Full lesson transcript for Mrs. Durand of school A

Lesson 3: Genetics and Inheritance

Genetic crosses

1 July 2020.

Details

- This lesson transcript represents 45.25 minutes teaching time.
- A South African female white teacher was teaching the topic meiosis 25 male and female student participants, all in grade 12.
- The lesson took place at a former model C co-educational High School in Johannesburg East district in Gauteng on 1 July 2020.
- When used by the teacher, the learners' names have been changed to protect anonymity.
- The textbook utilised during the lesson is Understanding Life Sciences Grade 12 Learner's book published by Pulse Education Services.
- Used PowerPoint, coloured markers and white board.

Transcription conventions

Symbol	Signification
T:	A verbal contribution belonging the teacher
L:	A verbal contribution belonging to any individual learner
Ls:	A verbal contribution belonging to two or more learners
…	Noticeable pause of less than 1 second in a turn, which could be due to reformulation or hesitation
—	Sound abruptly cut off e.g false start Truncated word Formal made shorter e.g S-
/ /	Words between slashes show uncertain transcription (not clearly known or understood.
/ **?** /	Inaudible utterances

[ ]	Words in brackets indicate non-linguistic information eg [pause for 1 second] Laughter, throat clearing, smile, applause, sigh happily/ werily/deeply, contently, swallowing, nodding, shaking head dance or movement towards/away
( )	Parenthesis around tone units indicate words spoken in a sotto voice under one's breath (in a very quiet voice)
,	Slight pause
?	High rising intonation
.	Falling intonation at the end of tone unit
:	Colon following a vowel, indicates elongated vowel sound or extending length of sound e.g Die:d
::	Extra colon indicates longer elongation
↑	A step up in pitch/ high pitch (high quality sound)
↓	A shift down in pitch (low quality sound)
^	A caret indicating high pitch level e.g ^weird
-	Low pitch level
— —	Self-interruption or repair
abc	Best guess transcription
ALL CAPS	Utterance is louder/said with extra stress/emphasised compared with surrounding words
/	Rise tone e.g …saying something, /
\	Fall tone
V	Fall-rise-tone
Λ	Rise-fall-tone
CAPS	Prominent syllable e.g sOn or FAthEr

EPISODE 1: RECAP ON MENDEL'S LIFE HISTORY

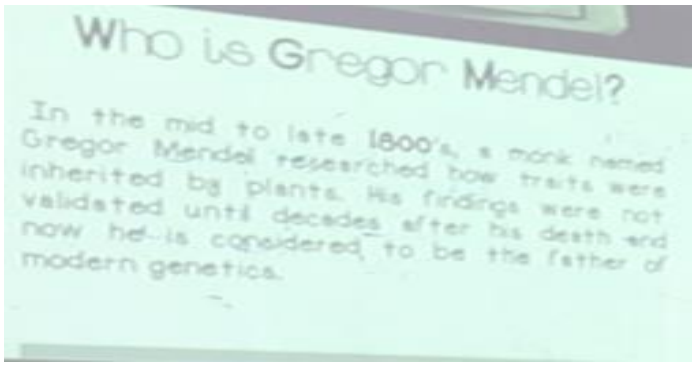
1. Mrs. Durand: You know that I told you, he was monk alright.

2. A monk is a priest who lives in a monastery and he is related to the Catholic church, you remember?

3. Alright ehm…so, so you see that you have a little box that is separate… it was on the side like this.

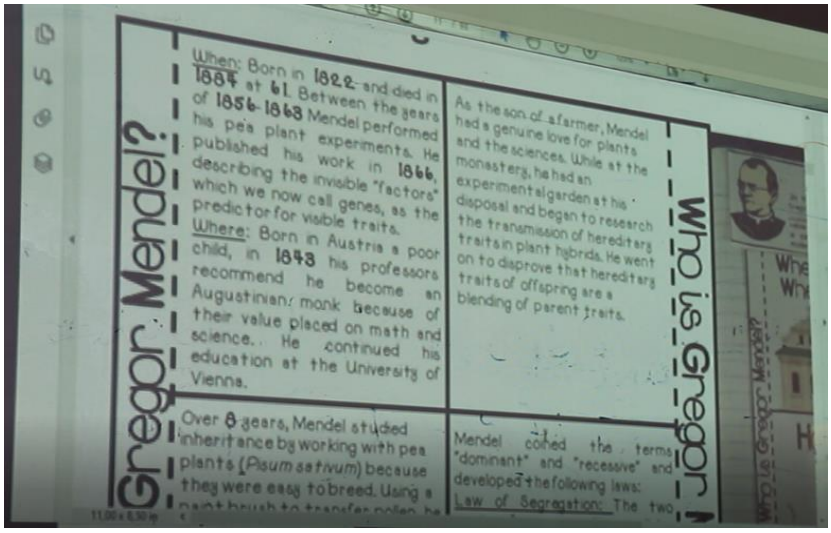
4. The word monk needs to go in there.

5.		He was in the mid to late eighteen hundred, he was born in eighteen twenty-two.
6.		So, he was born in the early eighteen hundred, okay.
7.		So, he researched traits…now what is a trait?
8.	Ls:	[Chorus]
9.		[Sitting] It is a characteristic and he basically researched those traits that you ehm…that plants would inherit.
10.		So, what…and I will go through his experiments again because it is quite important because they form the basis of what we are going to do now. [Standing up]
11.		Okay so, let us look at his life quickly.
12.		In fact, what I will do is, I will put the answers here that you can fill in.
13.		You need to read, PLEASE READ! [Looking for something]
14.		He was a monk, remember a monk lives in the monastery.
15.		A monk is a syllabit okay and the reason he became a monk is he was born in a poor family, that could not afford proper education for him.
16.		It was suggested that after his schooling, he goes into monastery and becomes monk and continue with his schooling. [Referring to slide]
17.		Come…it is going to come now [Slide on 'who is Mendel].



18.		He researched traits, I already said that a trait is a characteristic that a plant can inherit okay.
19.		He…his main study was on pea plants.
20.		[Seated] His findings were not valid until after his death, a decade later only alright!

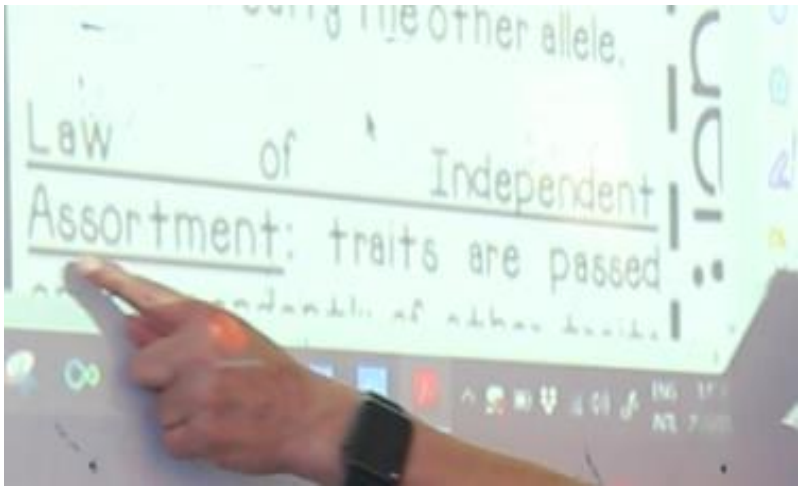
21. He is now called the ‘Father of Genetics’ because whatever he has done in actual fact forms the basis of genetics nowadays.
22. I already mentioned to you that his record keeping was such ehh…standard that always his experiments could be repeated and with hypotheses testing.
23. Let us also have a look…and I want you to change a word in your notes, I will tell you when to change it.
24. Here is his life history okay… [showing on the slide]



…born in eighteen twenty-two, died in eighteen eighty-four.

25. He was sixty-one years of ↑age.
26. He performed experiments on pea plants.
27. He published his work in ↑eighteen sixty-one.
28. We talk about invisible factors.
29. He basically at that time already said that there is something that is causing this inheritance but there was not a word to refer to it yet okay.
30. There was no word like genes, he said invisible factors, which off course are now known as genes.
31. As the…as the…ehm…[coughing] excuse me.
32. The factors being the predictable visible traits.
33. So already he said there is something causing the planta to grow the way they are. [Coughing]

34. Where was he born?
35. He was born in Austria and already like I said, it was suggested that he should become a monk.
36. Why was he mathematics and science?
37. He was very clever in mathematics and science okay.
38. There is something about him…him being a son of a farmer…
39. Okay you all got these first two boxes.
40. Do you want me …to try and make it bigger?
41. Ls: [Noise]
42. [Enlarging what is written in the slide] Alright!
43. Let me try and see if I can make it a bit bigger… like that, is it clear now?
44. Ls: Yes!
45. Mrs. Durand: Okay! [Silence]
46. Okay can I change?
47. Ahh…I mean…tell me to which point, I must stop. [Scrolling up the slide]
48. Ls: [Noise]
49. What is wrong?
50. I am doing what you are telling me to do.
51. ↑Right, there is one word you need to change. [Showing]



…that is…that word 'assortment' to what did we say in meiosis?
52. 'Independent arrangement' [showing] please draw a line through the word 'assortment' and write 'arrangement' in there.

53.		You are going to see; we are going to be looking at these models [sitting down]
54.	Ls:	Ma'am can you please go up?
55.	Mrs. Durand:	[Moving the slide up] More?
56.		I am not going any more, it is going to go off the screen.
57.		Where to?
58.	Ls:	It is fine. [Laughter]
59.	Mrs. Durand:	Please hurry up!
60.	Ls:	[Laughing and complaining]
61.	Mrs. Durand:	As a son of a farmer, Mendel had a genuine love for plants sciences.
62.		While at the monastery, he had an experimental garden at his disposal, and he began to research the transmission of hereditary traits…traits in plant hybrids.
63.		He went on with this proof that inheritance of traits in the offspring is a blending of parents' traits.
64.		Okay, you got that.
65.	Ls:	Yes, ma'am!
66.	Mrs. Durand:	[Going up] Okay…
67.	Ls:	[Noise]
68.	Mrs. Durand:	Listen! I do not-- I want you to stop your nonsense…you want to be an adult, now I will treat you like one.
69.		Then you stop acting like a kid.
70.		Okay, now there are two terms; dominant and recessive, I am going to go through them again.
72.		So, he…he actually had three laws and we will go through all the three eventually. We are going to…we will only go through them, when we talk about dihybrid.
73.		Okay, when we look a t two traits.

[Silence]

74. Ls: [Noise]

75. Mrs. Durand: Okay, can I change?

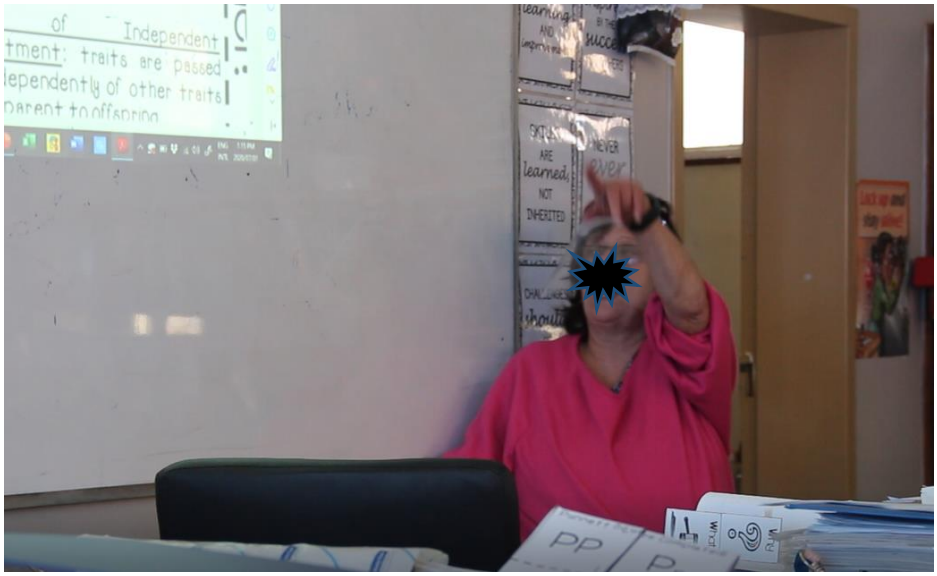
76. Ls: Yes!

77. Mrs. Durand: So, who is not here today? Alice…

78. Precious: …and Africa.

79. Ls: Kensani Africa.

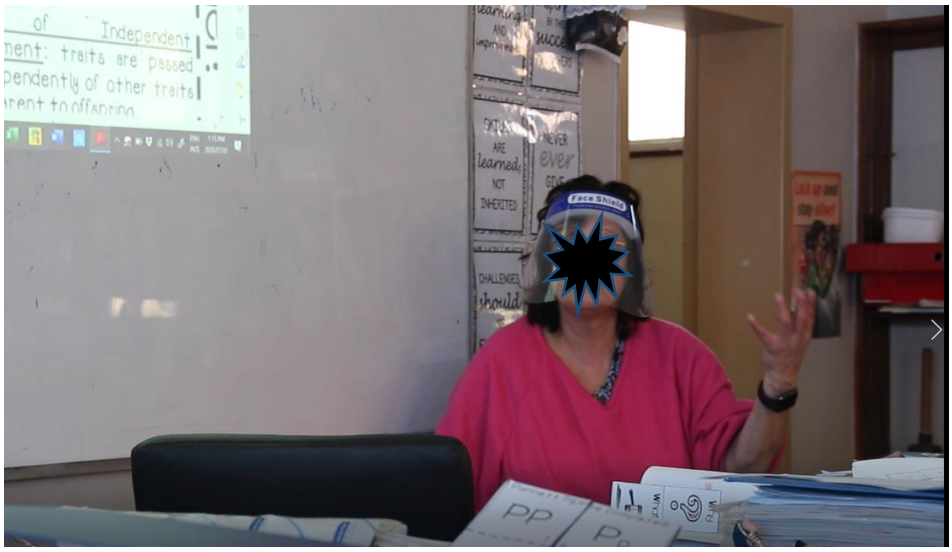
80. Mrs. Durand: Right, please have a look at that ehh…first paragraph.



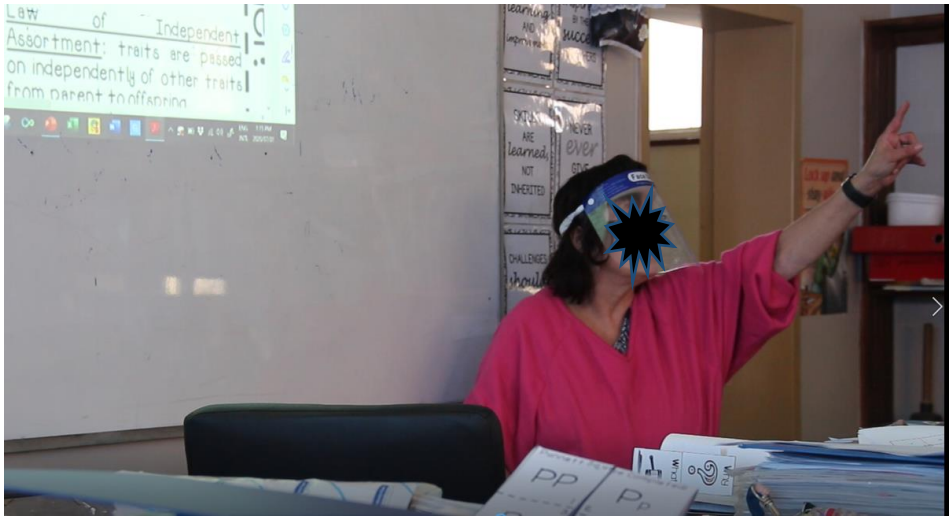
81. The second one says nearly twenty-nine thousand plants; you see how extensive his research was.

82. He used seven of the plants' observable traits.

83. What does the word 'observable' refer to?



[Pointing at one learner]



84. Sorry!

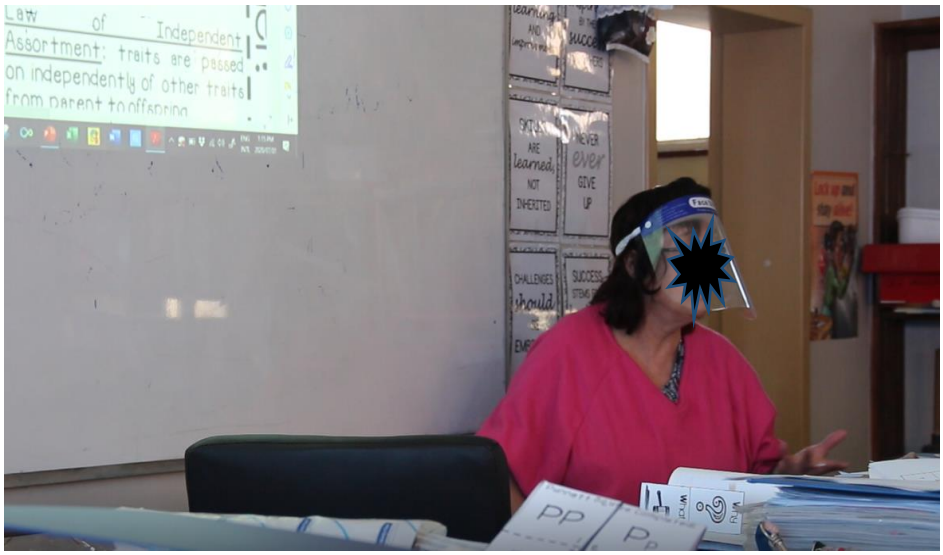
85. Mpilo / ? /

86. Mrs. Durand: What you can see, alright!

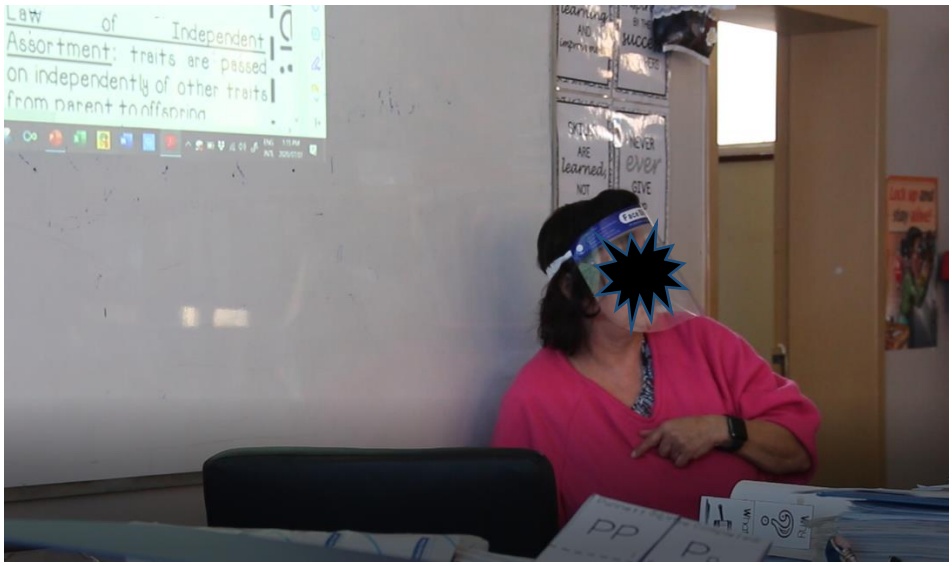
EPISODE 2: EXPLAINING THE WORD OBSERVABLE AND EXAMS

87. Please people sometimes in the exam, they have the word observable ↑what…if it is observable in the diagram.

88. So, if a diagram shows maybe the human skull [using head]



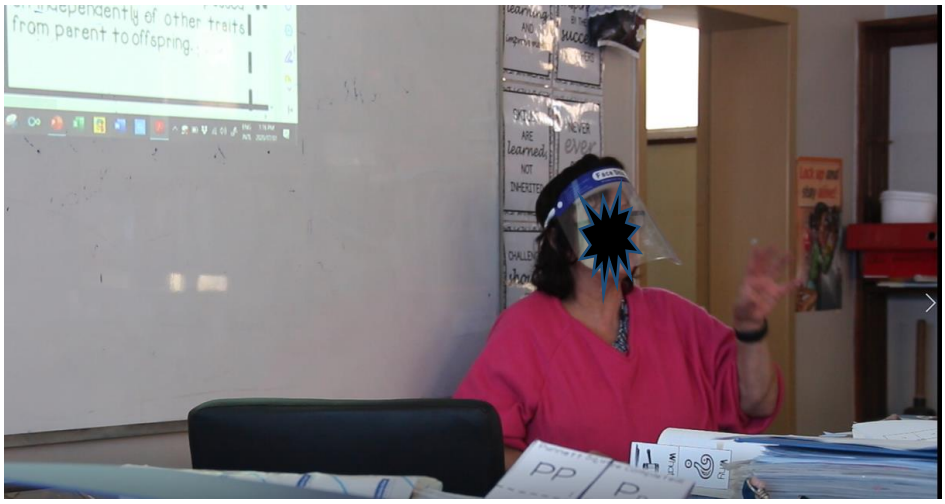
…but it does not show you teeth,



…okay so, that sounds left out.

89. You cannot say something about the teeth because it is not observable on the diagram.

90. Alright, you need to really say observable is what you see,



…that is the end of it…right—

91. Ls: [Noise]

92. Mrs. Durand: You all got that?

93. Ls: Yes!

94. Mrs. Durand: You all now go home; you cut and paste, on your own.

95. Please instructions are there.

96. Please, you need to learn to read instructions.

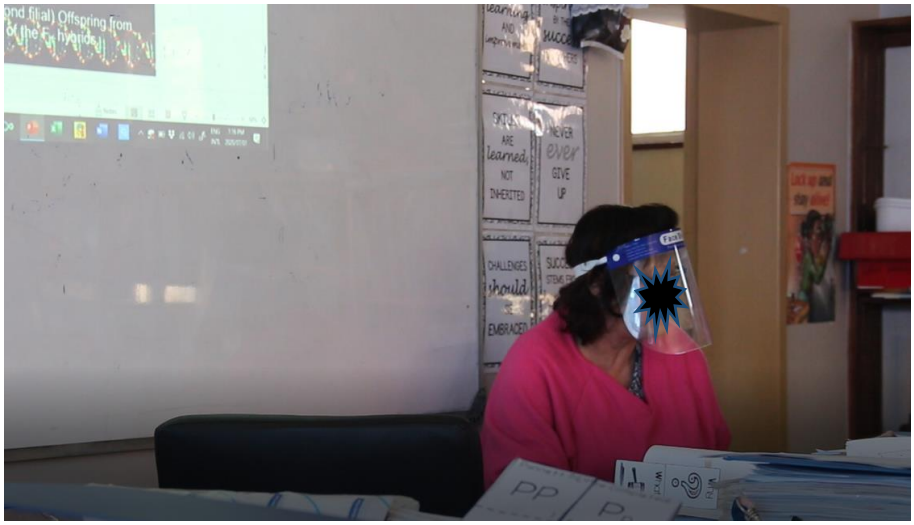
97. Ls: [Noise]

98. Where? Somewhere on the page, it says ↑cut, that's an instruction.

99. Ls: [Noise]

EPISODE 3: TERMINOLOGY

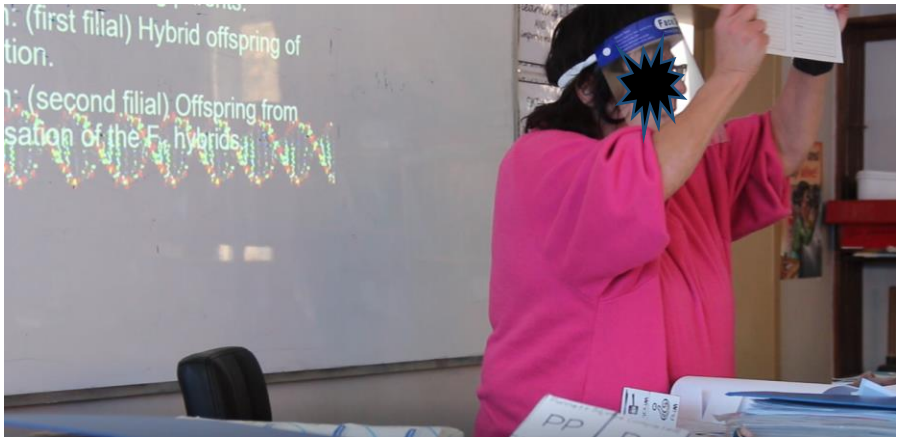
100. [Standing up] Alright, to get back to ehm…terminology, we started looking at …let us go now to the page…that is double for you this one here. [Lifting the paper up]



101. Okay we are going to go through all the terms as they come along.

102 Ls: [Noise]

103 Mrs. Durand: ↑Ahh…come on, the work-- this…



…the one that is double.

104. Ls: [Noise]

105. Mrs. Durand: You know…if you want to be a clown, you can be…I hate clowns / ? /

106. Ls [Noise]

107. Mrs. Durand: [Sitting] Okay, now I am going to give you the… memo the…answers…according to the memo, the actual definitions.

108. Yes! He actually [standing up] said in plants if you self-pollinate all the plants will be the same variety.

109. Basically, it means that they will be identical ↑to one another okay. In other words, ehm…a pink …or pink is a blending effect but red is and white are true colours…but pink is a blending of the two.

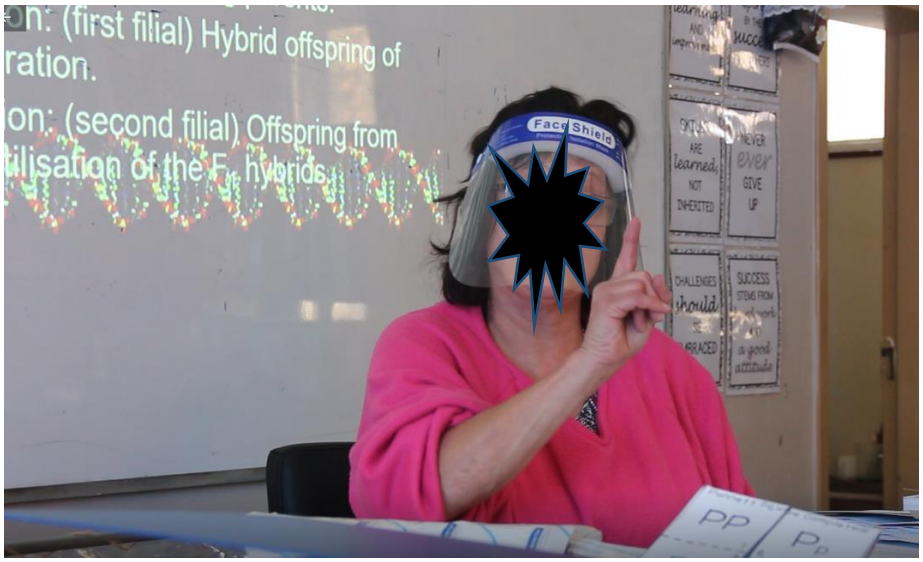
110. Did you know that?

111. Ls: No!

112. Mrs. Durand: Okay, you are going to learn that later in any case.

113. Right so, white and red are true, they are pure okay.

114. In other words, we are going to say— say, they are going to be homozygous and I am going to come back to those terms because those terms are very important.



115. Okay because we talk about traits,

…what is a trait?

116. A specific characteristic that varies from one individual to another, very important because we talk about traits.

117. Ivan: Ma'am can you please, / ? /

118. Ls: [Noise]

119. Mrs. Durand: It is a specific characteristic that varies from one individual to another.

120. Okay and you are going to see we…you going to find it later another page as well. [Standing and pointing to the board]

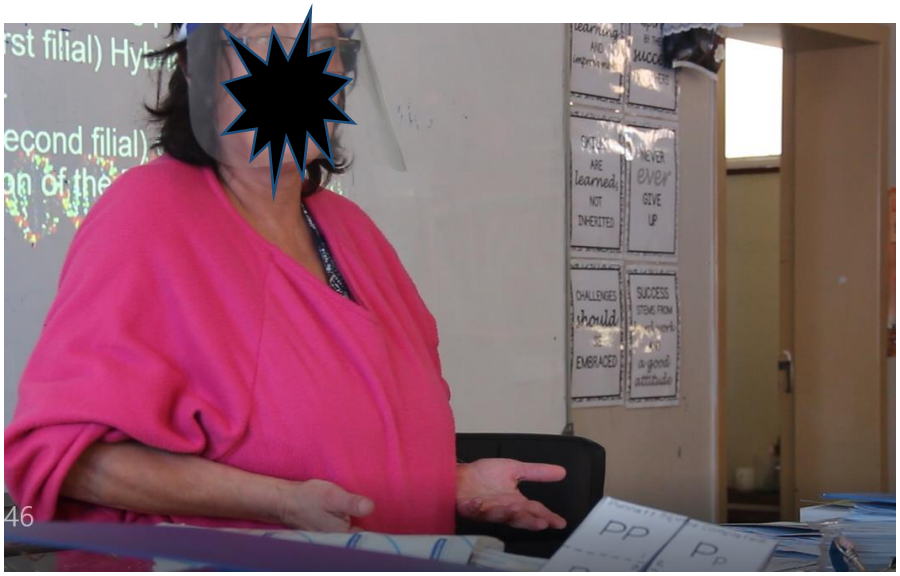
121. A hybrid is the crossing of two varieties, okay like I said you are-- the answers are going to come as we go through the whole thing okay.

