Argumentation From Evidence: Elementary

Objective: To deepen understanding of the practice of scientific argumentation for student sense-making.

Time: Total Time 12 hrs

Part I	Introduction to Student Sensemaking (1-20)	88 min.
Part II	Initial Sensemaking (21-33) 15 min	65 min.
Part III	Gathering Evidence (34-74)	365 min.
Part IV	Critique and Feedback (75-84)	85 min.
Part V	Planning for Implementation (85-99) 10 min.	156 min.

Materials:

Slides

S1 Building Student Sense-Making Through Disciplinary Literacy
S2 Zoom Norms
S3 Accessing Session Resources, Activities & Handouts
S4 This session was created by:
S5 Shared Icons
S6 Welcome & Who's in the room?
S7 Session Goals - Participants will
S8 What is in a word activity
S9 Why is Scientific Literacy Important?
S10 What does argumentation look like in your classroom?
S11 What is scientific argumentation?
S12 Elements of Scientific Argumentation
S13 Discuss features of classroom culture
S14 What does scientific argumentation look like?
S15 Importance of Culture and Context
S16 Why is Scientific argumentation an important science and engineering practice?
S17 The other practices inform argumentation
S18 Consider the Crosscutting Concepts
S19 Reflection to the classroom
S20 Developing an Evidence Based Argument
S21 Part 2
S22 Context of the Lesson
S23 Phenomena
S24 Establishing a Culture for Argumentation
S25 Example KLEWS chart
S26 KLEWS chart

S27 Town Story
S28 Your Task
S29 Whole Class KLEWS Chart
S30 Lovely Lake
S31 Initial Ideas Teacher debrief
S32 What is Student Sense-Making
S33 Initial Ideas Teacher Planning
S34 Part 3
S35 Developing an Evidence Based Argument
S36 Observation Categories
S37 Water Observations
S38 Gots, Needs & Commitment to Try
S39 Let's Explore
S40 Mini Teacher Debrief
S41 Gathering Evidence
S42 Whole Class KLEWS Chart
S43 Making Connections
S44 Mayor's Email
S45 Water Report
S46 What might be causing the fish to die in Lovely Lake?
S47 KLEWS Chart: What might be causing the fish to die in Lovely Lake?
S48 Claim and Evidence
S49 Fishy Findings
S50 Mayor's Email
S51 Health and Traffic Reports
S52 Let's Party!
S53 Health Havoc
S54 Mayor's Email
S55 What do we know?
S56 Air Pollution Model
S57 Air Pollution Model Collaboration
S58 Reading about Air
S59 Independent Work
S60 Can things be in the air that we cannot see?
S61 KLEWS Chart: Can things be in the air that we cannot see?
S62 Revise your group model
S63 Pollution Problem
S64 Gots, Needs & Commitment to Try
S65 Mayor's Email
S66 KLEWS Chart: What is causing the increase of asthma in Hope Valley?
S67 Claim, Evidence, and Reasoning
S68 Checklist for the CER
S69 Developing an Argument: Student Consultancy
S70 Students choose how to develop 1st draft of report

S71 Developing an Argument: Teacher Debrief
S72 Developing an Argument: Teacher Planning
S73 Report Work Time
S74 Developing an Evidence Based Argument
S75 Part 4
S76 Austin's Butterfly
S77 Strengthening Argumentation using Critique and Revision
S78 Post it Note Protocol
S79 Revise Your Report
S80 Gots, Needs & Commitment to Try
S81 Reflect on the Protocol
S82 Town Hall Meeting
S83 Solutions
S84 Critique and Feedback: Teacher Debrief
S85 Part 5
S86 What is Student Sense-Making
S87 Performance Expectations
S88 SEP 7 Progressions
S89 Identify your 3-D Learning Goal
S90 Phenomena
S91 CCC Critical Questions
S92 Planning for Implementation
S93 Consultancy Protocol
S94 Additive Feedback Frames and Clarifying Questions
S95 Lesson Planning
S96 Follow-Up On-Line Support
S97 Closure
S98 Research and Resources
S99 Gots, Needs & Commitment to Try

Handouts (documents for individual use)

H0 Agenda
H1 Features of Classroom Culture
H2 Classroom Norms
H3 Town Hall Minutes
H4 How People Learn 1
H5 How People Learn 2
H6 Lesson Strategies
H7 Hope Valley Water Report
H8 Hope Valley Map
H9 CER
H10 Hope Valley Health Report
H11 Hope Valley Traffic Report
H12 What is air made of?
H13 Hope Valley Air Report
H14 Hope Valley Weather Report

H15 Asthma CER
H16 Town Hall Meeting 2
H17 SEP 7 Progressions
H18 Critical Questions

Interactive (documents for collaborative thinking and sensemaking

I1 Strand padlet
February Padlet Link: February NGSS PL#1 Argumentation from Evidence: Elementary (padlet.com)
March Padlet Link:March NGSS PL#1 Argumentation from Evidence: Elementary (padlet.com)
I2 Working Slide Deck
I3 Teacher Planning Note Catcher
I4 Gots and Needs
I5 Evidence Table

Materials for Activities
Materials for hands on activity below:
Small jar
Cotton balls (2-3)
Scent (lavender, vanilla, etc.)

Video
V1 Scientific Literacy Video
V2 What Does Argumentation Look Like Video
V3 Water Observation Video
V4 Mass Investigation Video

Advance

Preparation: 1. Whatever needs to be done for preparation belongs here-use as many steps as needed) e.g., Review PPT, script, handouts, interactives,and resources labeled R
2. Review the tech script (next page) and prepare accordingly.

Tech Script

February Padlet Link: February NGSS PL#1 Argumentation from Evidence: Elementary (padlet.com)

March Padlet Link:March NGSS PL#1 Argumentation from Evidence: Elementary (padlet.com)

You will need to copy and paste the appropriate link for slide 3.

Elementary Argumentation **TECH SCRIPT** **Red bold** denotes a direction for the tech person (in both the slide notes and tech script)		
Slide Number	**Tech Directions**	**Special notes**
1 Part 1	**Main Room**	Before the session starts, make sure or the following tech pieces: All participants can share All facilitators are host or co-host. The host will be responsible for creating breakout groups.
2	**Main Room**	No special directions
3	**Main Room** **CHAT BOX.** **I1 Padlet**:[copy appropriate padlet link] **H0 Agenda**: https://docs.google.com/document/d/1jZHCeo2Rw5Gc2caK9GUNbqnrkrye-tAg75PZCoeElhA/edit?usp=sharing	Wait for facilitator before sharing in chat window
4	**Main Room**	No special directions
5	**Main Room**	No special directions
6	**Main Room**	No special directions
7	**Main Room**	No special directions
8	**Main Room**	Wait for facilitator before

	CHAT BOX: 1. Instructions for breakout rooms: You'll be in small groups. Select a role 2. Select one word that either attracts you, or repels you 3. Introduce yourselves and why you selected the word 4. Link to the Working Slide Deck: https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing Note: Keep track/write down who is in what breakout groups (you will need to put them back into these breakouts,as well as others, frequently) as well as the partner pairings.	sharing in chat window ***Make note of who is in each group as you'll be using these same groups of 4 across multiple workshop sessions.*** ***Remind participants to choose an elbow buddy***
9	**Main Room -then breakouts** Set norm that one person plays video and shares screen (if that works) **Post to CHAT BOX:** Link to the video: *https://www.youtube.com/watch?v=qFLYe_YAQYQ&t=24s* We suggest that one person plays video and shares screen (if that works) **BREAKOUT ROOMS:** 1. Put participants into breakout rooms of 4 (randomly assigned-these will be their "table groups") 2. 15 minutes total. (set timer for 14 minutes, then close the rooms and they will have 1 more minute before they are sent back to the main room-	No special directions

	this is for all breakouts) 3. At time = 5 min… **BROADCAST TO BREAKOUT ROOMS:** We encourage you to move on to the video. At time = 14 min **BROADCAST TO BREAKOUT ROOMS:** Reminder… please select an elbow partner.	
10	**Main Room**	No special directions
11	**Main Room**	No special directions
12	**Main Room** **CHAT BOX:** **Private Chat with Elbow Buddy** Private chat your partner what you notice about the elements of argumentation. Also, what is one difference between opinions and arguments?	Elbow buddies should have been decided on in their first breakout
13	**Main Room** **CHAT BOX:** Instructions for the breakout room: Read your assigned feature to yourself Take notes on the google slide for your section Share your observations with your group. Link to the working slide deck: https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing Link to Handout 1 (Features of	

	Classroom Culture): https://drive.google.com/file/d/13SHKNbPf4W5uTfkRIEwK62rqB2o35cUF/view?usp=sharing	
14	**CHAT BOX:** Link to video: *https://drive.google.com/file/d/1iwfYhEV2ndRybegclAhGJvklqDm7KCw4/view?usp=sharing* You have a total of 15 min total in breakouts (5 min for Norms, 5 min for video, 5 min for discussion). You should have one person in the breakout room share their screen and watch the video. If this doesn't work, individuals in the breakout group can watch the video individually and then you can discuss together. **BREAKOUT ROOMS** 1. Put participants into breakout rooms (same as before) after explaining this slide. 2. time= 14 min	Wait for facilitator before sharing in chat window
15	**Main Room**	No special directions
16	**Main Room** **CHATBOX:** Times when your students used more than 1 SEP together.	No special directions
17	**Main Room**	No special directions
18	**Main Room**	No special directions
19	**Main Room**	No special directions
20	**Main Room**	No special directions

	10 minute break here	
21 Part 2	**Main Room**	No special directions
22	**Main Room**	No special directions
23	**Main Room**	No special directions
24	**Main Room** **CHATBOX:** Link to Handout 2 (Establishing Culture for Argumentation): https://www.openscied.org/wp-content/uploads/2019/07/Handout-Classroom-Norms-from-1st-Units-in-OSE-OpenSciEd-2.pdf Participants add a response to the chat	Wait for facilitator before sharing in chat window
25	**Main Room**	No special directions
26	**Main Room**	No special directions
27	**Main Room** **CHAT BOX:** Link to Handout 3 (Town Hall Minutes): https://docs.google.com/document/d/1wgoFex29y8W6__6fdzLp5Da7-zUj3ei4VnWLIPjNs3Q/edit?usp=sharing	No special directions
28	**Main Room**	No special directions
29	**Main Room** **PLEASE TAKE OUT OF PRESENTER MODE TO BE ABLE TO ADD TO THE CHART** When you are adding to your whole class KLEWS chart you have to take it out of presenter mode	For this slide, take it out of presenter mode
30	**Please go back into Presenter Mode** **Post in chat box:** Question for breakout room: What do	

	you know about the water in Lovely Lake? **BREAKOUT ROOM** 1. Put participants into breakout rooms (table groups) 2. time = 5 minutes	
31	**Start Main Room** **CHAT BOX** Questions for Breakout: Revisit the phenomena: What made this an effective anchor phenomena? Anchoring Phenomenon: Things are changing in the town of Hope Valley (ex. fish dying, more asthma cases, etc.) What practices encouraged everyone to participate? What Common Core Standards and Next Generation Science Standards can we see being used in this learning sequence? How did we incorporate accessing prior knowledge? How would you modify this for your grade level? **Break Out Rooms (grade band groups-participants should have their grade level at the beginning of their name) 8 min** 1. Put them into a breakout room (grade band groups- participants should have their grade level at the beginning of their name. Put them into small groups by grade level or grade band depending on how many participants work with the same grade) 2. time = 8 minutes	
32	**Main Room**	No special directions

