Transcript for Video Clip 3.2

Teacher/video ID:	Anderson, 3.2_stella_WC_anderson_c1
Content area:	Water cycle
STeLLA strategy:	Engage students in constructing explanations and arguments (STL strategy 5).
Context:	In previous lessons about matter, molecules, and the water cycle, students learned about how the movement of water molecules can be used to explain their observations of boiling water (evaporation) and water droplets appearing on the outside of a glass of ice water (condensation). In the previous lesson, students observed the water-changes system. In this video clip, students are trying to explain their observations of the water-changes system. The focus question of the lesson is *How can ideas about water molecules help us explain evaporation and condensation in a system?* For the activity in this clip, the teacher asked students, "How can you explain your observations of this system?"

Video Clip 2

Time Code	Speaker	Discussion
0:00:02.2	T	So talk to me about that focus question [How can ideas about water molecules help us explain evaporation and condensation in a system?]. What does happen to the molecules as water evaporates and condenses?
0:00:08.5	SN	Um …
0:00:08.6	T	Yeah?
0:00:09.9	SN	It either gains heat energy or loses heat energy. It turns back into its liquid state.
0:00:14.8	SN	Or gaseous.
0:00:15.5	SN	Or back into gaseous.
0:00:17.0	T	Can you use the … the diagram in front of you to explain what you mean by that, Carlos?
0:00:22.9	SN	'Cause that's the—
0:00:23.8	SN	Hot plate is giving … is adding heat energy to the water, which is turning into its gaseous form. It goes through the aquarium into the test tube—
0:00:34.9	T	OK.
0:00:35.3	S	which … with … then it turn[s] … since it's cooler—
0:00:40.1	S	Since it's colder out here than it is in the test tube. It tur— It cools … loses heat energy and turns back into its liq-liquid state.
0:00:48.2	T	When you guys were taking your notes, based on what Carlos said, did you only notice it going into a liquid state or condensing back into a liquid state in the … in the test tube?
0:00:58.2	T	Or do you … or did you also notice that it was changing back into a liquid state anywhere else in the apparatus?
0:01:03.7	SN	Um …
0:01:04.0	SN	It was …

0:01:04.8	T	Go ahead.
0:01:05.2	S	It was turning into a liquid state a little bit in the aquarium.
0:01:09.4	T	So you noticed a little bit. Where would you notice that in the … in the aquarium tubing?
0:01:11.8	S	Well, down here, and then also, like, up around here where it was going into the flask, and then, like, kind of—
0:01:20.1	T	OK.
0:01:20.4	S	It's, like, the end.
0:01:21.8	T	Did anybody else make that observation as well?
0:01:23.8	SN	Yeah.
0:01:24.3	T	OK.
0:01:24.7	S	And also, the molecules are, like, in their gaseous state when they're in the test tube.
0:01:32.9	S	But, like, once they reach, like, [toward]— I mean, in the aquarium tube, but once they get to, like, almost to the testing tube,
0:01:43.5	S	it, like, gets into its liquid state because what Carlos said, that it is cooler over here. Like, it's cooler in the testing tube than it is in the aquarium tube.
0:01:55.8	T	OK, so you said it was cooler in the— You do … do you mean the tubing or the test tube, where it's cooler?
0:02:00.4	S	Test tube.
0:02:01.0	T	OK, so it's cooler here. So explain to me using— Kelsey used the word *cooling*. Explain to me what's happening with the molecules as [the water is] changing those states.
0:02:13.4	T	So we said it was changing state here. Carlos mentioned the increased energy from the hot plate.
0:02:20.2	T	We … I heard you guys say … a couple of you say it was changing state over here because it's losing energy. Correct?
0:02:28.4	SN	Yes.
0:02:28.9	T	OK. So what's happening with the molecules? What are the molecules doing? So …
0:02:33.4	SN	Well, they're, like, tied to each other … like, they start to form together.
0:02:37.7	T	Can you be specific about what state you're talking about? When are they doing that?
0:02:40.8	S	In the liquid state.
0:02:42.3	T	OK, so in your diagram, where— Explain what the motion of the molecules is doing at a particular spot.
0:02:51.0	SN	Well, in the … in the aquarium tubing, like you said, there's more heat than in the test tube.
0:02:57.3	S	So it's … it's forming as water droplets, but there's still, like, steam. It's, like, clouding the aquarium tubing.
0:03:05.4	S	But when you get down to the test tube … the test tube, it starts to form into just liquid water because the molecules are forming together. But they're still sliding past each other.
0:03:17.7	T	OK.
0:03:18.4	S	And there's, like … like [inaudible] … there's still gas.

0:03:23.5	T	So Kaya, what is the movement of the molecules like in the test tube?
0:03:27.8	SN	Um …
0:03:31.9	S	How it's moving?
0:03:32.6	T	Yeah, how are the molecules moving? Not— I'm sorry; I said the wrong thing. I'm sorry. What is the movement of the molecules like in the aquarium tubing?
0:03:41.2	S	Well, it's, like, gas … gaseous state. And they're moving really fast because … and they're losing energy because they're moving further away from the heat … hot plate. And so—
0:03:55.5	T	OK.
0:03:57.2	S	They start to form together more, 'cause they're losing energy.
0:03:59.8	T	Good. Here's a question I want to ask you.
0:04:01.9	T	In the aquarium tubing, are they only losing energy because they're moving away from the hot plate, or is there another reason that they're losing energy in the aquarium tubing?
0:04:10.4	T	Can you talk about that real quick?