122. Okay, today we are going to start looking at it a bit more in detail.

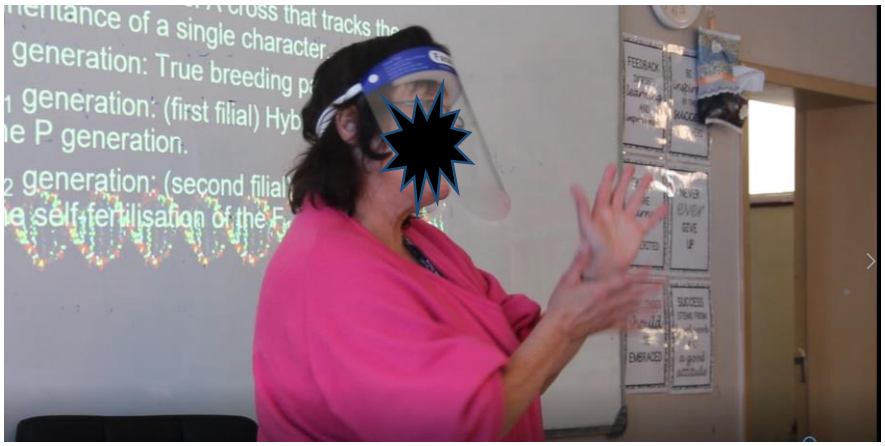
123. Ls: [Noise]

124. Mrs. Durand: Excuse me!

125. You are now quiet!



126. Okay, we are going to start really looking…I am going to move away from this sort of presentation okay because I found that this one is very much too condensed…

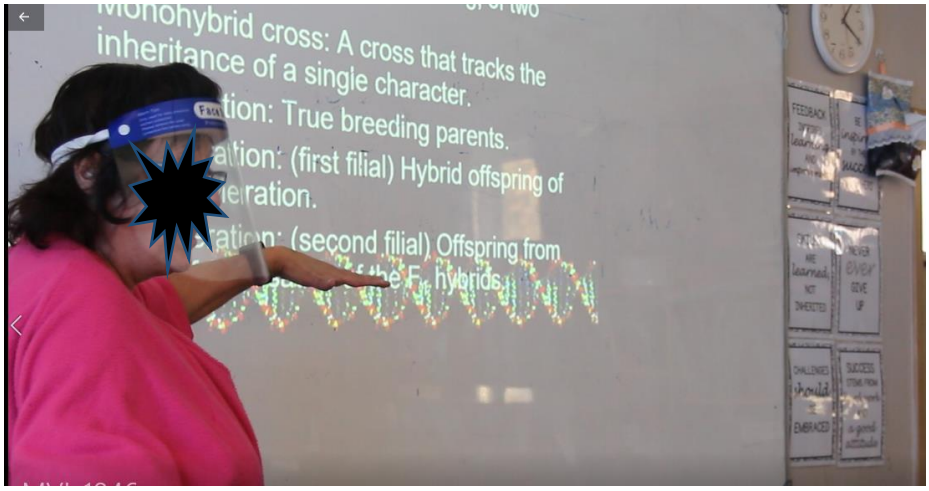


…and there are a lot of things not here that you really need.

EPISODE 4: GENETIC CROSSES

127. Just go back to what I said the other day.

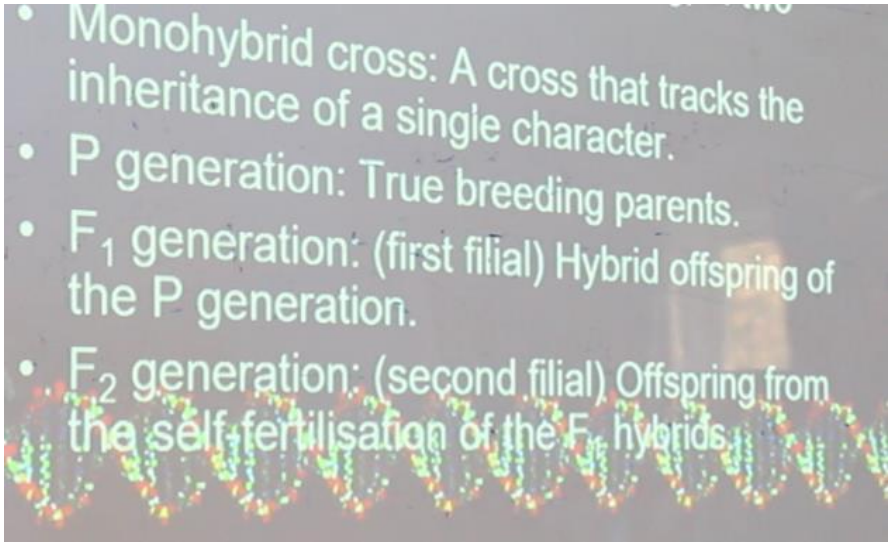
128. When I wrote the procedure for the genetics cross…



…which you were told to copy down, that is the way you are going to present it all the time especially in your tests and exams.

129. If you do not you are going to lose marks.

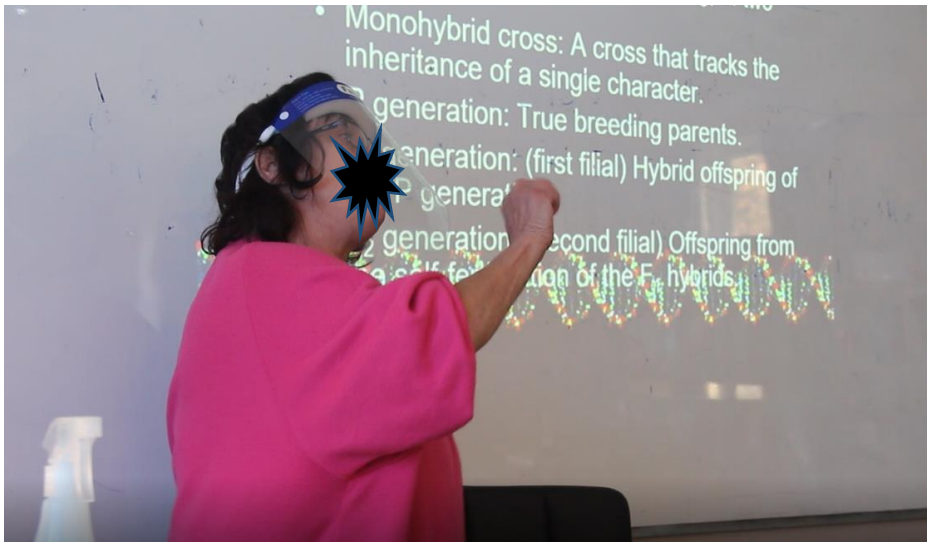
130. Alright, starting from the P generation…



…P refers to ((parents)) and you will put a number next to the P depending on what the question tells you-- [intercom interruption]

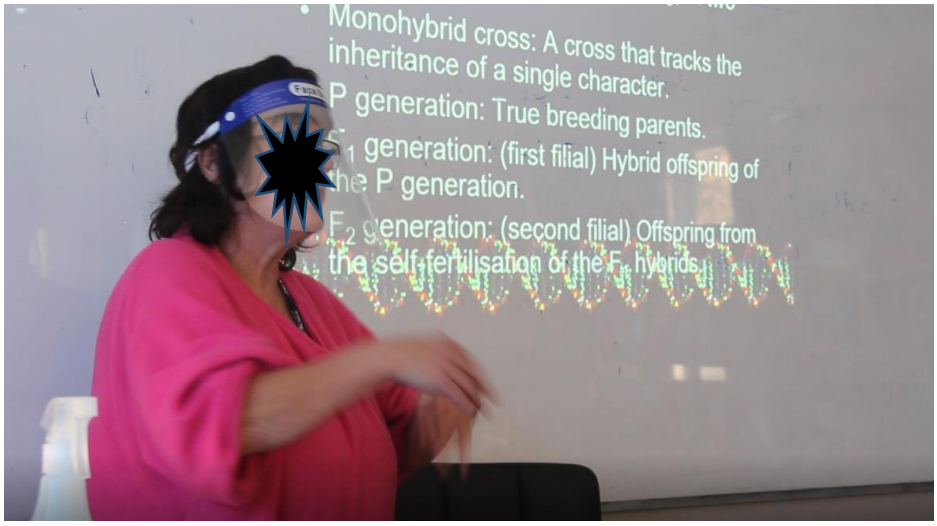
131. Right, then we had next to P…we had phenotype; you can fill in phenotype on your sheet it is number twelve.

132. Phenotype is the physical appearance of an organism [using hands]

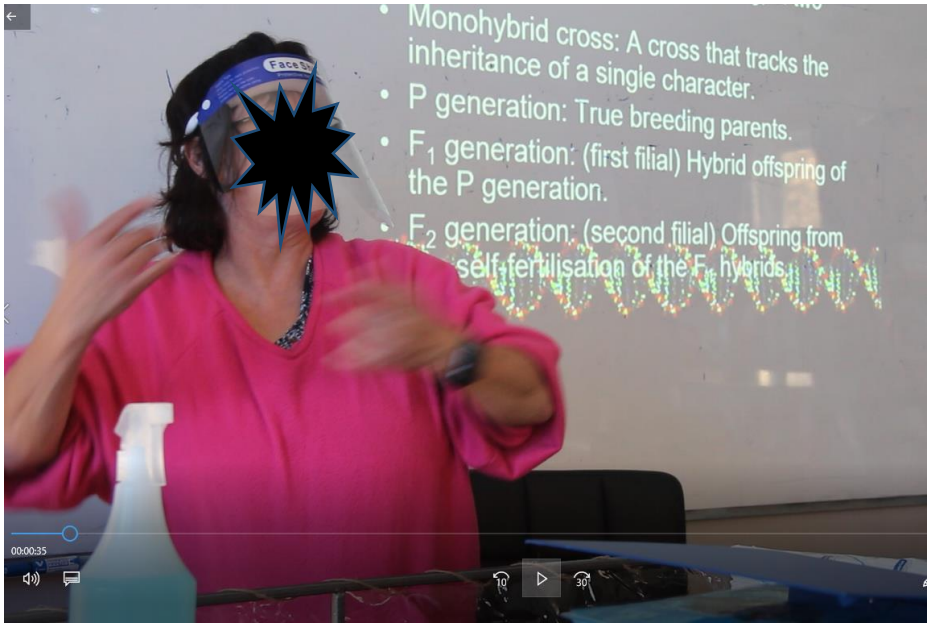


…you need to know that.

133. [Using hands] white…



…crossed with red,



…physical okay.

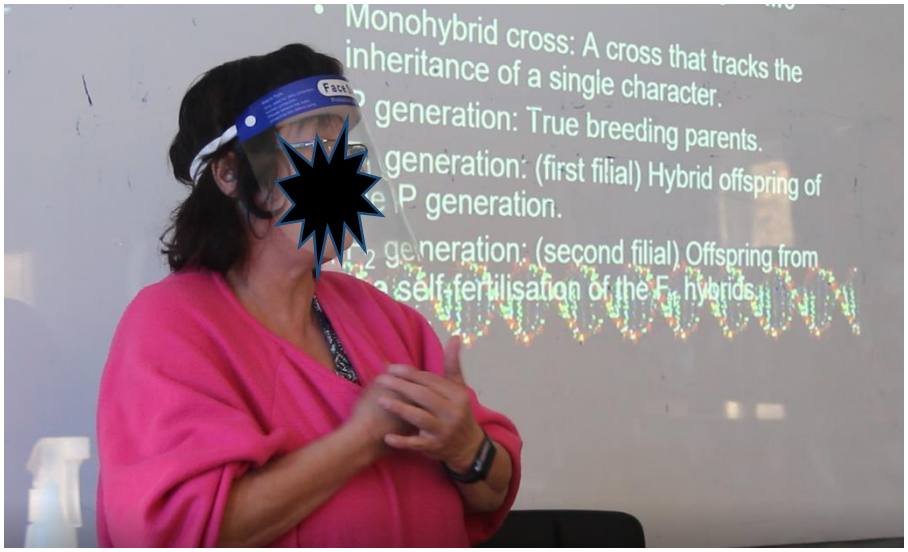
134. After phenotype you are going to have…

135. Mpilo: Genotype!

136. Mrs. Durand: Genotype, the genetic make-up of an organism.

137. Ls: [Talking]

138. Mrs. Durand: [Clapping hands]



Come on guys!

139. These are VERY, VERY important terminologies.

140. We are going to have meiosis.

141. What happens during meiosis?

142. What is formed?

143. ↑Gametes! [Intercom interruption].

144. Right, do you understand that now?

145. You have a school jersey, wear it…. if you have it already, we are not going to see it okay.

146. I am not going to check everybody and confiscate anything.

147. Next time you walk into my classroom, we do a uniform check out there and you will not come in if there is a uniform infringement.

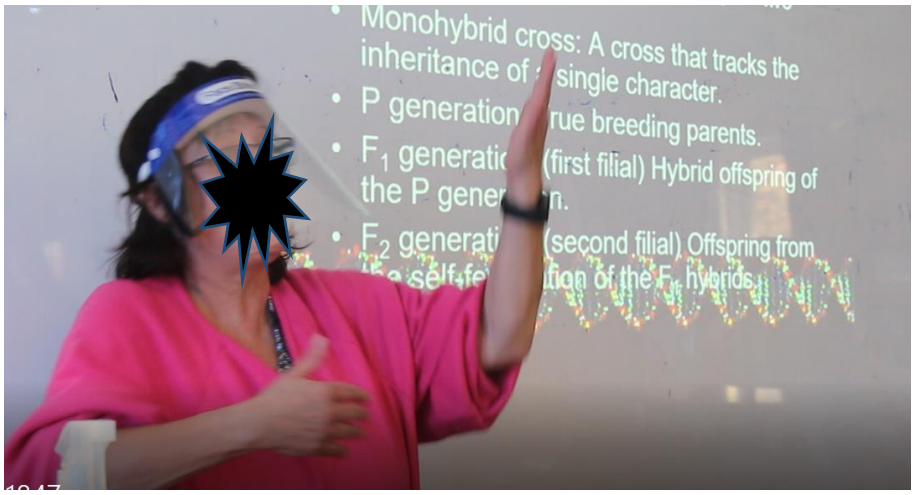
148. I hope it is made clear now.

149. I am dealing with adults; I am not dealing with babies okay…I do not do nappies.

150. Alright so, what is formed during meiosis?

151. Walter Gametes!

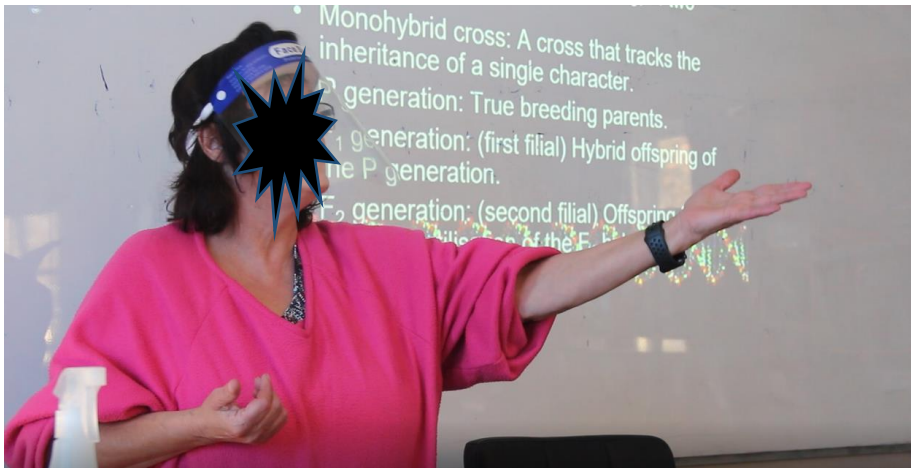
152. Mrs. Durand: Gametes, what are gametes?



153. ((Sex cells)), what are sex cells? [Pointing to a learner]

154. Lwazi: Ovum and…

155. Mrs. Durand: …and…

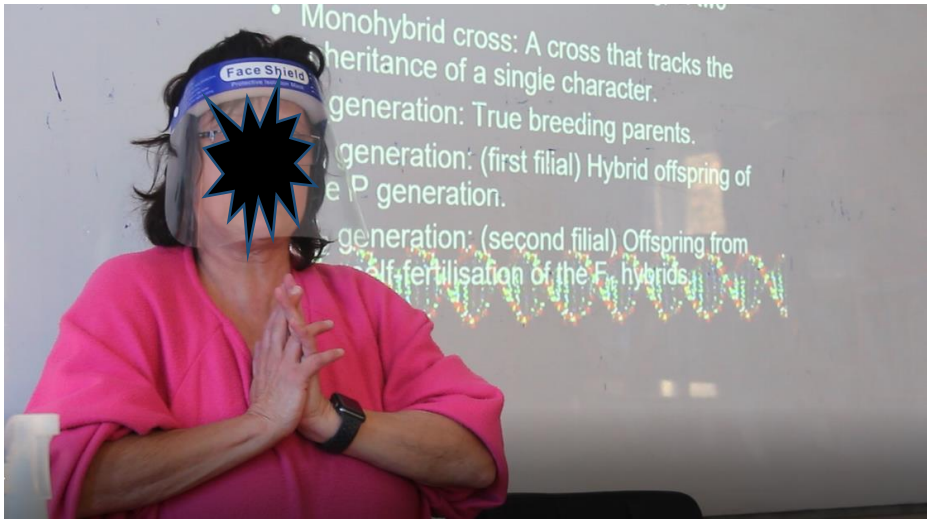


156. Lwazi: Spermatozoan!

157. Mrs. Durand: …and…sperm!

158. Exactly!

159. Ovum and sperm are↑your…

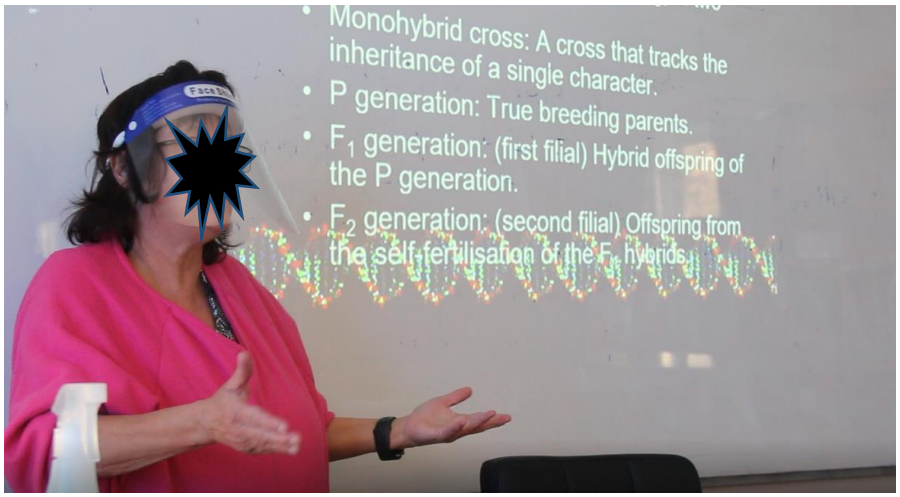


…gametes!

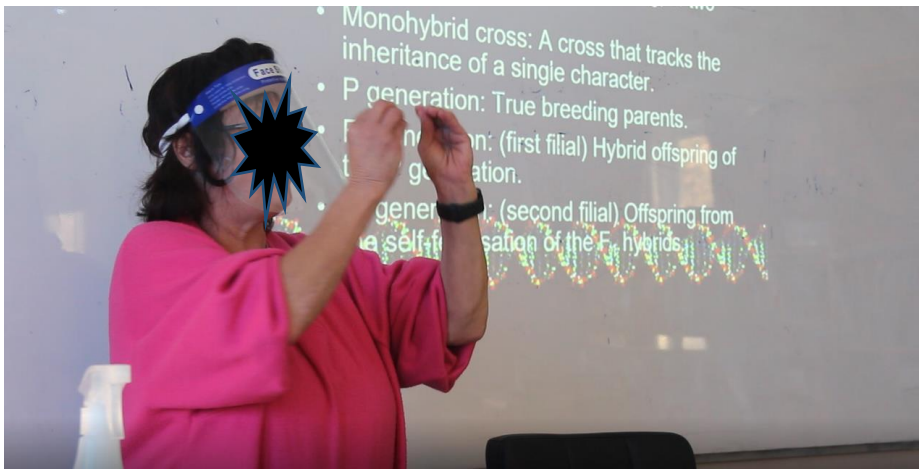
160. Gametes that are formed.

161. Okay, then we are now going to have ehh…fertilization.

162. What is fertilization?



163. It will be ↑the… [using hands]



…fusion of gametes, am I right?

164. Ls: Yes!

165. Mrs. Durand: Now we have dealt with the punnet square.

166. You are not going to get…to know much about what is going on there because that is what we are going to be dealing with today.

167. It is what…what is a punnet square?

168. Right, you all understand what I am talking about now?

169. Ls: Ehm.

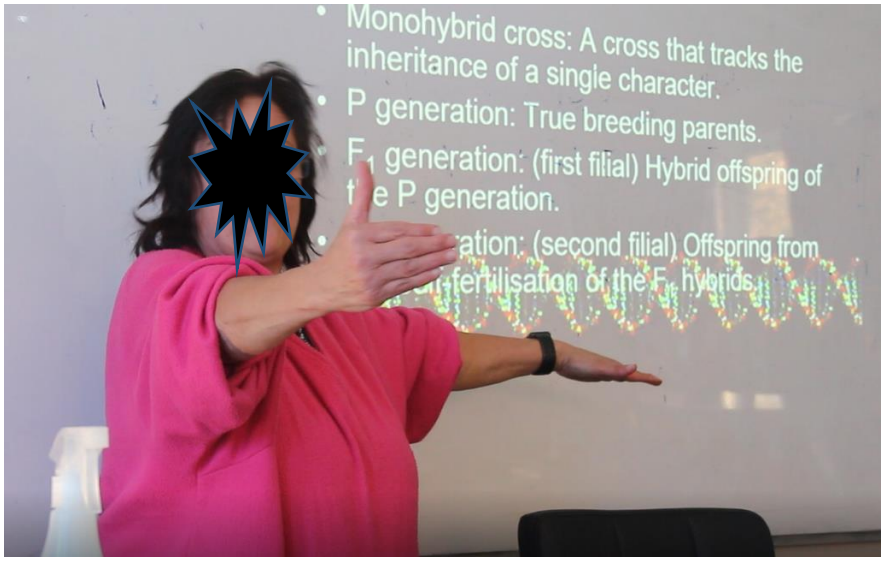
170. You are…some of these terms you are going to go back through them as well and they will come up as we go through okay.

171. Now I want to use some of Mendel's experiments [removing shield] to show the whole process okay.

172. How are you…ahm…how ahh…is the method going to work?

173. Ls: [Laughing]

174. Mrs. Durand: But I am far away…



…from you, now this is starting to irritate me.

175. Okay so, I am far away from you…you do not come near me, I do not go near you / ? /

176. Ls: [Laughter]

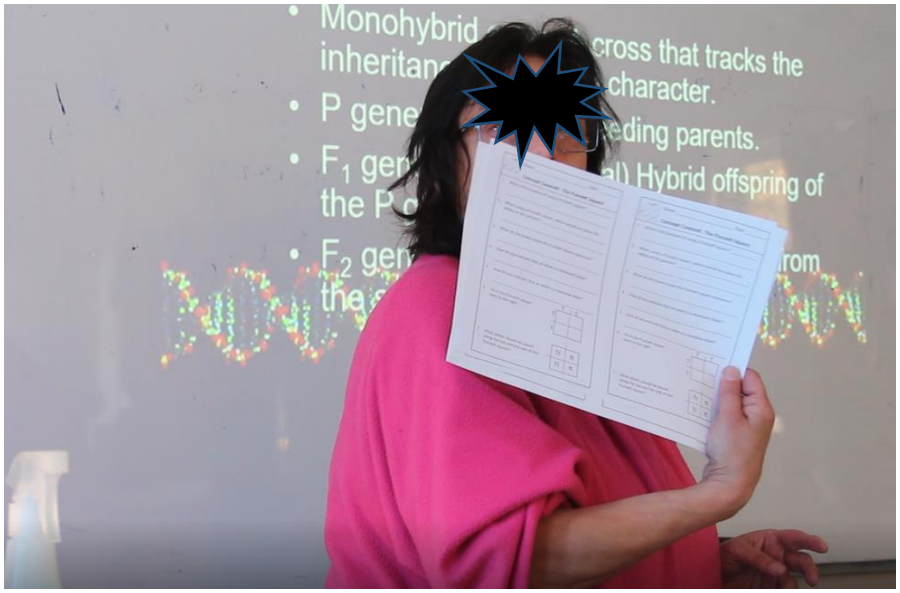
177. Mrs. Durand: So, we wanted to understand Mendel's experiments and how the punnet square is going to work.

178. We are going to do a punnet square and first what is a punnet square?

179. You have a page in your notes that…there is Gregor Mendel and his laws, we are going to come back to it.

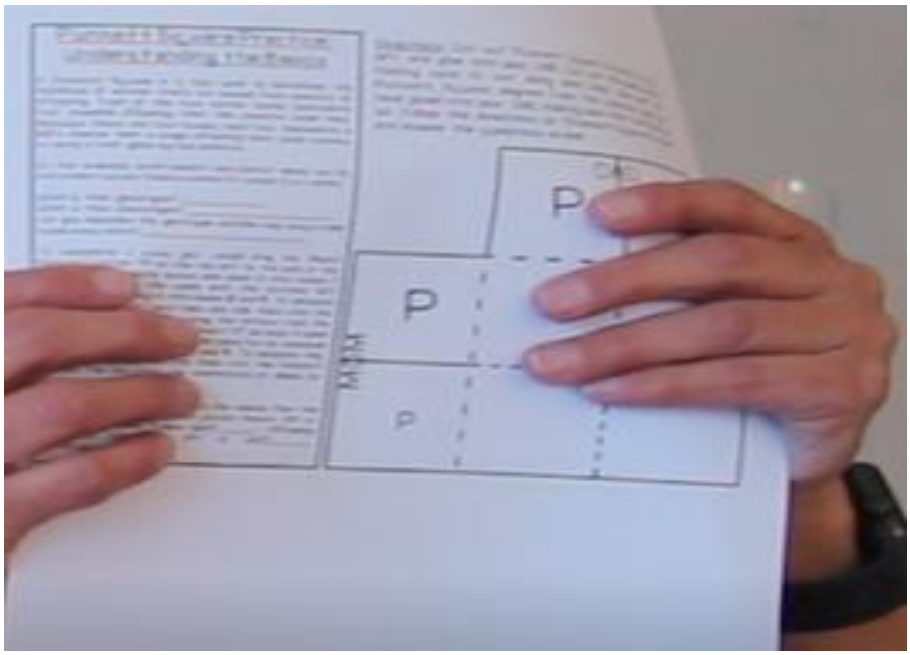
180. Mechanics of ehh…things.

