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Sign in: Name, Pronouns, SI Unit, Email (optional), Twitter (optional)
Please sign in so we can record your attendance.

- Carlos Arias, he/him, SI OCIO, Data Science Lab, ariasc@si.edu
- Tauana Cunha, she/her, STRI, CunhaT@si.edu, @tauanajc
- Jenna Ekwealor, she/her, SI OCIO: Data Science Lab, ekwealorj@si.edu, @bryophyter
- Nancy Kennedy, she/her, SI OCIO-LASSB, kennedyn@si.edu
- William Mattingly he/him | SI OCIO - Data Science Lab | wma229@g.uky.edu | @wjbmattingly
- Christopher Moriarty (he/him, SAO, cmoriarty@cfa.harvard.edu)
- Michael O'Mahoney;he/him;IZ;omahoneym@si.edu
- Jarrod Scott he/him | STRI | scottjj@si.edu
- Keri Thompson she/her, SI OCIO, thompsonk@si.edu
- Jaxine Wolfe (she/her, SERC, wolfejax@si.edu)

Please fill out the pre-training survey at
https://www.surveymonkey.com/r/instructor_training_pre_survey?workshop_id=2021-02-16-ttt-online-SI

Welcome

https://carpentries.github.io/instructor-training/01-welcome/index.html

Questions:

- Who are we and how do we approach teaching?
- What should you expect from this workshop?

Objectives:

- Introduce yourself to your fellow workshop participants.

- Describe what will and will not be covered in this workshop.
- Understand that The Carpentries is a community of volunteers who develop lessons and teach workshops on basic computing and data skills for researchers.

Exercise: Pronouns and Names

Using correct names and pronouns is important to setting a tone of respect. Learning these is hard todo quickly, so we recommend displaying it prominently during the workshop.
If on Zoom, give everyone a moment to update their display name to reflect this information.
If in person, encourage attendees to put this information on worn name tags or table-displayed name placards.
Note that pronouns are personal and some participants might prefer not to share them.Do not force people to share their pronouns.

Before The Course Begins

Exercise: Getting to know each other

If the Trainer has chosen an icebreaker question,participate by writing your answers in the course's shared notes.

- Carlos Arias (Evolution, electric fish, data science)
- Tauana Cunha: evolution, marine invertebrates, genomics
- Jenna Ekwealor (biologist, artist, researcher)
- Nancy Kenendy (libraries, archives, user training)
- William Mattingly (historian | medievalist | data scientist)
- Christopher Moriarty (software engineer, astronomy, research)
- Michael O'Mahoney marine inverts, microbiomes, project management
- Jarrod Scott microbiology | visualizations | explorer
- Keri Thompson librarian, data management, lint roller
- Jaxine Wolfe (data science, application development, coastal ecology)

Code of Conduct

https://docs.carpentries.org/topic_folders/policies/code-of-conduct.html

Introductions

Introductions set the stage for learning.
— Tracy Teal, Former Executive Director, The Carpentries

Discussion: Today's Trainers

To begin class, each Trainer should give a brief introduction of themselves.
(For some guidelines on introducing yourself, see some content fromlater in the workshop: Workshop Introductions)

Vanessa Gonzalez, email: gonzalezv@si.edu, twitter: @vl_gonzalez
Mike Trizna, email: triznam@si.edu, twitter: @MikeTrizna
Mirian Tsuchiya

Exercise: Reviewing The Carpentries Experience and Goals

Please answer the following questions in the shared notes document: (By putting an X to those that apply next to the response).
Have you ever participated in a Software Carpentry, Data Carpentry, or Library Carpentry Workshop?

- Yes, I have taken a workshop. XXXXX
- Yes, I have been a workshop helper.XXX
- Yes, I organized a workshop.
- No, but I am familiar with what is taught at a workshop. XXXXX
- No, and I am not familiar with what is taught at a workshop.

Which of these most accurately describes your teaching experience?

