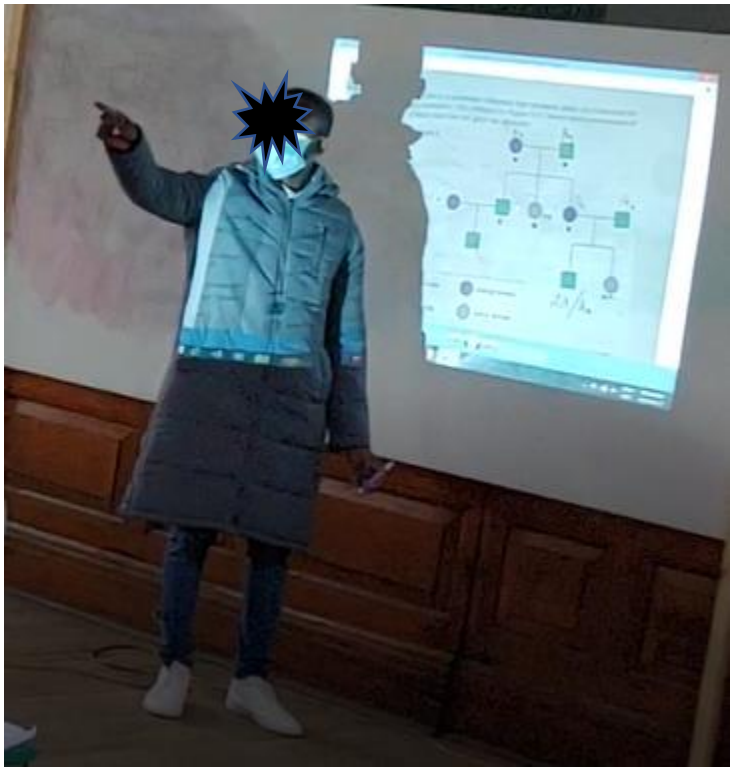
727. Sinenhlanhla: Because they had offspring that had albinism it means that both parents are hetero… heterozygous.

728. Mr. Zulu: Okay, we are looking at this generation neh…

…okay and we are saying that for this generation to have albinism, the parents must be heterozygous…

729. Sinenhlanhla: After the grandparents!

730. Mr. Zulu …and the grandparents must be heterozygous, okay I will take that one. Yes! [Referring to a learner]



731. Peter: Sir, they had recessive alleles that were hidden by dominant alleles.

732. Mr. Zulu: Sorry…they had …no, what do you say…okay remember boys you are just explaining the heterozygous situation.

733. Why are we saying the grandparents are heterozygous? Ehh…no! Tshepiso!

734. Tshepiso: / ? /

735. Mr. Zulu: But we are not given that remember this is what we did…

…we are not given that. Yes! [Referring to a learner]

736. Yash: / ? /

737. Mr. Zulu: Yah…ehh…

738. Yash: / ? /

739. Mr. Zulu: Yah…ehh…chief, man I am not sure I understand, or I understood what you are saying here but you are saying that this person…

…has albinism?

740. Yash: Yes!

741. Mr. Zulu: Okay so, it means that…okay sorry.

742. Yash: Sir / ? /

743. Mr. Zulu: Yes!

744. Yash: / ? /

745. Mr. Zulu: Yah…

746. Yash: / ? /

747. Mr. Zulu: Oh yes! That is correct okay.

748. So, the main part is just about D here [showing]

…because d is recessive it means that the parents okay must be heterozygous although they look normal.

749. They must be heterozygous okay that is why we ended up having this one…

…who is what…has albinism and it will be the same thing.

750. You can use E…

…you can say that E is also heterozygous because of the child…

…who has albinism okay.