	CHATBOX: Link to Handout 4 (How People Learn): https://docs.google.com/document/d/1F94l_Msph02EezlRDhSqpgHWSwd19uFHDnsTkIu74u8/edit?usp=sharing Link to Handout 5 (How People Learn 2): https://docs.google.com/document/d/1-B_bA6zGiP_RpiAirePFLGqJpUGeXMdtVC_T7LL_Ad0/edit?usp=sharing	
33	**Main Room** **Post to Chat:** Link to the Teacher Planning note catcher: https://docs.google.com/spreadsheets/d/184_oKMOLtUbFu-y9zR49HH1fp8ffp6WFhT9b1l4BRzA/edit?usp=sharing Link to H6 (Lesson Strategies): https://docs.google.com/document/d/1wedr_dcpLsfVR6kTJg2BwCa5IdmP14iX61MGFTrrNn4/edit?usp=sharing	No special directions
34 PART 3	**Main Room**	No special directions
35	**Main Room**	No special directions
36	**Main Room** **CHATBOX:** Link to the working slide deck: https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing	No special directions
37	**Main Room** **Post to Chat:** Please take 3 minutes to watch this video. Take notes while you do so. Please be sure to mute yourself. Feel free to turn off your camera while you watch.	Wait for facilitator before sharing in chat window

	Link to Water Observation Video: https://drive.google.com/file/d/1ITe_43623EqNRNpJ-ouZDT-nnyKTsTyu/view?usp=sharing **BREAKOUT ROOM** Put participants into breakout rooms (table groups) Time = 5 minutes	
38	**Post to Chat:** Form for Gots & Needs: https://docs.google.com/forms/d/e/1FAIpQLScSH2UjLq7gKs1IEGuYzQdwAgEqSxGpFogFdSDf-CVMZflgig/viewform?usp=sf_link	
39 FIRST SLIDE OF SESSION 2	FOR FACILITATOR/PERSON SHOWING SLIDES: Link to the Evidence table: https://docs.google.com/presentation/d/1EGmlEazgVE7naq83Hm6PErxFxDq7TATXQYKxBvfioOE/edit?usp=sharing **CHATBOX:** Be sure to post this to the chat BEFORE they go into breakout groups Link to Video (mass investigation): https://drive.google.com/file/d/1o-0ROofsYSqT1roLLQIPEz4Xj-CbO4An7/view?usp=sharing Link to the working slide deck: https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing **Breakout Groups** 1. Participants will be in breakouts (same groups of 4) 2. Time = 12 minutes. **At time = 10 minutes please**	Wait for facilitator before sharing in chat window When instructed, send to breakout rooms

	BROADCAST TO THE BREAKOUT ROOMS Please watch the video now!	
40	**Main Room**	No special directions
41	**Main Room**	No special directions
42	**Main Room**	No special directions
43	**Main Room**	No special directions
44	**Main Room**	No special directions
45	**Main Room** **CHAT BOX:** Questions for Breakout: What patterns do you observe in the data presented in the Water Report? How does the map help you understand what is going on? What does the pattern you see in the data allow you to conclude about the fish in Lovely Lake? Link to Handout 7 (Hope Valley Water report)**This report is 2 pages**: https://drive.google.com/file/d/1U6_V1WbIYY0EHbu9tmPYIAxm-7s8U1gK/view?usp=sharing Link to Handout 8 (Hope Valley Map): https://drive.google.com/file/d/1qHR356HwShPkFFYIA_2YyeJ7drGffXuQ/view?usp=sharing **BREAKOUT:** Send participants to breakouts (table groups) for 15 minutes	No special directions
46	**Main Room**	No special directions
47	**Main Room**	No special directions
48	**Main Room**	No special directions

	CHATBOX Link to Handout 9 (CER): https://drive.google.com/file/d/1yPW2xB8MhC8sNltvAsU6HAhnw0cLy-Kq/view?usp=sharing FACILITATOR: When the presenter starts talking about the color coding on the CER and KLEWS chart you will want to go back one slide so that participants can see this.	
49	**Main Room**	No special directions
50	**Main Room**	No special directions
51	**CHAT BOX:** Questions for breakout: Observe the data presented in the Health Report. What do you notice? Observe the data presented in the Traffic Report. What do you notice? What pattern do you notice when comparing the data? What does the pattern of data you see allow you to conclude about the air quality in Hope Valley? Link to Handout 10 (Hope Valley Health Report): https://drive.google.com/file/d/1slZXdW_pQ6Phz5w_DzGaUlfEiAXwxJKL/view?usp=sharing Link to Handout 11 (Hope Valley Traffic Report): https://drive.google.com/file/d/1Oklq8_zVM912i9kalN1u9GdIOaL-pDi8/view?usp=sharing **BREAK OUT** 1. Put participants into breakout rooms (table groups)	

	2. time = 15 minutes AT TIME = 5 MIN CLOSE THE ROOMS And go to the next slide	
52	**Main Room**	No special directions
53	**CHAT BOX:** Questions for breakout room: What do you think is causing the increased rates of asthma and/or What additional information do you want from the mayor? **BREAKOUT ROOM** 1. Put participants back into their breakout rooms (table groups) 2. Time = 10 minutes	No special directions
54	**Main Room**	No special directions
55	**Main Room**	No special directions
56	**Main Room** **CHAT BOX:** **Exploration directions: Spray a scent into a container, go to another room, then walk back toward the scent slowly. Note where you are when you first smell the scent again.**	No special directions
57	**Post to Chat:** **CHAT BOX:** Prompts for the breakout: Share your model with your group. Discuss what components you agree with and which you disagree with. Be sure to support your comments with evidence. Create a consensus model. Link to the working slide deck: https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing	Wait for facilitator before sharing in chat window When instructed, send to breakout rooms (it will be after they have 15 minutes to read and do a simulation)

	BREAKOUT: Put participants into breakout rooms (new random groups of 4-these will be their new table groups) for 8 minutes *will keep these groups through the end of the session*	
58	**Main Room** **CHAT BOX:** Link to Handout 12: https://docs.google.com/document/d/1IwNEtOBia-xVztCR4eb51uDd3EG5U6S7s57gU_sCxOE/edit?usp=sharing	No special directions
59	**CHAT BOX:** Link to the simulation: https://learn.concord.org/eresources/830.run_resource_html Breakout Prompts: What new information did you gather from the reading and simulation? How might this help us understand our air pollution model? **POST TO CHAT** *(right before going to breakout rooms)* Please copy these prompts before going to your breakout room. 1. What new information did you gather from the reading and simulation? 2. How might this help us understand our air pollution model? **BREAKOUT GROUP:** 1. Their new table groups 2. Time = 7 minutes	Wait for facilitator before sharing in chat window When instructed, send to breakout rooms
60	**Main Room**	No special directions
61	**Main Room**	
62	**Main Room**	When instructed, send to

	CHAT BOX: Link to the working slide deck: https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing You will be going back to their group models on GS6 **BREAKOUT ROOM:** 1. Table groups 2. time = 10 minutes	breakout rooms
63	**Main Room**	No special directions
64	**CHAT BOX:** Link for Gots & Needs: https://docs.google.com/forms/d/e/1FAIpQLScSH2UjLq7gKs1IEGuYzQdwAgEqSxGpFogFdSDf-CVMZflgig/viewform?usp=sf_link	No special directions
65 *This is the first slide of session 3*	**CHAT BOX:** Please rename yourself with your grade level then their name so we can put them into grade level breakouts easily. Link to Handout 13 (Hope Valley Air Report): https://drive.google.com/file/d/1KhfzHZ0F7_z59LxNox-3vR54xNbicaY2/view?usp=sharing Link to Handout 14 (Hope Valley Weather): https://docs.google.com/document/d/1-4poLi8jky5QCJVkBPTs63ima27BE0xvkpzM_FdKHnk/edit?usp=sharing Prompts: What do you notice? What patterns do you see? **BREAKOUT ROOMS:** 1. Table groups	No special directions

	2. Time = 15 minutes	
66	**Main Room**	No special directions
67	**Main Room** **CHAT BOX:** Link to Handout 15 (Asthma CER): https://drive.google.com/file/d/1TTNPQNspGgt_YynaWshQDK3HI61hH4IA/view?usp=sharing	No special directions
68	**Main Room**	No special directions
69	**Main Room** **CHAT BOX:** Questions for Breakout: What pieces of your CER are you proud of? What pieces of your CER are you still unsure of? What are your initial plans for your report? **BREAKOUT ROOM:** 1. Table groups 2. time = 20 minutes 3. **Broadcast to Breakout Rooms** @ Time = 5, 10. 15 and 20 Switch Presenters	Wait for facilitator before sharing in chat window When instructed, send to breakout rooms
70	**Main Room**	No special directions
71	**Main Room**	No special directions
72	**CHAT BOX:** Please copy these questions before you go to the breakout room: In your classroom, how can you support all learners in gathering and interpreting evidence? How can you make it safe to share ideas? How will you ensure students are accessing their	Wait for facilitator before sharing in chat window When instructed, send to breakout rooms

	prior knowledge. In your next unit of study… where will you employ these strategies? How can you align it with the Common Core Standards? Link to H6 (Lesson Strategies): https://docs.google.com/document/d/1wedr_dcpLsfVR6kTJg2BwCa5IdmP14iX61MGFTrrNn4/edit?usp=sharing **BREAKOUT ROOM:** 1. Grade band Groups 2. Time = 10 minutes	
73	**Main Room**	No special directions
74	**Main Room**	No special directions
75	**Main Room**	No special directions
76	**CHAT BOX:** What do you notice the teacher doing in this video? What do you notice about the students' feedback? What might it take to establish this type of classroom culture that supports critique and feedback? Link to working deck slides (GS9): https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing Link to the video: *https://vimeo.com/38247060* **BREAKOUT:** **1.** Table groups	No special directions