- I have been a graduate or undergraduate teaching assistant for a university/college course.X XXXXX
- I have not had any teaching experience in the past.X
- I have taught a seminar, workshop, or other short or informal course.XXXXXXXX
- I have been the instructor-of-record for my own university/college course.XXXXX
- I have taught at the primary or secondary education level.
- I have taught informally through outreach programs, hackathons, libraries, laboratory demonstrations, and similar activities.XXXXXXX

Why are you taking this course? What goals do you have for today and tomorrow?
If time permits, the Trainer may have you discuss these answers in small groups(in breakout rooms if online), or all together as a group.

A Brief Overview of The Carpentries

Instructor Training Workshop Overview

How Learning Works

Building Teaching Skill

Creating a Positive Learning Environment

The Carpentries History and Culture

What We Leave Out

Let us Get Started

Keypoints:

- The Carpentries is a community of practice. We strive to provide a welcoming environment for all learners and take our Code of Conduct seriously.
- This episode sets the stage for the entire workshop. The introductions and exercises help everyone begin to develop a relationship and trust.
- This workshop will cover general teaching pedagogy and how it applies specifically to The Carpentries.
- Learner motivation and prior knowledge vary widely, but can be assessed with a quick multiple choice question.

Building Skill With Practice

https://carpentries.github.io/instructor-training/02-practice-learning/index.html

Questions:

- How do people learn?
- Who is a typical Carpentries learner?
- How can we help novices become competent practitioners?

Objectives:

- Compare and contrast the three stages of skill acquisition.
- Identify a mental model and explain what it represents.
- Explain why practice and feedback are important for learning.
- Explain the purpose of formative assessments.
- Identify formative assessments in your teaching and learning experiences.

The Carpentries Pedagogical Model

The Acquisition of Skill

Image: Three people, labeled from left to right as "Novice", "Competent Practitioner", and "Expert". Underneath the people,an arrow labelled "Experience level" points from left to right. Underneath the figure labelled "Novice" a quote says "I'm not sure what questions to ask." The Competent Practitioner says "I'm pretty confident, but I still look stuff up a lot!" The Expert says "I've been doing this on a daily basis for years!" https://carpentries.github.io/instructor-training/fig/skill-level.svg

Cognitive Development and Mental Models

Image: Three collections of six circles. The first collection is labelled "Novice" and has only two arrows connecting some of the circles. The second collection, labelled "Competent Practitioner" has six connecting arrows. The third collection, labelled "Expert", is densly connected, with eight connecting arrows. https://carpentries.github.io/instructor-training/fig/mental_models.svg

Exercise: Your Mental Models

In the Etherpad, write your primary research domain or area of expertise and some aspects of the mental model you use to frame and understand your work. What concepts/facts are included? What types of relationships are included?
This discussion should take about 5 minutes.

- Carlos Arias: Exp-desing-->sampling-->genomic data--> population genomics inference--> Natural history-->Evolutionary process-->genome architecture--> adaptation
- Tauana Cunha: molecular data -> inference methods <-> phylogeny -> classification, phylo -> evolution of traits <- specimen/biological diversity -> various types of data
- Jenna Ekwealor evolutionary biology; phylogeny (incl. inference); life history/life cycles; genomics; physiology/metabolism; environment.
- Nancy Kenendy archival data - creators, provenance, acquisition, collections management | collections, objects, born dig or digitized | standardization and normalization for re-use, publication and administration, assessment
- William Mattingly => natural language processing (NLP) => tokenization => lemmatization <=> part-of-speech tagging => named entity recognition => topic modeling => sentiment analysis
- Christopher Moriarty: software engineering in astronomy -> Supporting legacy systems, following modern software engineering standards, project management.
- Michael O'Mahoney genomic analysis > metadata standards > denoising genomic data > quality checking sequences > amplification bias > identifying contaminants > classifying
- Jarrod Scott microbial genome structure -> base2 (purine/pyrimidine) -> base4 (base pairs) -> base64 (codons) -> base20 (amino acids) -> proteins + genomic signatures: -> codon bias -> kmer frequency -> co-occurance
- Keri Thompson metadata modeling - deciding on descriptive granularity, assessment of end-uses of information, selection and application of controlled vocabularies, understanding of existing standards
- Jaxine Wolfe: data synthesis => designing a database to standardize data to, working with collaborators to fully understand their data, data curation workflows, document/assemble metadata for the synthesis, publish synthesis, serve synthesis to end users