751. So, yes that is the correct answer okay, the central point is D here okay. Yes, Yash!

752. Yash: Sir, you see the…/ ? /

753. Mr. Zulu: Oh, they are part of the third generation, this is the third generation.

754. This family…they are part of that.

755. Okay it is just that they are from a different couple.

756. Yash: No! I mean this one why is it that they are not aligned.

757. Mr. Zulu: Hoo, oh! It does not have to be…they do not have to be aligned okay but thina [us in IsiZulu] we can make conclusions.

758. We can see; this is the second generation…

…okay.

759. So, it is just the way they did the diagram okay for example if they do not have this line here it was going to somewhere here.

760. Right so, we can see that this is the third generation from…

…this family okay.

761. Ahh…I am not sure if you are answered.

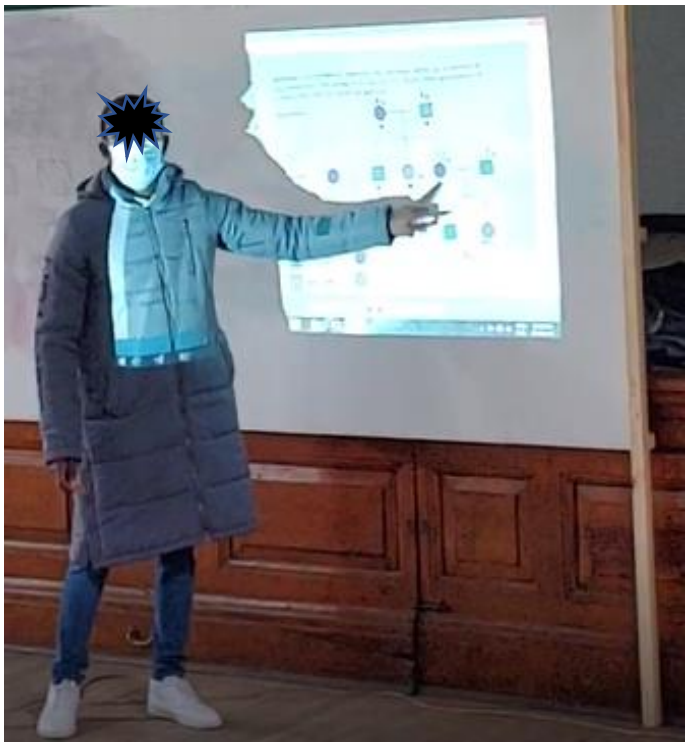
762. Yash: Yes!

763. Mr. Zulu: Right, we can move on now?

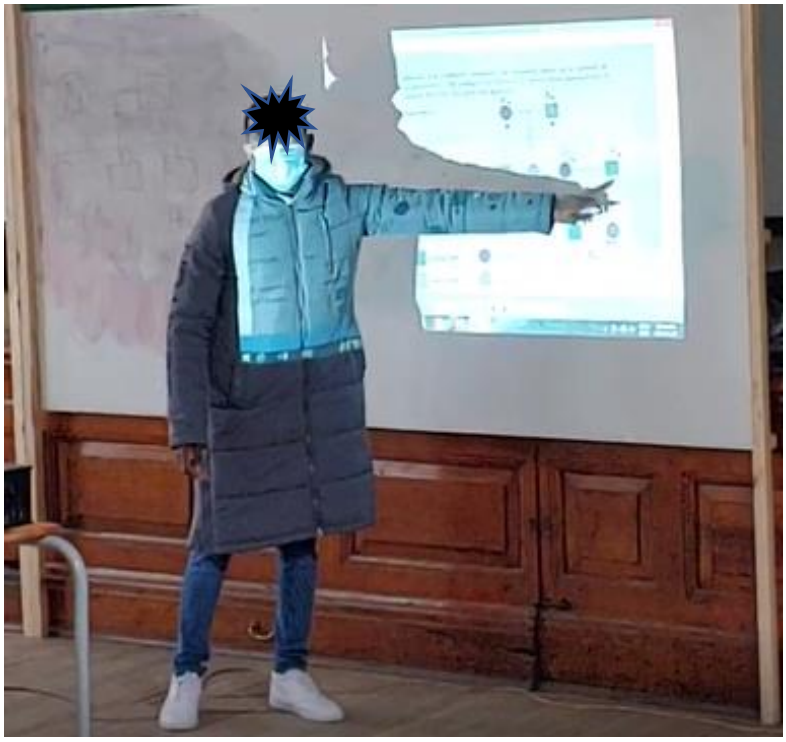
764. Right, we are using D because we can see that the grandparents…gave birth to someone…

…with albinism.