	2. time = 10 minutes	
77	**Main Room**	No special directions
78	Link to the working deck: https://docs.google.com/presentation/d/13tCZTGleNhVvbF4_gXGE1i2VYdS_8l56-H0VAnYYtao/edit?usp=sharing **BREAKOUT ROOM:** 1. Get ready for new breakout… pair people up with their partner from session 3 for peer feedback *(these will be rooms of 2, their partners will be from their table group of 4)* 2. Time = 15 minutes 3. Do not send them to breakout rooms until instructed to do so. 4. AT TIME = 7.5 minutes **BROADCAST TO ROOMS** *Please begin the critique of the second report.*	
79	**Main Room**	No special directions
80	**CHAT BOX:** Link for Gots & Needs: https://docs.google.com/forms/d/e/1FAIpQLScSH2UjLq7gKs1IEGuYzQdwAgEqSxGpFogFdSDf-CVMZflgig/viewform?usp=sf_link	
81 *This is the first slide of session 4**	**CHAT BOX**: Please rename yourself with your grade level then their name so we can put them into grade level breakouts easily.	
82	**CHAT BOX:** Link to Handout H16 (Town Hall Meeting 2): https://docs.google.com/document/d/1dl10W0-5Jsjhjmyo3S52Fca879di0HsgKqK1jgP8TOM/edit?usp=sharing **BREAKOUT ROOM**	

	1. Table groups 2. time = 15 minutes	
83	**Main Room**	No special directions
84	**POST TO CHAT:** Link to Handout 1 (Features of Classroom Culture): https://drive.google.com/file/d/13SHKNbPf4W5uTfkRIEwK62rqB2o35cUF/view?usp=sharing Link to H6 (Lesson Strategies): https://docs.google.com/document/d/1wedr_dcpLsfVR6kTJg2BwCa5IdmP14iX61MGFTrrNn4/edit?usp=sharing	
85	**Main Room**	No special directions
86	**CHAT BOX:** Link for Handout 4: https://docs.google.com/document/d/1F94l_Msph02EezlRDhSqpgHWSwd19uFHDnsTkIu74u8/edit?usp=sharing Link for Handout 5: https://docs.google.com/document/d/1-B_bA6zGiP_RpiAirePFLGqJpUGeXMdtVC_T7LL_Ad0/edit?usp=sharing **BREAKOUTS:** 1. Same groups 2. Time = 10 minutes	No special directions
87	**Main Room**	No special directions
88	**POST TO CHAT:** Link for handout H17 (SEP7: Argumentation Through Evidence) https://docs.google.com/document/d/12QdPKmpKxG-maYWYXejHhiQDJT2bzloPrKNTrtXWs7M/edit?usp=sharing Post the questions in the chat: • Look at the handout. Circle or highlight any bullet that represents	Have breakout rooms available to self select

	your students skill level. • Look at the next column. What supports do your students need to move along the continuum? • What did we do in this lesson to develop skills to engage in argument from evidence and move them along the continuum? **BREAKOUT** 1. Put participants into their grade level breakout rooms 2. Time = 10 minutes	
89	**CHAT BOX:** Link to the SDCOE NGSS website: https://ngss.sdcoe.net	
90	**CHAT BOX:** Links to websites for phenomena: https://thewonderofscience.com/ https://www.ngssphenomena.com/ If you are still having trouble finding something: https://wonderopolis.org/wonders	
91	**CHAT BOX:** Link to Handout 18 (Crosscutting Concept Critical Questions): https://drive.google.com/file/d/1yTS4tWdDvNkEFlghB2UUHR9Z-jBw_WaL/view?usp=sharing	
92	Open up breakouts for participants to choose to be in	
93	**CHAT BOX** 2 Min: Writer Shares No interruptions 3 Min: Feedback and Questions Feedback is additive	
94	**BREAKOUT** 1. Put participants into their grade level groups 2. Time = 20 minutes	

95	**Main Room**	No special directions
96	**Main Room**	No special directions
97	**Main Room**	No special directions
98	**Main Room**	No special directions
99	**CHAT BOX:** Link for Gots & Needs: https://docs.google.com/forms/d/e/1FAIpQLScSH2UjLq7gKs1IEGuYzQdwAgEqSxGpFogFdSDf-CVMZflgig/viewform?usp=sf_link	

Facilitator Script

Part I	*Introduction to Student Sensemaking (1-20)*	*88 min.*
1.	Display **S1 (Building Student Sense-Making Through Disciplinary Literacy)** and welcome participants to the session. Ensure that all participants know they are in the Argumentation from Evidence for Elementary session. (Total slide time=1 minute)	
2	Display **S2 (Zoom Norms)** and thank participants for joining you. Let participants know we want to establish a few norms for our PL#1 sessions. a. Please put yourself on **MUTE** unless you are speaking. b. Be respectful of others. c. Take turns speaking by "raising your hand" and waiting for the facilitator to call your name. d. Keep comments and sharing concise. e. Use the "Chat" feature to ask questions. f. Be present and say engaged. g. When possible, keep your video on. **We understand that you may be participating from home so kids, partners, and pets are always welcome to make guest appearances during our sessions.** h. Please rename yourself in zoom with the grade level you teach, your first and last name If you are not in a classroom you may also use your role (TOSA, Coach, etc) in front of your name	

	(Total slide time=2 minutes)
3	Display **S3 (Accessing Session Resources, Activities & Handouts)** and tell participants there will be multiple options for accessing the digital resources, activity links and handouts for this session. We will be using Padlet, Electronic Hyperlinked Agenda and Hyperlinks will be shared in the Zoom Chat. All links to handouts, videos, and other resources will be all 3 places so participants can use whichever resources works best for them. (Total slide time=2 minutes)
4	Display **S4 (This session was created by:)** and tell participants that this session was jointly developed by a group of educators from across the state. We want to be sure to acknowledge their work. This group includes classroom teachers, TOSAs/Coaches, County Office of Education colleagues, and representatives of Institutes of Higher Education. When you use portions of this workshop with others we ask that you share this slide, to give credit to those who worked to create this learning experience. (Total slide time=1 minute)
5	Display **S5 (Shared Icons)** and tell participants we wanted to share the icons which you will see on our slides throughout the session. These are from a project called the Noun Project (thenounproject.org) which has a wide array of icons that are labeled for free use. a. Ask participants to make sure they have a notebook, or some paper, that they can write on. (Total slide time=1 minute)
6	Display **S6 (Welcome & Who's in the room?)** Presenters introduce yourself. a. Ask participants to share their name, job, what and where they teach or work, and what they hope to get from the session. b. Read a few responses from the chat and ask participants to read them and see what they have in common with their fellow participants. (Total slide time=3 minutes)
7	Display **S7 (Session Goals - Participants will)** Display slide and describe the overall structure of this session. We will take you through the process of developing an argument from evidence using multiple lines of evidence. We will then look at critiquing arguments. While we do this you will have opportunities to collaborate and communicate with your fellow participants. Your time with us is not the end of our work. At the end of the session we will ask you to begin planning a cycle of inquiry that we will revisit during our virtual check-ins later in the year. (Total slide time=2 minutes)

8	Display **S8 (What is in a word activity)** and tell participants they will go into breakout rooms to do two tasks. The first is the what is in a word activity and the second is watching and discussing a video about scientific literacy. a. Tell participants that when they go into breakouts we want is to be a norm that when the 60 sec warning comes up to choose a reporter. Also, participants need to choose a partner within their larger group for private message chat. This private message chat will serve as our "turn and talk" opportunity in this virtual session. b. Groups should take a minute to fill out the GS Roles slide in the working deck, assigning each member a role. The role of the reporter will rotate. c. Tell participants when we use the Google Slides working deck there will be instructions and guiding questions on the side of the slides as well as in the presentation notes and they should look for those when they are in their breakouts using the working deck. d. For the what is in a word activity, ask participants to introduce themselves and share which of the argumentation words attracted or repelled them and why. e. Before groups go to breakouts, explain the next slide as well. (Total slide time=2 minutes)
9	Display **S9 (Why is Scientific Literacy Important?)** and tell participants that after they complete the what is in a word activity they will watch a quick video (2:45) on why scientific literacy is important a. Ask participants to look for connections to what they know about NGSS and ask them to reflect by picking something that stood out to them. b. Ask participants to keep in mind why scientific literacy is important as we move through the session (3 minute video and 3 minute discussion) (Total slide time= 16 minutes) *Trainer Note: Make sure video is embedded in powerpoint and you have checked sound. Video link: https://www.youtube.com/watch?v=gFLYe_YAQYQ&t=24s*
10	Display **S10 (What does argumentation look like in your classroom?)** and ask participants to do a quick write in their notebook to address the prompt. (4 minutes) If there are participants who are not in the classroom: "What do you think argumentation should look like in the classroom?" (Total slide time = 6 minutes)
11	Display **S11 (What is scientific argumentation?)** and have the

	participants read the quote. a. Ask the participants to take what they gathered from the video, quick write and quote and reflect in the chat or out loud on what they are thinking about right now in terms of scientific literacy and argumentation? What are you already doing well? (Total slide time=7 minutes) *Trainer note: The colloquial use of "argumentation" is not the same as "scientific argumentation". The goal and purpose of this activity is to help participants reach that understanding; and eventually with their students. Also, listen for and elicit the differences between opinion vs. argument. You can also elicit protocols for feedback and safe school culture.*
12	Display **S12 (Elements of Scientific Argumentation)** and tell participants part of scientific argument includes evidence and reasoning. Today, we will formalize that process based on the claims and evidence that we will be collecting. a. Have participants read the slide then private chat their partner about what stands out to them about argumentation. b. Tell participants that we want to make clear that opinions and scientific arguments are two different things. c. Have participants share one difference between opinions and arguments in the chat. d. When you are done private chatting with your partner, please post a "thumbs up". e. Ask participants if there was anything from their partner chat that they want to share related to what the difference between an argument and an opinion? You can share via chat or aloud. (Total slide time=8 minutes) *Trainer Note: This is a time to remind participants that the structure of a scientific argument is different from the colloquial use of "argument". Here we will look at the logical structure and the direct connections to observations, scientific understandings, and evidence.*
13	Display **S13 (Discuss features of classroom culture) and refer to H1(Features of Classroom Culture).** a. Explain to participants that will be going back to their breakout groups. When you get to your break out room each person will pick one feature from the classroom culture rubric. You will then

	be tasked with reading and annotating that one feature of classroom culture and share highlights with your group. Each person should select a different feature. b. Go on to the next slide before putting participants in their breakout rooms c. Use only page 1 for this handout (Total slide time=1 minute)
14	Display **S14 (What does scientific argumentation look like?)** and share with participants that they will be watching a video of an elementary classroom as the students engage in argumentation. a. Tell participants that the video is of a model classroom with a highly experienced teacher who worked very hard to get her students to this point. This is not what it will look like day 1 in any classroom. b. Explain to participants that they will be putting their observations into a google slide and then discussing the questions. (Total slide time=16 min) *Trainer Notes: Please make sure the video is embedded in the slide and the sound is working. Video link: https://drive.google.com/file/d/1iwfYhEV2ndRybegclAhGJvklqDm7KCw4/view?usp=sharing*
15	Display **S15 (Importance of Culture and Context)** and ask participants to read the quotes from How People Learn 2 and think about the implication for their students' learning and the environment they create and maintain. a. Ask participants to use their journal to reflect on these quotes and make a list of things they could do in their classrooms to set up and maintain a classroom culture that supports all students to engage in argumentation. (2.5 min) b. Ask participants to put into the chat one thing about culture they want to remember when they start to plan their learning sequence. Encourage participants to read their colleagues' ideas. c. After participants have shared, close this section out by reminding participants that argumentation thrives in learning environments where students feel safe and valued. Argumentation will be effective when the right culture and climate of learning exists. Our goal is to create experiences that allow learning to occur. (Total slide time=5 minutes)