The Importance of Going Slowly

If someone feels it is too slow, they will be a bit bored. If they feel it is too fast, they will never come back to programming.— Kunal Marwaha, SWC Instructor

Callout: Meeting Learners Where They Are

One of the strengths of Carpentries workshops is that we meet learners where they are at. Carpentries Instructors strive to help learnersprogress from whatever starting point they happen to be at, without making anyone feel inferior about their current practices or skillsets. We do this in part by teaching relevant and useful skills building an inclusive learning environment, and continually getting (and paying attention to!) feedback from learners. We will be talking in more depth about each of these strategies as we go forward in our workshop.

How “Knowledge” Gets in the Way

Identifying and Correcting Misconceptions

Callout: Summative Assessment

Summative assessment is usedto judge whether a learner has reached an acceptable level of competence.Learners either “pass” or “fail” a summative assessment.One example is a driving exam,which tells the rest of society whether someone can safely be allowed on the road. Most assessment done in universitycourses is summative, and is used to assign course grades.

Callout: Repetition vs. Reflective Practice

The idea that ten thousand hours of practice will make someone an expert in some fieldis widely known,but reality is much more complex.Practice is not doing the same thing over and over again:practice is doing similar but subtly different things,getting feedback,and then changing behavior in response to that feedback to get cumulatively better.Doing the same thing over and over again is much more likely to solidify bad habits than perfect performance.This is why we emphasize practice and feedback for learners at our workshops and for trainees in ourInstructor Training program.

Formative Assessments Come in Many Forms

Exercise: Formative Assessments

Based on your previous educational experience (or even this training so far!)what types of formative assessments do you know about?
Write your answers in the Etherpad; or go around and have each person in the group name one.
[skipped]

Exercise: Identify the Misconceptions

Choose one wrong answer and write in the Etherpad what the misconception is associated with that wrong answer.This discussion should take about 10 minutes.

Q: what is 27 + 15 ?
a) 42

b) 32
c) 312
d) 33

- Carlos Arias :
- Tauana Cunha: (312) each digit was summed and listed, so 2+1 = 3, 7+5 = 12, instead of taking/summing the 1 to the first digit of the correct answer
- Jenna Ekwealor (b) 32. the person who selected this answer correctly added digits from the correct places but forgot to "carry the 1" from the ones place to the tens place when 7 + 5 = 12.
- Nancy Kennedy (312) the learner concatenated the sum of the 10s and sum of the 1s column (2+1 = 3, 7+5 =12)
- William Mattingly (312 => person forgets to carry the one and add it to the tens place, rather than make it a hundreds position)
- Christopher Moriarty (32) Didn't carry the ones column to the tens column in the addition.
- Michael O'Mahoney b) the person forgets to carry the 1 over to the tens place when adding
- Jarrod Scott d) 33 they added the ones place and tens place but added the tens carry over to the ones.
- Keri Thompson c) they don't know the method of 'carrying' numbers when adding and have insteaad added the numbers above and below (in columns) and written them left to right, so 2+1 = 3, 7+5=12 therefore 312
- Jaxine Wolfe b) the person forgot to carry the one, they just saw 7 and 5 makes 12 (so the answer ends in a 2) and 1 and 2 makes 3

Exercise: Handling Outcomes

Formative assessments allow us as instructors to adapt our instruction to our audience.What should we do as instructors if the class chooses:

- mostly one of the wrong answers?
- mostly the right answer?
- an even spread among options?

For one of the above, enter your answer in the Etherpad.
This discussion should take about 5 minutes.

- Carlos Arias 1, I will find another way to explain the concept, with other examples and re asses.
- Tauana Cunha: (1) go back and try a different explanation of how to sum double-digit numbers, focusing on the specific error they are doing (if most of the class is doing the same thing, sounds like the original explanation might have been problematic)
- Jenna Ekwealor (2: mostly the right answer): probably i'd reinforce how everyone arrived/should have arrived at the correct answer. use this opportunity to point out where mistakes could have easily been made.
- Nancy Kennedy 1. if mostly wrong answer, i spend time on that wrong answer. (and maybe re-write the question next time! if several people came to wrong answer, maybe the Q is unclear). I would walk through the model where the wrong answer made sense (acknowledge what model or Q they thought they were answering) and then model another example, with slight variation, to show a second version of a simple challenge. a new example -- preferably real-world -- will usually help clarify & reinforce.
- William Mattingly (1 - wrong answers => 1) State that his particular subject is difficult and admit