765. Right, and again E…



…ahh…with her husband,



…they have a child with albinism neh.

766. This is why we are saying that these ones are heterozygous neh…okay.

767.		Ahm…"c) give the genotype of the people labeled D and E"… Amandla!
768.	Amandla:	Sir D is recessive a, recessive a.
769.	Mr. Zulu:	Yes! We have already done that, thank you.
770.		So, its recessive a, recessive a, dominant A and a recessive a. okay so, we are done with that.
771.		Please make sure that you mark neh!
772.		You can see that mark allocation…it is one, number two is three marks.
773.		Not number one in fact a) is one mark then b) is three marks and then c) is two marks okay.
774.		So, it means it is one mark for d) then another for e).
775.		Then e); "if a person D is married someone who is homozygous for the dominant characteristic for normal skin colour, what is the percentage chance of them having a child that is…that has albinism".
776.		Okay what is the chance?
777.		Right we are saying this person now marries someone who is homozygous for dominant alleles for a normal skin neh…homozygous.
778.		Right, can we get the alleles for…

…normal skin? Yes! It is…

779. Ls: / ? /

780. Mr. Zulu: Yes, because we are told that it is homozygous…it means that they have to be same neh…and we are told that D…individual D…we have alleles for individual D and this is the homozygous both for recessive allele neh! [Writing]

781. Right so this individual marrying this person who is normal ehh…who is having a normal skin okay, does it make sense?

782. Then the question says [reading] “If a person D marries someone who is homozygous for the dominant characteristics for nor mal skin colour”.

783. What is the percentage chance of them having a child that an albino…it is supposed to say; that has albinism neh!

784. Okay we do not use albino. Yes!

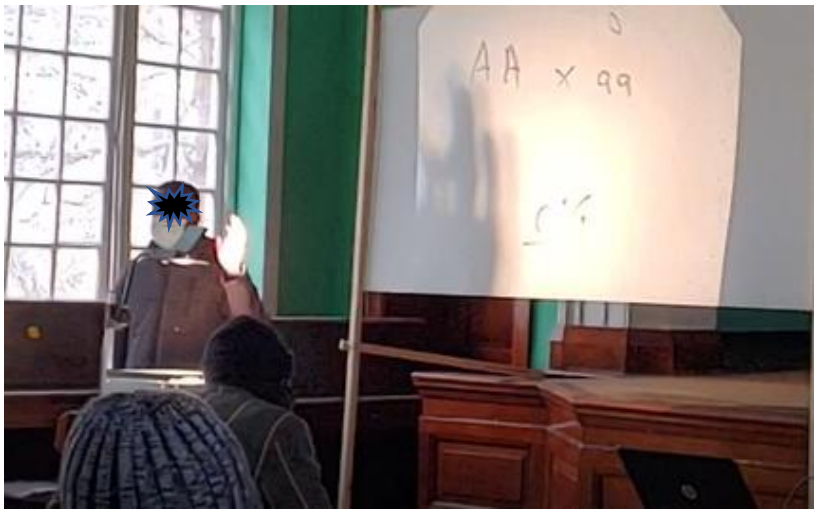
785. Amandla: Zero percent!

786. Mr. Zulu: It is zero percent, remember I said that with the chances, you can have zero, you can have twenty-five, you can have fifty, you can have seventy-five or hundred percent.