	Trainer Note: Listen for ideas that this sort of classroom does not happen on its own, the teacher needs to do a lot of work to set up the routines, procedure and culture.
16	Display **S16 (Why is Scientific argumentation an important science and engineering practice?)** *This slide is animated.* a. Ask participants to reflect back to their classrooms, specifically to times when they have witnessed their students using multiple Science and Engineering Practices together. Encourage participants to reflect in their notebooks, or in the chat. (2 min) b. Then ask participants to think specifically about argumentation and how the practice of argumentation relates to and incorporates the other Science and Engineering Practices. You can put your ideas in the chat or share aloud. (2 min) Total slide time=5 minutes) *Trainer Note: Participants may want to check out the SEP and CCC reference sheets in the padlet, even if they aren't particularly new to NGSS*
17	Display **S17 (The other practices inform argumentation)** *This slide is animated* a. Tell participants, "A Framework for K - 12 Science Education" organizes the relationship of the eight science and engineering practices in this graphic. b. Argue, critique and analyze are at the center of this graphic and align with the science and engineering practices of "Analyzing and Interpreting Data" and " Engaging in Argument from Evidence". Click slide. c. The other practices help inform and support the practice of argumentation, which is why argumentation is the focus of this session. d. There will also be opportunities in this session to experience some of the other practices but it is in service to supporting argumentation and how it supports student learning and sensemaking. (Total slide time= 1 minute)
18	Display **S18 (Consider the Crosscutting Concepts)** and tell the participants that we have been talking about how argumentation relates to other Science and Engineering Practices and now we will shift to talking about how it relates to the Crosscutting Concepts

	a. Ask participants what they notice about the arrangement of the Crosscutting Concepts. What does this represent in terms of which CCCs are overarching and which can be used within others? b. How do the crosscutting concepts work with the practice of argumentation c. Ask participants to share their thinking in the chat or out loud (Total slide time=4 minutes) *Trainer Note: Not all crosscutting concepts are created equal. Cause and effect is the overarching crosscutting concept and impacts all science as a "need to understand" a phenomenon. Structure Function is color coded to fit under cause and effect as it is usually a part of understanding cause and effect. Patterns stands alone as a way of predicting explanations based on repeating effects. The green crosscutting concepts are supporters of either patterns, cause and effect or each other.*
19	Display **S19 (Reflection to the classroom)** and ask participants to read the quote and question. a. Ask participants reflect on the first section have a whole group discussion about the question on the slide. We certainly want to think about SEPs and CCCs as a component of developing scientific literacy, but also think about what we've discussed and seen so far in this session as it relates to scientific literacy. (Total slide time= 8 minutes)
20	Display **S20 (Developing an Evidence Based Argument)** and explain that this slide provides an overview of the next three sections of the professional learning. a. Describe how we will be engaging in a learning sequence. b. Explain to participants that this is a model of how sensemaking in students can be done by using scientific argumentation construction as an instrument of learning. c. Ask participants to consider how they may experience this as a learner and as a teacher for how this might look in their classroom. (Total slide time=1 min)
Part II	*Initial Sensemaking (21-33) 15 min* *65 min.*
21	Display **S21 (Part 2)** and tell participants that if they are following along with the padlet or agenda, we are transitioning to the 2nd part of the professional learning.

	a. Tell participants that we want to emphasize that we will be breaking down the steps of building an argument into different sections and allowing them to reflect and think about planning after each section. This first section of the learning sequence (Part 2 of the professional learning session) is all about eliciting students' initial ideas about a phenomenon they will eventually create an argument around. b. Ask participants to look for opportunities throughout the learning sequence where participants will be speaking, listening, reading, and writing. (Total slide time=1 minute)
22	Display **S22 (Context of the Lesson)** and share with participants that they will look into a 5th grade science lesson in which we will be asking students to demonstrate understanding on: a. 5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen. b. 5-ESS2-1: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. c. 5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. d. Students will be developing models to show that matter is made of particles too small to be seen and how the biosphere, hydrosphere and atmosphere interact. e. Students will be making inferences from observations, analyzing data and testing their own and other claims. f. Participants will notice that they will be using lots of Science and Engineering Practices to help them develop an argument. g. Finally, they will make their own claim from evidence based on revision from those initial ideas by creating a final report. i. This writing piece is aligned with the Common Core Standards such as : 1. CCSS.ELA-LITERACY.W.5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. and 2. CCSS.ELA-LITERACY.W.5.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience just as some examples. (Total slide time=2 minutes)
23	Display **S23 (Phenomena)** and share with the participants that students will be investigating the following phenomena from the slide deck. Students will be developing an argument around the essential

	question. (Total slide time=1 minute)
24	Display **S24 (Establishing a Culture for Argumentation)** and refer participants to **H2 (Classroom Norms for Equitable Sensemaking)** a. Ask participants to take 2 minutes to read through the classroom norms on the handout. b. Ask participants to pick which norm they want to focus on for the learning sequence and to type it in the chat. c. Participants can also add a norm they think is missing to the chat. d. Read out a few examples from the chat e. Explain that this process mirrors one that works well with students in allowing them to take some ownership over norms that help create their classroom culture f. Ask participants, if there are any that we need to add to our norms as adult learners. (Total slide time=3 minutes)
25	Display **S25 (Example KLEWS chart)** and share with participants that this is an example of a KLEWS chart from an elementary classroom. a. Explain to participants that a KLEWS chart is a strategy used in argumentation in order to help students keep their ideas organized and help them see the connections between claims, evidence, and reasoning. b. Reasoning often shows up in the S (Science) column. Notice that the S (Science) is not in this KLEWS chart, sometimes the "S" shows up later. c. In this KLEWS chart the K (student's own thinking) they know that air is everywhere and air has oxygen. d. In the L (Learning) the whole class came to a consensus that the air is strong and takes up space. e. Notice the arrows from the Learning to the Evidence, they connect the new learning from evidence they gathered. New learning shouldn't be written on the chart without evidence to support it. Arrows are not always needed to connect the (L) and (E), but they were used here on this example. f. Wonderings are added throughout the learning. These charts can change as the new learning occurs. Sometimes students just keep adding to the columns as the learning sequence progresses and sometimes they need to go back and cross things out and re-think. (Total slide time=2 minutes)
26	Display **S26 (KLEWS chart)-**this is an animated slide, and share with participants that argumentation requires a lot of evidence and sensemaking around that evidence. Show participants the Whole Class KLEWS Chart

	a. Tell the participants that in order to support students it is helpful to use strategies that help us keep all our ideas and learning organized and make the class collective thinking visible. The KLEWS strategy is an adaption of a strategy many of you might be familiar with KWL chart. Keep in mind, this would be part of the student's' Science Notebook. The student's would already have their notebook set up with a table of contents and be familiar with using KLEWS charts and other notetaking skills. b. Walk participants through what the columns are and let them know we will be specific about where things go. c. Tell participants that the KLEWS chart is not intended to be completed in a linear fashion. There is no dictated order and students should fill things in as need be. d. Stress that the KLEWS chart is meant to be a visual marker of collective sense making of the class. The colored columns are where we will need to agree as a class and come to consensus about what should go in the chart. To fill in those columns there will need to be some sort of engagement as a class, even if we don't all agree yet. The white columns are for students' own thinking and don't have to match anyone else, though they can certainly add other ideas they hear from the class. e. The KLEWs chart is meant to be an ever changing document and will reflect our current thinking. We can always go back and cross things out we no longer agree with, or change ideas to make them better reflect what we think and understand. Notice that we will have students use the L (learning) to make a Claim later in the lesson. f. Have participants create a KLEWS chart in their notebook. They may choose to color code the columns with highlighters or markers if they wish. Suggest that color coding may help students. Suggest to your students putting one letter on each page, or making sure they have enough room to write in the KLEWS chart. Keep in mind that the KLEWS chart is NOT used for all of your note taking, but more specifically for your new findings, evidence and wonderings. Any note taking can be taken in your Science Notebooks in addition to your KLEWS chart. g. Tell participants that they can add to their (W) Wonderings at any time, and there will be some times during the learning sequence that they will be prompted to do so. Tell Participants that pictures, numbers, drawings and words can be used to show their learning. (Total slide time=5 minutes)
27	Display **S27 (Town Story)** and tell participants they are going to put on their learner hat now. a. Have participants access **H3 (Town Hall Minutes)** b. Ask participants to read it independently.

	c. Ask participants to take notes in their science notebooks about all the information from the Town Hall Minutes that they think might be important. This should not be in their KLEWS chart. d. Ask participants to write down 2-3 things they think they know from prior knowledge and experiences in the K column of their KLEWS chart that they think might relate to the scenario. e. Encourage participants to add anything they wonder in the W column of their KLEWS chart in their notebook. (Total slide time=6 minutes)
28	Display **S28 (Your Task)** and ask participants to read the task to themselves. a. Tell participants now that they got this email, they need to go back to their notes and try to decide what issues we should start to focus on. b. Ask participants, based on the charge of the task force to study the environmental and health concerns, what issues might we want to investigate in Hope Valley? You can have one person at a time share with the group and then ask participants to show a thumbs up or down if they agree or disagree that we should focus on that issue. c. As the participants share an idea that is from the town hall minutes, the presenter will have the two ideas, worded as questions, ready to add to the digital whole class KLEWS chart (in the Wonderings). i. What is killing the fish in Lovely Lake? ii. What is causing the increase in hospitalized asthma cases in Hope Valley? d. If the idea about the dogs barking comes up have a quick discussion about how this is not an environmental or health concern and is therefore outside the scope of the task force's work. e. Tell participants that we are going to start by focusing on the water and fish in Lovely Lake. (Total slide time=5 minutes) *Trainer Note: If participants are stuck, or not bringing up the ideas you need them to, this may help them focus on the ideas about the fish or the water.* *Ask participants:* *a. What do we already know about these issues?* *b. What do you need to know?* *c. What do you need to investigate?* *d. What data do we need to gather?*