that I too struggled with this when I was learning to foster comfort in being wrong. 2) Address that most missed this which means it is a difficult subject. 3) Reassess how I taught the material and attack the teaching from a different angle. 4) Determine the angle by asking why certain answers were selected over others. 5) Use the mass failure of the class as a learning opportunity for a spontaneous deep dive in the subject. 6) Retailor how I teach that material in the future.)
- Christopher Moriarty (3 - even spread) Have a discussion to talk about all of the answers/pitfalls, and prepare another formative assessment.
- Michael O'Mahoney 1) a core concept was misconveyed and its explanation needs to be re-examined/reformulated and conveyed
- Jarrod Scott 1: mostly one of the wrong answers: need to rethink the way the material was taught in the first place, redesign, re-teach the material, then reassess with another set of relevant questions..
- Keri Thompson 3- even spread makes me think they aren't paying attention or are just guessing so possibly should go over the material again and (the instructor) pay attention to how engaged the learners are, maybe stop more often for periodic formative assessment or a few little summative assessments
- Jaxine Wolfe (2 - mostly right => emphasize the right answer and what makes it right, but mention the answer that a few people may have selected incorrectly and point out why

Exercise: Modeling Novice Mental Models

Take 10 minutes to create a multiple choice question related to a topic you intend to teach.Type it into the Etherpadand explain the diagnostic power of each its distractors,i.e., what misconception is each distractor meant to identify?

- Carlos Arias
- Tauana Cunha
- Jenna Ekwealor
- Nancy Kennedy
- William Mattingly
- Christopher Moriarty
- Michael O'Mahoney
- Jarrod Scott
- Keri Thompson
- Jaxine Wolfe

Callout: A Note on MCQ Design

- A good MCQ tests for conceptual misunderstanding rather than simple factual knowledge.If you are having a hard time coming up with diagnostic distractors,then either you need to think more about your learners' mental models,or your question simply is not a good starting point for an MCQ.
- When you are trying to come up with distractors,think about questions that learners asked or problems they hadthe last time you taught this subject.If you have not taught it before,think about your own misconceptionsor ask colleagues about their experiences.

Formative Assessments Should Be Frequent

Exercise: How Many?

The Carpentries use formative assessments often. How many have we done since the start of thisworkshop? Put your guess in the Etherpad along with one example and the purpose that assessment served.
This discussion should take about 5 minutes.

- Carlos Arias
- Tauana Cunha
- Jenna Ekwealor
- Nancy Kennedy
- William Mattingly
- Christopher Moriarty
- Michael O'Mahoney
- Jarrod Scott
- Keri Thompson
- Jaxine Wolfe

Callout: A Corollary Regarding Novices

Learners are commonly *far* too satisfied to not understand key pointsand remain confused. If learners remain confused, they are far less likelyto adopt our “good enough” practices at the conclusion of the workshop.Encourage helpers to support confused learners as far as possible withinthe flow of the workshop.

Optional exercises

Exercise: Confronting the Contradiction

Describe a misconception you have encountered in your own learning or teachingand how to get learners to confront it.

- Carlos Arias: Students have problems differenciting between what is a loci, gene, snp an their implictation for data analysis. I will build a model "diagram/example" to help them to differentiate this concepts...
- Tauana Cunha: Novice students often have a hard time correclty answering which groups are more

related to each other in a phylogenetic tree, usually using physical proximity of terminals instead of the branches that connect them. I try to present the tree drawn in different ways and ask the question again, highlighting the branching patterns that leads to the terminals, and how that doesn't change regardless of how the tree is drawn.