787. Alright so, we have this answer, do you all agree it will zero?

788. Ls: Yes!

789. Mr. Zulu: If yours is different, please raise your hand.



790. Okay so, we all agree with zero neh!

EPISODE 8: PROVING WHY PERCENTAGE CHANCE IS ZERO

791. Okay so, let us just try and find out why it is zero.

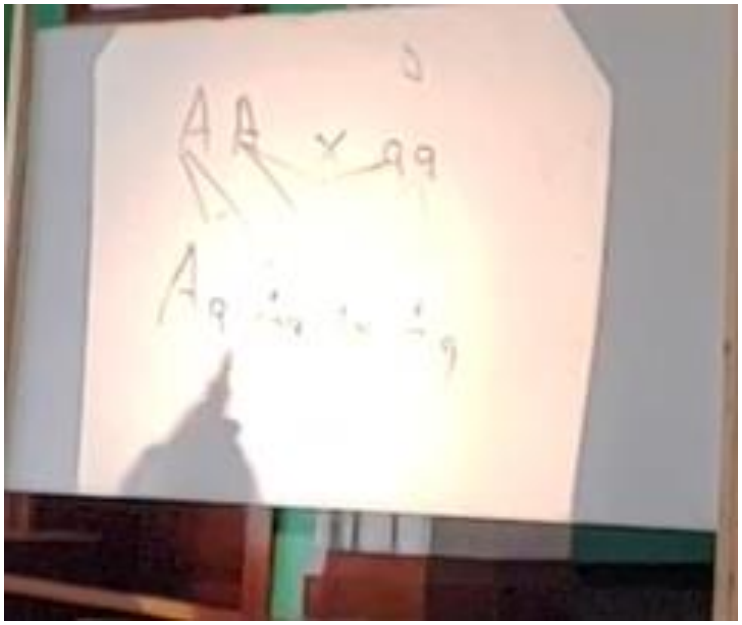
792. Right, remember if you are doing your crossing, you must follow all the steps neh!

793. Okay, can you see that now we are linking these genetic lineages to monohybrid crosses.

794. Right so, you know that you must have the gametes…you must have everything boys!

795. The steps are very important; you will be marked wrong if you do not follow the steps neh…but we are not going to follow the steps because ahh…I am explaining neh!

796. So, we will have this one and this one which will give us…dominant and recessive a then it will be this one and this one. [Writing]



797. It will be dominant and recessive a. you still remember how to do this neh!

798. Right, and then we have this one and this one and it will be like this.

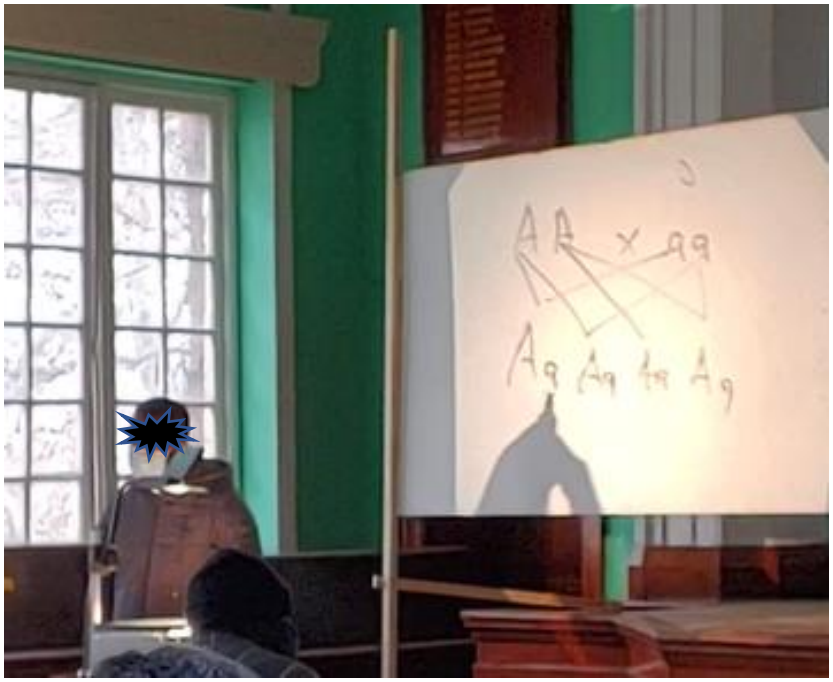
799. Can you see?

