

Chapter 6
The Rime of the Ancient Mariner: Transcript

1. Jenny: Okay, as you guys look at these words, what do you think of?
2. Haja: Water
3. Jenny: Moyatu?
4. Moyatu: Um, water, like in Africa, how they don't have a lot of water, and how they don't have clean water to drink.
5. Jenny: Alright, so you're thinking of places where there's not clean water to drink ... Rachel?
6. Rachel: How like, most of the water in the world can't be drinkable—
7. Jenny: You're thinking about how we have such small amount of actual drinkable water. Andrew?
8. Andrew: Um ... I don't—can I, can I explain my, uh, thought on it?
9. Jenny: Sure, please do.
10. Andrew: Well, I, I, I think it's some guy that's, uh, stranded in the middle of the ocean, and he's stuck on one little board, and he can't drink the water because it has salt in it.
11. Jenny: Well, why can't he drink salt water?
12. Andrew: Because it's not good for you.
13. Jenny: Why?
14. Andrew: Because...
15. Brian: Oh! Because—
16. Jenny: Brian?
17. Brian: It dehydrates you because of the salt.
18. Jenny: So the salt water would dehydrate you because of the salt.
19. Brian: Yeah, well like it's just bad (*inaudible*) because—I don't—(*waves hand and shakes head*)

20. Andrew: It's gross.
21. Jenny: Alright, Tilson, what do you think? You gonna expand on Brian's thought? ... No?
22. Tilson: I think it's talking about a boat, and how the boards on the boat shrinks when there's no water.
23. Jenny: When there's no water the boards of the boat would shrink?
24. Tilson: Yeah.
25. Jenny: Why would that happen?
26. Grace: The water expands the wood.
27. Tilson: The water expands.
28. Jenny: Is there water or is there not water?
29. Grace: I think there's water.
30. Moyatu: There is water
31. Haja: There is water.
32. Jenny: Why do you think there's water?
33. Haja: Cause it's everywhere.
34. Student: ...water water everywhere.
35. Jenny: Okay, water water everywhere...
36. Andrew: It's an ocean.
37. Metzzy: Yeah. That's what I was thinking.
38. Jenny: It's an ocean.
39. Rachel: I have a question about what Brian said ... um...
40. Jenny: Okay.

41. Rachel: Yeah, if you're—you read stories about like shipwrecks and people who like aren't you know rescued for days and then they want—and then they start drinking the salt water and then they like, I guess they don't like die, but—would that be because like it like messes with brain chemistry or just 'cause it dehydrates you so much that you ... die? (*smiles*)
42. Jenny: Great question, so let's go back to Andrew's original thought and what Brian piggybacked on. The salt water—why can't we drink the salt water?
43. Students: Cause it's bad ... cause it'll make you sick ... and it's dirty ... (*inaudible*)
44. Jenny: Why does it do that?
45. Toan: Because of the salt.
46. Jenny: So what does the salt do?
47. Hawaney: It makes you more thirsty. It dehydrates you.
48. Grace: I think the salt absorbs the water, or...
49. Jenny: So salt absorbs water? The way ... a sponge absorbs water?
50. Brian: It doesn't like get rid of it, but it gets ... enough of it ... (*inaudible*)
51. Rachel: Isn't it like so your body can't use it?
52. Jenny: Can't use what?
53. Rachel: The water ... like it's still there but it's in a form that your body can't use.
54. Jenny: So maybe it alters the water—is that what you're saying?
55. Rachel: I mean, I guess it would be some kind of chemical process where it wouldn't exactly be water anymore, it would be like a form that your body couldn't use.
56. Jenny: Well, what happens when you put salt into water?
57. Grace: It dissolves.
58. Jenny: Okay...
59. Andrew: But not the salt water in the ocean.
60. Jenny: Does it change the chemistry of the water?