- Jenna Ekwealor in evolutionary biology, there are many common misconceptions related to "tree thinking." importantly, there are misconceptions about certain lineages being more "primitive" than others. the way evolutionary trees are commonly drawn, there seems to be a hierarchy of "evolved-ness." one way to confront this is to show the same information drawn in the opposite way. example: fish are primitive relative to humans because their lineage diverged from ours a long time ago. draw the tree with humans diverging from the fish lineage a long time ago, and the contradiction can become more apparent. weee!
- Nancy Kennedy in archives, that all collections material will be available online and searchable in full text. also, the conception that a 'creator' is the an individual identity (a single name, or single person).
- William Mattingly => In teaching the History of Christianity (level 100 course at a university), a student asked why I didn't emphasize the importance of the Four canonical Gospels as having being written by the apostles. I had to inform the student that they were, in fact, written a generation (or two) after the Apostles. The student was shocked from a religious point-of-view, so I corrected by telling the student that this should not be taken as an alternative to your faith, rather view it as the way historians and linguists interpret the historical and linguistic evidence.
- Christopher Moriarty: The misconception is that writing scripts is the same as being a software engineer. Confronting this is often a sensitive topic, and as such I tend to describe two models for writing software: "Obtaining a result" and "Building and mainiting a system for decades".
- Michael O'Mahoney Not so much a misconception, but rather I’ve had to reassure interns and co-workers that it is ok to be intimidated by working in terminal when starting out and that comfort comes with practice. I will often let them know that I began using terminal when I was 18, but wasn’t nearly comfortable with it for over 5 years.
- Jarrod Scott when teaching the idea of metagenomics or microbial ecology to non-experts, many people feel it is to complicate to understand. So I use analogies that are familiar to everyone, to demystify the information. Ofen I will let the students explain the analogy itself.
- Keri Thompson when users initially upload data to figshare many see the tab labled 'project' and hit the 'create project' button. i explain that the term figshare uses is very misleading - though we all work on projects, they actually mean 'collaborative space' - i then walk them through the features of a project and they understand that it is unncessesary
- Jaxine Wolfe: In teaching my colleagues how to collaborate in a Github repository and not assuming they could work in any part of the repo without stepping on eachothers toes. I was using command line to make commits and realized quickly that it would be much more useful for me to learn Github Desktop and write out a tutorial which emphasized why merge conflicts happen and steps we can take to avoid them.

Keypoints:

- Our goal when teaching novices is to help them construct useful mental models.
- This requires practice and feedback.
- Formative assessments provide practice for learners and feedback to learners and instructors.

Expertise and Instruction

https://carpentries.github.io/instructor-training/03-expertise/index.html

Questions:

- What type of instructor is best for novices?
- How are we (as instructors) different from our learners and how does this impact our teaching?

Objectives:

- Explain what differentiates an expert from a competent practitioner.
- Describe at least two examples of how expertise can help and hinder effective teaching.
- Identify situations where you have an expert awareness gap.
- Demonstrate strategies for compensating for your expert awareness gap.
- Demonstrate strategies for avoiding demotivating language.

What Makes an Expert?

Exercise: What Is An Expert?

- Name someone that you think is an expert (does not matter what they are an expert in). As an expert, what makes them special or different from other people?
- OR
- What is something that you are an expert in? How does your experience when you are acting as an expert differ from when you are not an expert?

This discussion should take about 5 minutes.

- Carlos Arias: An expert can see the all picture. For instance, taxonomist in fish identification will

quickly look for diagnostic traits for general groups...

- Tauana Cunha: The expert makes new connections bringing different areas/strategies/alternatives to solve a problem or answer a question. When I am having trouble with something, for example, I come to this trusted friend to discuss the issue
- Jenna Ekwealor i'll say i am an expert in bryology (relative to most!). obviously accumulated knowledge plays a role in this expertise, but more importantly it allows me to SEE/notice more relevant details than a novice would. a novice can look at two mosses and truly not see the differences, but they are very apparent to me (e.g.).
- Nancy Kennedy An expert might understand what question isn't being asked; they might see the 'why' question, when someone has brought a 'what'. Flip side! Some experts immediate deep dive into more information than they were asked for!
- William Mattingly => Mike Trizna -- He can troubleshoot any coding problem on the fly or find the solution to the problem seemingly from nowhere
- Christopher Moriarty: I'll say I'm an expert in software, and this knowledge spans technologies and languages. As a non expert, you may run into a barrier if the problem is out of the scope of the language/technology.
- Michael O'Mahoney A close friend is an expert horticulturalist and is able to answer nearly any question I have about propagating succulents to explaining the composition of growth media. He has a seemingly encyclopedic knowledge of plants and how to keep them thriving
- Jarrod Scott : Expert. someone who can use their collective experience and knowledge to adapt in novel situations, find solutions to previously unexperienced problems. A firefighter for example: Added after disc ussion -> developing/identifying new connections.
- Keri Thompson an expert has experience & subject knowledge that lets them recognize and apply patterns to new situations. for the sake of argument i'm going to say i'm an expert cook - i use past experience to visualize how things will come together based on application of different methods and how i know the ingredients taste. i don't follow recipes lol
- Jaxine Wolfe => When confronted with a problem, an expert might not have the answer but they have enough experience to arrive at an answer that is logical and sound. They know how to use their resources and approach the problem from different angles.