29	Display **S29 (Whole Class KLEWS Chart)** This is an animated slide and explain that these are examples of what students might wonder or think they Know about Hope Valley: a. Have participants write in the chat any additional wonderings or things they think they know b. (Click slide) Share that we will investigate the problems in Lovely Lake first and focus on this question (Total slide time=7 minutes) *Trainer Note: Often when students are discussing what goes into the KLEWS chart new vocabulary comes up. Participants should use their judgement about when and how to introduce new words to students. Additionally, while we are specifically asking for wonderings here, let participants know it is always ok to add to their W column.*
30	Display **S30 (Lovely Lake)** and tell participants that we know that the health of fish is directly related to the water they live in so we are going to focus our efforts on the water in Lovely Lake. a. Ask participants What do you know about the water in Lovely Lake? b. Tell participants to jot their answers into the K section of their personal KLEWS chart. c. Send participants to breakout rooms for 5 minutes and remind them that when the 60 second warning comes up they should choose a reporter (Total slide time=8 minutes) *Trainer Note: We want participants to make the connection between there being something in the water that is affecting the fish but that Mia, the fisherman, said she didn't see anything different about the water.*
31	Display **S31 (Initial Ideas Teacher debrief)** and ask participants to discuss the questions in their breakout room a. Tell participants they are thinking specifically about part 2, the initial sense making of the learning sequence. b. When participants come back from their discussion ask them to share what really stood out to them from their discussion (Total slide time=10 minutes) *Trainer Note: Listen for the following ideas to emerge: the KLEWS chart, the opportunity to pre-think before sharing, the reading level of*

	the text, small group before whole group, the gender of the characters created context for identity etc.
32	Display **S32 (What is Student Sense-Making)** and have participants access **H4 (How People Learn)** and **H5 (How People Learn 2)** a. Ask participants to think specifically about culture and prior knowledge and where they showed up in part 2 of the Professional Learning. b. Participants will read this individually and add ideas to the chat about where these elements showed up in part (Total slide time=10 minutes)
33	Display **S33 (Initial Ideas Teacher Planning)***This slide is animated* and tell participants they will have some individual thinking and planning time. a. Provide link for Note-catcher 1 b. Ask participants to think back to the first part of this learning sequence about Hope Valley and give them 5 minutes to fill in the group note catcher and read what their colleagues wrote. c. Bring participants back together and explain **H6 (Lesson Strategies)**. This document is designed to help make clear the strategies used, standards addressed, expected student learnings, and 5E model components used in the learning sequence. There is also a place for educators to write in ways they might adjust that section of the lesson to meet the needs of their grade level. Make it clear to the participants that we would never expect the same lesson to be taught in another grade level and therefore by looking at the strategies used it is easier to see how we might use some of the aspects of the lesson in other grade levels. d. Give participants at least 5 minutes of individual time to read through and interact with H6 and invite them to shut off their video if they want. (Total slide time=10 minutes)
Part III	*Gathering Evidence (34-74)* *365 min.*
34	Display **S34 (Part 3)** and share the session goals in this section of the learning sequence with participants and emphasize that we will be gathering and interpreting evidence to develop a scientific argument and allowing them to reflect and plan after this section. a. Ask participants to look for opportunities throughout the learning sequence where they are provided the opportunity for speaking, listening, reading, writing and using mathematics or computational thinking. (Total slide time=1 minute)

35	Display **S35 (Developing an Evidence Based Argument)** and describe how we will be moving on to the next part of the learning sequence. Consider how you may experience this as a learner and as a teacher for how this might look in your classroom. (Total slide time=1 min)
36	Display **S36 (Observation Categories)** and tell participants these are the different categories of observations they can make as we start to gather evidence. a. Give participants a moment to read the categories and think about if there are any others they would add. b. Participants can share if there are some that work well in their classrooms or if they have other categories they would use in their classroom. (Total slide time=3 minutes)
37	Display **S37 (Water Observations)** This is the first investigative phenomenon. Tell participants they are going to watch a quick demonstration to see if they can better understand water. a. Tell participants we know the lake looked clear but the fish are still dying so we are going to see if there could be something in the water of Lovely Lake even if we can't see it b. Tell participants that they will want to use the google slide categories to make observations of the demo video. They can write their observations in their notebook. c. Give participants 3 minutes to view the video and take notes individually. Make sure participants are muted. They may turn off their video if they would like. d. After participants have viewed the video, put participants into breakout groups to discuss and fill in their observation chart in the google slides (it is Group Slide #4). e. Come back whole group, then the facilitator then presents the participants with 2 opposing claims about the salt in the water i. The salt has disappeared and is no longer there since we can't see it anymore ii. The salt is still in the cup but it has mixed with the water so we can't see it. f. Ask participants to start to brainstorm ideas about what they might be able to do or test in order to gather evidence to support or refute claims. (Total slide time=12 minutes)
38	Display **S38 (Gots, Needs & Commitment to Try**) and remind participants to share with us their gots/needs. (Total slide time=2 minutes)
39.	Display **S39 (Let's Explore)** and welcome participants back to the

	session. a. Tell participants now that they have made observations and thought about the facilitator's claims they need to think about what evidence they would need to collect to support or refute those claims. b. Introduce the table participants will use to determine what they could do to test the claims and what the expected results might be. Table: https://docs.google.com/presentation/d/1EGmlEazgVE7naq83Hm6PErxFxDq7TATXQYKxBvfioOE/edit?usp=sharing c. Use the mass experiment as the example to go through one row with all participants together. Explain the basics of the mass experiment and ask participants what the expected results of the experiment would be if it supported each of the claims. Fill in the top row of the chart with their answers. d. Explain to participants that one piece of evidence is not enough to support or refute a claim so they will need to come up with two more experiments they could do to test the claims and what the expected results would be for each of them. e. Tell participants that after they fill in their 2 rows of the chart they will watch the video of the mass experiment and take notes in their notebooks. f. Send participants to breakout rooms for 12 minutes. Tell them to talk and record for 10 minutes and watch the video in the last 2 minutes. g. When participants come back from breakout rooms explain to them that we have the data from the mass experiment but we will not be able to complete any other experiments in this session. (Total slide time=18 minutes)
40	Display **S40 (Mini Teacher Debrief)** and tell participants that what you just did was plan an investigation. a. Ask participants the questions on the slide and ask them to put their ideas in the chat. Participants can unmute themselves and talk too. (Total slide time=4 minutes)
41	Display **S41 (Gathering Evidence)** and tell participants that now that they have done their observations, it is time to write in their KLEWS chart. a. Give participants 3 minutes of individual think time to write in their KLEWS chart in their notebook. Tell participants that we will focus on adding to our L (learning) and the E (evidence). We want to make clear to participants that the L column is where we will be putting Claims. Tell participants that we will always add the the (L) and (E) at the same time because Learning/Claims need to be

	supported by Evidence. Encourage participants that they can add to their (W) Wonderings at any time, and this is a great time to do so. b. Ask one participant to unmute themselves and make a claim about if the salt disappears- ask all participants to agree or disagree in the chat and cite one piece of evidence. c. If most participants agree- add the claim to the L in the whole class KLEWS chart and pick a common piece of evidence (it should be mass since that is the only evidence we actually collected) that was shared in the chat for the E. (Total slide time=8 minutes) *Trainer Note- if you were doing this in the classroom you would have had students do an investigation and they would have had multiple pieces of evidence to add to the KLEWS chart in their notebook and whole group. Hold off on talking about the S column just yet as the participants will get more information. If someone brings it up you can say some students may have a science word or principle at this point but we want to wait until the majority of our students have enough information to come up with that word or idea.*
42	Display **S42 (Whole Class KLEWS Chart)** and and explain that these are examples of what students might have learned about water and the evidence that lead them there: a. Point out that Students should connect their learning to the evidence that supports it b. Ask participants to think about what students learned so far about water and ask them to share in the chat what thoughts students will now have about Lovely Lake c. Have participants to private message their partner using the sentence fram; "now I think___ (about hope valley) because I learned _____" (Total slide time=7 minutes)
43	Display **S43 (Making Connections)***This slide is animated* and ask participants to private message the answer to the question to their partner. a. Ask participants to quickly jot down some ideas for the mayor- not a formal letter- in their notebook and add any questions they now have to their W column of their KLEWS chart. b. After participants have had a moment to do those two things, show a "student" example of what that letter might look like (animate the slide)

	c. Have participants think about what they want to remember from this section of the learning sequence and jot it down in their notebooks to remember for planning. (Total slide time=8 minutes)
44	Display **S44 (Mayor's Email)** and ask the participants to read the Mayor's Email to themselves a. Tell participants that as a teacher you will want to point out that the mayor is using the word dissolve. Students may need some vocabulary support here. Also, have participants think about that word as they are looking at the data. (Total slide time=1 minute)
45	Display **S45 (Water Report)** and refer to **H7 (Hope Valley Water report) and H8 (Hope Valley Map)** a. Tell participants we have the data and map the mayor sent and we are going to examine them to look for evidence that might help us understand what is going on in the lake. b. Tell participants to think about what data they might be able to gather from the map, noticing different landscape features as well as the placement of different elements of the town. c. Remind participants that there are two pages of H6 the water report. d. Tell participants that in their breakouts they will examine the evidence, take some notes in their notebooks, and have a discussion with their group around the evidence and the three questions. (Total slide time=15 minutes) *Trainers Note: Some students may struggle with being able to read the map in order to gather information. As a teacher it may be worth including a mini lesson on maps before students do this activity, or taking the time to go through the map as a class. Additionally, some groups may be able to analyze the data more quickly than others. Something to consider is having additional data or information to give those groups to reason with as other groups work with the original data. This new information could be connected to their wonderings, an additional connection, or just more complex information about a topic. In wanting to support all learners, something to consider when presenting data sets and complex reading to students is creating an audio version to support English Language Learners and struggling readers.*
46	Display **S46 (What might be causing the fish to die in Lovely Lake?)** and tell participants that now that they have analyzed the map