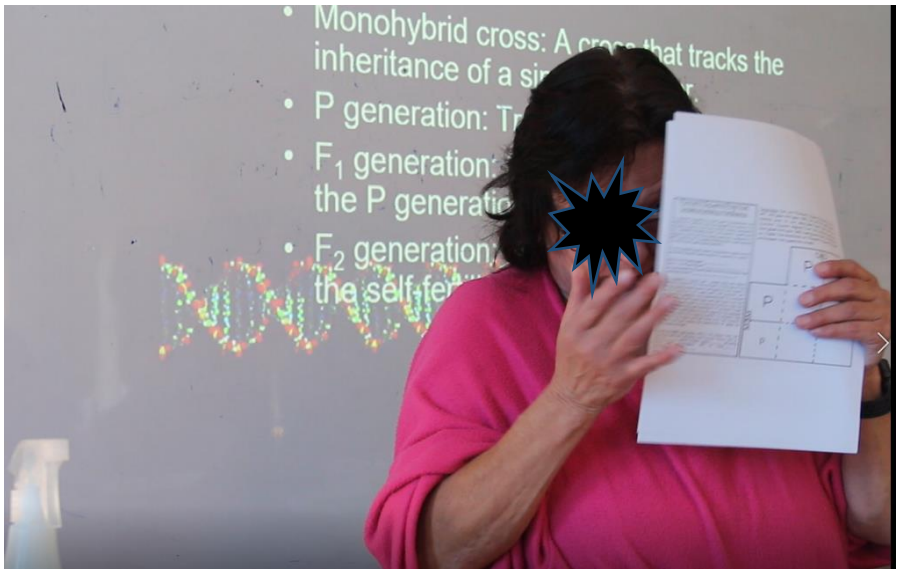
181. Segregation, the punnet square, one of the pages is a punnet square. [Showing]



182. Just go through it until you can find it.

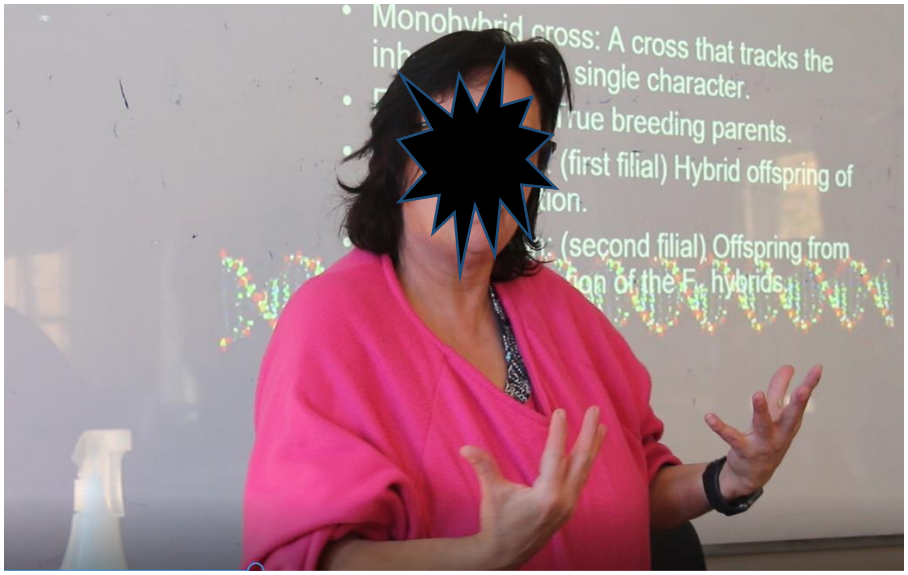
183. Then you can also go to…this page here… [showing]





184. Okay one with boxes on punnet square practice, understanding the basics.

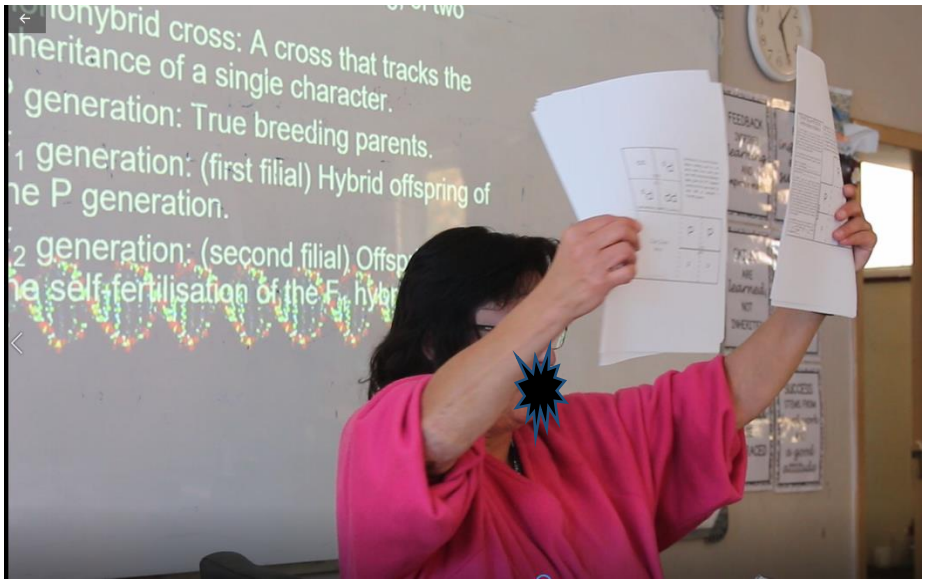
185. Right, what is punnet square?



186. Is the first question, I am giving to you.

187. Right, a punnet square, [sitting down] if you want to read through with me; is a tool used to determine the likelihood of certain traits passed from parent to offspring.

188. It is on your notes [raising paper]



…you know you have a pack like this, you have each one of these.

189. There, it tells you what a punnet square is all about.

190. [Reading] "It is a tool that is used to determine ↑the likelihood of traits to be passed on from parents to offspring right", very important.

191. ↑So, we are going to use a punnet square to see what traits are going to be like.

192. Okay, so I am going to switch that off and leave the laptop on and will come back to these things now.

193. Right, Mendel used pea plants and you saw in his life history, he looked at ahm…seven physical observable features in plants, tallness…

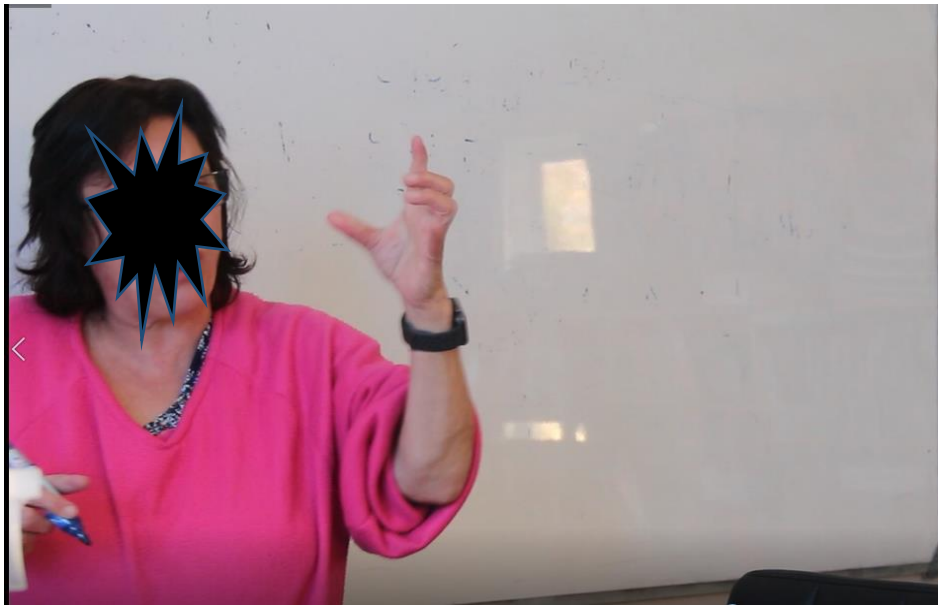
…ehm…colour,

…whatever the case might be,

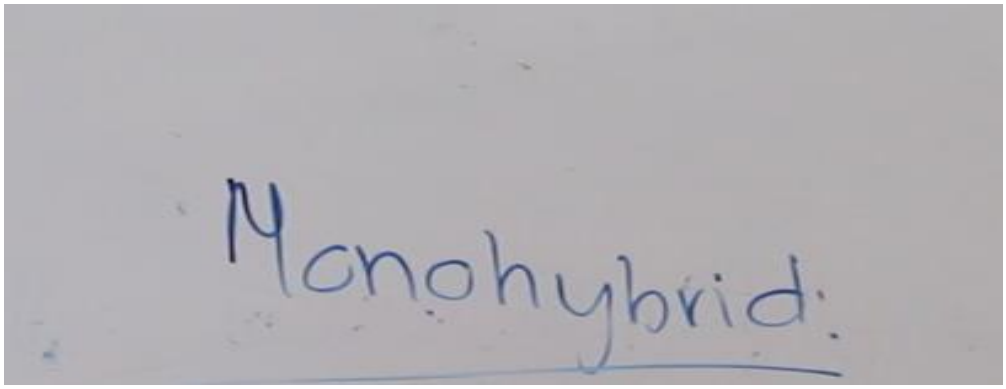
…rough seeds okay all of that.

194. We are just going to look at one thing now,

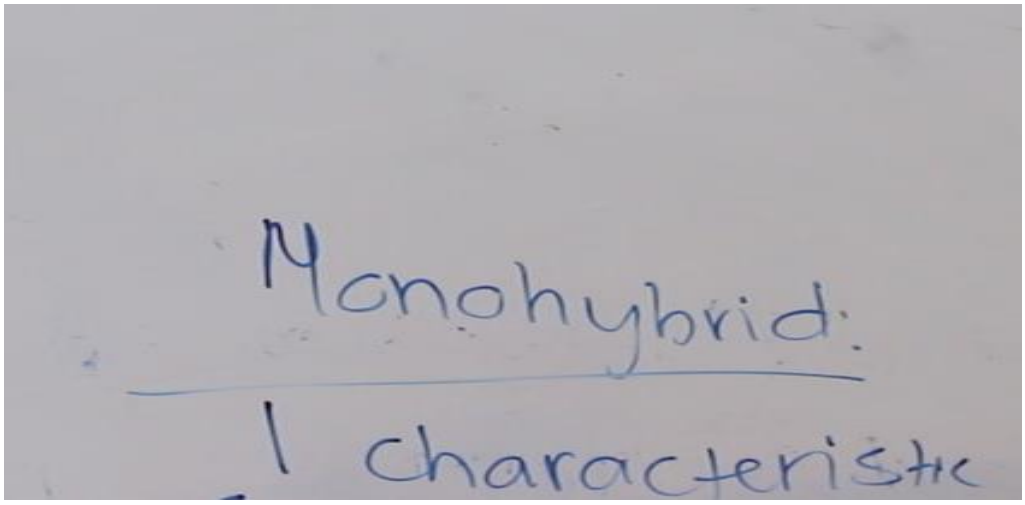
…we are looking at one concept now,



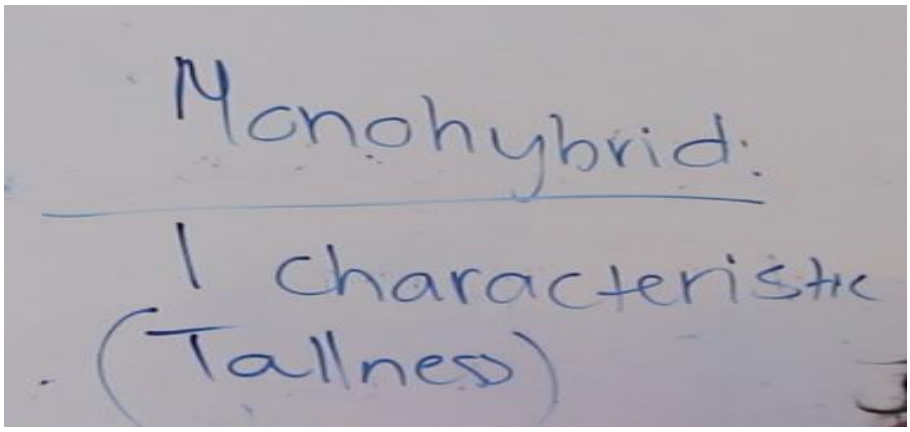
…and the concept is called [writing on the board] monohybrid.



195. Right, that's the concept we are going to look at using his experiments and basically what it refers to as we look at one [writing on the board]

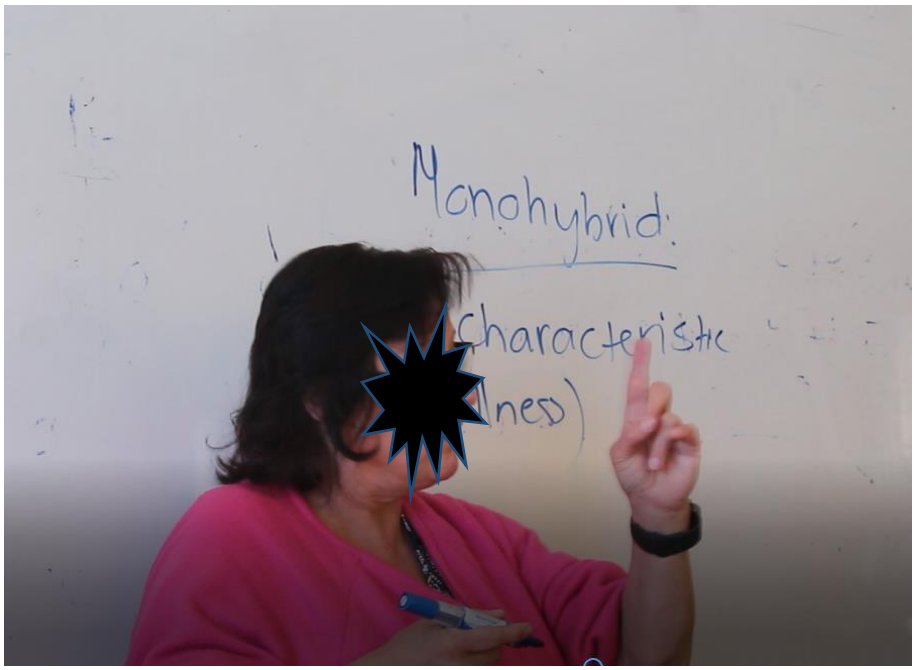


…characteristic and that characteristic could be…maybe the tallness of plants.



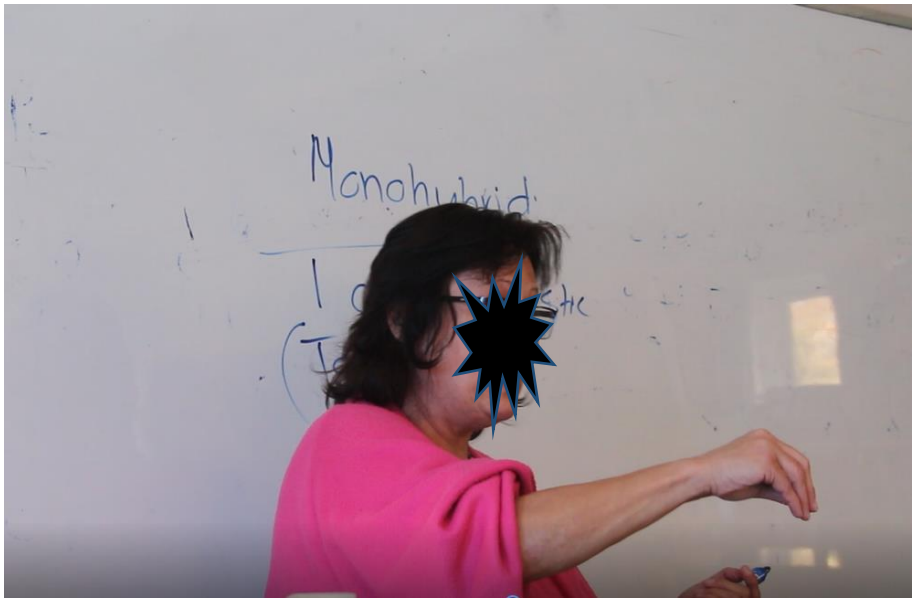
196. Okay that is one thing we look at so, tallness and height could refer to one thing.

197. Now when we cross ehm…ehhh…/ ? / we actually look at one…

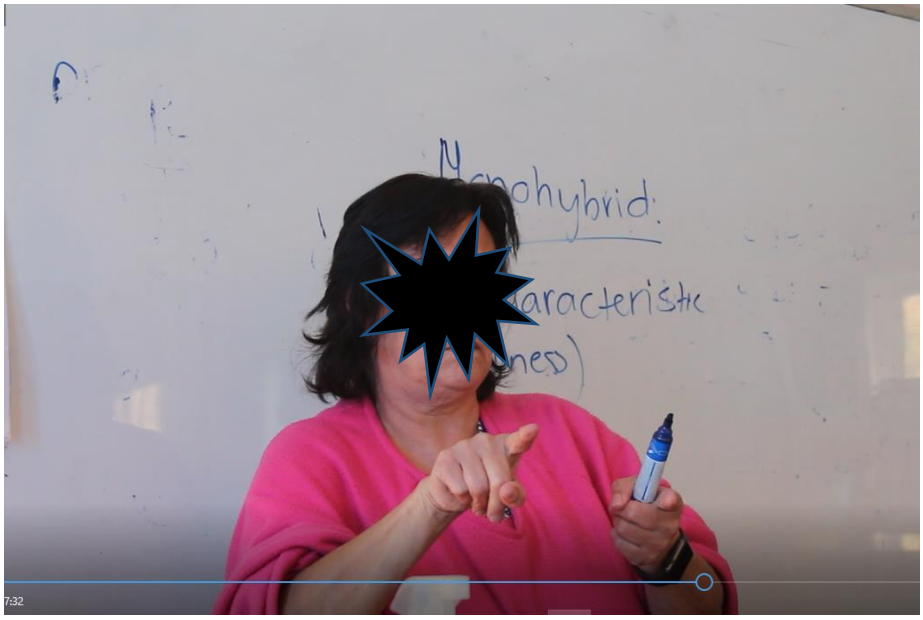


…of his laws while we do it and that is called the 'Law of Dominance'.

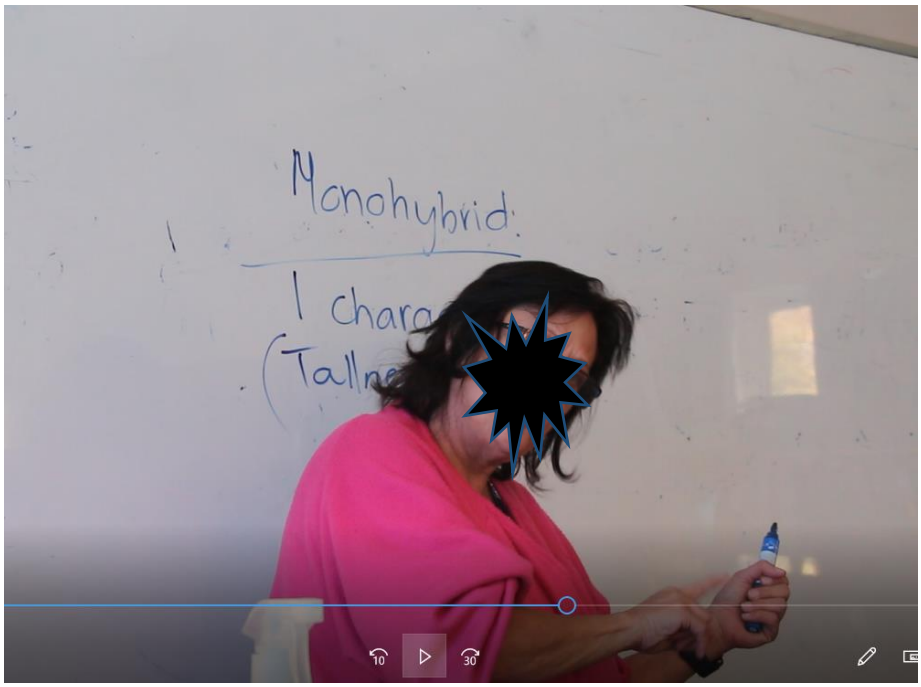
198. He basically stated that there is a feature or a trait…



…that is expressed…

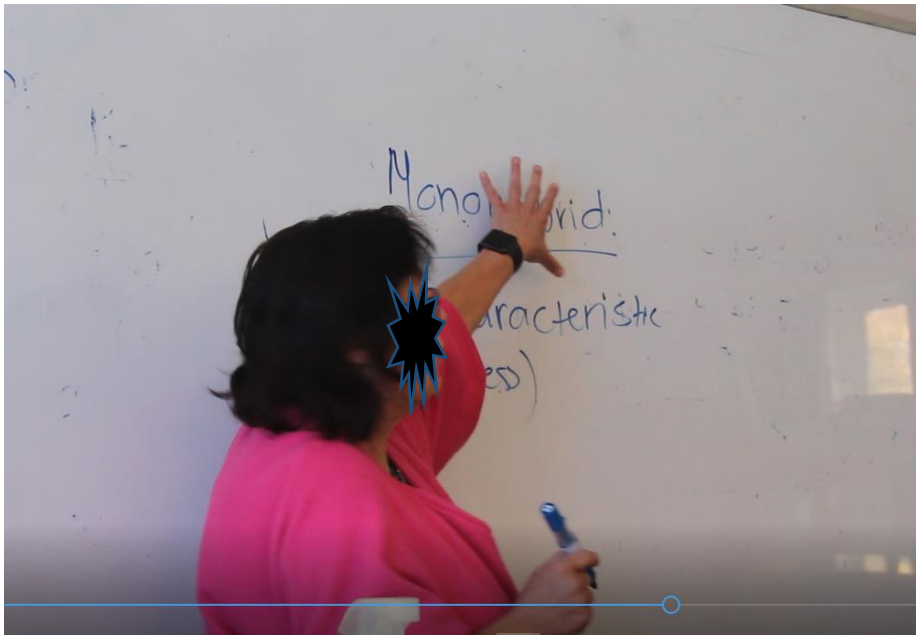


…but the other one is not.



199. What is that referred to as?

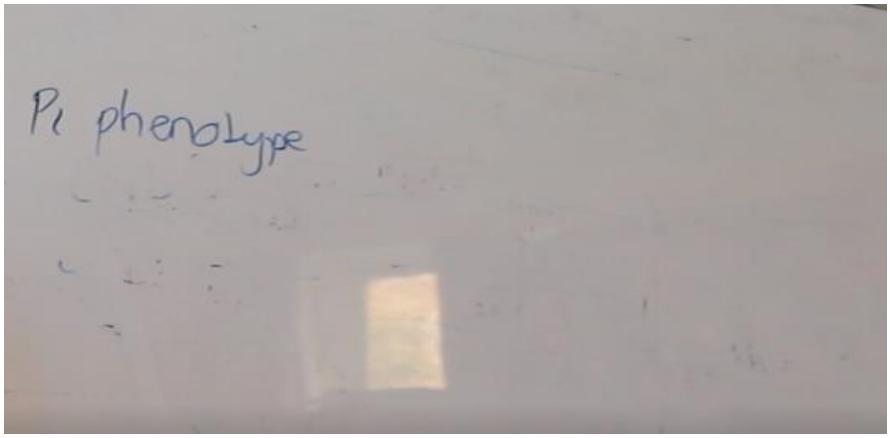
200. Okay that is what we are going to be doing now here,



…monohybrid.

201. So, if I have…do I have to write the whole story out.

202. Yaah…let me just do it.



203. I cannot go too high.

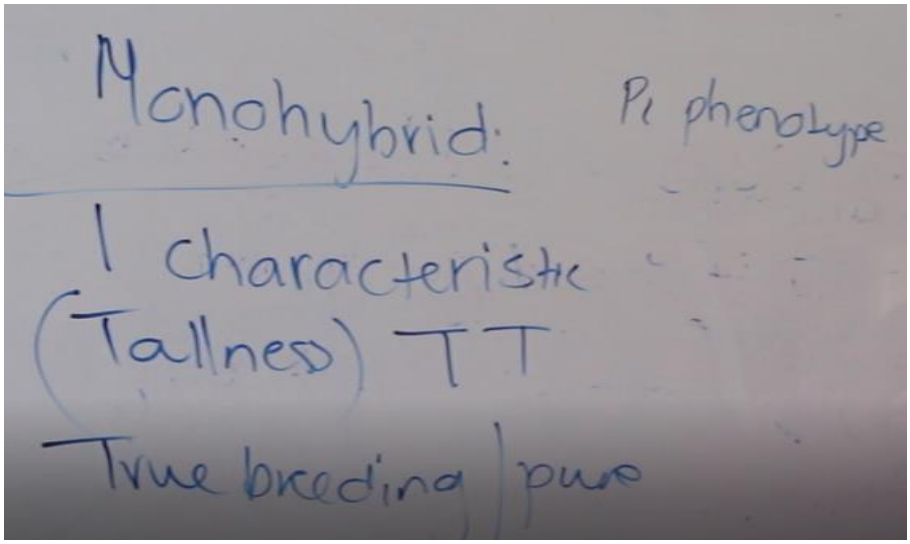
204. So, we look at the phenotype okay.

205. Remember he used pure breed okay; pure breed is also called true breeding.

206. So, we are going to look at this whole thing using pure breed plants. [intercom interruption]

207. Okay, people there is something that you got to look at.

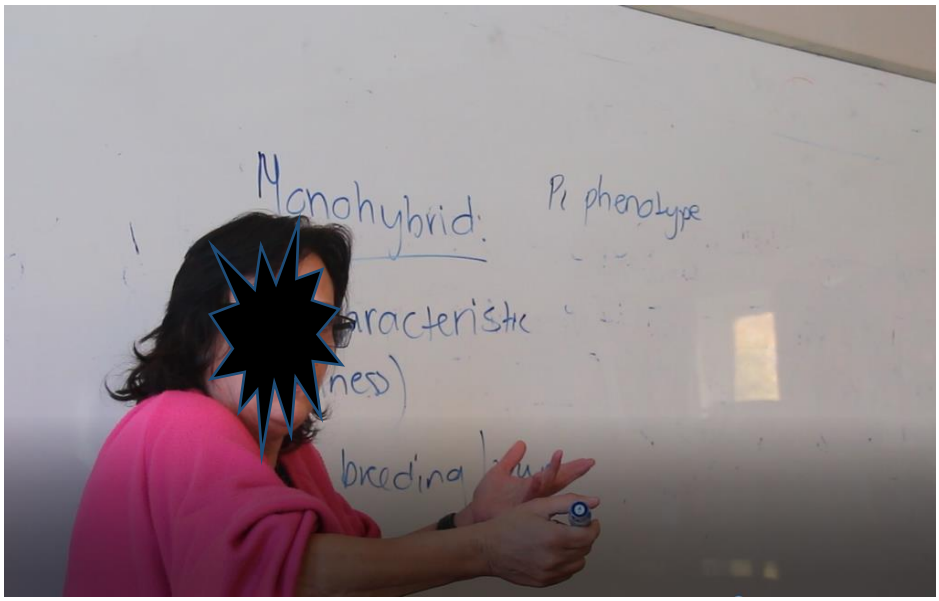
208. If I say that we are going to be looking at first of all at TRUE BREEDING… [writing]



…which refers to PURE okay.