800. All of them are carriers neh!

801. All their offspring will be carriers.

802. We are not going to have anyone that is hundred percent normal okay.

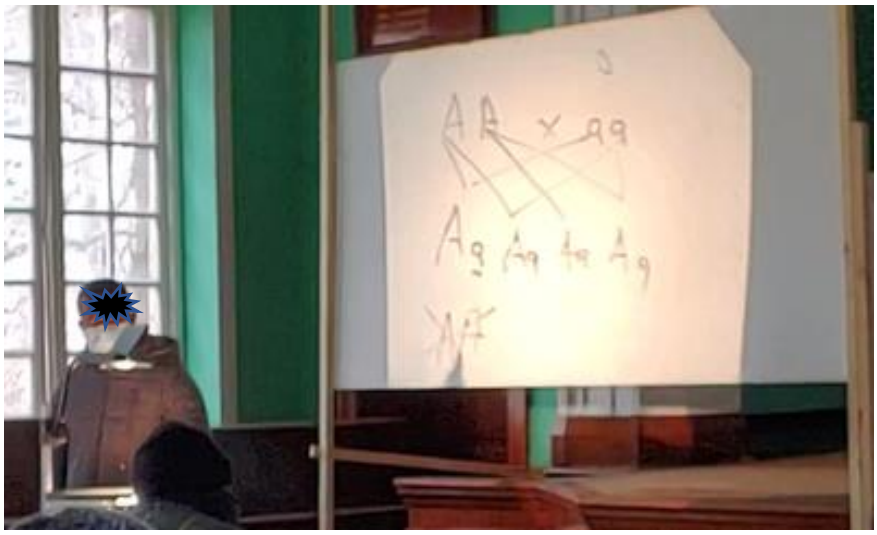
803. They will look fine if you look at their skin…they will look just like anyone but then they have that allele…



…okay.

804. There is no one that is going to be like this in this family [showing].

805. There is no one [showing] that is going to be like this…



…there is no one that is going to be like this…

…in this family.

806. They are all like this neh!

807. So, that is why the chance is said to be zero okay.

808. So, that answer is correct, thank you!

809. Now let us move now onto…okay it is one-mark neh!

810. So, for saying zero percent or zero it is one mark, “e); suggest a reason for your answer above”.

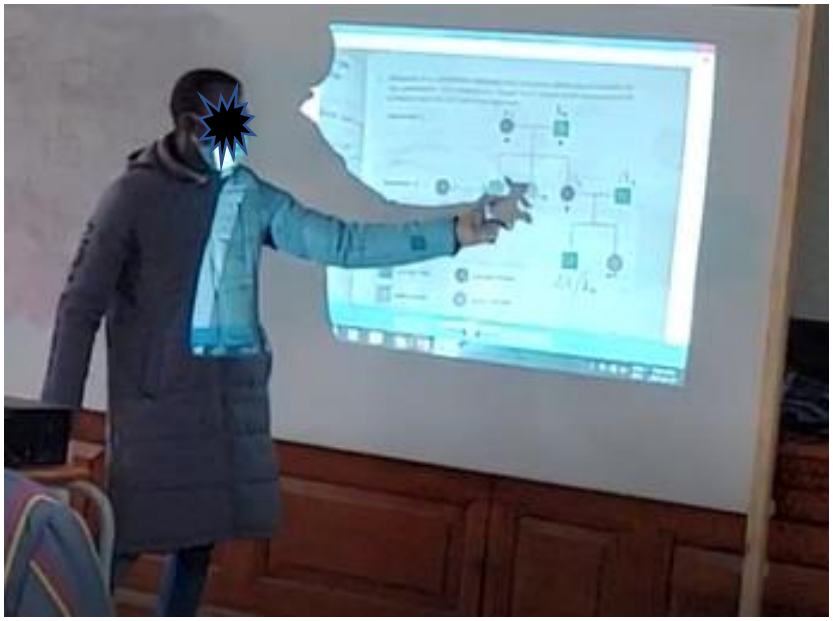
811. Okay so, the reason is related to this neh!