	and water report it is time to write in their KLEWS chart. a. Give participants individual time to fill in their L and E in their KLEWS chart. b. Ask one participant to share out loud their claim and evidence. c. Ask all participants to put in the chat if they agree or disagree and why. The *why* should be supported with evidence. d. If most participants agree then the facilitator will add it to the whole class KLEWS chart for the L and E. e. Tell participants this a good time to add some science words or ideas to the S column of their KLEWS chart (i.e. dissolve, objects too small to be seen can be dissolved in water) (Total slide time=8 minutes)
47	Display **S47 (KLEWS Chart: What might be causing the fish to die in Lovely Lake?)** and and explain that these are examples of what students might have learned about Lovely Lake and the evidence that lead them there: a. Point out that students might pulls evidence from different sources (i.e. water report, map, water investigation) (Total slide time=7 minutes)
48	Display **S48 (Claim and Evidence)** and refer to **H9 (CER).** Tell participants it is time to develop your argument about what is killing the fish in Lovely Lake. a. Give participants 5 minutes to individually fill out their C and E. To help you out, we have color coded the CER and KLEWS chart to help students see that their Claims might come from what you have Learned, the Evidence might come from the Evidence column and eventually your Reasoning might use information from the Science principles portion of the KLEWS chart. b. Then as facilitators, walk participants through filling in their reasoning by using their S column of the KLEWS chart. The idea to convey here is that things can be dissolved in water and we can't see them. Help participants connect that to their C and E (Total slide time=10 minutes)
49	Display **S49 (Fishy Findings)***This slide is animated* and tell participants it is time to let Mayor Jackson know of your findings. a. Tell participants at this point we would have students write a letter to the mayor using the CER as a scaffold to write . b. Ask participants to take a moment to process what they have done and jot notes in their notebook for what they would like to remember about this section for when they start planning. Questions they can think about are: What supports might your students need, how might you use some of the structures we

	modeled, etc. c. The facilitator will show a "student" example of what that letter might look like (animate the slide) (Total slide time=5 minutes)
50	Display **S50 (Mayor's Email) and** ask participants to read the Mayor's Email to themselves. a. Tell participants we will be transitioning to think about the other health and safety issues that were brought up in the Town Hall Meeting. Refer back to the wonderings (questions) from the beginning in the whole class KLEWS chart. (Total slide time=1 minute) *Trainer Note- If your students struggle with the word "patients" or "acquired" feel free to define them for them. They are not critical to the students' explanations so we do not need them to develop their understanding of it through the learning sequence.*
51	Display **S51 (Health and Traffic Reports)** and refer to **H10 (Hope Valley Health report) and H11 (Hope Valley Traffic Report)** a. Tell participants they will be headed into breakout rooms. They should examine the new evidence sent to them by the mayor and use their notebooks to take notes on the health and traffic reports. b. They should then engage in a discussion around the four questions. c. Participants may add to questions or wonderings to their W column in their KLEWS chart in their notebook (Total slide time=6 minutes) *Trainer Notes:* *1. Once they have all gone to the breakout room, advance the slide to the party invitation.* *2. At Time = 5 minutes close the breakout rooms* *Feel free to put on a party hat or a celebratory virtual background and dance to some party music when the participants come back from their breakout. Then go to next slide*
52	Display **S52 (Let's Party!)** and welcome participants back from their breakout rooms. a. Tell participants, "Surprise! We have new evidence to share with you. I just received this invitation. What clues does this party

	invitation give you about your date? What is important about this invitation? Is it important? How does this change your discussion? b. Ask participants to put their answers in the chat or unmute themselves to share. Go to next slide before they go back to their breakout rooms. (Total slide time=3 minutes) *Trainer Note: Put on a party hat, celebration virtual background, and dance to some party music when the participants come back from their breakout.*
53	Display **S53 (Health Havoc)** This slide is animated. a. Have participants read the first part of the slide. b. Tell participants when they go back to breakout rooms to continue to look at the data, patterns and correlations. They should discuss the following: What do you think might be causing these health concerns and why? What additional information do you want from the mayor? Participants should make sure they choose a reporter to share out what they discussed. c. Once participants are back in the whole group, take 5 minutes and have one representative from each group share what their group came up with for the cause of the problems or the additional information they need. d. **Advance the animation** so the second piece of the slide is viewable. Tell the participants they have about 3 minutes to reflect on what we have just done and jot notes in their notebook for what they would like to remember about this section for when they start planning. Questions they can think about are: What supports might your students need, how might you use some of the structures we modeled, etc. e. Show participants what a student letter example might look like. (Total slide time=16 minutes)
54	Display **S54 (Mayor's Email)** Ask participants to read the Mayor's Email to themselves a. Highlight that most patients live clear across town from the power plant and freeway. (Total slide time=1 minute)
55	Display **S55 (What do we know?)** and tell the participants we need to see if we can gather more information in order to help convince the Mayor. a. Give participante time to individually fill in the K and W columns on their KLEWS chart. They can use the prompt on the slide to help focus their thinking. What do you think you know about how

	the power plant and freeway could affect people living clear across town. b. Have one or two participants share out. (Total slide time=3 minutes) *Trainers Note: Hopefully the participants will start to bring out the idea that the air/air pollution in Hope Valley has something to do with the asthma rates and that we need to investigate the air pollution further. If this doesn't come out of the discussion, try to lead them in that direction. Also, listen for participants to share their knowledge from their own lives (e.g., smog or spare the air days, camping fires blowing in their face) Make a reference to how they have share about their own lived experiences and how such an important thing for children to be draw from their personal lives, activate their prior knowledge and is supported by the findings in How People Learn 2-Culture and Community.*
56	Display **S56 (Air Pollution Model)** and tell participants this is the second investigative phenomenon. a. Participants will work on this slide individually and asynchronously. b. Remind participants of the observation categories they used earlier in the session. c. Have participants spray a scent into a container, go to another room, then walk back toward the scent slowly. d. Participants should note where they are when they first smell the scent again. i. Are they right next to the jar? a few steps away? all the way across the room? ii. Is it the same if you walk out of the room and walk back in again? e. Participants should use their notebooks to record any observations they may have. If they have wonderings they can record those as well. f. After participants have completed the observations they should take a few minutes to sketch a quick model in their notebooks of what they think might be going on. (Total slide time=20 minutes- including 10 minute break) *Trainer Note: Perfume, essential oils, vanilla extract, and hand sanitizer all work well as the scent.*
57	Display **S57 (Air Pollution Model Collaboration)**

	a. Participants will go into breakout rooms to complete a group model on the interactive slides. This is the first time these groups have been together so the groups will need to choose new roles and new elbow buddies. b. Participants should use the prompts on the slide to guide their process. (Total slide time=10 minutes) *Trainer Note: Participants may bring up fires, smoke, or smog. If this comes up it is fine to have the conversation and let participants know that students may bring that up too.*
58	Display **S58 (Reading about Air)** and refer to **H12 (What is Air Made Of?)** a. Set participants up for reading b. Explain that readers usually read nonfiction to learn something. c. Remind participants that they are trying to figure out how pollutants can move across Hope Valley. d. Point out that there is a lot of information in the text and that they will have to read closely for answers to the listed questions e. Point out that through all of the reading in this lesson participants are meeting the Common Core Standard RL 5.7 (Total slide time=2 minutes)
59	Display **S59 (Independent Work)** *This slide is animated* a. Participants will independently read the article and take notes in their notebook about the questions on the slide. b. Then participants will be asked to explore a simulation and take notes on their observations from the simulation. c. Participants will have 15 minutes to individually complete the reading, simulation, and sentence frame. d. After that the participants will go into breakout rooms for 7 minutes to process the two activities using the prompts on the slide (Total slide time=22 minutes)
60	Display **S60 (Can things be in the air that we cannot see?)** Give participants individual time to fill in their L, E and S in their KLEWS chart and do some thinking individually. What have we learned about air from our reading? Is there anything we have learned about the air that can help us make sense about what is happening in Hope Valley? a. Displaying the Whole Class KLEWS Chart remind participants that we going to focus on something that was recorded in the L column (claim), Evidence, and S columns. Ask one participant to share out loud their L, E, S columns

	b. Ask all participants to put in the chat if they agree or disagree and why. The why should be supported with evidence and reasoning. Ask them to consider adding an extra piece of evidence or something that you recorded in the column. c. If most participants agree then the facilitator will add it to the whole class KLEWS chart for the L, E, and S. (Total slide time=8 minutes) *Trainer Note: As participants respond in the chat be sure to identify what column the idea being presented could be added to.*
61	Display **S61 (KLEWS Chart: Can things be in the air that we cannot see?)** and and explain that these are examples of what students might have learned about air and the evidence that lead them there: a. Point out that students might pulls science words and principles from the reading b. Point out that new wonderings or thoughts may appear during this time that should be added to the KLEWS chart c. Ask participants to share any new wonderings or connections they are making to Hope Valley in the chat (Total slide time=7 minutes)
62	Display **S62 (Revise your group model)** Ask participants to collaboratively work together to revise their group model that was created earlier. a. What can you incorporate from the reading and simulation that you can incorporate into your model. Tell participants to make sure they include evidence from their reading and simulation. b. Remind them that they are working on a consensus model so they need to agree on the additions or changes in their model. Let participants know it is good practice to revise their model in a different color. (Total slide time=11 minutes)
63	Display **S63 (Pollution Problem)** *This is an animated slide* a. Ask participants to quickly jot down some ideas for the mayor- not a formal letter- in their notebook and add any questions they now have to their W column of their KLEWS chart. b. After participants have had a moment to do those two things, show a "student" example of what that letter might look like (animate the slide). Ask for a participant to read the letter sent to Mayor Jackson. Call out how Josie used her highlighter to identify her claim(L), Evidence, and Science on her letter as a strategy. c. Have participants think about what they want to remember from this section of the learning sequence and jot it down in their

	notebooks to remember for planning. (Total slide time=8 minutes) *Trainer Note: Let participants know that in the classroom, asking students to color code their own letters, or their peers' letters, is an exercise that can be worth the time to help students make the connection between the KLEWS chart and their writing.*
64	Display **S64 (Gots, Needs & Commitment to Try)** and remind participants to share with us their gots/needs. (Total slide time=2 minutes)
65	Display **S65 (Mayor's Email)** Ask participants to read the the Mayor's Email to themselves. (Ask for a participant to read aloud to the group). Say with this letter the mayor has given you more information; she has provided you the Hope Valley Air report and the Weather Report. Encourage participants to look for patterns and post in the chat: What do you notice? What patterns do you see? a. Tell participants that they should read **H13 (Hope Valley Air report)** and **H14 (Hope Valley Weather Report)** and take notes in their science notebooks. b. Tell participants to discuss what they learned or can claim from this new information and what evidence they have to support those claims. (Total slide time=17 minutes)
66	Display **S66 (KLEWS Chart: What is causing the increase of asthma in Hope Valley?)** and and explain that these are examples of what students might have learned about Hope Valley and the evidence that lead them there: a. Point out a typical claim and its supporting evidence. b. Point out that students might pulls science words and principles from the report (Total slide time=7 min)
67	Display **S67 (Claim, Evidence, and Reasoning)** and refer to **H15 (Asthma CER).** Tell participants now that you have had time to discuss your ideas and listen in as we continued to contribute to our Whole Class KLEWS Chart it is time to develop your argument about what is causing the increasing rates of asthma in Hope Valley. Remember the CER here is colored coded to assist you with using your KLEWS chart to complete this Claims-Evidence- Reasoning document. a. Give participants 5 minutes to individually fill out their C,E,R b. Remind participants when there is one minute remaining (Total slide time=5 min)