209. Now we can ask, how did he do that?

210. Well, if he crossed two tall plants and they are all tall.

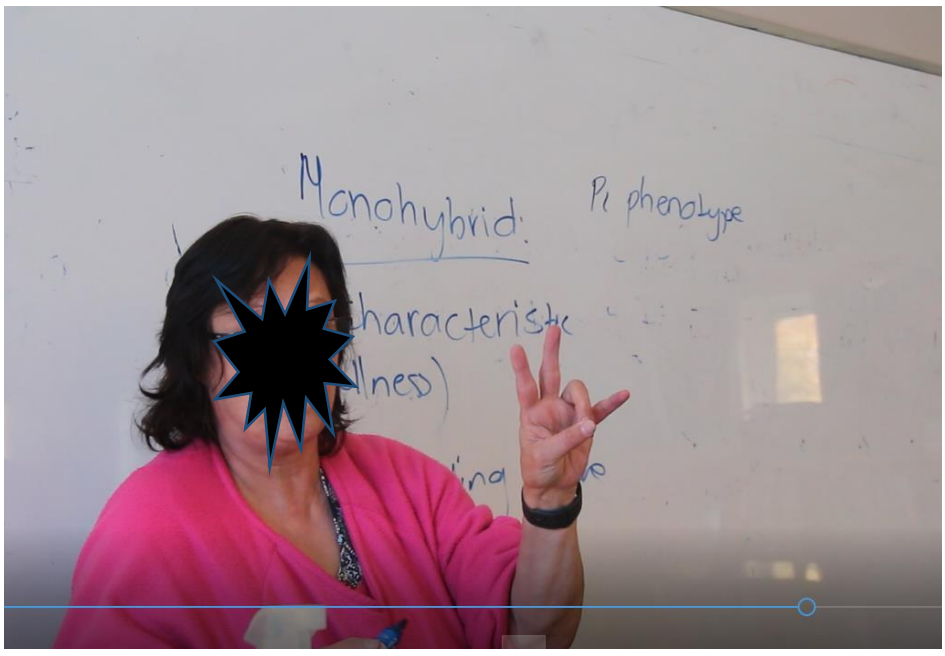


211. Are they going to heterozygous combination or homozygous combination?

212. Now these are two important terms.

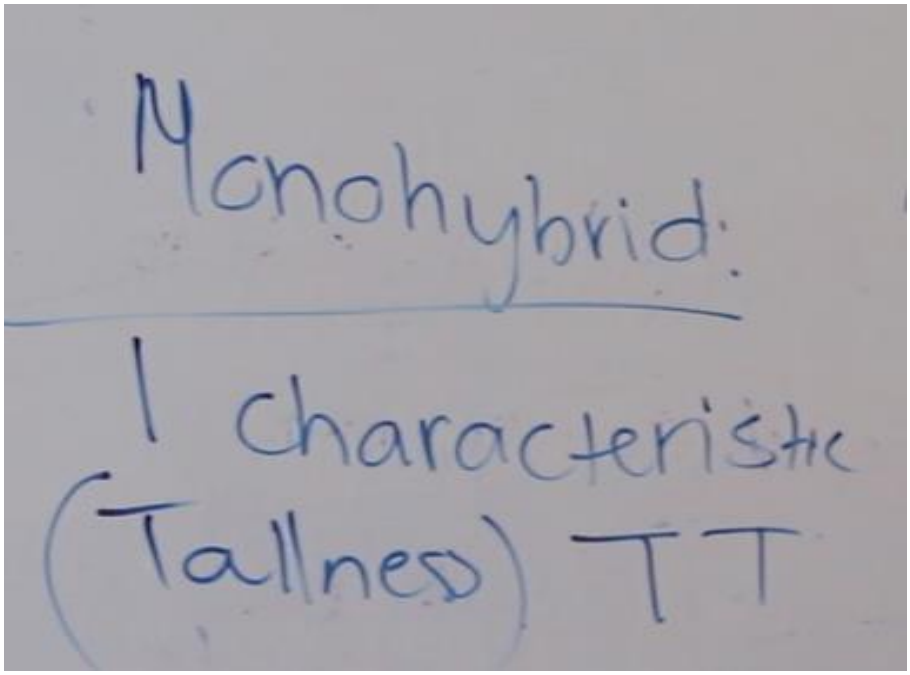
213. We are going to have that on the board on Monday.

214. Homozygous means genes are the same…

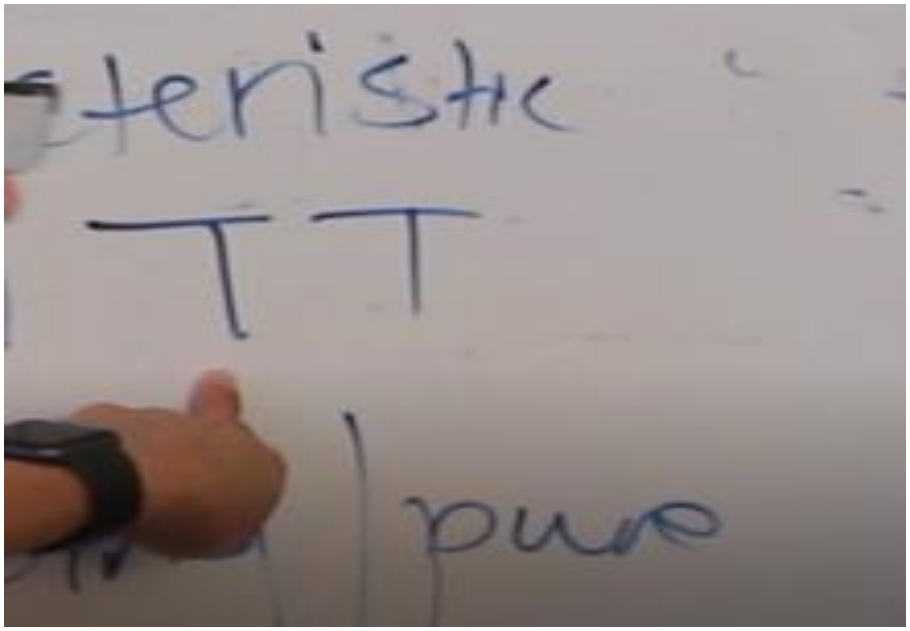


…and so, please you cannot change the symbols.

215. If I say [writing]

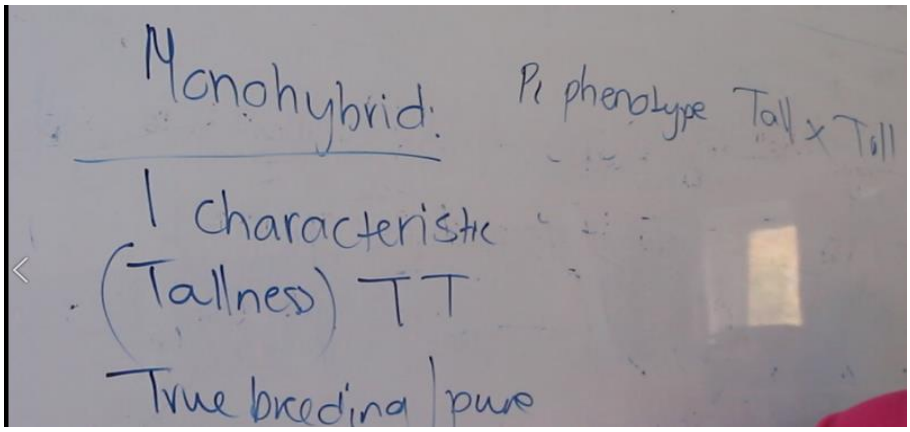


…TALLNESS (TT) remember, its pure breeding, we are just going to use two capital Ts (TT) okay.



216. So, I am going to, he is going to cross two tall pants…with a tall plant okay.

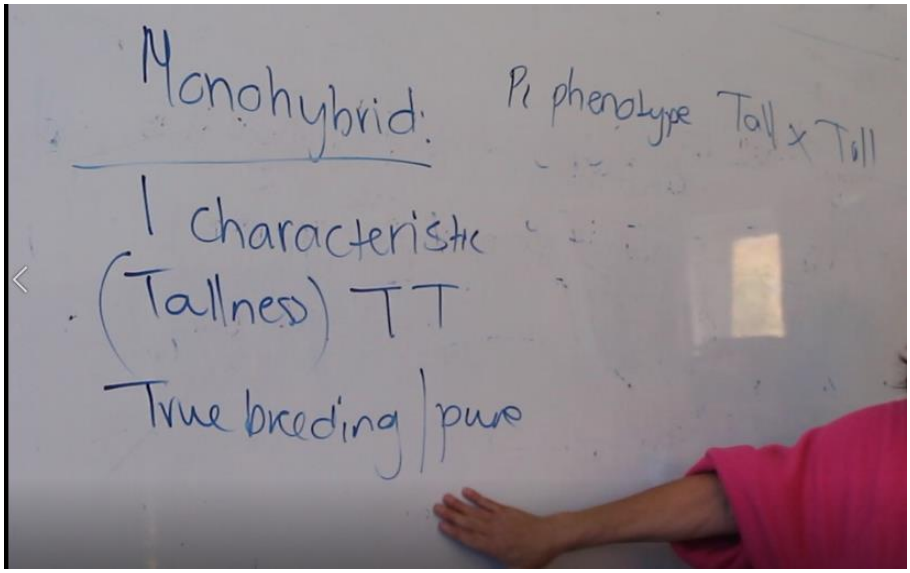
217. So, my phenotype is going to be ↑tall [writing] crossed with tall okay.



218. That is what I am saying to you.

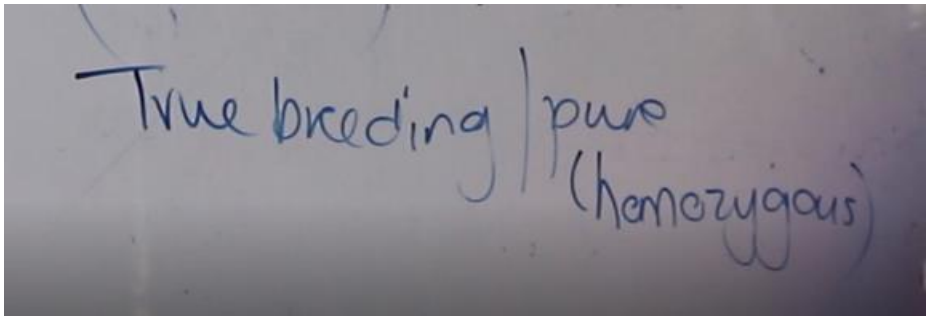
219. He is going to take two pure plants.

220. They are pure…



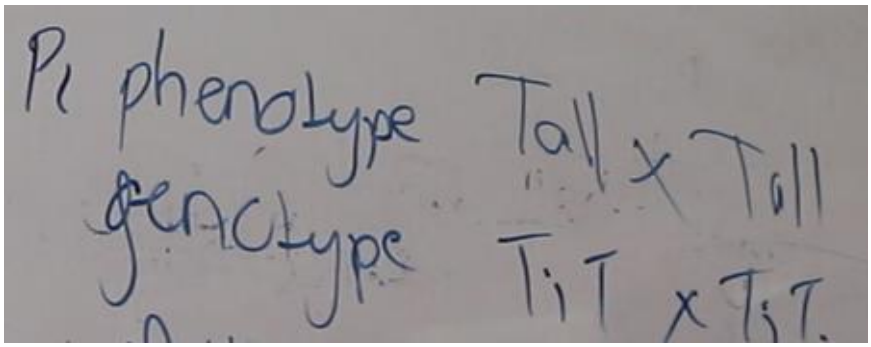
221. So, their genes must be same.

222. We are actually going to say that when we talk about pure, we are talking about [writing] homozygous.



223. Okay so, we are now going to look at the genotype.

224. What will be the genotype of these plants? [Writing TT x TT]

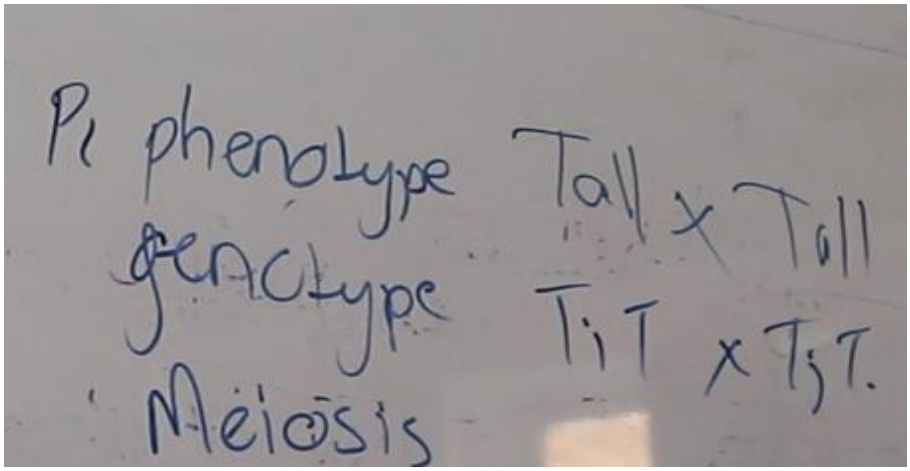


225. They are tall okay.

226 These are the genes we are looking at.

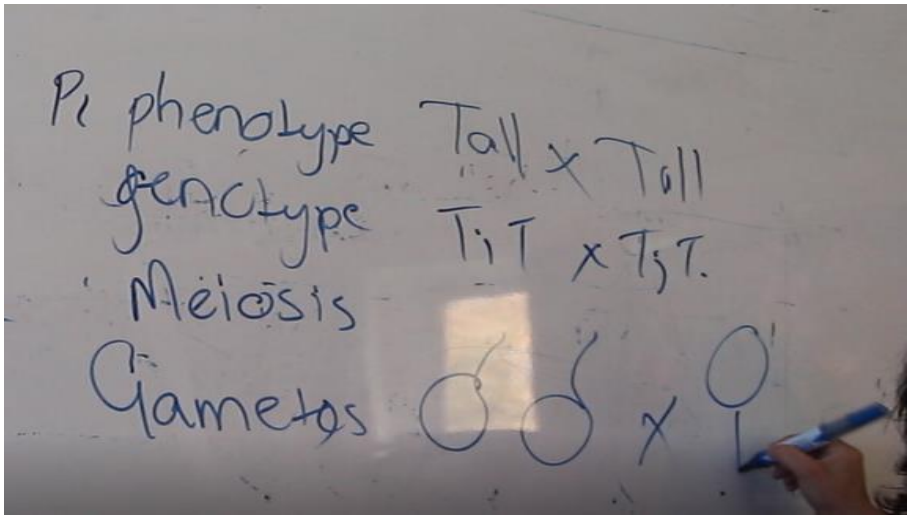
227. What comes next?

228. MEIOSIS [writing]

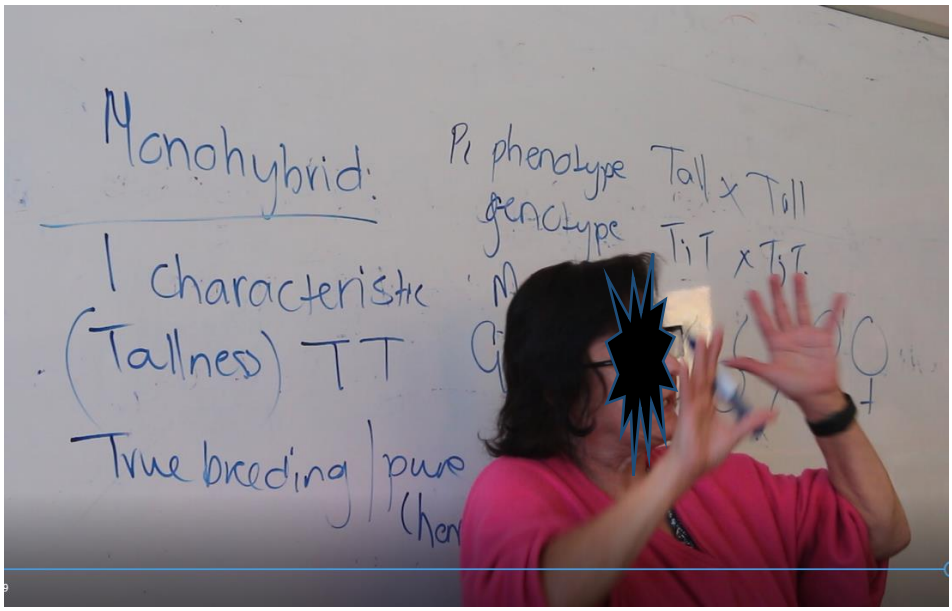


…right and now we are going to have [writing] GAMETES.

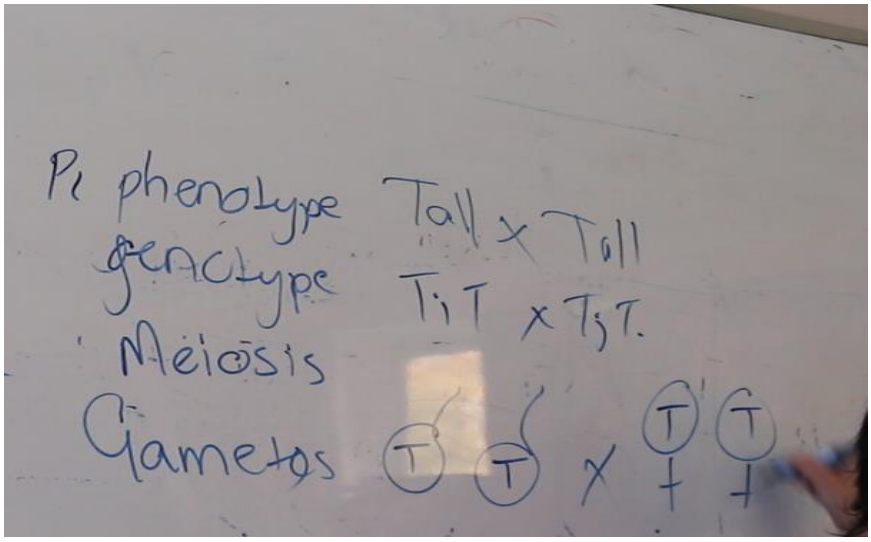
229. What did I tell you to do when dealing with gametes? [Drawing sperm and ova].



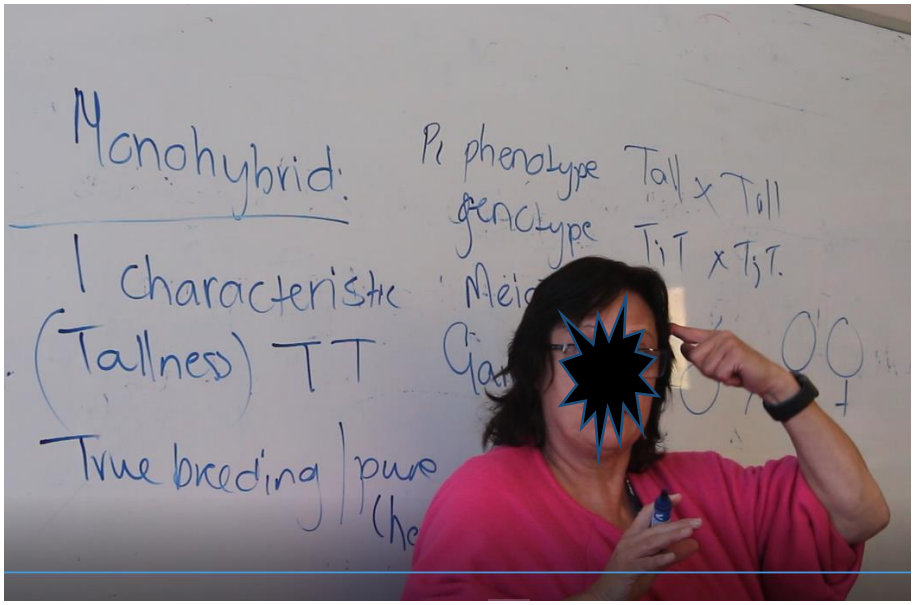
230. You are going to draw ↓ovum and sperm because then you know we are going to have meiosis; we are going to have segregation…



…and I am going to do segregation just now…



…that you get that picture in your skills [pointing her head]



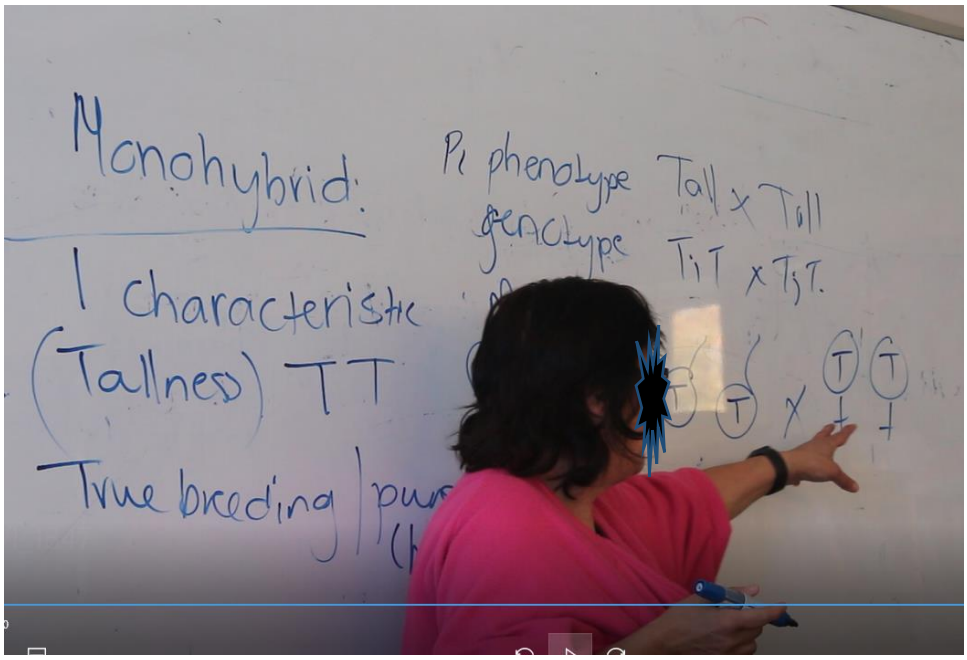
…okay.

231. So, now what happens?

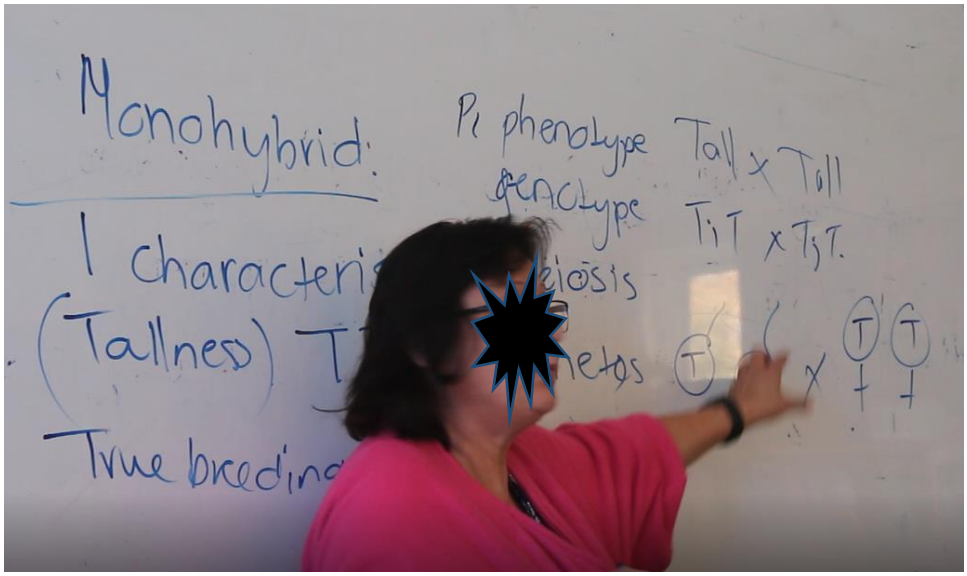
232. Meiosis [knock] yes! No! you are not fetching anything from my class.

233. Okay meiosis happened.

234. So, now there are two ova…

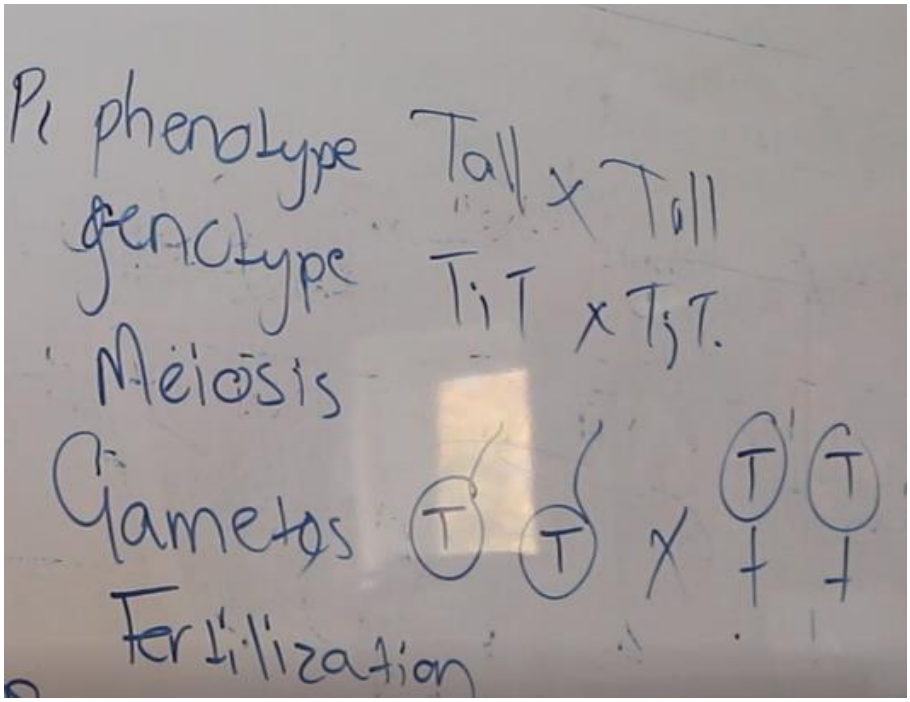


…with tallness in them and two sperm…

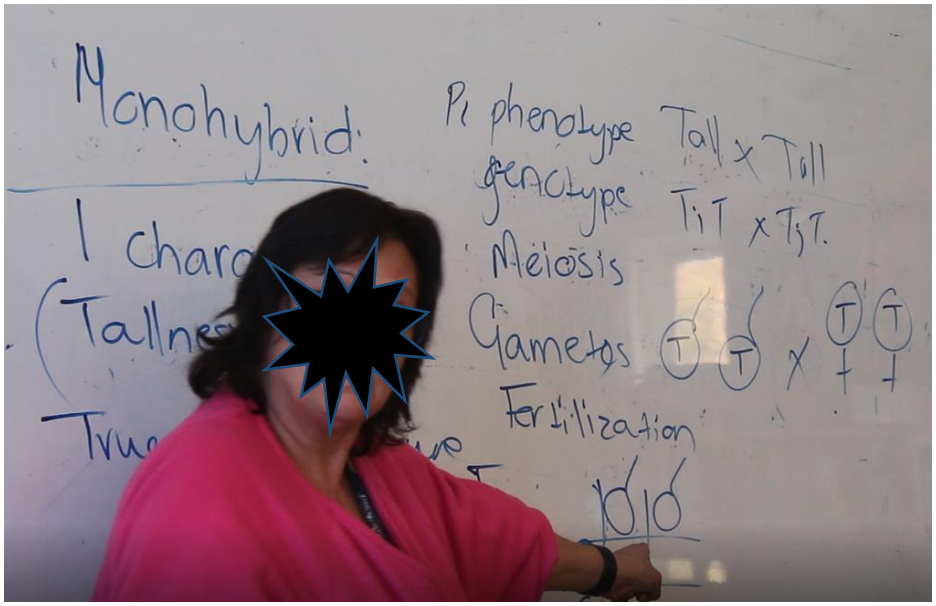


…with tallness in them okay.

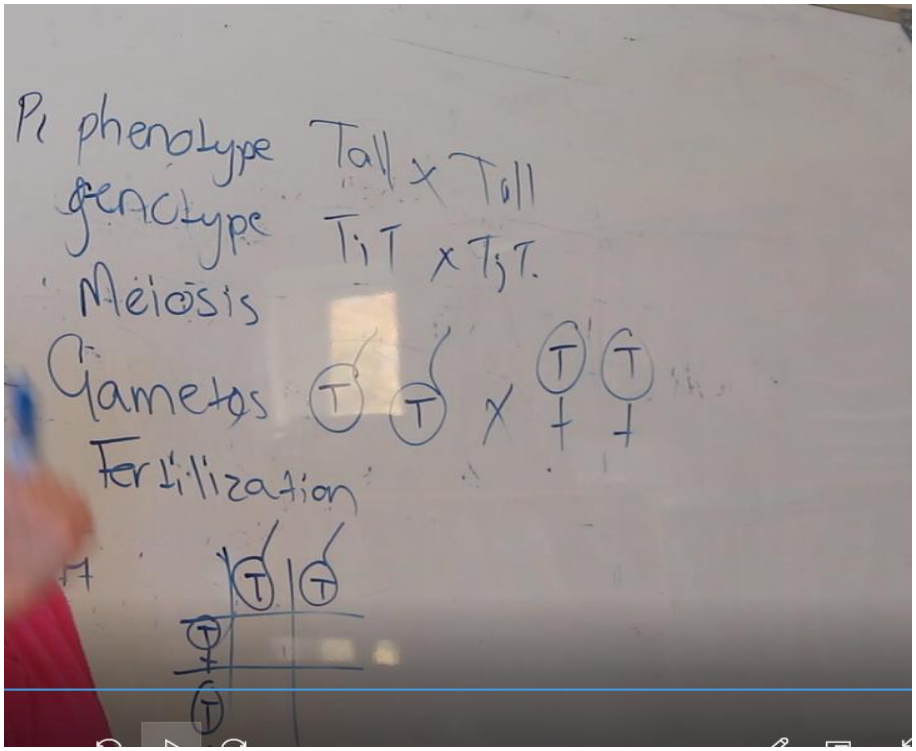
235. Now we are going to talk about fertilization.



