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| STeLLA 2010 Summer Institute |
| Context:  | Seven 5th grade teachers participate in a discussion of classroom video. The video is of lesser quality than typical for STeLLA videocases, the clip comes from 2010, our pilot of the STeLLA program. The clip comes in where teachers are making claims, based in evidence from the transcript, about students understanding about the water cycle. The students in the classroom clip have been watching a beaker of water boiling, and discuss their observations and initial ideas about what they see.  |

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| 1 | PDL: Jody | If you step out and think about this lesson or this clip a little bit holistically, are there some ideas about the water cycle that you think students generally understand or are there some ideas that you think they generally don’t understand?  |
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| 2 | PDL: Jody | Are you able to identify …? |
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| 3 | T: Kathleen | I think they understand the sense when you heat water, you get steam … you get evaporation. I think they do understand that piece.  |
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| 4 | PDL: Jody | And do you have some evidence for that?  |
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| 5 | T: Kathleen | Well, just the sense of … well, at the very beginning “where all the water and steam is pressured inside, and I can see it, a big gush, whoosh, well” And then she, “What’s steam?” um … |
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| 6 | PDL: Jody | So Ms. Dieken says, “Well, what’s the steam?” |
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| 7 | T: Kathleen | And then someone uses their hand and gets burnt. So they’re going “oh, oh.” |
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| 8 | PDL: Jody | So Katie, what did you see? |
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| 9 | T: Katie | I don’t think they know steam is water.  |
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| 10 | PDL: Jody | You don’t think they know the steam is water? |
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| 11 | T: Katie | No, because, right over here at 37:14–16, the same student says, “So steam is water?” “Oh I don’t know, I thought it is gas.” |
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| 12 | T: Kathleen | Except over here, at 36-43, it says, “steam is water.” |
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| 13 | PDL: Jody | Hang on. You are using words here that we should probe a little bit. |
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| 14 | PDL: Jody | You said, “Steam is water.”  |
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| 15 | T: Katie | But I think this is a different student |
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| 16 | PDL: Jody | What’s the relationship between water and gas? What’s that relationship? |
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| 17 | T: Kathleen | I don’t think they’ve made that connection yet. That the gas … that the steam ... |
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| 18 | T: Katie | That water is water, in all cases.  |
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| 19 | T: Kathleen | Right. |
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| 20 | T: Katie | It’s never not water.  |
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| 21 | PDL: Jody | Okay, so you’re not sure that kids have, we need to capture this more … |
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| 22 | PDL: Jody | You’re not sure that kids have the idea that anywhere in the water … everywhere in the water cycle, water is water. |
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| 23 | T: Katie | Because if you use words like “gas” instead of “water vapor” it confuses them. |
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| 24 | PDL: Jody | Okay. |
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| 25 | T: Katie | It confused me. |
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| 26 | T: Lisa | I think her problem too … she’s using the term water as that means H2O in a liquid state. And then … |
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| 27 | T: Lisa | It’s H2O in the, yeah … to them is liquid water, not ice …  |
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| 28 | T: Katie | H2O to them is just water, not ice. |
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| 29 | PDL: Betty | Liquid water. |
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| 30 | T: several | Yes.  |
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| 31 | PDL: Jody | So, let’s go back to steam as water. What state of matter is steam? |
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| 32 | T: Katie | Gas.  |
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| 33 | PDL: Jody | You say, “gas.” What do others think? |
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| 34 | T: Kathleen | She’s using the term “water vapor.” |
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| 35 | PDL: Jody | So you’re saying that steam is water in the gaseous state and that is the same as water vapor. What do others think? |
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| 36 | T: Kathleen | Still, I think you are right, I don’t think they have the connection yet …  |
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| 37 | PDL: Jody | Uh, what connection … |
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| 38 | T: Kathleen | … between gas and vapor andwhat is forming on those scissors. |
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| 39 | PDL: Jody | Okay, so we want to know do students understand this. So let’s talk about your understanding for a moment.  |
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| 40 | PDL: Jody | Steam is water. Some of you have said that steam is in the gaseous state. That steam is water vapor. What do others think? |
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| 41 | T: Katie | I would think that gas is water vapor. Steam is gas, but gas is water vapor. Does that make sense? |
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| 42 | T: Michelle | There’s a difference between the two. Steam is not necessarily water vapor, right, is that what you are saying? Gas is water vapor, but steam is not necessarily water vapor. |
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| 43 | T: Katie | No, I think it is all water vapor. |
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| 44 | T: Michelle | Okay.  |
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| 45 | PDL: Jody | That’s what I thought you said. That steam is gas, and the gas is in the gaseous state … |
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| 46 | T: Katie | I think it is all the same. |
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| 47 | T: Denise | I marked up there that this had a different meaning, this was a misconception, on the very first page of misconceptions, it says here, the science explanation is that steam, fog, clouds exist as liquid water and they are not water vapor in that, we have water vapor in the air right now and we can’t see it.  |
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| 48 | T: Denise | When we … But if it’s cold out, and we blow our breath out, we think we are seeing water vapor but we are actually seeing water droplets.  |
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| 49 | T: Kathleen  | So there is a confusion of vocabulary. |
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| 50 | PDL: Jody | Well, before we go to vocabulary let’s see where we are so far. Do we agree that steam is water, it is H2O? Do we agree on that? |
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| 51 | PDL: Jody | Some have said that steam is the gaseous state of water, and we can call the gaseous state of water, water vapor.  |
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| 52 | PDL: Jody | Right, that’s what you just said, is that right, Katie? |
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| 53 | T: Katie | Yes. |
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| 54 | PDL: Jody | Now, Lisa … |
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| 55 | T: Denise | Denise.  |
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| 56 | PDL: Jody | Arghh, Denise …  |
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| 57 | T: Denise | But the scientific explanation, and I don’t know where this came from, states that is not true. That the steam, because it is visible, is, we are actually seeing water droplets. |
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| 58 | PDL: Jody | So, so, Yeah, okay,  |
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| 59 | T: Lisa | Steam is the water that is condensed on the way out of the (inaudible) … and it probably, it sort of hits the air and the air is cool … yeah, air particles. Same with clouds, clouds are made up of condensation.  |