61. Andrew: Yeah ... it's salty.
62. Metzy: Yeah, doesn't it? ... Doesn't it?
63. Rachel: It makes like a mixture.
64. Jenny: It creates a mixture?
65. Moyatu: Doesn't it depend on how much salt you have in the water?
66. Andrew: But not, not, not in the ocean, though ... salt lakes.
67. Jenny: Expand on that (*to Moyatu*). What do you mean?
68. Moyatu: Like, cause when you put a certain amount of s—like if you put like a little bit of water and then you put a lot of salt, the water becomes solid, doesn't it?
69. Student: Yeah.
70. Moyatu: Like, it's dissolved in water.
71. Jenny: The water becomes solid?
72. Rachel: That's just because there's not enough water for a whole lot of salt.
73. Jenny: Yeah. So the sol—it becomes saturated, and then you've got salt still in there ... So why can't you drink salt water?
74. Andrew: It's bad for you. It tastes bad.
75. Jenny: Tastes bad?
76. Metzy: Yeah, yeah.
77. Jenny: What if that—and that's that's all you had?
78. Haja: Isn't it bad for like your heart or something?
79. Jenny: It's bad for your heart?
80. Andrew: You're just not supposed to drink it. It gives you a problem. It's a long term (*inaudible*)

81. Brian: Isn't like, like sodium is good for you, but like if you take too much in at a time it just messes you up?
82. Jenny: Well let's go back to your thought on dehydrating you. Why would salt dehydrate you? Somebody said it 'absorbs water.'
83. Brian: Oh!
84. Jenny: What do you think?
85. Hawaney: Since water is just like H₂O and, salt water's like a different kind of a different kind of compound than water and it doesn't react with like water in your body and all—so maybe um like maybe because it—kills you.
86. Jenny: How?
87. Hawaney: It sucks up all the water?
88. Jenny: Okay.
89. Brian: If you drink salt water, and the salt water like goes into your body, then the water's already in your body and the salt water, or just like the different molecules of salt—salt molecules kind of absorb water in your body and it will dehydrate you.
90. Jenny: Okay.
91. Brian: But the, but the uh—you know—(*shakes his head*)
92. Jenny: I saw Grace and then Rachel.
93. Grace: Maybe because salt is a solvent ... and it like breaks down like—
94. Jenny: Okay.
95. Grace: then like ... I don't know. Does it have like anything to do with like how like salt like—'cause like it can break down like ice into water ... I don't know, I don't know.
96. Rachel: Can I (*inaudible*)?
97. Jenny: Yeah.
98. Rachel: Like, okay sodium isn't like salt it's just like, cause sodium can't actually be in water and by itself so salt that's just NaCl, but since water's a solvent (*inaudible*).

99. Jenny: Yeah what happens? You guys did that in your water lab.
100. Rachel: Yeah, I think it would come and then it would break up the sodium and the chloride molecules right?
101. Jenny: Okay
102. Rachel: and then ... cause didn't you say that—
- [This is a standard moment for us to stop and discuss the students' reasoning and ideas.]*
103. Jenny: So then what would happen?—alright let's look at a couple lines here. Water, water everywhere and all the boards did shrink. What-what do you think's happening there?
104. Brian: Is this English class or biology class?
105. Metzy: Boating.
106. Jenny: Good.
107. Haja: What did he say?
108. Jenny: Good. Use your science to interpret the English.
109. Andrew: What did he say?
110. Jenny: He asked if this was English or biology class ... *(laughter)* ... I detect a wee bit of sarcasm there.
111. Andrew: *(inaudible)*
112. *(Students laughing)*
113. Jenny: What do you guys think? “And all the boards did shrink.” What are they talking about there? ... Boards of what?
114. Brian: Oh! A boat.
115. Jenny: Boards of a boat. Why would boards in a boat shrink?
116. Brian: It would possibly just sink.
117. Metzy: Yeah the salt is eating it up.