236. What happens when the sperm and ova…?
237. Now guys I mentioned to you something when I drew the punnet square.
238. Everything is twenty-five percent; it means an offspring has a twenty-five percent chance of having that gene…genetic combination okay.
239. So, we are going to talk about F_1 now okay.
240. Then we are going to have our punnet square.
241. Okay, now what happens?
242. Here is my one sperm, here is my other sperm.
243. Here is my one ovum, there is my other ovum.
244. You see what I mean? [Showing on the board]



245. Okay now this one was a T and that aah…that…[writing]

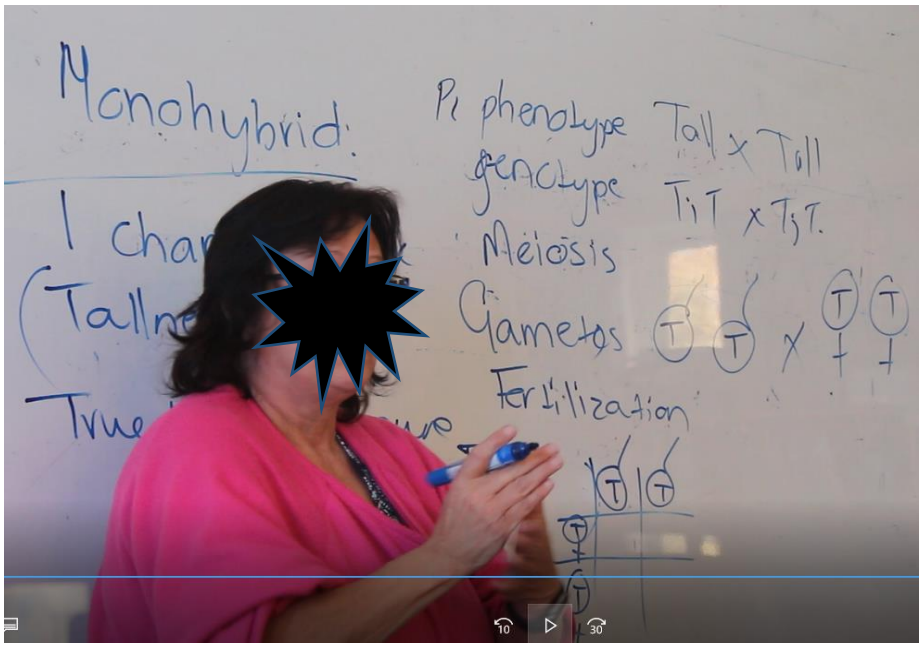


…and that one…that one.

246. Please note, I am going to write this out.

247. I am going to look at the one at the side first.

248. Try to be consistent…



…but right now, I am going to tell you where to put things when they say heterozygous combination but for now let us just do this okay.

249. So, I am going to say what do I have here?

250. I got a T, is that correct?

251. Do you agree?

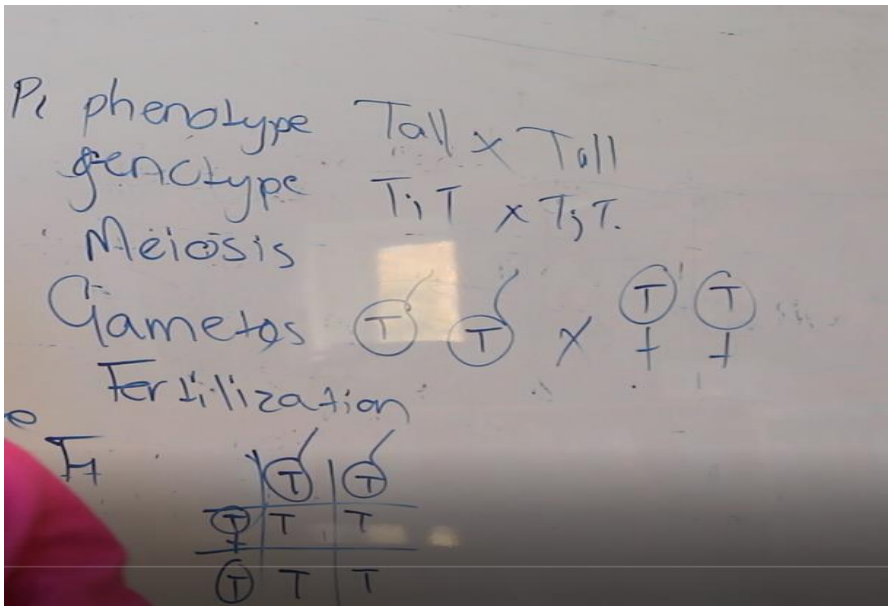
252. Right what do I have here?

253. Ls: T!

254. Mrs. Durand: T, okay.

255. Ls: Yes!

256. Mrs. Durand: Now I am going to have to…whatever is here, I am going to have to put this side as well [showing]



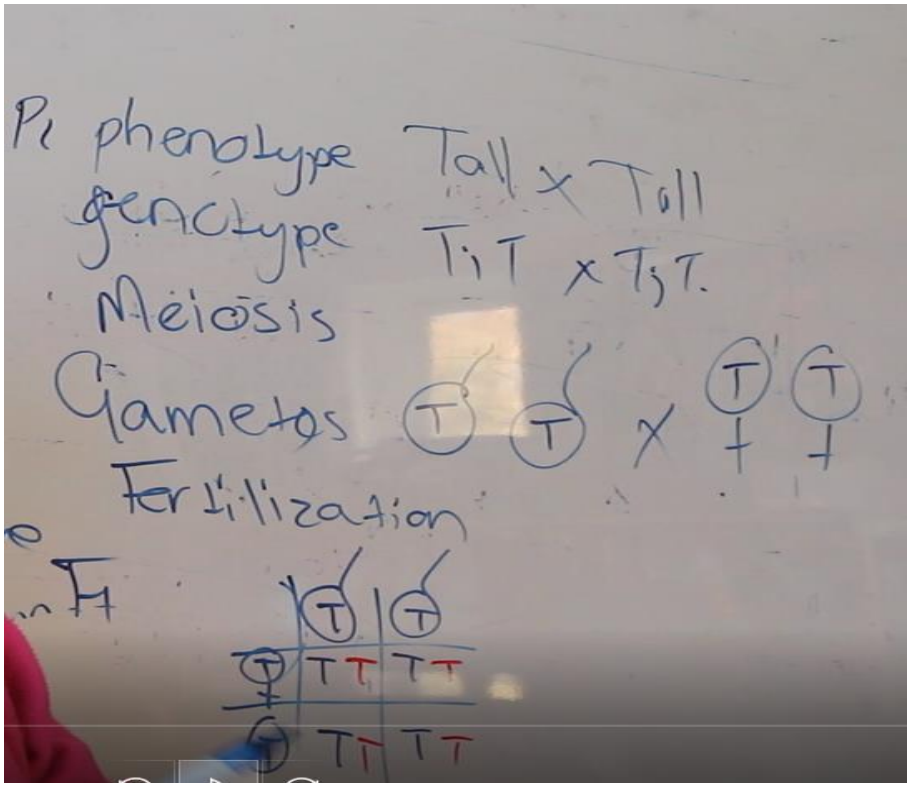
257. Okay because that is one line.

258. So, I repeated the female characteristic.

259. So, what is the male?

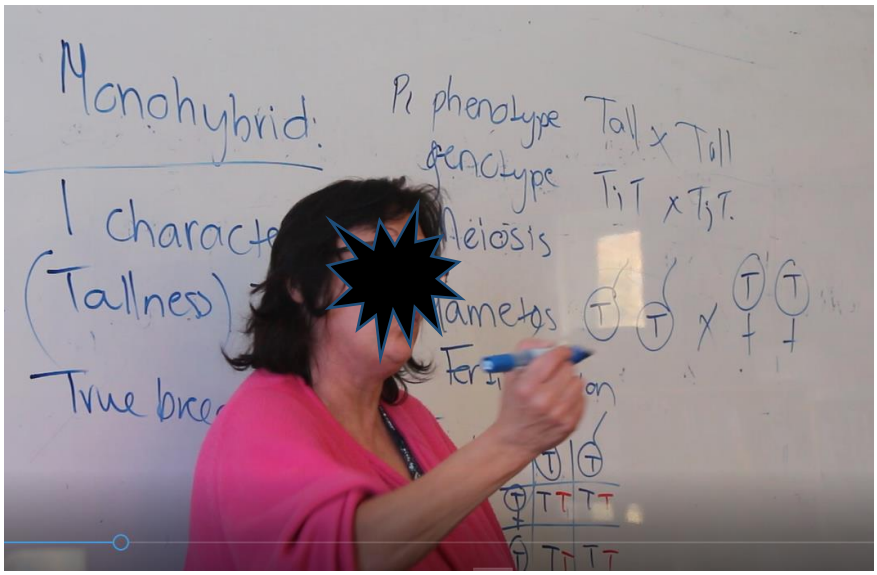
260. Okay so, it is also a T in this argument.

261. Okay there is a male.



262. What does this tell me about the offspring?

263. There will…be hundred percent chance of being tall [using different colours for TT]



264. Okay, you see where I am?

265. I am coming down to…you see if I do my…my genotype here ↑okay.

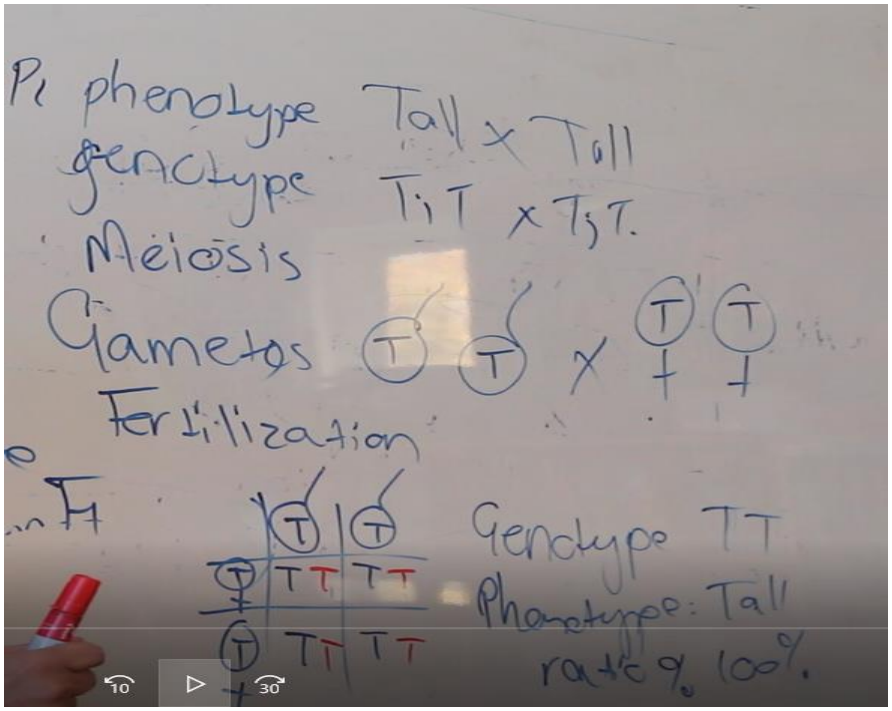
266. My genotype is just that.

267. Okay, phenotype I do not have to write this out.

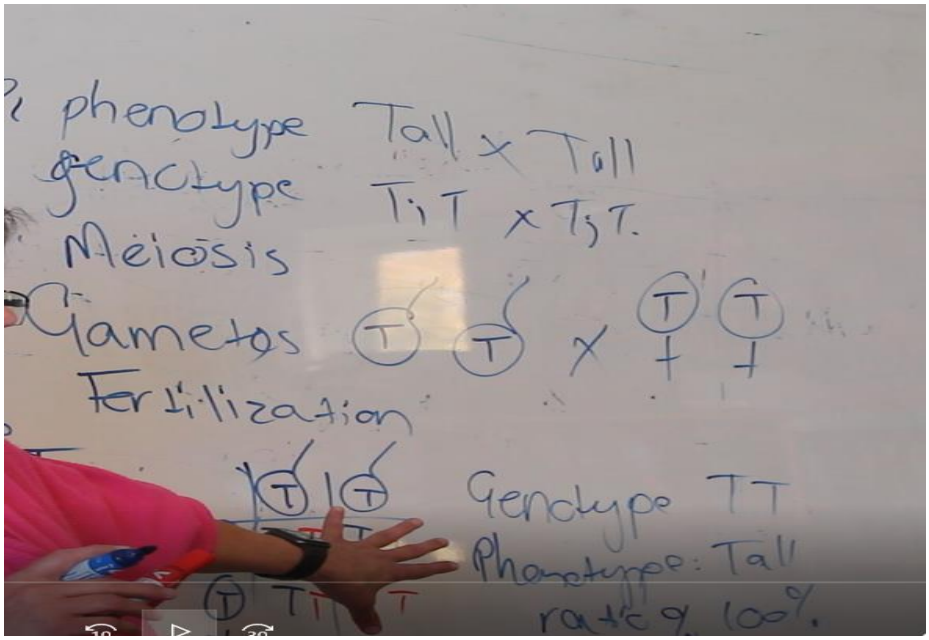
268. Ratio…can you put ratio, can you?

269. You can put percentage.

270. What does this tell us now? [Showing]

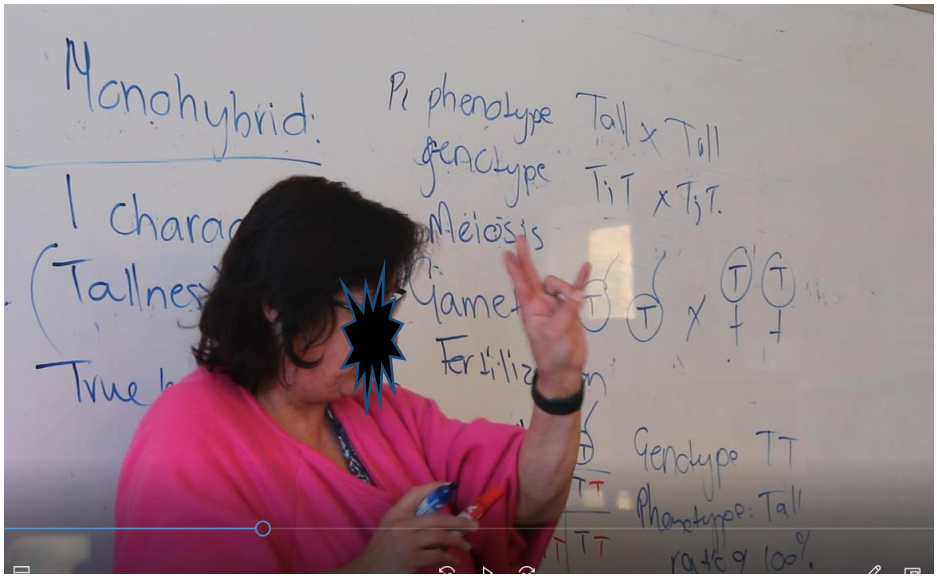


271. That is hundred percent chance of the offspring being tall.



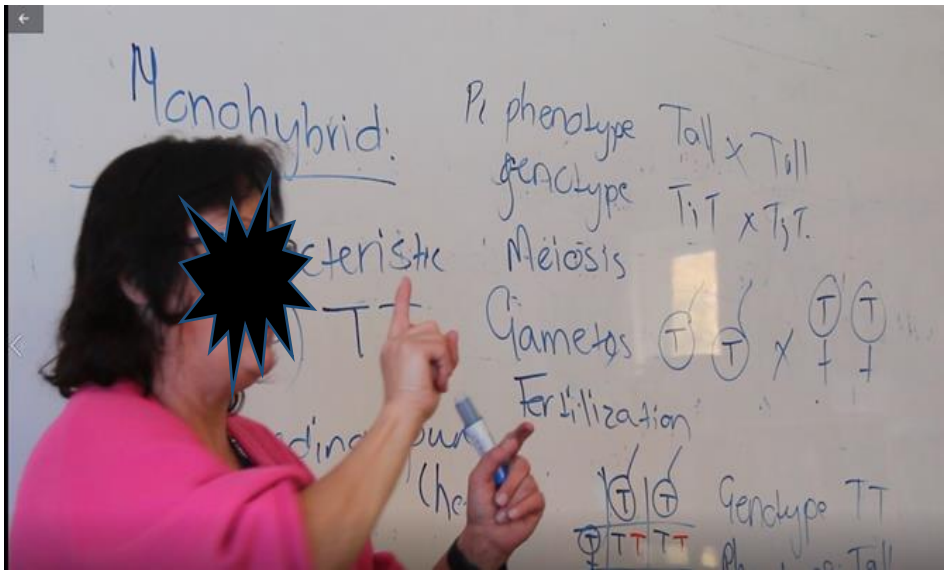
EPISODE 5: MONOHYBRID CROSS OF PURE BREEDS

272. Now, let us come and say, we are going to have two pure breeds.



273. We are going to cross a tall plant with a short plant, but they are both pure breeds and I am going to say to you.

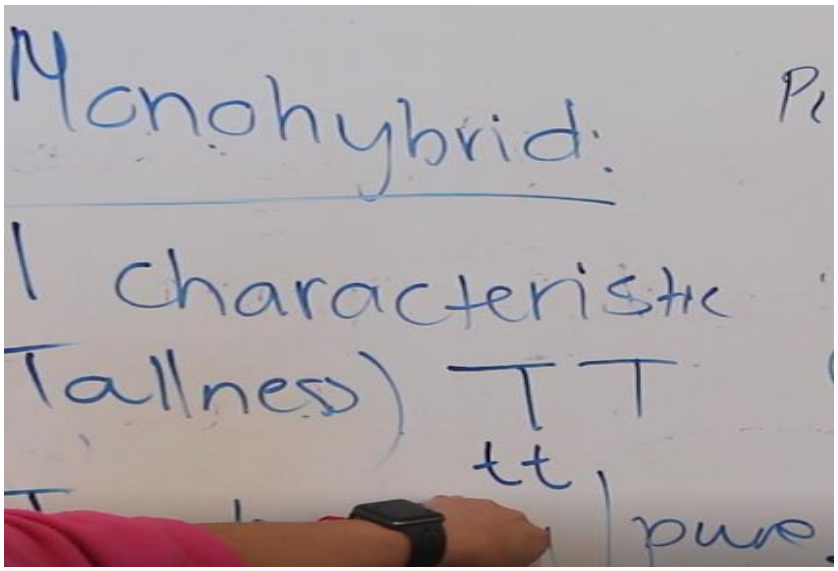
274. The tall plant is dominant…



…while the short is recessive.

275. What do you make of that?

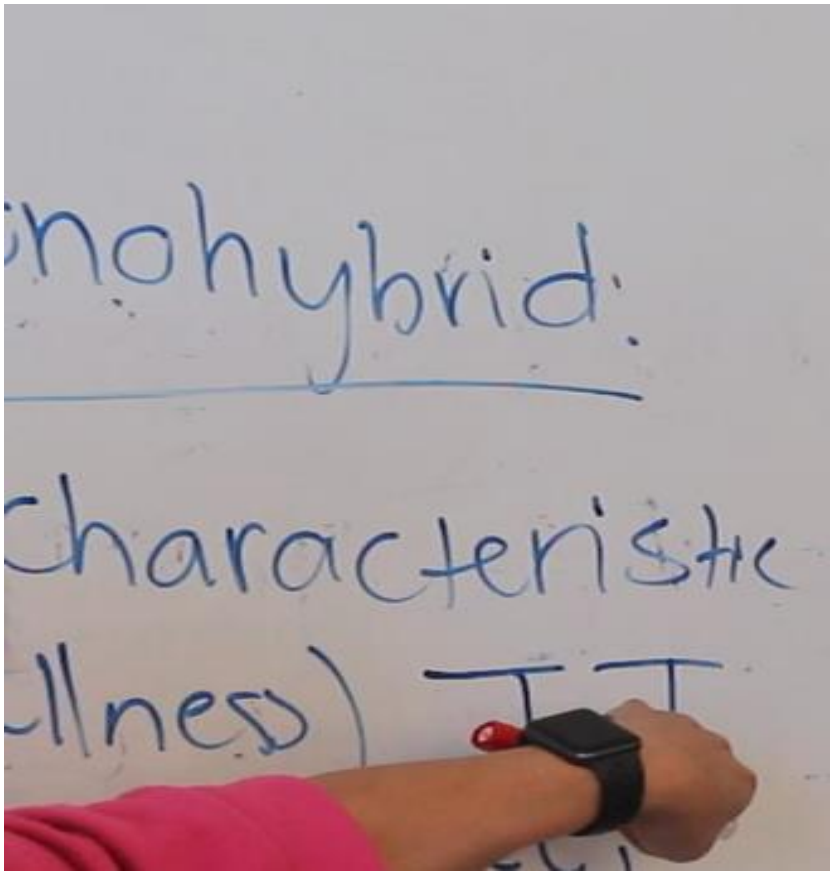
276. Okay so, there is my tall plant, and I am going to have the short plant here. [Showing]



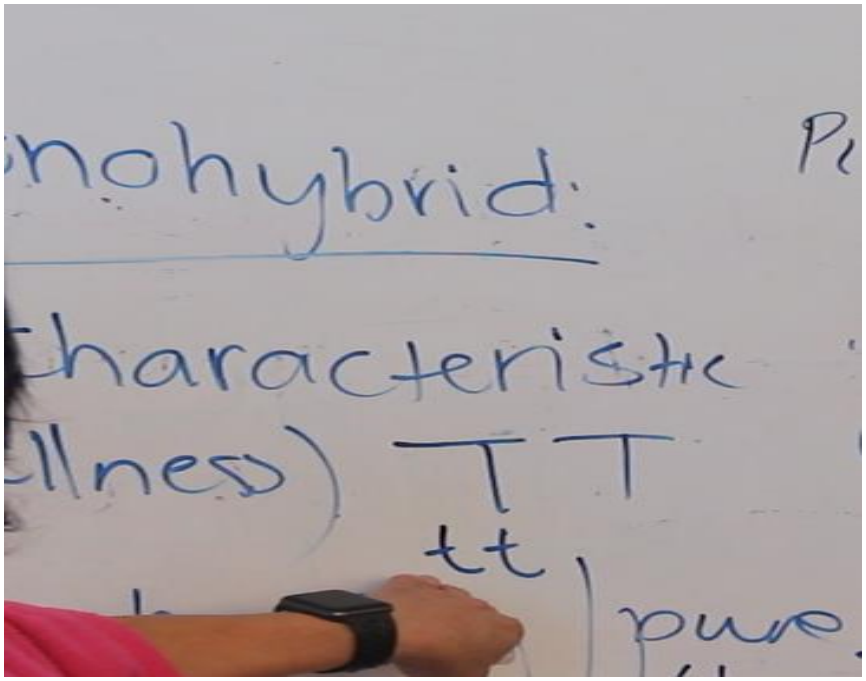
277. I am going to use a symbol similar to my dominant so, I am just going to use lower case in this case for instance okay.

278. ↑you always have to use the same symbol unless the question tells you to do something else and that comes only later when we go through where there are other things we need to consider but for now we use that same symbol.

279. So, I am going to say that I have a pure tall plant and I am going to cross it with a pure short plant, I am telling you that ahm…the tall plant…

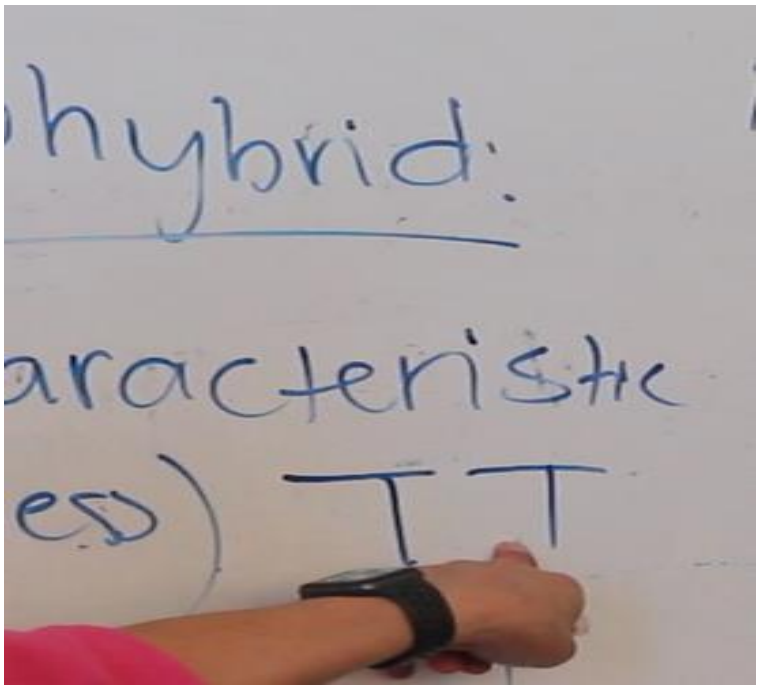


…is dominant over the short plant okay…

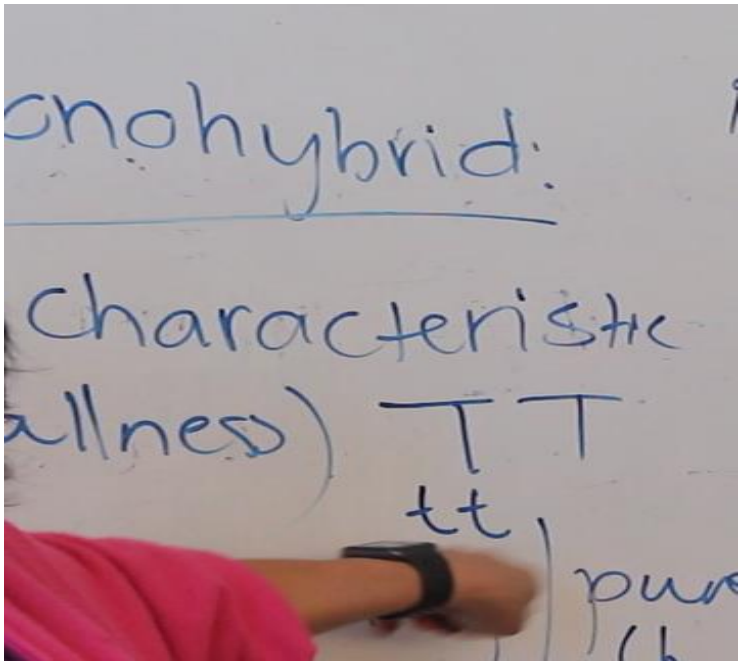


…the genes are dominant in other words, homozygous dominant.

[Pointing]



…and recessive. [Pointing]



280. Right guys, this can change the whole story.

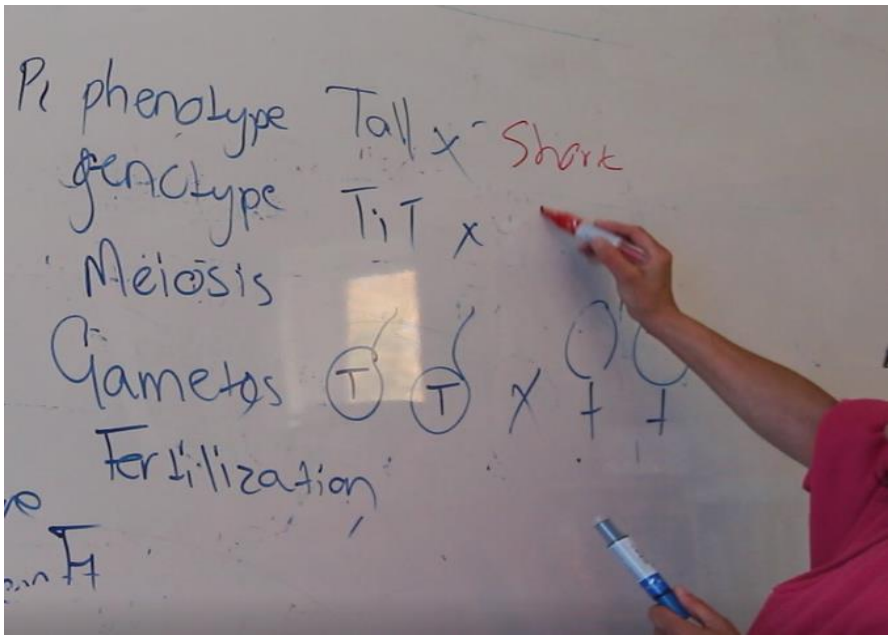
281. It is very simple okay [erasing part of the board] let me change the one side okay and this does not mean that males are dominant over females it is just for argument sake okay, we are using that.

