

CU Science Ambassadors

Workshop #1 – 27 August 2015 (How People Learn)

Time		Activity
2:30pm	(10min)	Arrival <ul style="list-style-type: none"> • Greetings • Sign in and Attendance • Fill out nametag • Take headshots • Have Dance your PhD videos showing
2:40pm	(10min)	Welcome, Today's Agenda and Goals <ul style="list-style-type: none"> • Introductions of Fall 2015 Fellows • Designing engaging activities • Get each started on identifying key points of your work
2:50pm	(30min)	Making Meaning (Catalog pg37) <ul style="list-style-type: none"> • Learn more about CU Science Ambassadors group and motivations. Have everyone share. Why are they here and what do they hope to get out of the program? • We'd like to learn more about the group and your motivations for being here. We'll go around the room and everyone will share <ul style="list-style-type: none"> ○ Your name ○ Where are you from ○ Your area of scientific research ○ Your favorite childhood toy • Questions for the group: <ul style="list-style-type: none"> ○ Why is science communication important to you? ○ What are some of your challenges or barriers to communicating your science? • Hand out the 'Making Meaning Worksheet' and have scientists describe a memory through words or pictures. This should be a 'meaningful' informal learning experience (meaningful can be defined by scientist) (5-10min) • Reflect with a partner – take time to highlight specific qualities of the experience that made it meaningful • Place a check mark on the board next to the meaningful words on the board (or add your own) (keep this section to 10min) • Discussion: <ul style="list-style-type: none"> ○ What did our experiences have in common? ○ Does anything on the board surprise you? ○ How many experiences involved some type of interaction with another person? ○ How do you think these qualities relate to the experiences you will create and facilitate at the science center? • Remind scientists that these experiences don't just "happen",

		<p>though when you are a learner, it often feels as if this is so. More often, such experiences are carefully constructed and designed by some type of informal science education professional</p> <ul style="list-style-type: none"> • Comment on the idea that the scientists can and will create these meaningful experiences for science center visitors. This doesn't mean that every interaction with a visitor will be as memorable as the ones you have just recounted. But you never know when that magic moment between you , the materials or activities, and the visitor will occur. • Also, remind the scientists that, because learning is inherently personal, the real meaning-making happens within the individual learner. As facilitators, we can support this learning by working on these qualities, and paying attention to the unique needs and interests of the learners in front of us.
3:20pm	(30min)	<p>Activity: The Pleasure of Finding Things Out (Catalog pg49)</p> <ul style="list-style-type: none"> • Main Idea: Experiences of this activity involve aspects of personal histories, emotions, acquired attitudes, curiosity, inferences, risk and many other factors that constitute elements of learning. The most essential tool of inquiry is inference. • Round #1: Each person gets a black box, tell participants: "Without opening or damaging the box, describe as completely and precisely as possible everything inside the box" (5min) <ul style="list-style-type: none"> ○ Ask: "What are some words that could describe the room in the last five minutes?" ○ What resources did you apply to exploring the boxes? ○ What resources did you apply to exploring these differences? ○ How can we group the words from our description of the room? ○ How can we group the words describing the resources we applies? • Round #2: (without drawing attention, have assistant place tools on the table) Tell participants "Now leave your box and anything you wrote down or drew about it, and sit at a new table with a new box. Your should now have a note left by the box's previous investigator. Without opening or damaging the box, describe as completely as possible everything inside the box. (10min) <ul style="list-style-type: none"> ○ What is different now from when we tried this before? ○ How many of you have used the tools? ○ How many of you waited until others have used them? Why? ○ How did the tools change things? Have you added anything to the written description? • Describe inquiry as transitory, continuous, a "journey of

		<p>experience” for which the end isn’t the point. The most essential tool of inquiry is inference. Without uncertainty, inquiry is impossible.</p> <ul style="list-style-type: none"> List suggestions for actions taken during the box investigation: shake it, try to look in the hole, weigh it, etc. “Where did these suggestions come from?” (Answers may include: prior knowledge, senses, curiosity, a question, hands/bodies, other people, problem solving, tools...) Round #3: Change tables again, and this time work collaboratively with someone on another box. Tell participants: “For the next ten minutes or so, please focus on precision. How well can we describe the inside of the box? What do we use for descriptive precision in science? Solicit suggestions like “we rolled marbles inside to approximate the height of partitions” Open the boxes: then, half of the mystery boxes in this workshop will remain unopened. Ask: “What are some differences between what we can say about the unopened boxes and what we can say about the opened ones?” Intended Outcomes <ul style="list-style-type: none"> Science is a journey Without uncertainty, inquiry is impossible
3:50pm	<i>(5min)</i>	Break
3:55pm	<i>(30min)</i>	<p>Effective Table Top Demonstrations:</p> <ul style="list-style-type: none"> Eric to show off three demos of things we have developed <ul style="list-style-type: none"> Photo Origami Board Game Flow from Fire and Ice Binary bracelets + lasers
4:25pm	<i>(10min)</i>	<p>Activity: Personal Learning (Catalog pg43)</p> <ul style="list-style-type: none"> Play with 3-D Mirascope (or Pintacudas) (5min) Pass out personal learning worksheet Share responses (5min) Intended Learning Objectives <ul style="list-style-type: none"> People enter environments and situations with their own personal motivations, curiosities, understandings, interests, conceptions, and misconceptions. We can create engaging and meaningful experiences by acknowledging and accommodating what individuals bring with them to activities. If there is time: read <i>Fish is Fish</i> by Leo Lionni <ul style="list-style-type: none"> It’s important to remind scientists that, just as they should not assume that visitors are familiar with a particular concepts, the reverse is true, as well. They should not assume that visitors have no familiarity with a particular concepts. Scientists don’t want to end up in the awkward situation of explaining a cell to a molecular biologist.