68	Display **S68 (Checklist for the CER)** and tell participants that we are reaching the end of this investigation. Ask participants to keep out their CER #2 and get back out their first CER a. Ask participants to Individually go back through their CERs (both the water/Lake, and air/pollution) and see if they have were able to answer the questions on the Checklist? b. Tell them we are going to give you an additional 5 minutes to go through the checklist and see if they have everything that they need. c. If participants find their CERs are missing something they should feel free to add to them, or change anything they think they should change. (Total slide time=5 minutes)
69	Display **S69 (Developing an Argument: Student Consultancy)** *This slide is animated* a. Tell participants to individually re-read their CERs (both of them). Tell participants that they will have about 3 minutes to highlight anything they are confident and proud of. They should then highlight in a different color anything they are unsure of and need some support from their colleagues. b. In breakout groups, ask participants to share their initial plans for their report as well as what you are proud of and need support with from your two CERs. Participants should set a timer so each person gets 3 minutes to share and 2 minutes to receive feedback then switch. This will give everyone 5 minutes to share out and get feedback. We are getting ready to write our final report so this will give you time to talk about your ideas and received feedback first. (20 minutes) c. When participants return to the main room, click the slide ask them to think about the two questions on the bottom of the slide. We would like to have a whole group discussion as we address the questions on the slide. Invite participants to unmute themselves and share their thoughts, or put them in the chat. i. Invite participants to build off or refute ideas shared. "Does anyone want to add?" ii. Ask participants to share what they think is happening with Hope Valley? Encourage them to use their evidence and scientific reasoning to support their claim. (Total slide time=28 minutes)
70	Display **S70 (Students choose how to develop 1st draft of report)** and tell participants that now we would want students to develop their 1st draft of their report. Describe that the participants will get to read through the options for creating their final report to the city council. a. Ask participants to write down some ideas in their notebook about

	what they would like to do for, and include in, their report to the city council. b. Remind the participants that they are summarizing and can refer to the KLEWS chart for information. c. They will have asynchronous time at the end of this session to create their report, they are just getting some ideas down for now. (Total slide time=1 minute) *Trainer Note: We are anticipating that you are making a single slide. If you have more than one slide, please be sure to put your name on each slide.*
71	Display **S71 (Developing an Argument: Teacher Debrief)** and ask participants to read the questions on the slide. a. Give participants about 2 minutes of individual think time to jot some things down in their notebooks. They should choose a questions or two to focus on, not all of them. b. Have a whole group discussion- participants can use the chat or unmute themselves as they feel comfortable. Let participants lead the discussion as much as possible. If they are only focused on one question you can ask if anyone responded to another question. (Total slide time=12 minutes)
72	Display **S72 (Developing an Argument: Teacher Planning**) and ask participants to read through the prompts. a. Put participants back into breakouts for 10 minutes to have a discussion around some of the prompts. b. When participants come back, ask them to share in the chat an "aha" they heard from another participant in their breakout room. c. Give participants a few minutes to write in **H6 (Lesson Strategies)** for this section of the learning sequence (Total slide time=18 minutes)
73	**Display S73 (Report Work Time)** and tell participants they will now have 30 minutes to work asynchronously on their report as well as take a 10 minute break. a. Tell participants there is a slide in the Google Slide working deck with the directions. Also, please remind participants that there is one slide for each of them in their working deck to put their report onto. Please make sure their reports are all in the working slide deck by the end of the work time, b. Participants are welcome to turn their screens off but at least one facilitator will remain in the room at all times for questions.

	c. Tell participants what time the session will resume (Total slide time=40 minutes)
74	Display **S74 (Developing an Evidence Based Argument)** and tell participants this is the process that we have been in so far and we will be moving into the section in the learning sequence where we will be refining and sharing our ideas. This section will focus heavily on critique, feedback, and revision of arguments. Consider how you may experience this as a learner and as a teacher for how this might look in your classroom. (Total slide time=1 minute)
Part IV	*Critique and Feedback (75-84)* *85 min.*
75	Display **S75 (Part 4)** and tell participants how this part builds on the work from previous evidence gathering and claim development but we are now moving into a new section of the learning sequence. Share the session goals in this section of the learning sequence with participants and emphasize that we will be critiquing and revising their arguments and allowing them to reflect and plan after this section. Look for opportunities throughout this section of the learning sequence where participants will be speaking, listening, reading, and writing. (Total slide time=1 minute)
76	Display **S76 (Austin's Butterfly)** and share with participants that they will be watching a video of a facilitated discussion on providing critical feedback on a scientific drawing. The video is 6:30. a. Tell participants to have one person in their breakout share their screen and watch the video. The participants should then spend about 3 minutes discussing the questions on the slide. Remind participants to choose a reporter when they are given the 60 second warning to leave the breakout. b. Have participants come back together with the whole group and have each reporter unmute themselves and share their group's answer to one of the questions. (Total slide time=15 minutes) *Trainer note: Please make sure that video is loaded into the google slide deck. Link to video https://vimeo.com/38247060.* *Listen for the participants to bring up the following ideas:* *-The teacher used words like critique and feedback with the students*

	building their scientific literacy *-The teacher paraphrased and restated contributions of the students* *-The teacher helped the students focus their feedback to wing shape and pattern in the wings* *-The students were respectful of the original work and the iterations* *-The students gave specific feedback so it was useful in the iterations*
77	Display **S77 (Strengthening Argumentation using Critique and Revision)** and thank participants for the conversation about the way students provided feedback in the video Austin's Butterfly a. Tell participants that the next activity, the Post-it Note Protocol, gives participants an opportunity to leave questions and comments on their peer's work. This will also give participants an opportunity to read their peers' work. The type of feedback we are trying to offer should be helpful . b. Show examples of helpful feedback and not-so-helpful feedback. Review the sentence frames with participants and ask if there are any others that the group would like to add. (Total slide time=3 minutes)
78	Display **S78 (Post it Note Protocol**) This slide is animated a. tell participants we will be using the post-it note protocol to give and receive feedback on the first draft of their report. b. Describe to the participants what the color codes represent i. Pink- Add ii. Blue- Revise iii. Green- Remove iv. Yellow- Questions/Compliments c. Here are some ways for us to think about the feedback. We can look at the claim for feedback (read the bullet points on slide). We can also review the use of evidence (read the bullet points on slide). And finally you can look at their reasoning and provide feedback. d. Tell participants the questions on the slides are purposeful to help students be specific and helpful in their feedback. e. Remind participants that they will be working with their partners/"elbow buddy" to talk and work through the process to give feedback on 2 reports. These 2 reports are the ones created by the other two people in their table group. f. Tell them that they need to split the time so that both reports receive equal attention. Ideally each report will feedback from each color post-it and at minimum one comment per color. g. Tell participants that elbow partners will work together to review

	the posters of the other pair in their group. This way you have someone with whom to discuss the poster's attributes. You'll spend the first 7.5 minutes on one poster and the next 7.5 minutes on the second poster. You and your partner are not reviewing your own posters, but the other pairs. h. They will have 15 minutes to complete this protocol for the 2 reports assigned to them. (Total slide time=18 minutes) *Trainer Note: If the poster you are looking at doesn't allow you to add post-it notes if it's too crowded. Consider using comments and just write "pink" or "green" in the comment box so your partner knows what kind of feedback you are giving.*
79	Display **S79 (Revise Your Report)** and tell participants that now they will have a chance to review to the feedback from the other group. Ask participants to take 5 minutes to read the feedback they received on the first iteration of their report. a. Remind participants that ultimately the report is their work and they get to decide what revisions they make. You will have an opportunity to review, consider, and adopt or reject the feedback you have received. b. Please make any edits to your report on that same slide on the slidedeck. c. Check-in with participants to see if they need more time at (Total slide time=5 minutes)
80	Display **S80 (Gots, Needs & Commitment to Try)** and remind participants to share with us their gots/needs. (Total slide time=2 minutes)
81	Display **S81 (Reflect on the Protocol)** and ask participants to reflect back on the post-it note protocol using the questions on the slides. Ask participants to consider how the process felt to them. This is important as educators to first reflect on how receiving felt and then how our students might feel receiving feedback. a. Remind participants to raise their hand to share out loud or in chat as this is a whole group discussion. Encourage the participants to respond to ideas being shared in the chat. (Total slide time=10 minutes) *Trainer Note: Checking in with students about a critique and feedback process helps them make refinements for the next time they use this process.* As participants share, listen for and respond to the range of

	emotions related to making our thinking visible and be sure to acknowledge this. Consider tying it back to the classroom culture and the Austin's Butterfly.
82	Display **S82 (Town Hall Meeting)** and refer to Handout **H16 (Town Hall Meeting 2)** a. Ask participants to individually read the town hall meeting minutes b. Tell participants that they are going to have 15 minutes in a breakout room to discuss how they would respond to the counter arguments presented by the CEO of Orbit and the Farmer. What you will be doing during the 15 minutes to wear your learner hat. How could you or would you respond to this counter argument. c. Then put on your educator hat and discuss in your breakout rooms discuss how they, as educators, might support students to be able to respond to counter arguments. (Total slide time=17 minutes) *Trainer Note- We want participants to key in on the point that human activity is causing the problems in Hope Valley.* *What if the farm wasn't there? What we expect to see in the lake?* *What if the power plant wasn't there? What would we expect to see in the air?* *Also, students would have turned in their final reports by now so it would be reasonable to ask them to make a presentation as if they were at the town hall if that is a skill a teacher was working on with their students.*
83	Display **S83 (Solutions)** and tell participants that after the Town Hall meeting, the participants would receive a letter from Mayor Jackson thanking them for their hard work and proposing their next task, to find a solution to the problems facing Hope Valley. a. Ask for a volunteer to read the Solutions Mayor Jackson letter aloud. b. Now, tell participants we will talk them through where we would go next in the learning sequence but they will **not** actually experience this part as learners. Participants can chat what they might do next in their classroom. c. Participants would then spend some time brainstorming possible solutions and thinking through the pros and cons for each solution. d. Participants would then decide on a course of action to be presented to the Mayor e. Participants would need to include the consequences of their