282. Okay, let me wipe this so I can draw the whole punnet square.

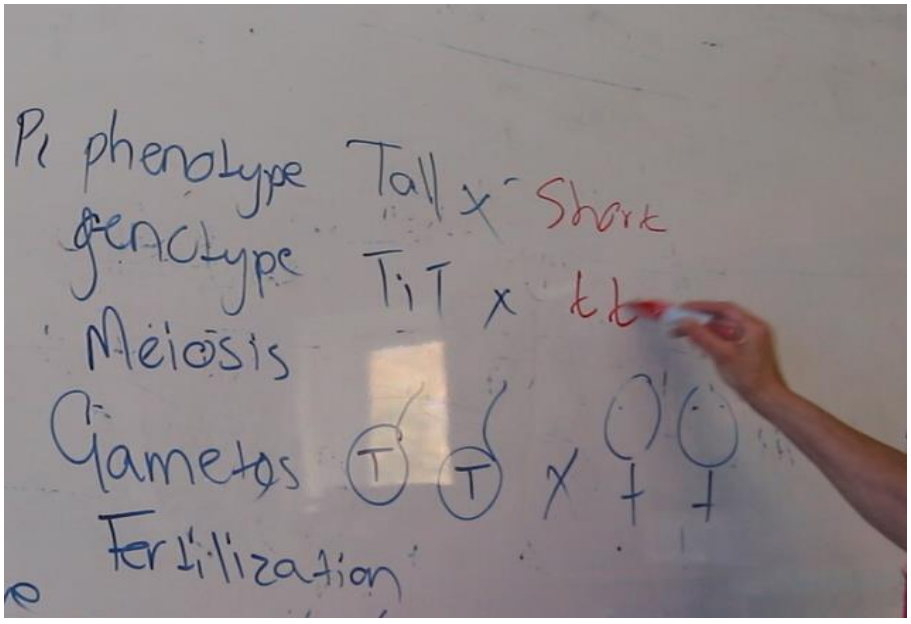
283. ↑okay so, I had a short pea plant and I am going to cross it with a tall pea plant but my gene for tallness is dominant over shortness.

284. Okay so we have got the whole ↑story.

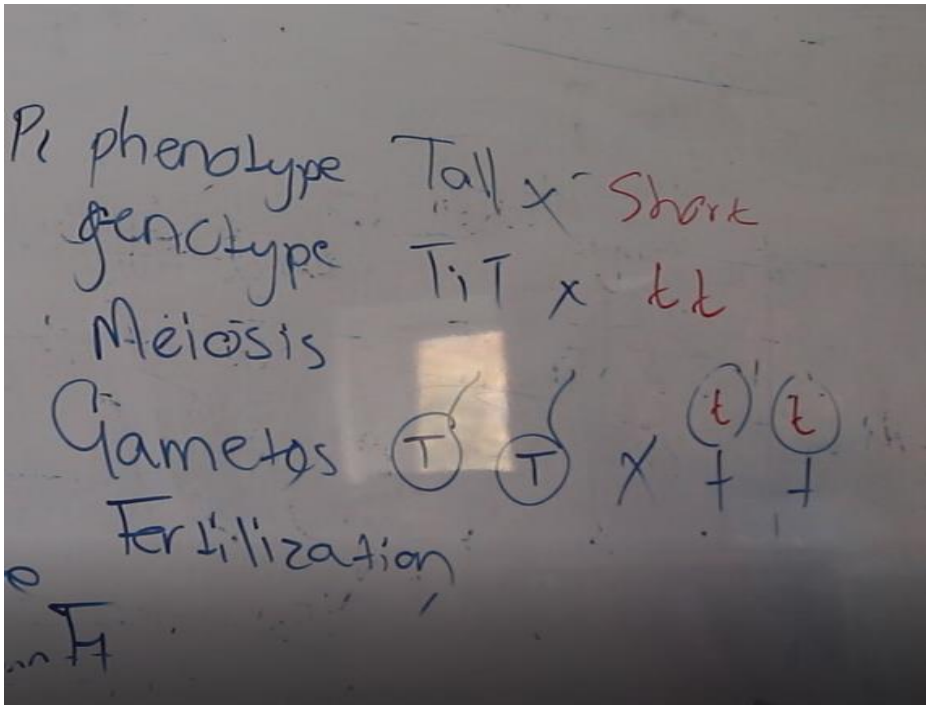
285. So, I am going to write here short alright.



…and I am gonna do that [writing tt].



286. Obviously, meiosis is going to give me two ova. [Writing tt in the ova]



…ahh…with the gene for shortness okay / ? / it does not really matter okay; it is for argument sake.

287. You keep it line okay.

288. What is going to happen when fertilization now takes place? [Writing]

289. This is a sperm, here is an ovum.

290. I am just going to do the ovum like this for argument sake right, the cross means it is a female and the arrow means male.

291. The arrow means penis right.

292. Ls: [Laughter]

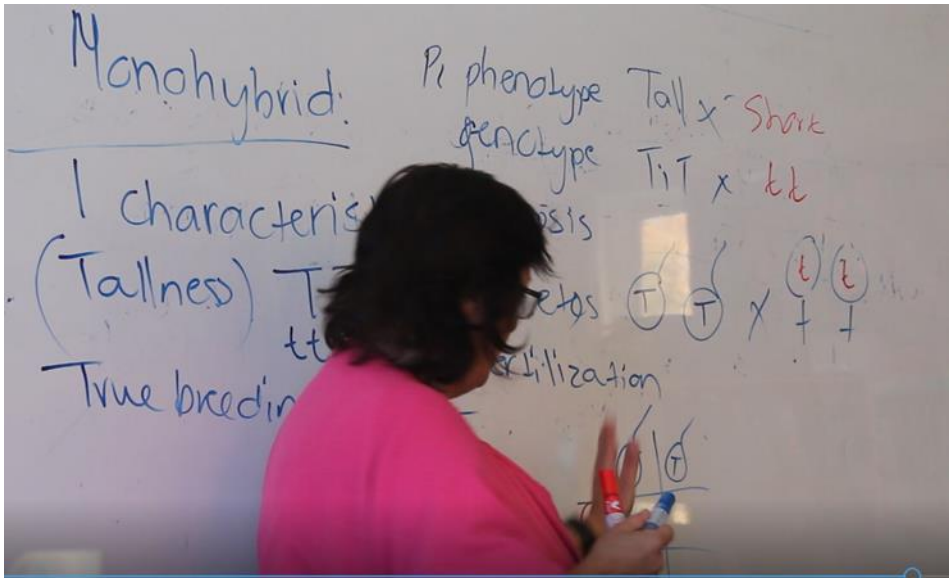
293. Mrs. Durand: Now we are going to cross them.

294. Ls: Noise

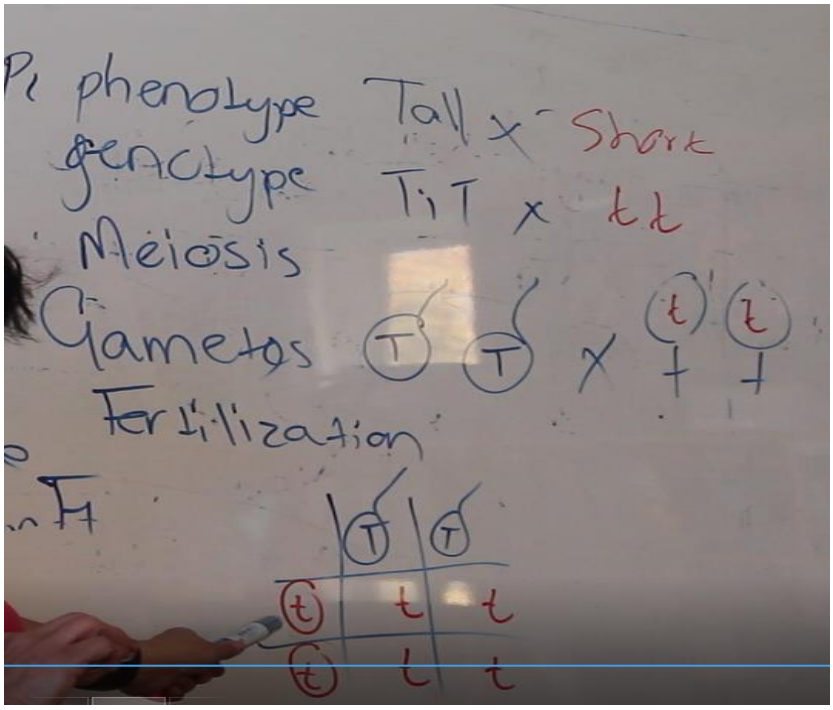
295. Mrs. Durand: Now you must remember something very important.

296. We always write the dominant towards the left and the recessive towards the right, but I am just going to start with the female alright.

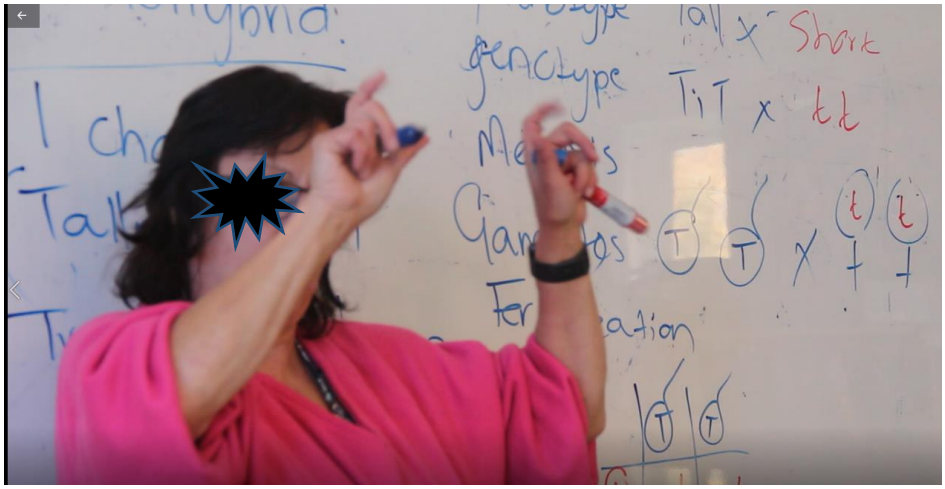
297. So, I am going to put it towards the right-hand side of the box, [showing]



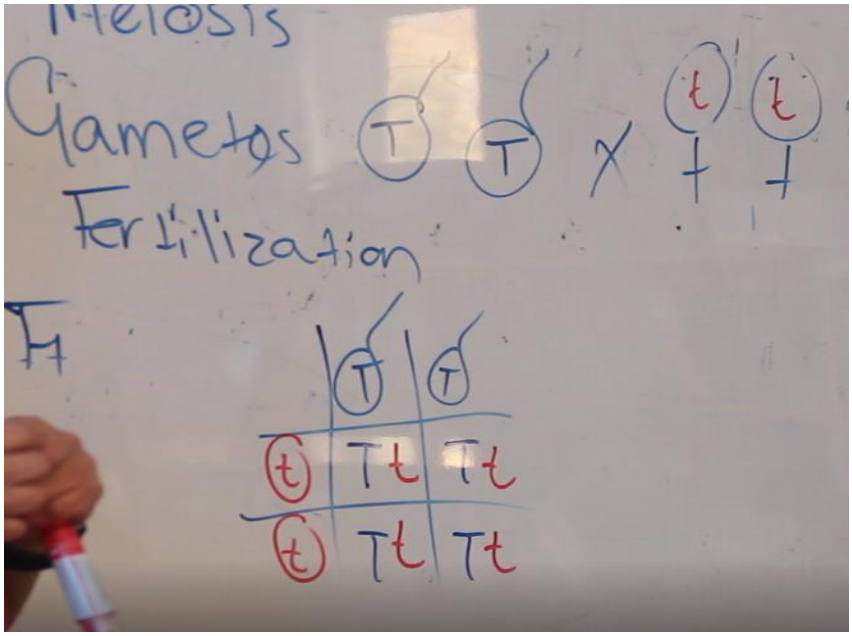
you see that?



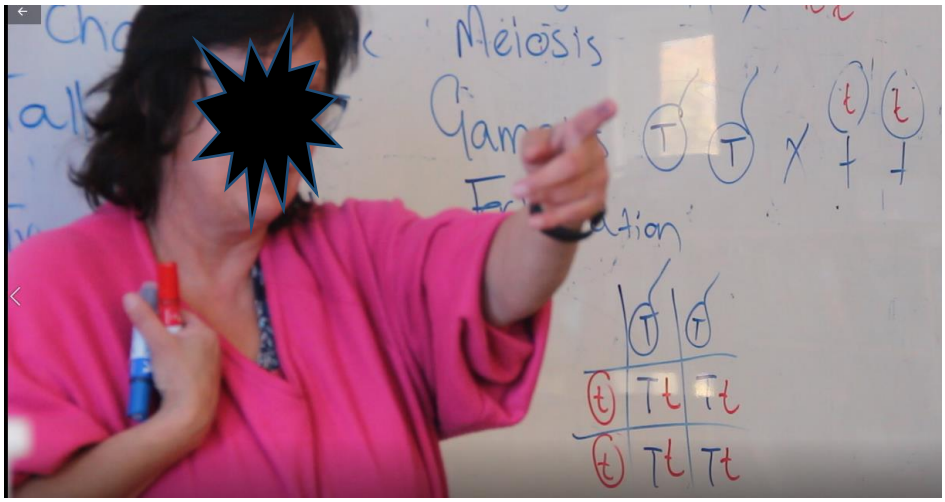
298. Now I am going to put in…the tallness of the sperm



…or pollen.



299. What now…what happens now… [Pointing to learner]

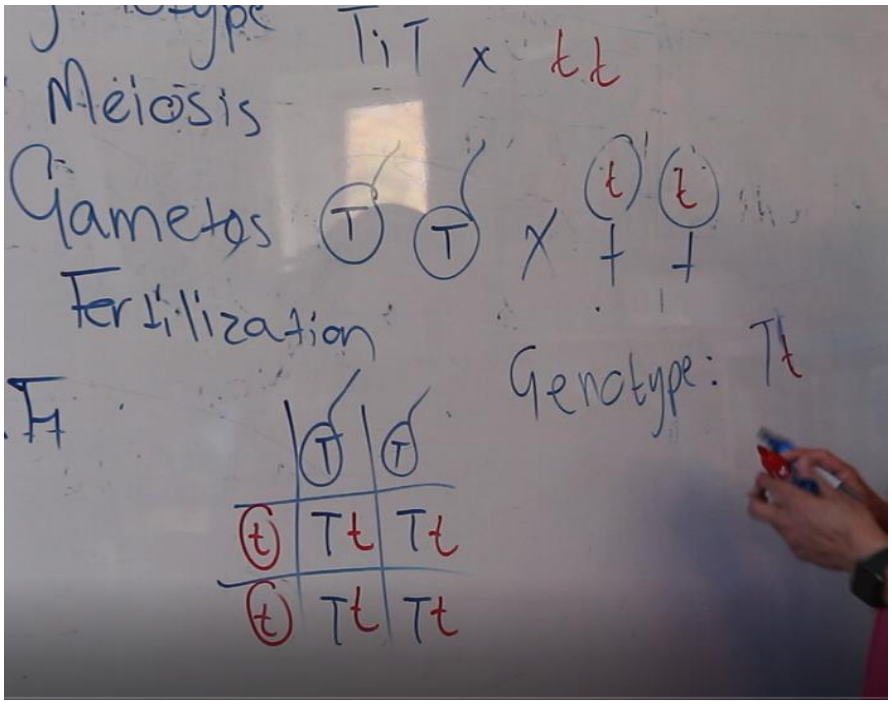


…to the genotype?

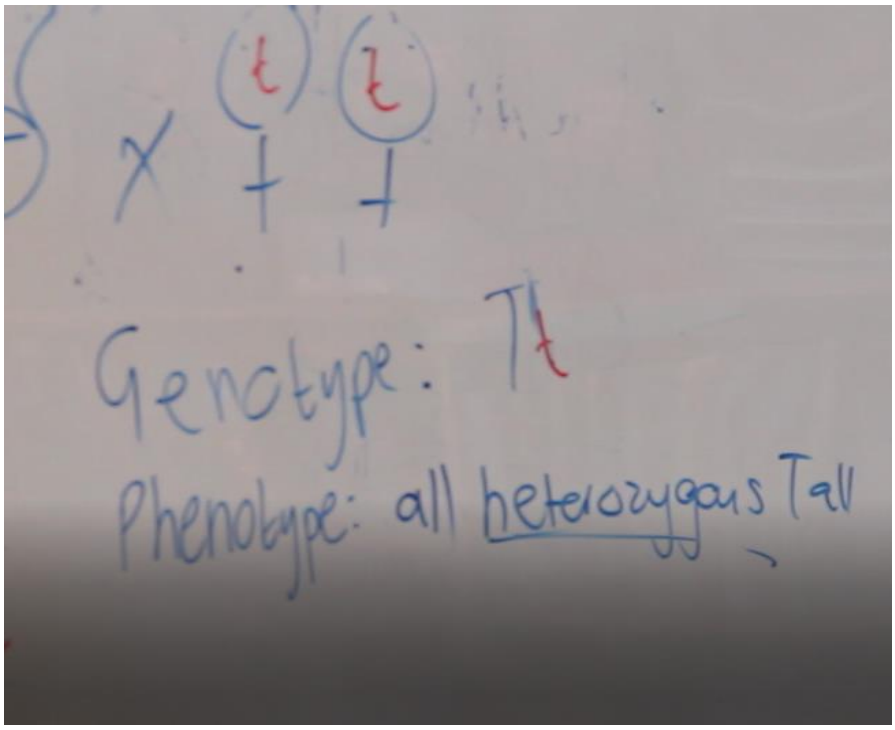
300. Okay I am going to show you something, what you must write when a question comes out in the examination.

301. Okay so, genotype of the F_1.

302. They are all… [writing Tt]



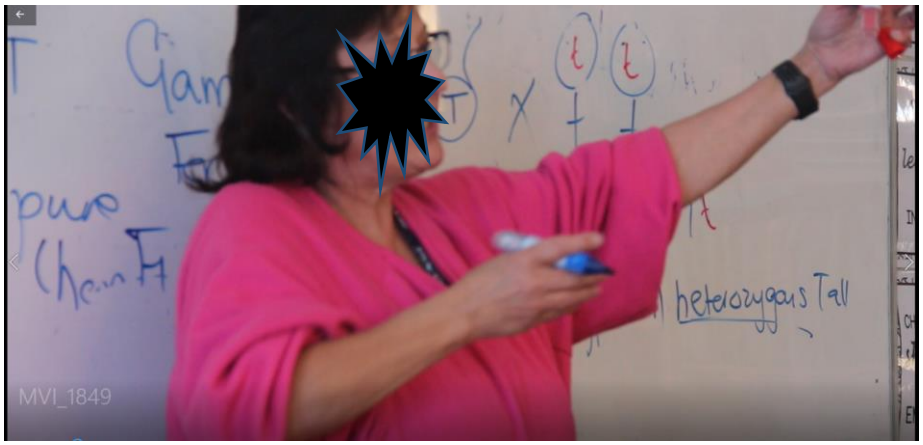
…but in the PHENOTYPE they are…we are going to say all HETEROZYGOUS TALL.



303. Why heterozygous?

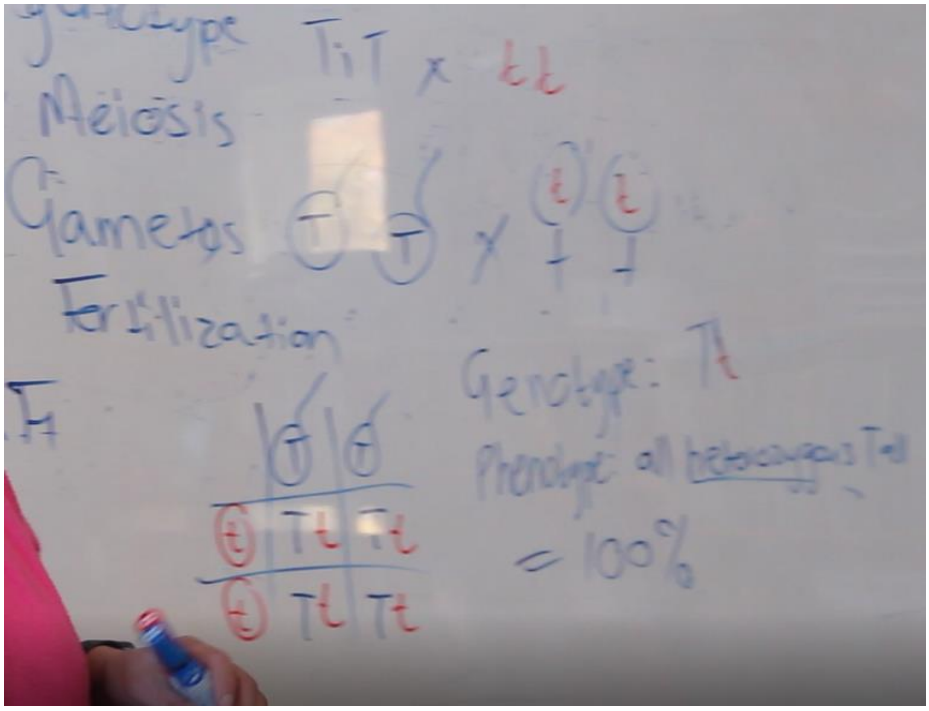
304. They have got alternative forms of the gene.

305. They have got a tall gene…



…and a short gene okay.

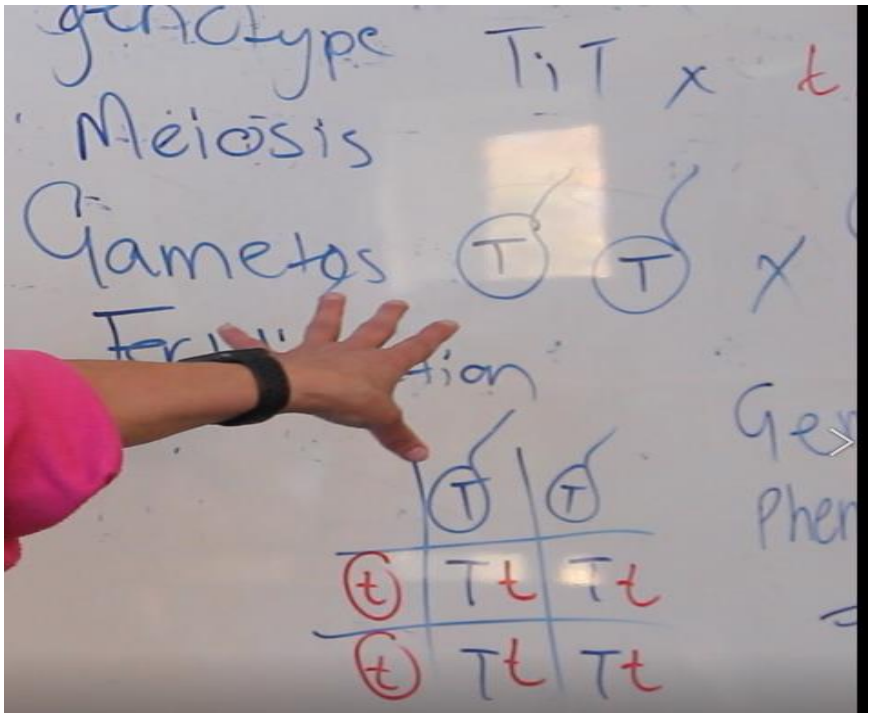
306. Yes! They are going to be hundred percent tall okay. [Writing]



307. You can also put a ratio of one is to one if you really want to but there is no need to do that.

308. Right, you can go to your percentage straight away.

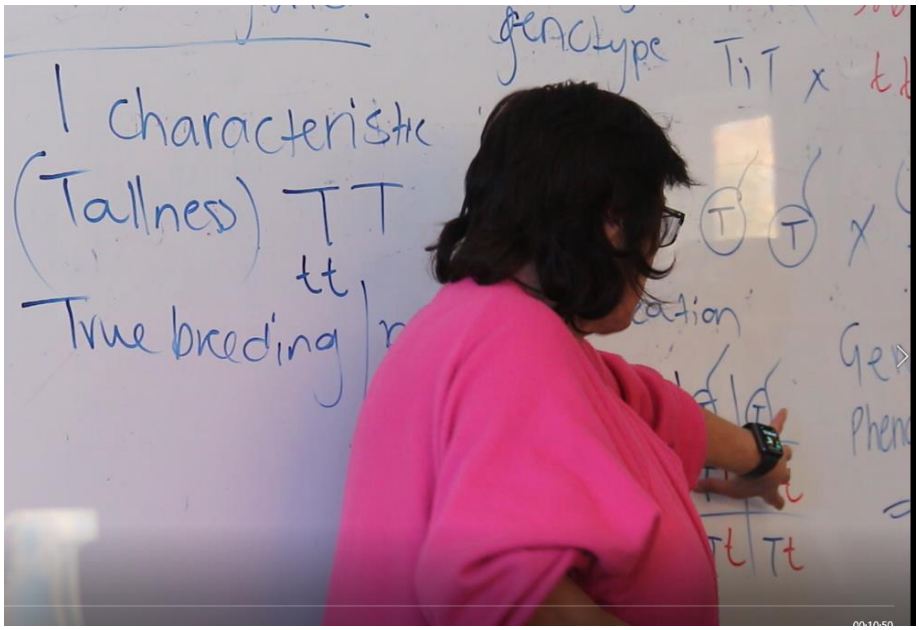
309. Do you understand what I have done here?



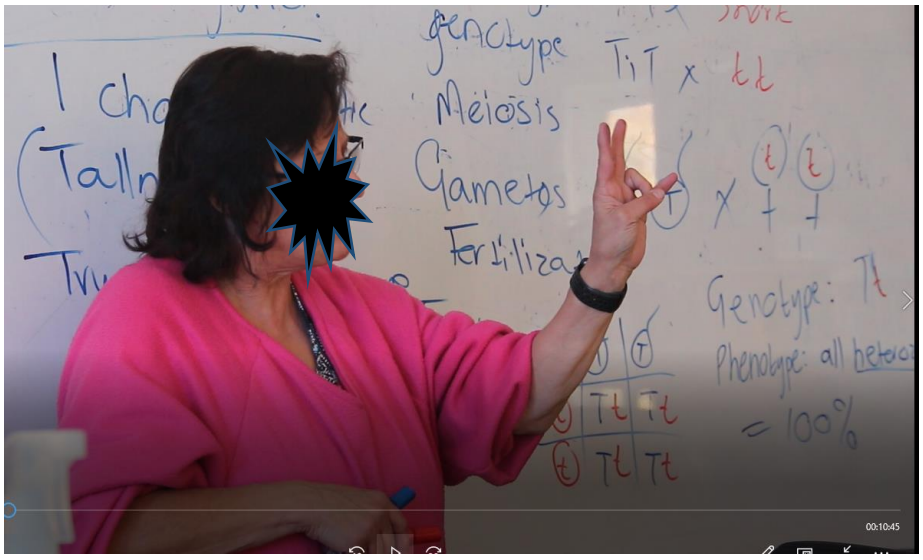
310. Ls: Yes!

311. It is simple okay.

312. Now we can say that, okay I want to take two of these offspring.

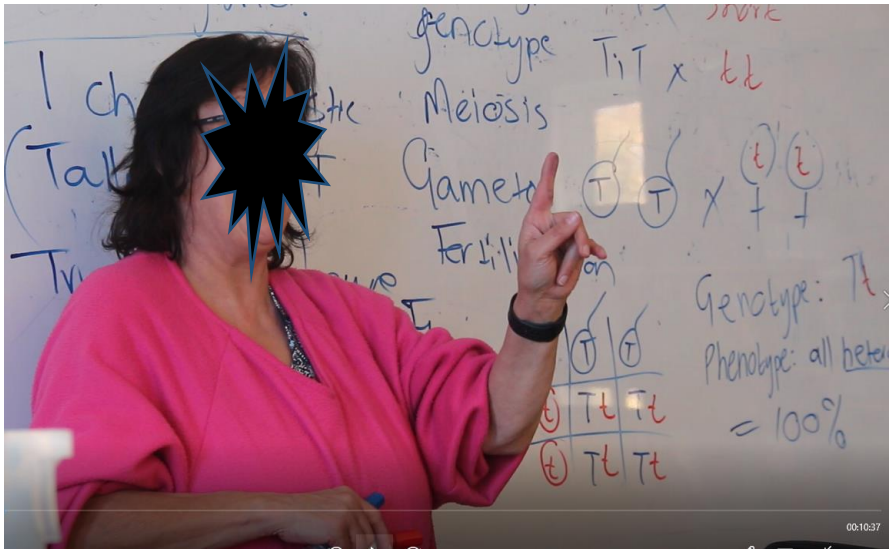


313. I am going to take two…



…heterozygous offspring and I am going to cross them.