Callout: Connections and Mental Models

The graph model of knowledge explains whyhelping learners make connections is as important as introducing them to facts.The more connections a fact has to other facts,the more likely the fact is to be remembered. This builds on our earlier ideaof mental models - a mental model is (in part) a set of connections or relationshipsamong facts or concepts.

Expertise and Teaching

Callout: More Examples of Fluid Representations

- Programming: Referring to an R object like abcde as both “character vectors” and “strings”.

- Programming: Switching among df[,1], df[,'foo'], and df$foo notation when talking about columns in a data.frame.
- Biology: Switching between common species names and Latin names (e.g. “mouse” vs “*Mus musculus*”).
- Biology: Using both three letter and one letter amino acid codes interchangeably (e.g. Lys = K = Lysine).
- Chemistry: Switching between “Reference material” and “Standard”
- Mathematics: Thinking of things algebraically vs geometrically.
- Navigation: Switching among different routes between two locations.

Exercise: Fluid Representations

In the Etherpad, give at least one example of a fluid representation that you use in yourown work. If you can, also give an example of a fluid representation that might occur in aCarpentry lesson.
Building awareness of how you can represent the same concept in multiple different wayswill help you avoid doing so without explanation while teaching.
This discussion should take about 5 minutes.

- Carlos Arias : in R when calling different columns in data frame. There several similar ways to use annotation to call them for different functions such as filtering.
- Tauana Cunha: (on R visualization): using mapping aesthetics inside ggplot function or geom_ function have (mostly) same outcomes, but probably seen as different things or in a confusing way by novices. I find that explaining the general structure of ggplot syntax, plus an understanding of a mapping aesthetic vs. a fixed aesthetic really is helps a lot.
- Jenna Ekwealor in my own work: either writing a procedure as a loop or as a list of commands. (this may actually come up in carpetries, too...). in "Introduction to Command Line for Genomics," there could be different ways of viewing a file, such as cat or emacs. or even head with or without line count.
- Nancy Kennedy in the carpentries OpenRefine lesson with faceting, 'invert' facet selection can be fluid, in that there are multiple ways to arrive at the same selection of rows vs records. i think this is especially likely to happen after showing how to split cells into multiple rows, which will leave blanks in other columns. to avoid this? show the facet inversion while within rows, then later the same selection with records? or, focus on 'positive' faceting first, then show how negative/inversion/not logic can be trickier
- William Mattingly => lemmatization and rooting words in NLP => Both are used to find the key part of the word (i.e. was and is => be | dogs and dog's => dog), but both find the key part of the word differently which and are used to perform slightly different tasks.
- Christopher Moriarty: In git, merge & rebase are often interchanged and the difference between them not well understood. In a branching lesson, I find it useful teach merging first, using diagrams, and then afterwards have a discussion on rebasing using diagrams and HIGHLIGHT the difference between them.
- Michael O'Mahoney using different geoprocessing tools to change vector geometry from lines to polygons using polygonize or line-to-polygon
- Jarrod Scott naming and identification of chemical structures. For example, an indole = a benzene + a pyrrol. A benzene is a 6 member double bonded ring of C, a pyrrol = 5 member ring with a N.
- Keri Thompson loading data into an openRefine project most often you'll upload from a local

drive/folder, but you can also load data by pasting in a URL location. uh that isn't a concept that's an action. idk
- Jaxine Wolfe: using keyboard commands to execute code or load R packages

Exercise: Diagnosis (Optional)

What is an error message that you encounter frequently in your work? (These are often syntax errors.)Take a few minutes to plan out how you would explain that error message to your learners. Write theerror and your explanation in the Etherpad.
This discussion should take about 5 minutes.