118. Jenny: The salt eats the boards ... is that what you said too?
119. Metzzy: That it eats the bigger boards and stuff.
120. Jenny: So the salt would deteriorate the boards or eat the boards?
121. Toan: Yeah.
122. Andrew: No.
123. Jenny: Yeah?
124. Andrew: No.
125. Moyatu: Well no, I don't get that.
126. Jenny: You don't get that?
127. Moyatu: Yeah because I don't—it, it deteriorates the boards?
128. Jenny: I don't—that's what they're saying.
129. Moyatu: Oh you're just asking.
130. Jenny: Yeah, I'm asking what they mean, "And all the boards did shrink." What do they mean? What's happening there?
131. Toan: Well the NaCl might, like, attract stuff from the boards and then like water flows from the boards where it's dense to like less dense...
132. Jenny: So the board becomes less dense because—
133. Toan: Like, there are holes on the board.
134. Jenny: Cause there are holes on it?
135. Metzzy: Like it's sinking ... Was that your question?—sinking?
136. Jenny: (Calling on Brian). Yeah.
137. Brian: I thought if you put water on like wood it swells.
138. Students: Yeah.
139. Metzzy: Oh yeah, what if that happens?

140. Jenny: Interesting ... have you had experience with that?
141. Brian: Nooo...
142. Metzy: So wouldn't—isn't wood like—doesn't it suck up water because it'll flow or whatever?
143. Jenny: So—why would they shrink?
144. Brian: Oh!
145. Rachel: Well, I know that, um, if you take a drum that's too tight, and you put water on it, or sometimes you like hold it like over a fire, then it'll tighten, so I think like maybe if it evaporates...
146. Jenny: If ... the water evaporates ... then...
147. Rachel: Maybe because the molecules come together and get in the way somehow (*smiles*).
148. Metzy: Like a sponge.
149. Jenny: Okay ... why would the water evaporate?
150. Tilson: It's going to a place of lower density.
151. Jenny: What's that?
152. Student: Water evaporates.
153. Tilson: Um ... let me (*picks up textbook*) ... think about it.
154. Jenny: Be confident! Be brave!
155. Moyatu: You said why it would evaporate?
156. Jenny: Yeah, so Rachel's saying, I think, it's getting smaller cause the water's evaporating.
157. Rachel: And, I guess if the—like if the water molecules are in with the water where the water's going to evaporate and the molecules are in the wood?
158. Jenny: So the wa-water inside the wood would evaporate.
159. Rachel: And then—

160. Jenny: And then those molecules would come together to make the board shrink ... does that make sense to people?
161. Students: No ... yeah ... no.
162. Moyatu: It makes sense, but ... it doesn't.
163. Jenny: But it doesn't.
164. Haja: It's still a little confusing.
165. Jenny: So could water leave the—do you think there's water in wood?
166. Students: Sure ... no ... depends ... yeah ... well ... if it's ... after it rains...
167. Andrew: Depends on if it's been dried out or not.
168. Andrew: I mean if it's if it's not been like—
169. Brian: Oh!
170. Andrew: —if it just came off a tree or something then it probably does have water.
171. Jenny: Alright, so if we just cut the tree then it's got water in it.
172. Brian: Okay. So the tree-so wood comes from trees—*(laughter—Jenny: Good)* and the tree, and trees need water in order to, uh, survive, when you cut the tree down and make the uh, wood, there's still water left inside of it, but when you put it in salt water the salt water will evaporate the actual water inside of it.
173. Moyatu: But, but wouldn't it just absorb the water? Absorb the water because, because when the tree-when the tree actually has water it comes from the roots, but if you have wood, there's nothing for it to like ... absorb, so it just absorbs it.
174. Jenny: So the boards just absorb the water.
175. Moyatu: ... absorbs the water.
176. Jenny: Alright. I want to go back to what Brian said.
177. Brian: Oh Yeah!
178. *(laughter)*