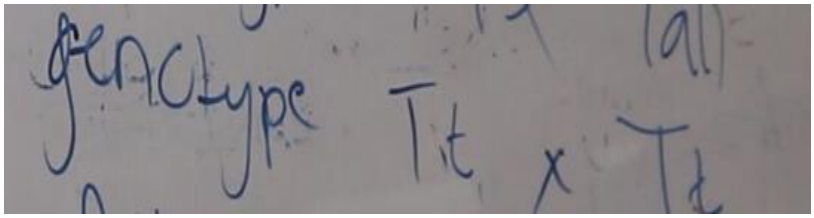
314. [Smiling]



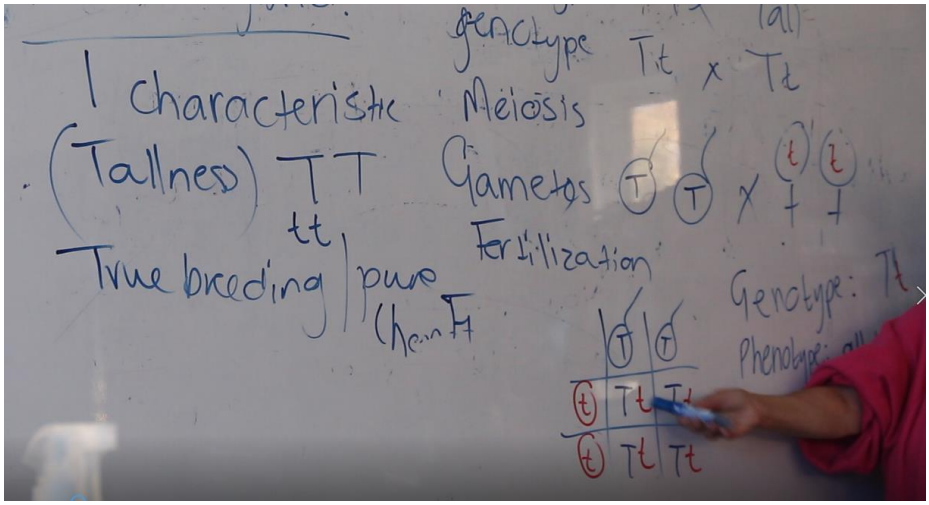
No! Wait before you can go onto that you are going to see something else differently.

315. ↑So, I am saying they are heterozygous, ↓I should not use my hands otherwise everything is blue and black by the time I am finished.

316. Okay so, this one is tall, but they are now…they are heterozygous hey.



317. So, I am taking two of these and I am crossing them.



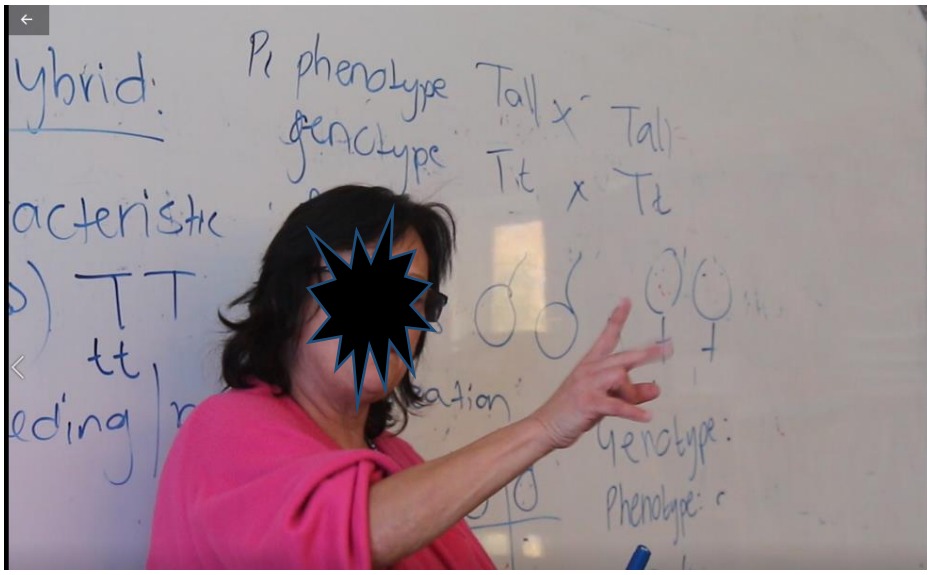
318. [Erases part of the board]. Okay, we are going to go through meiosis now.

319. Okay wipe that out, wipe that out.

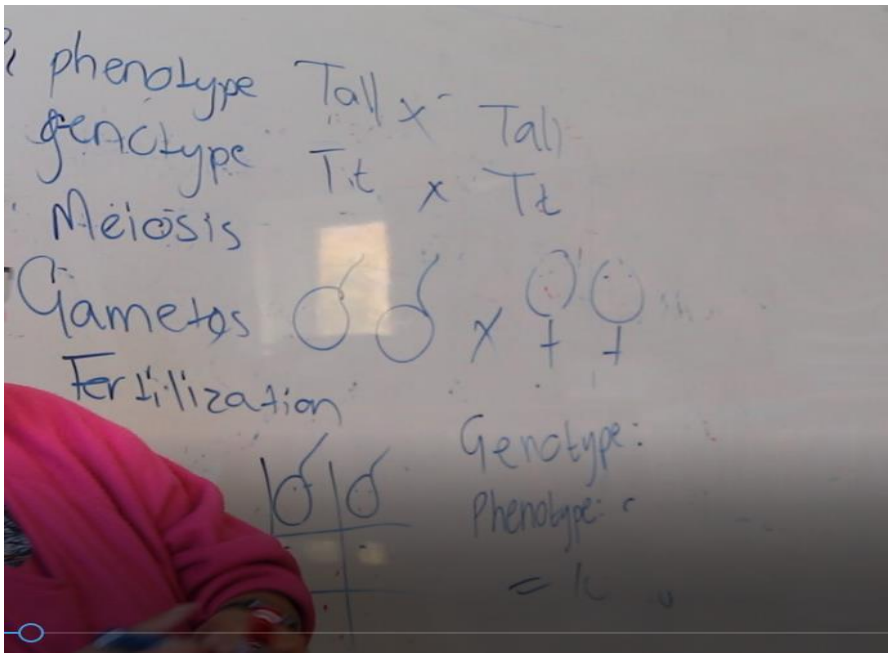
320. Right! What is going to happen now?

321. It is meiosis… what is going to happen?

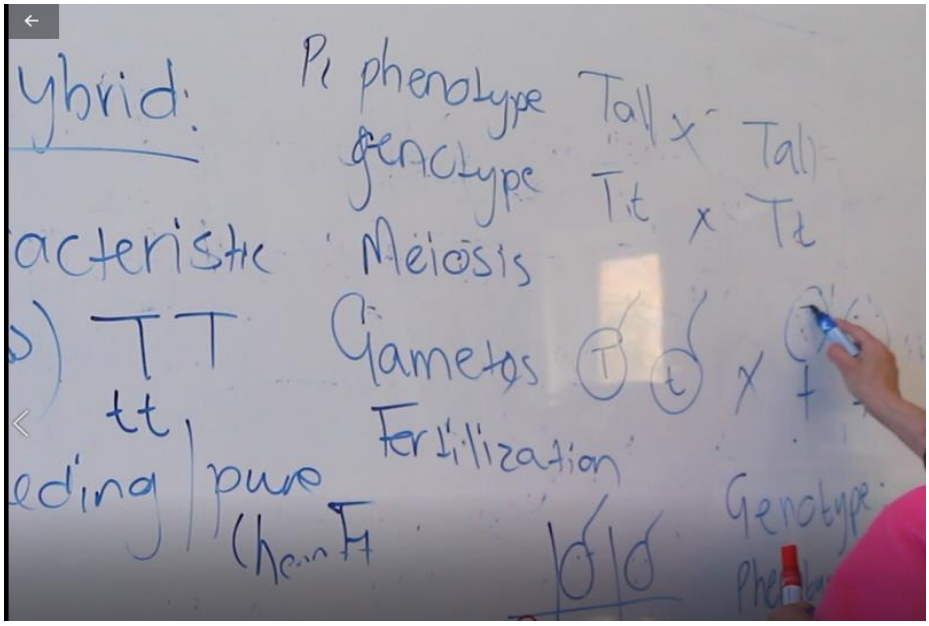
322. Each one of them…



…carries a tall gene and a short gene.



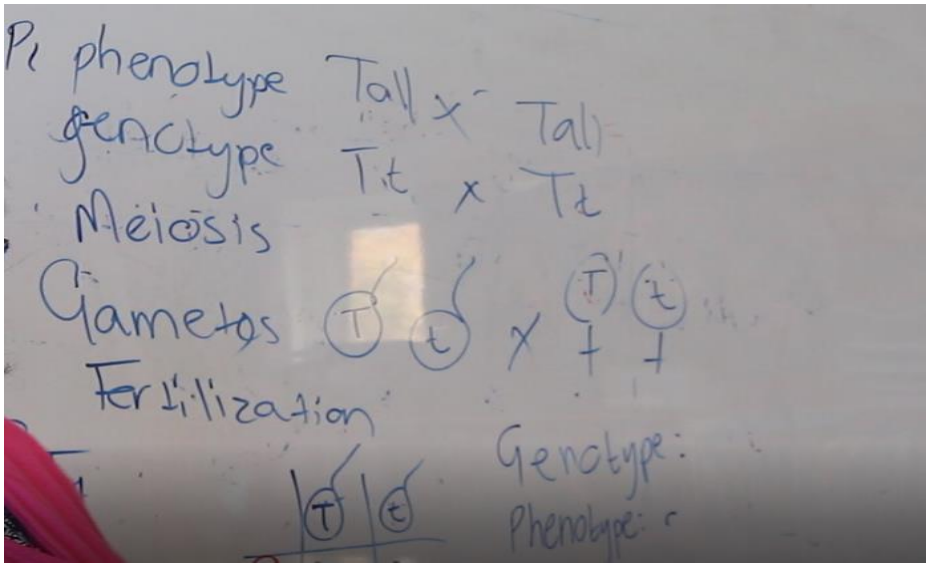
323. So, one sperm will have a tall gene, one will have a short gene.



324. Okay, same here, one tall, one short okay.

325. Do you agree with me?

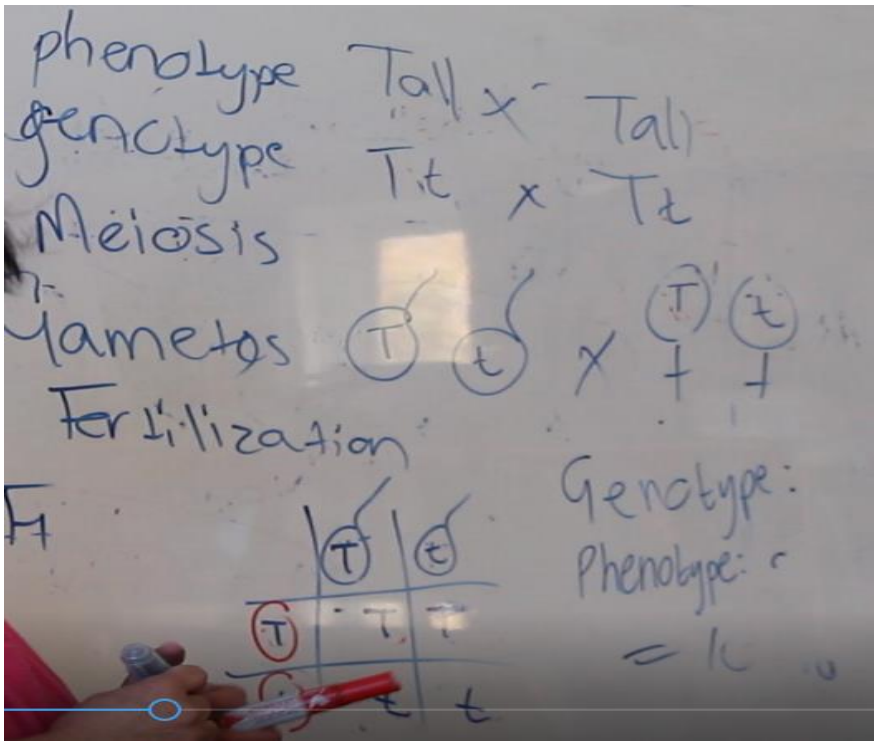
326. Okay so, one tall, one short, one tall, one short [writing].



327. Now I am telling you, you must put in whatever you see here.

328. Now I am telling you that you T capital letter is always first, so it does not matter what I really do here okay.

329. Are you agreeing with me on that point?



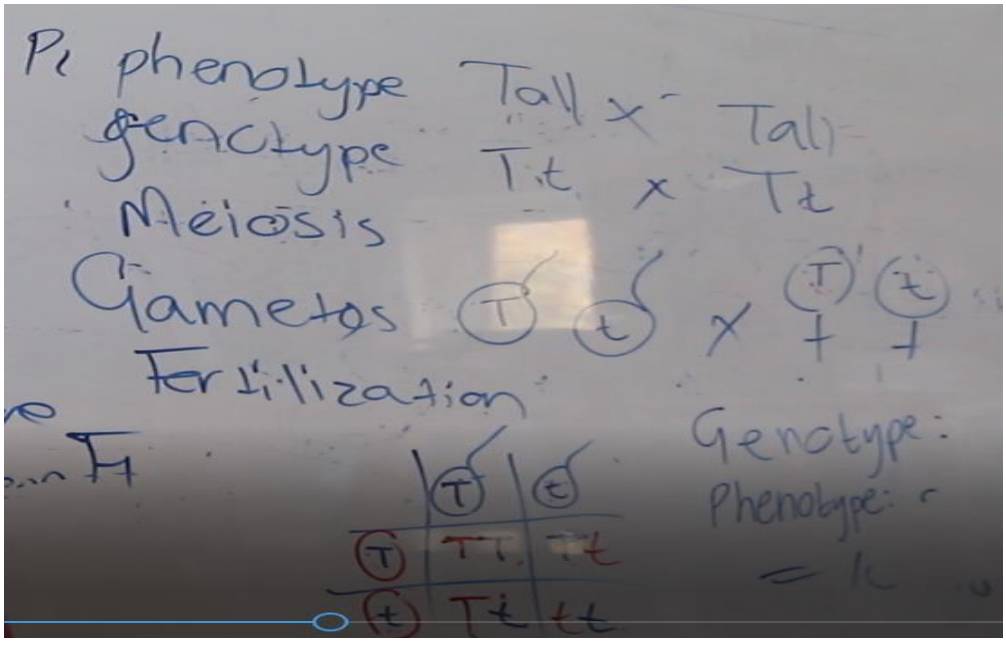
330. Ls: Yes!

331. Mrs. Durand: Okay, what then happens…when we add the male?

332. Shall I use male in red colour now?

333. Ls: Yes, ma'am.

334. Mrs. Durand: Okay… [Writing]



335. What on earth happened?

336. Percentage wise twenty-five plus twenty-five plus twenty-five is…what is the total?

337. Ls: Seventy-five!

338. Mrs. Durand: Seventy-five. What is that here?

339. Twenty-five of the offspring will be short.

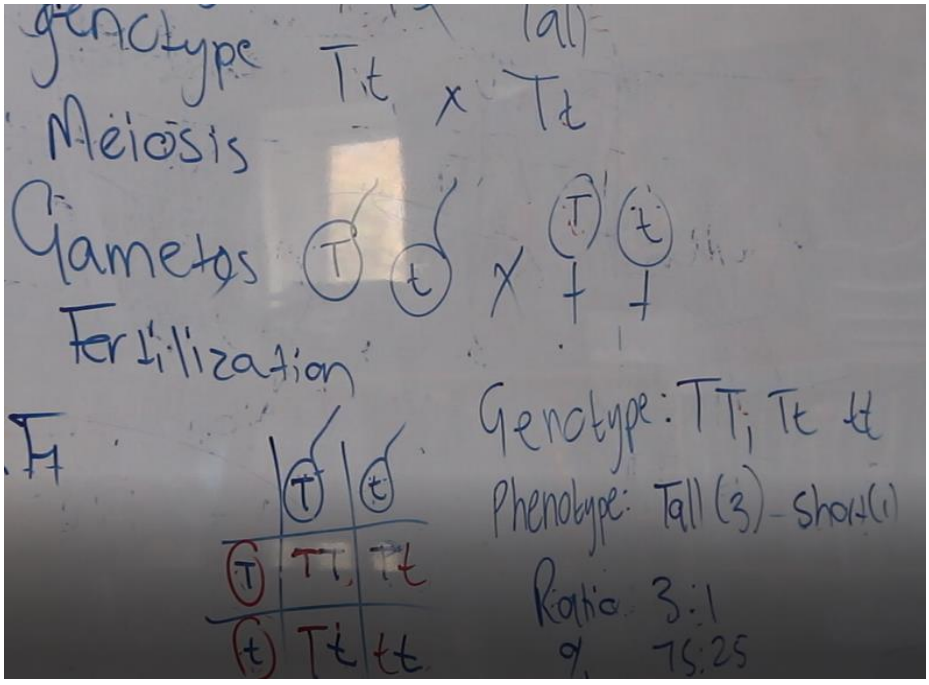
340. This people all the time you cross two hybrids, where the genes are alternate forms…that is the ratio you are going to get [smiling] okay.

341. So, here we say we have this and that genotype [writing TT, Tt and tt] okay, we are going to say phenotype you can do that okay [writing Tall] and short one.

342. Now I an already putting the ratio in. what is my ratio?

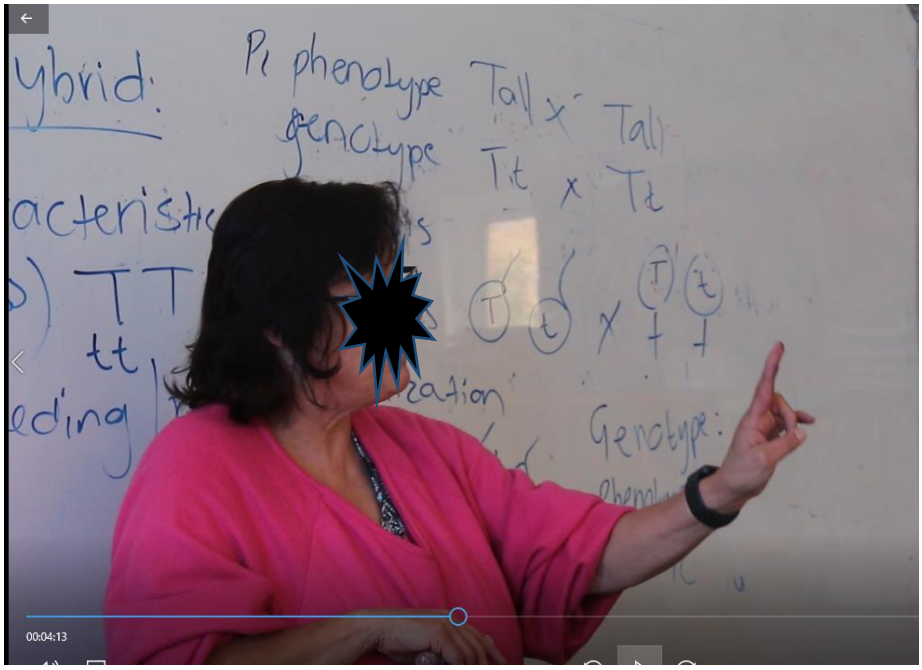
343. Ls: [chorus]

344. Mrs. Durand: Three is to one, seventy-five, twenty-five and…that is how you would do a genetic cross problem.

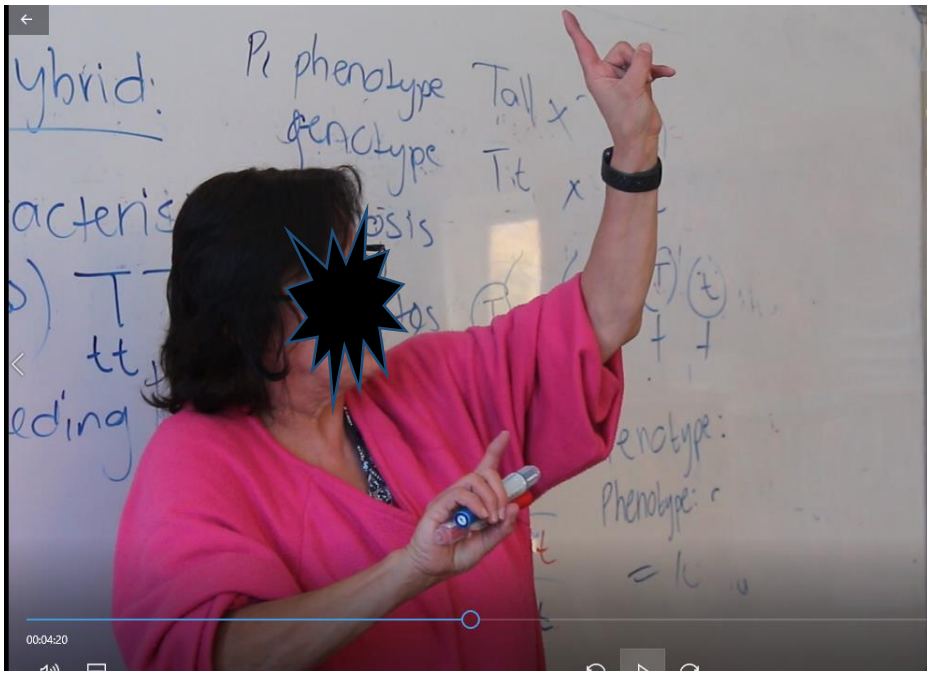


345. Now, have you listened to what I said to you?

346. Every time…



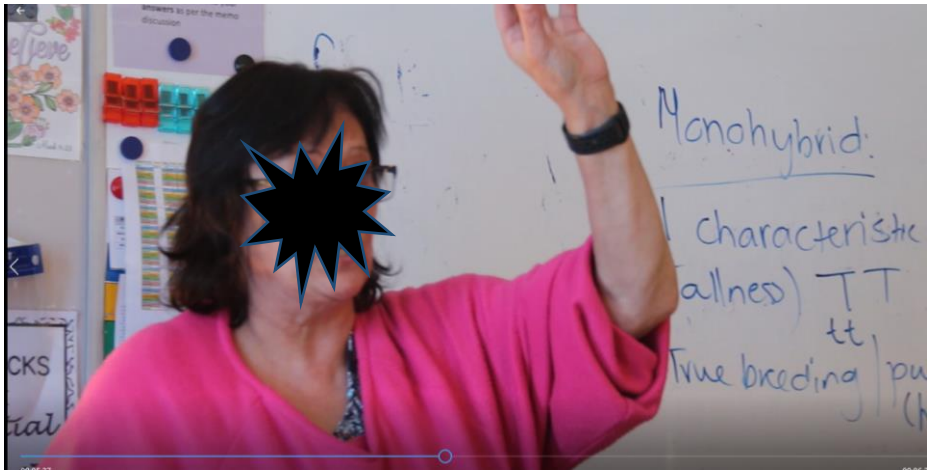
…you cross hybrids where the two genes are alternative forms,



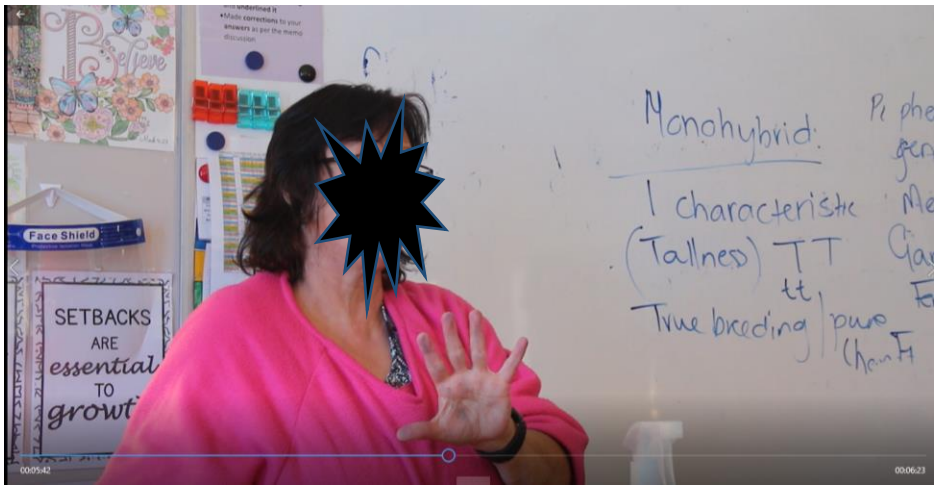
…that is the ratio you are going to get.

347. Right, always seventy-five, twenty-five or a ratio of three is to one.

348. Three of them will have the dominant feature,



…one will have the recessive feature.



349. Are there questions?

EPISODE 6: BACK TO TERMINOLOGY

350. Okay we are going to go back to the terminology page, and we can fill in the ones that are missing.

351. Ls: [Noise]

352. Mrs. Durand: Now I did say talk, you go back to your first page.

353. Ivan: Ma'am is this is going to be / ? /

354. Mrs. Durand: Yes! Ahh…although there is -- I will say yes.

355. Let us just leave it at yes.

356. For example, tallness in people there are about six or seven different genes for that.

357. Okay but take it to be just one.

358.		Yes, it does, alright!
359.		Alright! [Sitting].
360.		Shall we just go from hybrid?
361.		You have hybrid already; am I correct?
362.	Ls:	Yes!
363.	Mrs. Durand:	[Sitting] What is a gene?
364.		[Reading] "A sequence of DNA that codes for a specific protein that determines a trait".
365.		So, what is gene?
366.	Ls:	A sequence…
367.	Mrs. Durand:	Short section of DNA…okay, that codes for a protein and therefore that protein it codes for is actually one of your characteristics.
368.	Ls:	[Noise]
369.	Mrs. Durand:	Excuse me!
370.		Why not just listen now and then I will…I would redo it with you.
371.		Okay, you are supposed to know already what a gene is.
372.		You have done that from…meiosis, from DNA onwards.
373.		You have done that in meiosis as well.
374.		What is a gene?
375.		It is a short section of DNA…that codes protein…and determines a trait or characteristic.
376.		A short sequence of DNA that codes for a protein and determines a trait or characteristic…it is that same thing.
377.		Alright, but a question may say characteristic, or a question may say a trait.
378.		Please be aware of that okay.
379.		You got that?
380.		Okay, a short sequence of DNA that codes for a protein and determines a trait or characteristic.
381.	Walter:	Ma'am, ma'am so if a question says please define what a trait… / ? /

382. Mrs. Durand: I cannot hear you, please pull the mask.

383. Walter: [With mask down] If a question says please define what a character…ahh…chara-- ehh…

384. Mrs. Durand: They will never say that!

385. walter: Okay.

386. Mrs. Durand: No! Alright now an allele people is very simple.

387. We have alleles on the board.

388. It is an alternative form of a gene.

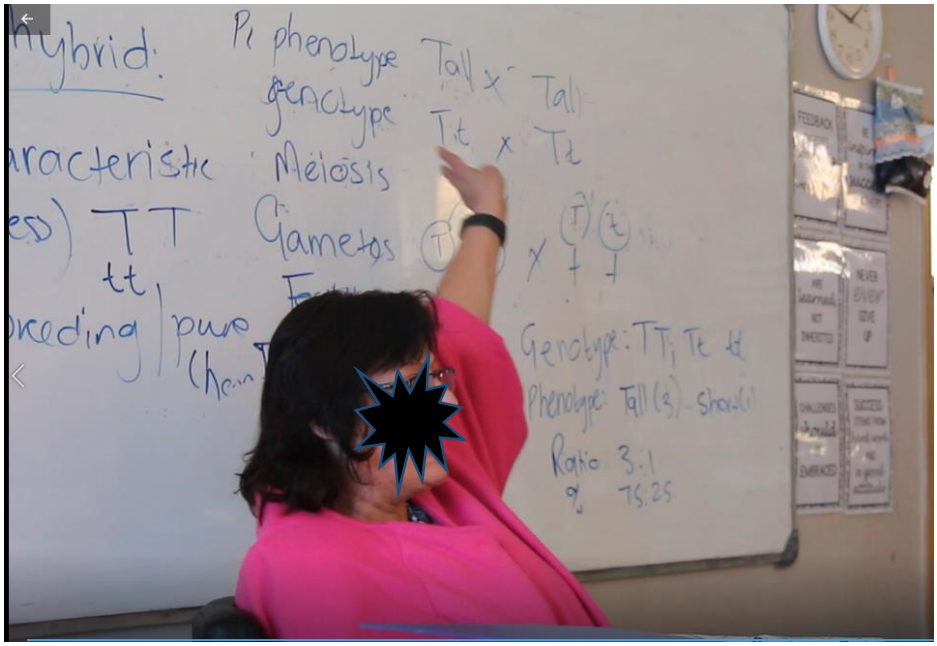
389. Were we have tall gene and short gene.