4:35pm	<i>(20min)</i>	<p>Activity: Concept Mapping (Catalog pg67)</p> <ul style="list-style-type: none"> • This exercise is designed to help scientists identify and develop the main concepts they would like to share with public audiences. Scientists are guided to think about strategies they might use to communicate their work. If scientists are creating a hands-on-activity, the concept map can help focus and define the activity's scope. • Explain that the goal of the concept map is to help scientists select and reflect upon a science concept specific to each scientist's own work. The concept can then be used for activity development.
4:55pm	<i>(5min)</i>	<p>Wrap up:</p> <ul style="list-style-type: none"> • Explain what's next: <ul style="list-style-type: none"> ○ Please complete the Concept Map ○ One-on-one meetings: once between August 31st – September 9th ○ At our next workshop we will ask you to give a brief update to the group on your activity development. ○ Next Workshop will be: September 10th at 2:30pm. • Before you leave today..... <ul style="list-style-type: none"> ○ Sign up for One-on-One meeting date (be sure to note where we will be meeting) ○ Evaluation??? <p>Thank You</p>

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Workshop #2 – 10 September 2015 (Activity Development)

Time		Activity
2:30pm	(10min)	Arrival <ul style="list-style-type: none"> Greetings Sign in and Attendance
2:40pm	(10min)	Welcome, Today's Agenda and Goals <ul style="list-style-type: none"> Explore how to create a materials rich demonstration
2:50pm	(25min)	More demonstrations of good table top demos <ul style="list-style-type: none"> This time we are focusing on optics Eric's lights and wavelength demos 3-D mirascopes Laser maze
3:15pm	(45min)	Discussion: Fellows Share/ What's in a Word? <ul style="list-style-type: none"> Hand out the what's in a word sheet before the sharing. Fellows share developing plan for their activity <ul style="list-style-type: none"> Now that we have had one workshop and our one-on-one meetings; each of you should be narrowing in on your plan for your activity 2 Minutes each and share the following information <ul style="list-style-type: none"> Share your "big idea" Share some of your key messages Share your plan (outline) for activity Share any concerns/excitements about activity Activity: What's in a Word? (Catalog pg141) <ul style="list-style-type: none"> Avoiding Jargon Partners share jargon Reflection GOAL: <ul style="list-style-type: none"> Consider what types of language communicates science the best <p>Speaking to multiple audiences requires flexibility in word choice. The goal is always to maintain precision without sacrificing understandability. It's not about dumbing it down; it's about finding the right words that will give you audience access to your science.</p>
4:00pm	(5min)	Break
4:05pm	(30min)	Tour of the Material Room and Brainstorming about activities <ul style="list-style-type: none"> Play with materials that we have available and brainstorm about your presentation. Tour of the materials room.
4:35pm	(15min)	Watch TED talk "Tyler DeWitt: Hey Science Teachers – Make it Fun"
4:50pm	(5min)	TED Talk Discussion <ul style="list-style-type: none"> Share an example of a scientific concept you remembered only because you or a teacher made it fun

		<ul style="list-style-type: none">• What are some of the reasons DeWitt's mentioned that his students were disinterested in learning about viruses• Must we "dumb down science" in order to make it fun?• Do you think it's possible for you to be scientifically accurate about your work and still tell a good story?
4:55pm		Wrap up <ul style="list-style-type: none">• Homework: 4-5 Sentences on what you plan on presenting and a title for your activity

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Workshop #3 – 1 October 2015 (Facilitation)

Time		Activity
2:30pm	(15min)	Arrival <ul style="list-style-type: none"> Greetings Sign in and Attendance Take group photo
2:45pm	(15min)	Welcome, Today's Agenda and Goals <ul style="list-style-type: none"> Specific strategies for facilitating a conversations (generic strategies) Time to practice talking about your work (specific strategies) Final wrap up and logistics before prototyping
3:00pm	(10min)	Activity: Invitations to Participate (Catalog pg113) <ul style="list-style-type: none"> Hand out the Invitation to participate handout Discuss the invitation to participate handout Fellows fill out two examples for each invitation Share ideas with a partner for 3-5 min GOAL: <ul style="list-style-type: none"> Develop communication strategies the support inquiry Understanding the importance of developing personal connections with audiences based on shared experiences.
3:10pm	(45min)	Activity: Questioning Strategies and Energy Balls & Rattlebacks (Catalog pg125) <ul style="list-style-type: none"> Your questions to facilitate inquiry Handout (5min) Questioning Strategies (10min) Instructions for role-play (5min) Set-up (5min) Round-1 – Group A (5min) Lead a reflection on Round 1 (5min) Round 2 – Group B (5min) Lead a reflection on Round 2 (5min) The Power of Questions GOAL: <ul style="list-style-type: none"> Practice helping the “learner” explore an object using questions Learning the power and effectiveness of good questions and question sequence How we can use questions as a strategy to facilitate discovery and personalize learning experiences for visitors.
3:55pm	(5min)	BREAK
4:00pm		<ul style="list-style-type: none"> FameLab Dance your PhD Summarize your work in 7 words or less
4:20pm	(40min)	Show the TED talk “Carol Dweck: The power of believing that you can improve”

		<ul style="list-style-type: none">• What do you think about Dweck’s theory of fixed vs. growth mindsets?• Do you think you have a fixed mindset or a growth mindset?• Do you think a fixed or growth mindset is more prevalent in certain careers? How about the field of engineering?• How can being aware of fixed vs. growth mindset affect your facilitation strategies?
4:50pm	<i>(10min)</i>	Wrap-Up <ul style="list-style-type: none">• Explain what’s next• Workshop #4: Prototyping session on Oct 12?• Evaluation