179. Jenny: Can you say it again? So you're saying that its got water in it, and then when you put it in the salt water it evaporates it. Why would salt water evaporate water? ... Go back to what you learned about water and...
180. Tilson: Doesn't water go to a place with lower density?
181. Jenny: Water goes to a place of...
182. Tilson: Lower density.
183. Jenny: Lower density.
184. Students: (*inaudible*)
185. Toan: The water, like, it goes inside the boards, makes the boards heavy.
186. Jenny: Alright, so water inside the board would make it heavy ... and it would sink ... but how 'bout shrinking? Getting smaller—Rachel—you've been patient.
187. Rachel: Um, well I guess going back to how there's like salt in the water or whatever, um ... would it—we're, like what are we talking about in terms of like what salt in the water—like making the water (*inaudible*). Like how it dehydrates you?
188. Jenny: That's what Brian's—'cause water, water everywhere nor any drop to drink. So Brian also suggested that he couldn't drink the salt water because it would dehydrate him, and I want to know why ... and if you're saying the salt water takes the water out of the boards, I wanna know why.
189. Rachel: Well I guess, would it be because of, I guess because of water's polarity ... like we ... yeah, like we talked about, when we talked about polarity we talked about how it would react with like, like other molecules and how like the positively charged sodium would attract to like the hydrogens—so does that like break the water molecules?
190. Jenny: What do you guys think?
191. Sam: Water is the universal solvent, so basically it can dissolve trees 'cause trees require water and sunlight or whatever to grow, so then—
192. Jenny: Okay.
193. Sam: that may have dissolved it.
194. Jenny: Okay, so you think the boards are shrinking because water's the universal solvent and it's going to slowly break down the wood ... now why then do you

think, there's all this water but he—he can't drink it? Would the same explanation apply to that, or...? No? Okay.

195. Jenny: Yeah? (*to Brian who has his hand up*)
196. Brian: I'll take another shot at it.
197. Jenny: I—Is your hand up to? (*to another student*). I'll come to you, I'm sorry. Alright, go for it Brian, be brave.
198. Brian: Okay, so if the water is the universal solvent and like there's always so like so much like water inside the boards then like salt water goes into the boards as well the water is dissolving—is dissolving the salt and as it does that then there's no more water—let, just let somebody else go!
199. Jenny: Alright, Tina?
200. Tina: Um, well, you said that, you were asking why the tree like wouldn't be absorbing the water—the salt water. Um, maybe it could be the water and the salt has already just like combined, which would mean that the wat—that the tree would just not want it ... (*laughs*) not want it, but it just doesn't take it in.
201. Jenny: But what's it doing? It's not—not only is it not taking in water, what is it doing?
202. Metzy: It's getting water out.
203. Moyatu: It's getting it out.
204. Andrew: It's getting out.
205. Jenny: Why?
206. Brian: Wait, what was the question?
207. Jenny: What did you say earlier?
208. Tilson: Osmosis.
209. Jenny: What's that...
210. Tilson: Like water moves from high—high-density place to a low-density place.
211. Jenny: So water's moving from a high-density place to a low-density place?
212. Students: (*lots of voices—inaudible*)

213. Jenny: Alright so we talked a—so diffusion, what's that?
214. Metzy: Isn't that when—
215. Brian: —it's when stuff moves from a high concentration
216. Toan: —to a low concentration
217. Metzy: Yeah.
218. Andrew: There we go.
219. Jenny: Alright, so moving from high concentration to low concentration.
220. Metzy: Like you mix something and then it gets like unmixed.
221. Jenny: Okay. Does that come into play here?
222. Metzy: Maybe.
223. Brian: Well, maybe it's like the other way around, so if the water, like, molecules move from high density to low density ... the ocean.
224. Jenny: So where they gonna go? Where—What's going to happen to the water?
225. Brian: It's gonna like leave.
226. Student: Go to the ocean.
227. Student: Going to get out.
228. Metzy: It's gonna be a big circle of water.
229. Jenny: It's going to go from where?
230. Metzy: ...from the wood
231. Bryan: It's gonna go from the wood ... out like any hole in the wood.
232. Jenny: Why would it go from the wood into the ocean?
233. Brian: Because it's going from a lower concentration to a higher concentration. You just reverse it.