390. Okay, please for dominant and recessive, I am going to give you what it stands for here.

391. You need to know this basically off by heart.

392. Okay for dominant [reading] "form of an allele…form of an allele whose trait always shows up if it is present" …form of an allele whose trait always shows up if it is present.

393. Okay, what is my allele here [showing]



…for dominant?

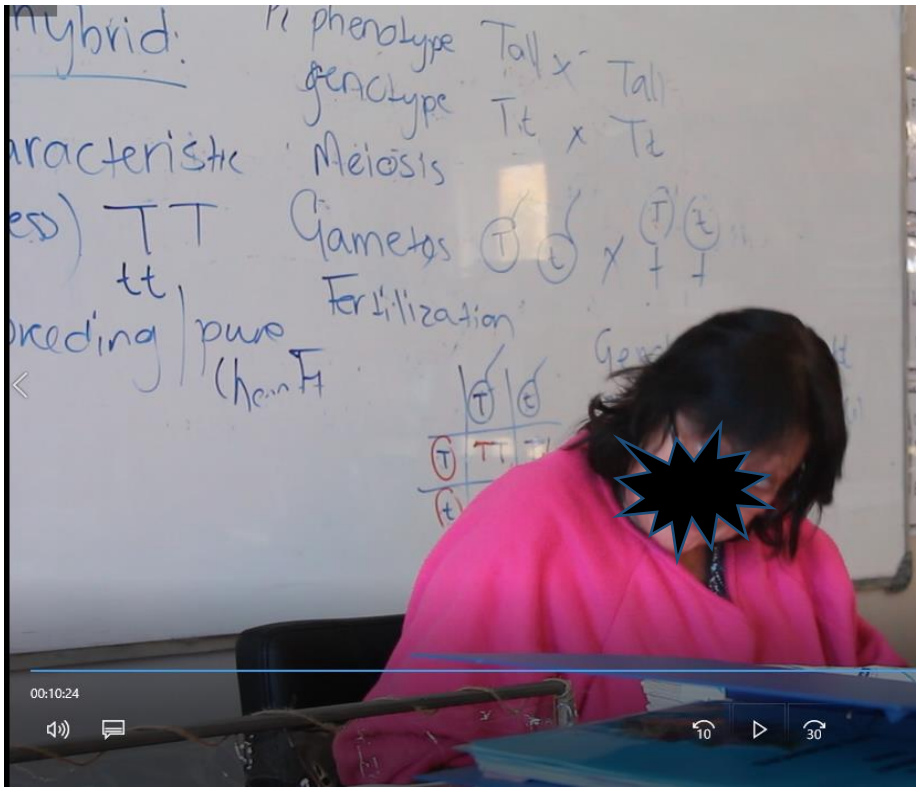
394. Ls: Tall.

395. Mrs. Durand: Tall, what is the alternate form?

396. Walter: Short!

397. Mrs. Durand: Short! Okay so, short will be a recessive allele.

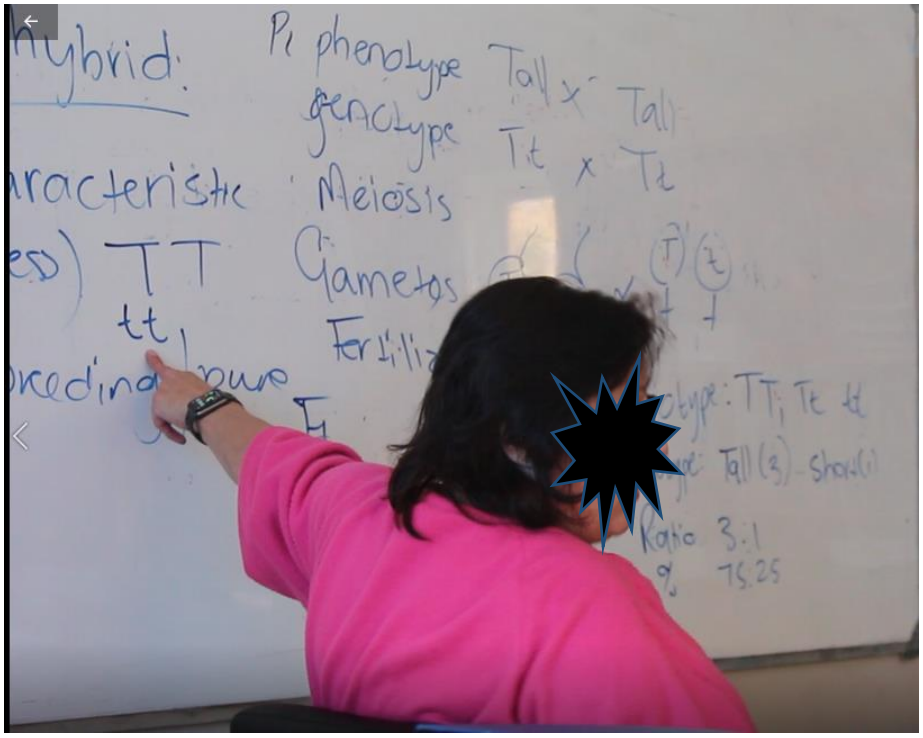
398. [Smiling] Right, for recessive, form of an allele whose trait shows up ONLY…



…and if you do that only in capital letters that will be good and maybe the always in capital letters for the previous one…shows up only when the dominant allele is not present.

399. If I take two short plants, is there dominant allele in there?

400. If I use what I had here for the previous one.



401. No! therefore, the plant will be short okay!

402. Must I repeat that?

403. Form of an allele whose trait shows up ONLY when the dominant allele is not present, okay very important.

404. You should know what gametes are.

405. What are gametes?

406. Ls: Sex cells.

407. Mrs. Durand: Sex cells which are the…

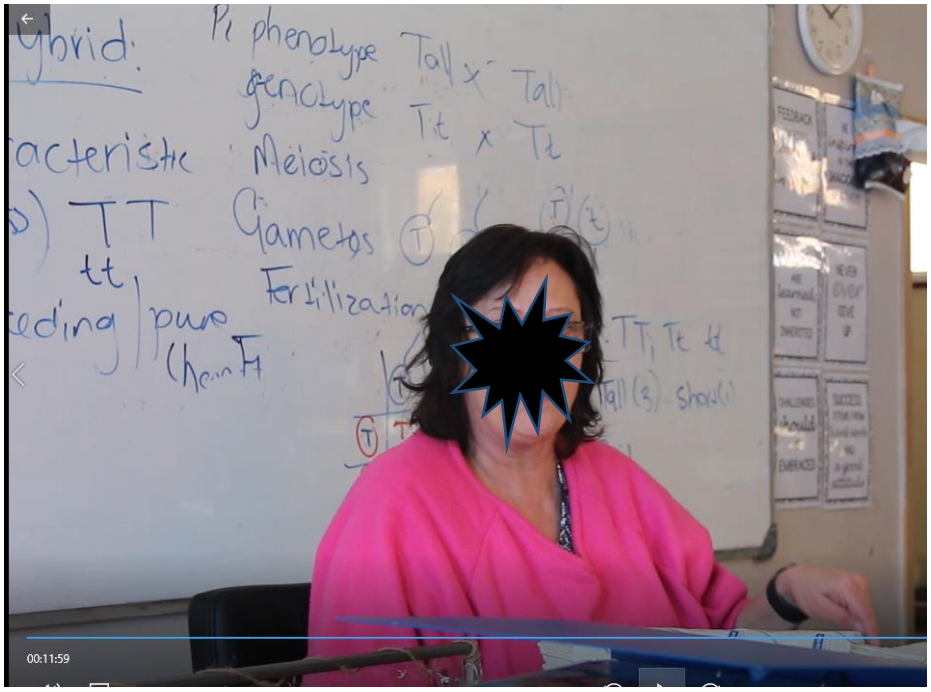
408. Ls: Sperm or ova

409. Mrs. Durand: Sperm or ova.

410. Okay, people I mentioned homozygous and heterozygous, but I am going to go through then again.

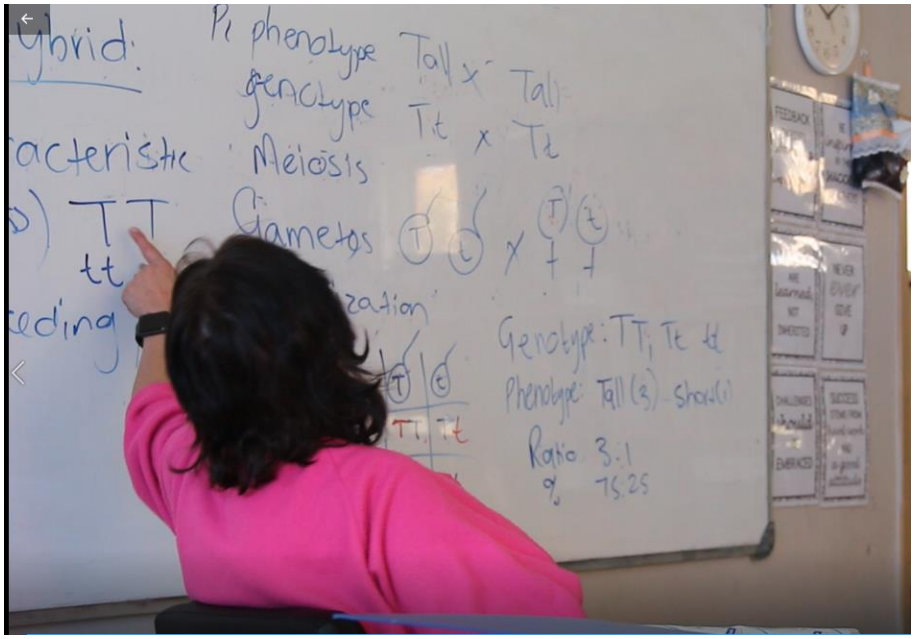
411. Homozygous, this is what the term refers to [reading]; an organism that has two identical alleles for a particular trait.

412. An organism that has…

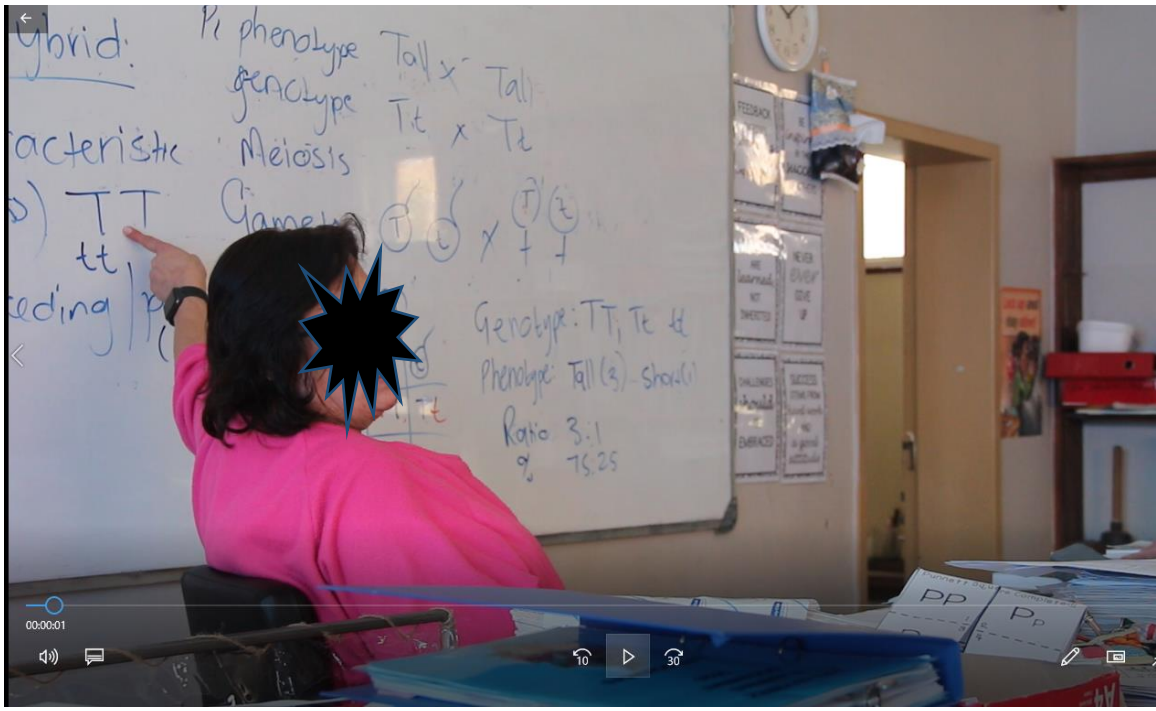


…two identical alleles for a particular trait.

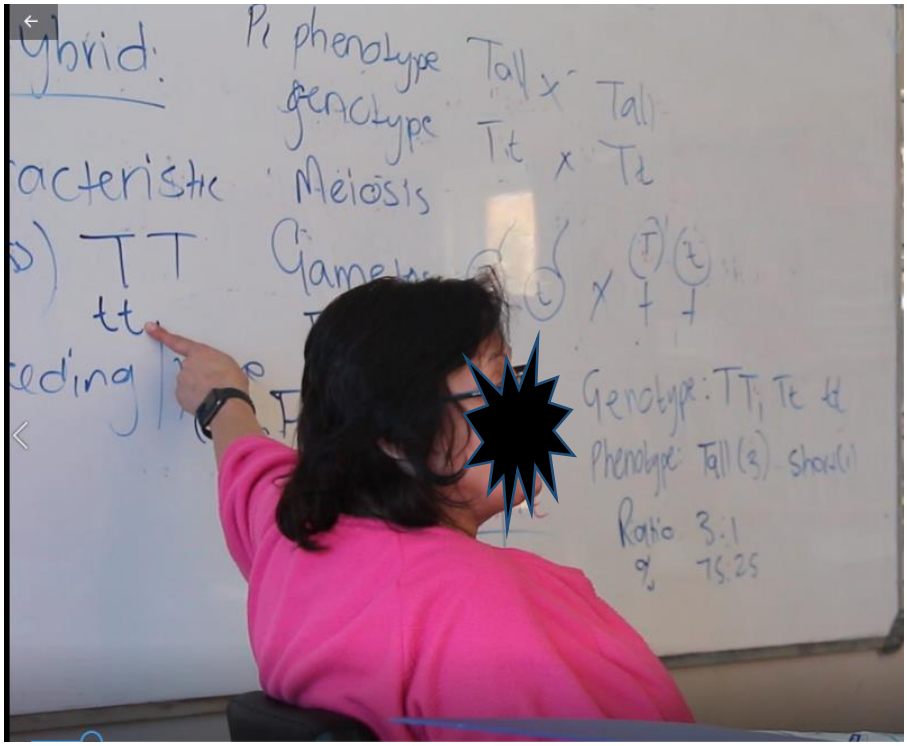
413. Okay, here you have…[showing]



…homozygous tall…



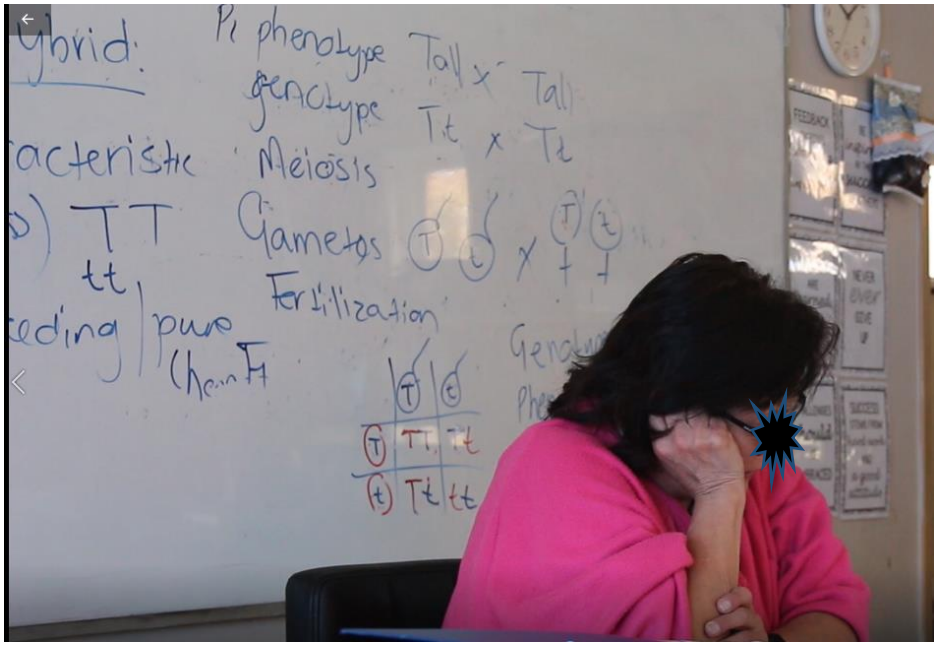
…homozygous short. [Pointing]



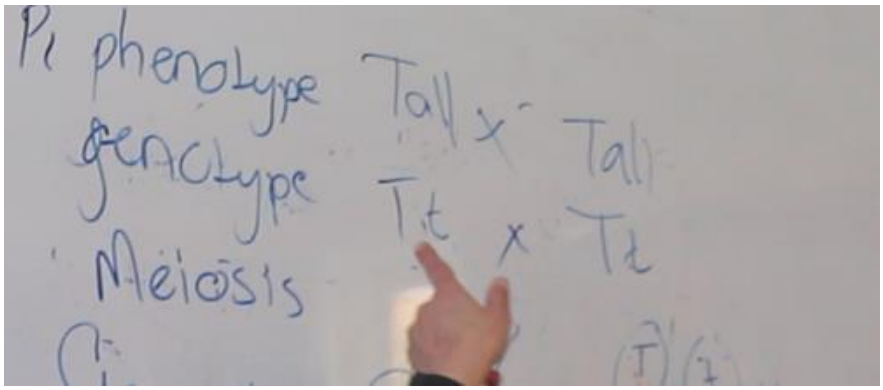
414. Okay, what is heterozygous then?

415. Walter: An organism that has [two different alleles for the trait]

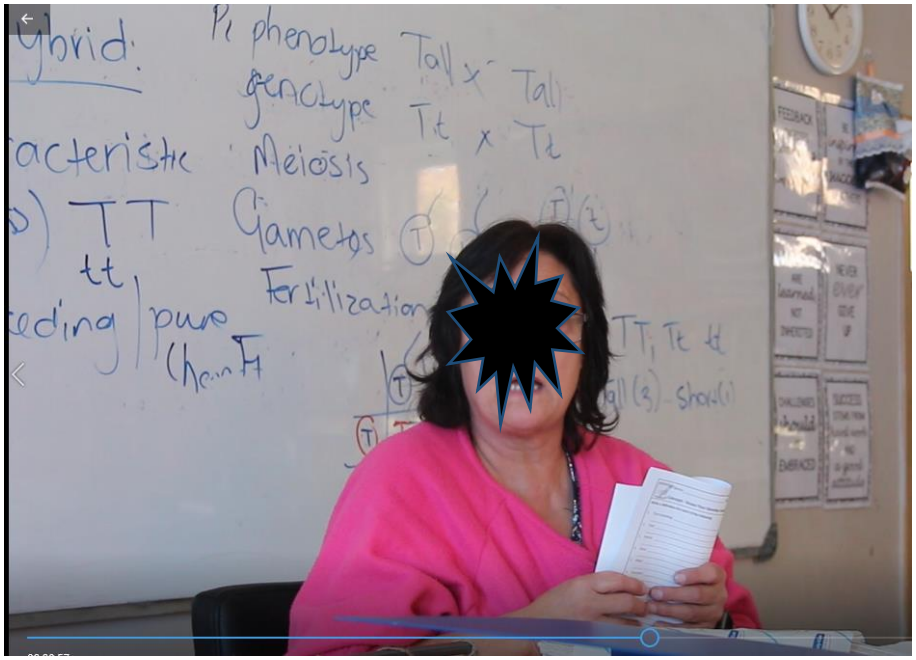
416. Mrs. Durand: [Holding the head]



An organism that has two different alleles for a particular trait.



417. For heterozygous, now you have a side where you actually-- cover when you want to go and study and try to remember all these terminologies. [Showing worksheet]

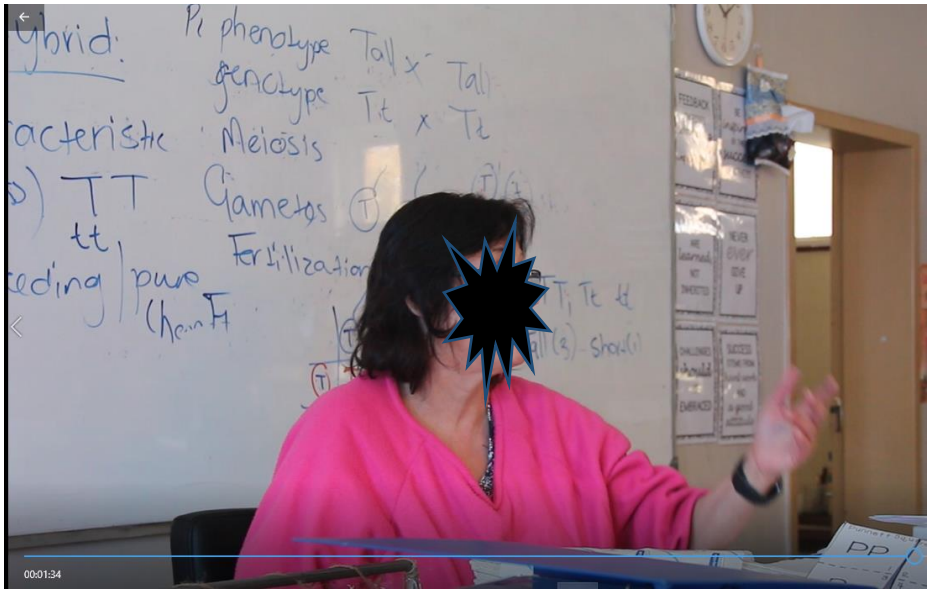


418. People they are very, very important okay.

419. There are more coming later on, but these ones form the basis of monohybrid as well as some other things we are going to do.

420. Alright are there questions?

421. Okay so, you have the whole page of terms that is complete. [Pointing to learner]

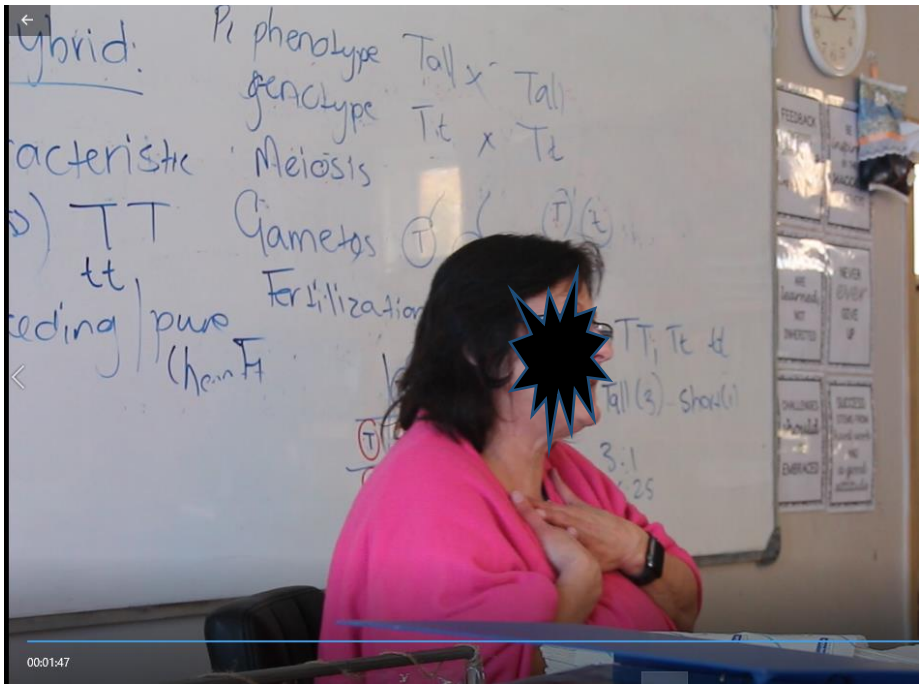


422. Kelly: Ma'am does it matter…?

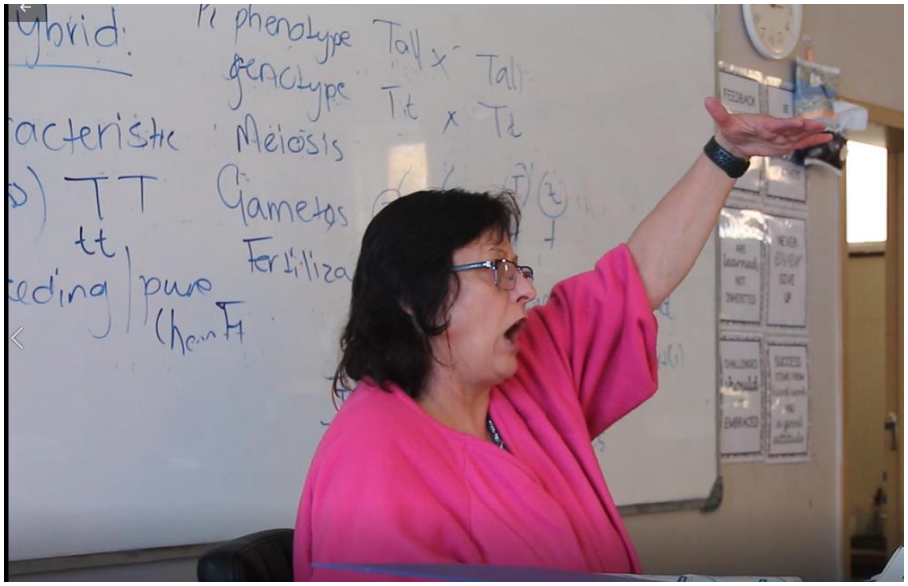
423. Mrs. Durand: Just remove your mask when you talk.

424. Kelly: [With mask down] Ma'am does it matter where you write the…the alleles on the block?

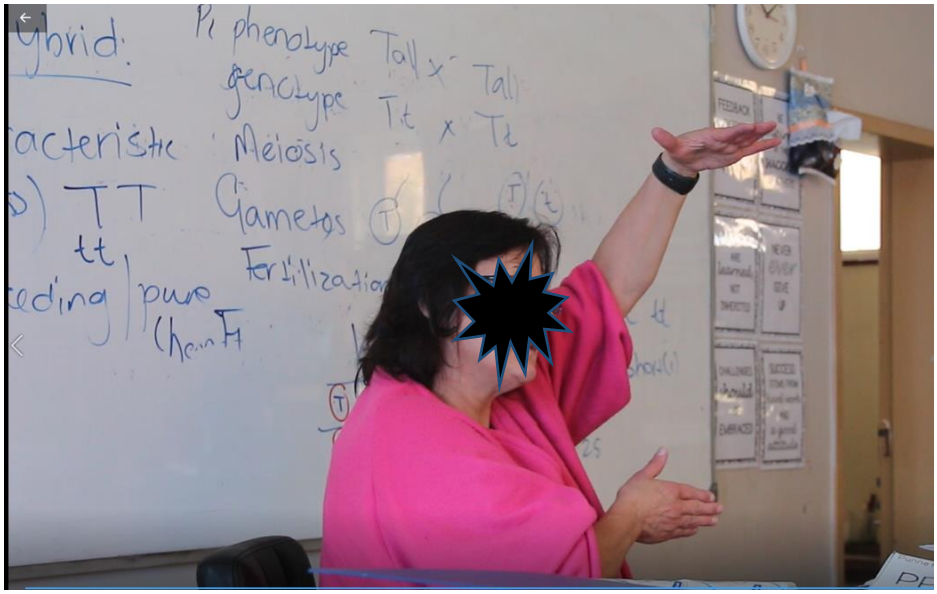
425. Mrs. Durand: You always write, okay I am consistent,



…male…



…top and female down…



…the side.

426. Then I do not get confused.

427. No! it does not matter; you could put female on top…

END!