- Carlos Arias
- Tauana Cunha
- Jenna Ekwealor
- Nancy Kennedy
- William Mattingly
- Christopher Moriarty
- Michael O'Mahoney
- Jarrod Scott
- Keri Thompson
- Jaxine Wolfe

Callout: Expert Awareness Gap

In The Carpentries, we aim to create an inclusive environment. We prefer to refer to thisphenomenon as the *expert awareness gap* to be consistent with our objective to useinclusive language. It can be exclusionary to use a term that relates to a disabilityfor other purposes. We introduce both terms, however, to help you as futureinstructors engage with these ideas inthe literature and with people outside of The Carpentries community.
In evaluating potential terms, one instructor provided the following thoughts:
I like expert awareness gap because it is more precise than blind spot(it is not about seeing, but about noticing) and feels more of a surmountablechallenge than a disadvantage. To me a disadvantage can sometimes feel likething that exists as a fact, like an inevitable consequence, but a gap is athing to be bridged– and we certainly want instructors to try to overcome(or mitigate) their expert awareness gap

Exercise: Awareness Gaps (Optional)

- Is there anything you are learning how to do right now? Can you identifysomething that you still need to think about, but your teacher can do withoutthinking about it?
- Think about the area of expertise you identified for yourself earlier. What could apotential awareness gap be?

Dismissive Language

Exercise: Changing Your Language

What other words or phrases can have the effect of demotivating learners? What alternatives can we use to express this meaning in a positive and motivational way?
In the Etherpad, make a list of demotivating words/phrases and alternatives.
This discussion should take about 5 minutes.

- Carlos Arias fast, commands that imply that you can do it. must, should,
- Tauana Cunha: easy, simple, "I'll let you do this quickly", "I'm going to skip that" (assuming people already know) | avoid the words, do not skip, plan less content to guarantee enough time to avoid these words
- Jenna Ekwealor jargon in general. everyone here has great answers!!! "we covered this already"
- Nancy Kennedy instead of "mess" or "messy data", complex or raw. strange and crazy are also not helpful
- William Mattingly => simple | alternative: this will become simple in the future, but when you first come to it, it can be quite challenging. If you follow my steps and we approach it slowly, it will become clear. If you practice it will become easier.
- Christopher Moriarty: Commonly when using ticket systems, a status of a ticket undergoing testing will be set to "FAIL", which is quite offputting for a new developer. Unfortunetly in this case its not often easy to change the syntax of an issue workflow, but having definitions documented for each status can help them understand that the status of "FAIL" is a mechanism to pass control from the tester to the developer, rather than the implications of feeling like a failure.
- Michael O'Mahoney "we are going to quickly do x." Since memory isn’t as solid in learners it can create a feeling of deficit since the task may take some time to complete.
- Jarrod Scott "oh, that's simple" perhaps it may be simple for one person but not another. a better way to approch it is to explain that everyone can understand (I am stealing my explaination from Carlos :)
- Keri Thompson "simple" problem vs. "common" problem. saying "your problem here is..." ack. "the problem is.."
- Jaxine Wolfe: easy, simple, quick, piece of cake, using advanced language that you haven't defined...
- Mike: acronyms

Expert Advantages

You Are Not Your Learners

Callout: The Carpentries Is Not Computer Science

Many of the foundational concepts of computer science,such as computability,are difficult to learn and not immediately useful.This does *not* mean that they are not important,or are not worth learning,but if our aim is to convince people that they can learn this stuff,and that doing so will help them do more science faster,they are less compelling than things like automating repetitive tasks.

The Importance of Practice (Again)

Keypoints:

- Experts face challenges when teaching novices due to expert awareness gap.
- Expert awareness gap: knowing something so well that it seems easy when it is not.
- With practice, we can learn to overcome our expert awareness gap.