234. Metzzy: It's going to be evaporated into the air. It's gonna go through the water cycle thing, right?
235. Jenny: Alright, evaporated, water cycle...
236. Rachel: Isn't it because like, okay if the example is like oxygen going into the water because there's more like, like a higher density of oxygen in the water, so it would be like, going from like, the ship where there's like maybe 10 water molecules to the ocean where there's like a million. It's by—it's moving to a higher density place from a lower one. It...
237. Jenny: So it goes from a lower density place to a higher density place? What's diffusion?
238. Rachel: Okay! Yeah! Then would it be—
239. Brian: Diffusion of cells from a higher concentration.
240. Jenny: Molecules.
241. Brian: Molecules.
242. Rachel: Yeah.
243. Jenny: From high—
244. Brian: Concentration to low.
245. Hiba: To low concentration.
246. Jenny: To low.
247. Rachel: Yeah. See, yeah I feel like they, like they move in the direction where there's more space—so like it doesn't really make sense to me because-
248. Jenny: Where do the oxygen molecules move when they're in the lungs?
249. Students: Out?
250. Jenny: They go out, right? Why do they go out?
251. Hiba: 'Cause there's more less, like ... concentration
252. Jenny: 'Cause what?
253. Hiba: Higher concentration—I mean lower concentration.

254. Jenny: So there's a lower concentration, so it's going from high concentration to low concentration. How does that apply here?
255. Jenny: Water's leaving the board. Why?
256. Haja: Because that's a higher concentration of water.
257. Jenny: Where?
258. Haja: In the boards.
259. Jenny: Higher concentration.
260. Haja: Of water.
261. Jenny: Of water in the board?
262. Haja: Yeah.
263. Jenny: Than in the ocean?
264. Haja: Then in the ocean, yeah.
265. Jenny: Why?
266. Haja: Um ... cause...
267. Jenny: How can there be a higher concentration of water in the board when it's in the big old ocean?
268. Grace: Because the water in the ocean is salt, and the—so it's NaCl and the water in the boards is just H₂O.
269. Jenny: Good. Can you say that again really loud?
270. Grace: The water in the ocean is a mixture of NaCl and H₂O but the water in the board is just H₂O so that's a higher concentration.
271. Jenny: Of water.
272. Grace: Yeah.
273. Jenny: Does that make sense to folks? Brian?

274. Brian: So if you took like a—if you took like a drop of salt water and compared it to a drop of just regular water, there'd be more of the regular water in the regular water because there's also salt in the salt water so the salt water has a lower concentration of water since it's mixed with the salt, so the water molecules would move to the outside of the board where there's a lower concentration.
275. Jenny: So then the boards do what?
276. Brian: They shrink, because they're losing water.
277. Student: They shrink.
278. Jenny: Great, so why can't we drink salt water?
279. Brian: That happens—the same thing would happen—I don't—
280. Student: 'Cause...
281. Jenny: Brian, keep going, come on!
282. Brian: Um, okay, so you like, drink the salt water and the water in your body goes where the salt water was, so that's—
283. Ann: Oh, 'cause the water in our body is kinda higher concen—or a higher ... concentration.
284. Jenny: Okay.
285. Ann: So it's like a board ... in the water ... goes from....
286. Jenny: Okay, so the water's gonna go—where's the water in your body?
287. Students: Everywhere.
288. Jenny: Everywhere ... so if we're looking at water in cells, the water's gonna do what?
289. Haja: Get out.
290. Jenny: Go out.
291. Metzy: Yeah.
292. Andrew: Goes out.
293. Jenny: Okay! Interesting! Good.

294. Haja: Do you have your own analysis on this?
295. Jenny: Um, I do but what I'd like you guys to do where you originally wrote your thoughts I want you to take five minutes to just complete your thoughts on what this means, okay? And then we're gonna move on.