	solution on each of the following factors in Hope Valley i. social ii. economic iii. political iv. environmental f. Participants would then be given one of the following stakeholder group roles: i. Business owners including Hope Valley Power Plant ii. Environmentalists including Avery Green our Environmental Scientist iii. Local Family groups iv. Agriculture workers and owners v. Health and safety personnel like Police Officers and Nurses g. Participants then read each of the proposed solutions with their role group and pick one they would support to the city council. They prepare their argument for why this solution is the best one. h. Participants would then form "city councils" with one member from each role group. In that group they need to decide on a solution to present to Mayor Jackson with a clear argument that addresses the four factors (social, economic, political, environmental) as well as the interests of each of the stakeholder groups. (Total slide time=6 minutes) *Trainer Note: This is a great place to connect CCSS.ELA-LITERACY.RI.5.9: Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.*
84	Display **S84 (Critique and Feedback: Teacher Debrief)** a. Reintroduce the **H1: (Features of Classroom Culture #2)** to participants. Ask them to think about the classroom culture that is needed for students to engage in this type of learning and to be able to share their ideas and receive feedback. Have participants discuss any features that stand out to them. Ask them to circle or highlight any that we used during our explorations and discuss how it was used. Ask participants to write on the handout where that specific feature was experienced during the exploration. Participants can share out findings to the whole group. b. Tell participants, now that we have engaged in the critique and revision process, consider how you would use these practices in your own classroom. Give participants time to fill out page 2 of the handout as much as they would like. c. Ask participants to add new findings or adjustments they will use for their own classrooms in their notes on **H6 (Lesson**

	Strategies). (Total slide time=8 minutes)
Part V	Planning for Implementation (85-99) 156 min.
85	Display **S85 (Part 5)** and tell participants this is an opportunity for participants to reflect on the learning experience and strategies practiced in the previous parts and to think about how these strategies might apply in their next lesson and/or unit. a. Tell participants to rename themselves with which grade level they would like to plan with. (grade/role, Name) (Total slide time=1 minute)
86	Display **S86 (What is Student Sense-Making)** and refer back to **H4 (How People Learn)** and **H5 (How People Learn 2)**. Explain that they will follow these procedures: a. Tell them that they will have 5 minutes to re-read both handouts. b. Put participants into breakouts for 10 minutes to talk about where they saw HPL connections in the learning sequence c. Come back whole group and have one group member share a take-away from each group. (Total slide time=20 minutes) *Trainer Note: Ask the participants what they know about these key findings. If there is limited knowledge in the rooms, use these as talking points for the 5 key findings:* *Prior knowledge: what students bring to the new learning—their past experiences, knowledge, ideas, conceptions, misconceptions etc. In classrooms, we often elicit prior knowledge…and then go right on and teach what we planned! The goal instead would be to build on student prior knowledge as we facilitate bringing them to the scientific explanation of phenomena.* *Conceptual Frameworks: This is the idea that experts have a schema or way of thinking about a topic that is not focused on just the details or facts. Instead, experts have a broader view on which they can hang information. For example, an expert chess player sees several plays ahead; a chef can create meals from a variety of foods without using a recipe; a seasoned traveler knows how to navigate cancelled planes. In school we often focus on the bits and pieces. NGSS expects student to engage in big ideas—core ideas, practices and crosscutting concepts.* *Metacognition: The importance of understanding how you come to know something. What did you think when you started? What ideas made you think differently? Why? What are you questioning now?*

	Learning happens in a social-cultural context: Understand that all teaching and learning interactions are cultural processes which include diverse experiences, perspectives, and values. *Learning is best when it is culturally relevant and motivating to the learner: Create access to socially just science experiences that are meaningful to students' lives and future and that build upon their current scientific worldviews and deepen their science knowledge as they engage in science in socially relevant and transformative ways.*
87	Display **S87 (Performance Expectations)** and tell participants we are going to look at 2 standards that involve argumentation at opposite ends of the K-12 spectrum. a. Have participants look at the kindergarten standard. Ask participants what is expected of students at kindergarten? Encourage them to share in the two or to raise their hand to share. b. Then ask participants to look at the high school standard. Ask participants to think about where we are trying to get students in terms of argumentation by the end of high school. c. Participants can use the chat or say out loud what they notice (Total slide time=5 minutes) *Trainer notes: Some ideas that might emerge* • *you have to begin in kindergarten if we expect students to be able to do what is asked in high school* • *regardless of grade students need to provide evidence to support a claim* • *flexibility is provided in Kindergarten in the construction of the argument (e.g., whole class science talk, teacher charting) whereas in high school students are specified to produce an oral argument*
88	Display **S88 (SEP 7 Progressions)** and refer to **H17 (SEP 7: Argumentation Through Evidence)** A. Tell participants that part of the appendices to the NGSS standards document are progressions for each Science and Engineering Practice. Since we are focused on argumentation from evidence we will examine the progression for SEP 7: Arguing from Evidence B. Ask participants to circle on the progressions document the things that their students can do now, paying special attention to the

	grade bands. C. Put the participants into grade level breakout rooms and ask them to talk about what they can do in their grade level, in their own classroom to move students forward on the progression. Also ask them to think about what we did in this session to develop students skills for engaging in argument from evidence. D. Before participants leave their breakout room ask them to chat briefly about what unit they are going to be planning to see if there is any overlap among educators at their grade level. (Total slide time=13 minutes) *Trainer Note: You can remind them that since argumentation starts in kindergarten they can use it in conjunction with other SEPs even if it is not called out in that specific PE*
89	Display **S89 (Identify your 3-D Learning Goal)** and tell participants we will begin planning our learning sequence by thinking about their learning goal for the students. a. The facilitator should open up the SDCOE website and demonstrate how to find grade level standards. b. Have participants use the progressions document H17 (SEP7: Argumentation Through Evidence) to identify where their students currently are on the progression for argumentation from evidence, ask participants to think about what components of argumentation they want to focus on. c. Participants will next think about the DCI they want to have students explore and finally what CCC would they like to use as a lens. d. Participants should work on this independently and should feel free to turn their screens off. Facilitators will remain on screen in order to support the participants in this process. e. If participants are done early they can start working on Phenomena (next slide) (Total slide time=20 minutes)
90	Display **S90 (Phenomena)** and tell participants one of the core tenets of NGSS is students making sense of phenomena in the world around them. a. Tell the participants we would like them to choose a phenomenon that matches their 3-D learning goal and also sets students up to engage in argumentation. b. The facilitator should show the participants a few sites where they can find phenomena, including SDCOE NGSS site. (Total slide time=10 minutes)

91	Display **S91 (CCC Critical Questions)** and ask participants to review the **H18 (Crosscutting Concept Critical Questions).** a. Ask participants to private message their partner to discuss how the use of the Crosscutting Concepts and critical questions can support scientific reasoning. (2 minutes) b. Ask for volunteers to share their thinking or their partner's thinking. Listen for the participants to share ideas (see below) and reinforce the ideas: i. students should support their responses with evidence ii. teacher prompts can support this kind of sense making iii. Cross cutting concepts can be another type of "glue" that helps with reasoning and dealing with multiple lines of evidence (Total slide time=8 minutes)
92	Display **S92 (Planning for Implementation)** and tell participants we want to provide them with time to plan for classroom implementation. a. Explain to participants that they are welcome to plan individually or with others. Tell them there are breakout rooms open for them to join if they choose. Otherwise, they may turn their screens off and work. b. Ask everyone to return at XX:XX *Trainer note: This time can be flexible but should be at least 20 minutes.*
93	Display **S93 (Consultancy Protocol)**. The purpose for the consultancy protocol is to provide a structure to enhance the value of collaboration and to provide feedback to lesson sequences. a. Tell participants this is the structure we will be using for the consultancy protocol in our grade level groups. b. 2 minute: One write shares their individual lesson sequence without any interruption. They must describe their lesson sequence in detail and how and when he/she plans to use strategies to support scientific argumentation. He/She can also expand on what his/her student work might look like to fill the 2 minute time. As *person one* shares, the other participants do not respond, they listen. a. 3 minutes: The *other participants* in the group provide positive considerations (feedback that is additive*) and ask clarifying questions. The next slide will provide some frames to support positive feedback. b. Tell participants to adjust the time if necessary. c. Tell participants to continue this protocol until all members of the

	group have shared their lessons. d. Go to next slide before putting them into breakout groups (Total slide time=2 minutes)
94	Display **S94 (Additive Feedback Frames and Clarifying Questions)** and tell participants when providing feedback we want to be clear and specific. a. These are some examples of positive additive feedback frames as well as some clarifying questions. Model using one of the frames. b. Remind participants that they will have 2 minutes for the writer to share their lesson without interruptions. They will have 3 minutes of feedback and questions after. c. Have participants complete the consultancy protocol. Know that groups will finish at different times, direct participants to revise and continue working on their lessons sequences until all groups finish. (Total slide time=21 minutes)
95	Display **S95 (Lesson Planning)** Use this time to continue working on your lesson sequence or follow up activity that you will do. a. Give participants the option to return to breakout rooms, or just work with their cameras off. Facilitators will remain in the main room to answer questions and provide support. b. After about twenty minutes of work time gather everyone back together and allow participants to share something from the learning sequence they are planning. (Total slide time=30 minutes)
96	Display **S96 (Follow-Up On-Line Support)** and tell participants we want to continue to support each other and the implementation of strategies and tools provided in this session. There will be series of follow-up online support opportunities. Please consider joining your colleagues in this opportunity to collaborate and learn with each other. Follow-Up Sessions (Artifact Sharing) Dates: March 10, April 7, and April 28 Times: 4:00pm - 5:30pm Fall Tune-Up Sessions [NEEDS TO BE MORE DEVELOPED] Proposed Dates July 28 August 18 September 15 (Total slide time=2 minutes)

97	Display **S97 (Closure)** and remind participants that educators are lifelong learners, take small steps to make the adjustments needed to meet your student needs. Thank them for all their hard work and engagement over all the sessions. (Total slide time=1 minute)
98	Display **S98 (Research and Resources)** and tell participants that this is a list of resources and research we used to inform this session. (Total slide time=1 minute)
99	Display **S99 (Gots, Needs & Commitment to Try)** and remind participants to share with us their gots/needs. (Total slide time=2 minutes)