812. So, what will be the reason?

813. Amandla: The reason is that the above allele is dominant, it is going to mask the recessive allele.

814. Mr. Zulu: Yes! That is correct!

815. The male that will marry this person…



…is having dominant alleles only okay.

816. So, these dominant alleles will mask the recessive alleles and then all their offspring will then be normal or become carriers neh!

817. Right so, that will be three marks.

818. So, the total here is…it is ten neh!

819. Then just write your mark out of ten.

EPISODE 9: CHECKING TOPICS COVERED

820. Right boys, did we cover mutations with this class?

821. Mutations ehh…/ ? / biotechnology, genetic engineering…did we do that?

822. Alright so, it means we covered it with the other class neh!

823. Ehh…right we have about four minutes ehh…right, before we move to…did we do paternity testing using ehh…blood groups?

824. Yes! No! okay I only taught this class for one-hour last time neh!

825. Oh! Okay that is. okay let us just cover that and then [something drops] ehh…today is Wednesday, then Friday we will be doing 'responding to the environment in animals.'

826. We will be looking at the human brain, the spinal cord and ehh…the neurons neh!

EPISODE 10: ASSIGNING HOMEWORK

827. So, your homework is on page ninety-seven.
828. Study the pedigree diagram in figure 5.18 that traces the inheritance of haemophilia.
829. So…haemophilia again but now you are using a pedigree diagram.
830. You will do that one neh, that is number two.
831. Number one was your classwork…it is up-to page…ninety-eight, questions; a) to c) ehh…it's just three questions that you must answer neh!
832. Okay that will be your homework, please make sure that you do it.
833. Yebo [yes in IsiZulu] we did this one?
834. Ahh…boys…ehh…did we do paternity testing using blood tests…I mean blood groups?
835. So, we did that one neh…alright, thank you! [Erasing board]
836. So, it is just genetic engineering neh…the only one we did not do neh!
837. Okay, let us just try to cover that one.
838. It will not take us more than ten minutes.
839. Then we will leave, let us just wait for it to respond neh! [Referring to computer].
840. Right, 'genetics and mutations' disorders neh!
841. Boys, you know what a mutation is? Yes! [Referring to a learner]

842.	Tanatswa:	[The change, sir in the genetic…]
843.	Mr. Zulu:	Change in the genetic…
844.		Okay in the genetic sequence…is it what you wanted to say?
845.	Tanatswa:	Yes!
846.	Mr. Zulu:	That is correct, a mutation can be any change in the genetic sequence.
847.		When you say the genetic sequence for example [bell rings] ehh… boys let us just finish with this neh…then we leave.
848.		Right ehh…let me check how many slides we have here [checking]
849.	Ls:	We did this!
850.	Mr. Zulu:	We did this?
851.		Ahh…boys.
852.	Ls:	[Laughing]
853.	Mr. Zulu:	Okay, so … right ehh…we will just look at genetic engineering ehh…on Friday.
854.		It will not take us more than 5 minutes.
855.		It is something very simple.
856.		We did that in grade 10.
857.		Cloning of the sheep, Dolly the sheep.

858. You still remember that?

859. Okay so we are going to do it again.

860. Only 5 mins then we move to ehh… ‘responding to the environment in plants.’

861. You can leave thank you!

END!