Morning Break

https://carpentries.github.io/instructor-training/04-coffee/index.html

Questions:Objectives:

Keypoints:

Memory and Cognitive Load

https://carpentries.github.io/instructor-training/05-memory/index.html

Questions:

- What is cognitive load and how does it affect learning?
- How can we design instruction to work with, rather than against, memory constraints?

Objectives:

- Remember the quantitative limit of human memory.
- Apply concept mapping as a strategy to identify concepts and relationships required in a lesson.
- Use a concept map to plan a formative assessment strategy.
- Name the three components of cognitive load theory and which should be emphasized or diminished.
- Identify when cognitive load is likely to limit learning.

Types of Memory

Exercise: Test Your Working Memory (5 min)

https://miku.github.io/activememory/
This website implements a short test of working memory.
Take 5 minutes to complete the exercise. What was your score? Write your answer in the Etherpad.

Carlos Arias: 8
Jenna Ekwealor: 11 o_O i typed 12 but i think i got the plurality (is that a word?) wrong! that was scary/fun.
Chris Moriarty - 5 :(
William - 4 - I am blaming the fly that's bothering me ha! fair.=)
Nancy - 7, but then 4. so. twice doesn't help lol.
jarrod scott : 5 :-(humbling
Tauana Cunha: 9
Jaxine Wolfe: 7
Keri Thompson 5

Mike O: 8

Exercise: Improving Short-term Memory with Chunking

Repeat the memory exercise you did earlier, but this time,try to form short stories or phrases, or a visual image, from the words you see.
Write the number of words you remembered in the Etherpad.How does this compare with your first attempt?

https://miku.github.io/activememory/

Tauana Cunha: 5 (way worse! XD)
Chris - 4 :((((
jarrod scott: 6
Keri still 5 - i tried making sentences before it's just too fast
William 2 - =(-- I kept hearing *just* make a sentence
Jenna 8 not improvement! i used all my remaining brain power on the first attempt.
Jaxine: 5
Nancy: 5.
Mike O: 5

Strategies For Memory Management

Chunking

Active Learning Through Formative Assessment

Limit concepts

Concept Maps as Instructional Planning Tools

Image: Three rectangles labelled "loop variable", "collection", and "loop body".
https://carpentries.github.io/instructor-training/fig/for-loop-concepts.png
Image: "Loop variable" is connected to "collection" with an arrow labelled "takes each value in order" and to "loop body" with an arrow labelled "changes each time". "Loop body" is connected to "collection"

by an arrow reading "runs for each". https://carpentries.github.io/instructor-training/fig/for-loop-arcs.png
Image: Two arrows are added to the previous figure, showing that the loop variable and collection are usually not changed by the loop body. https://carpentries.github.io/instructor-training/fig/for-loop-rec.png

Exercise: Concept Mapping

Create a hand-drawn concept map for a part of a Carpentries lesson you would teach infive minutes (i.e.the amount of material you would teach before doing a formative assessment).You can use the same subject about which you created a multiple choice question, or a different subject.Trade with a partner, and critique each other's maps. Are there any concepts missing in your partner's map that you would include? Are there more than a handfulof concepts in your map? If so, how would you re-divide those concepts to avoid overwhelming your learners' short-term memory?
Note for online trainings: please use a bold marker and write large so that your concept map can be shared on Zoom if you are prompted to do so.
Take 10 minutes to draw the concept maps and share with your neighbor. Write "*done*" in the Etherpad chat once you have finished.

Callout: Other Uses of Concept Maps

In addition to helping you plan where to introduce formative assessments, concept maps canbe used in many other ways:

- To aid solo design of a lesson by helping authors figureout what they are trying to teach.
- To aid communication with fellow lesson designers.
- To aid communication with learners.While it is possible to give learners a pre-drawn map at the start of a lesson for themto annotate, it is better to draw it piece by piece while teachingto reinforce the ties between what is in the map and what the instructor said.
- Concept maps can be used as a classroom discussion exercise.Put learners in small groups (2-4 people each),give each group some sticky notes on which a few key concepts are written,and have them build a concept map on a whiteboard by placing those sticky notes,connecting them with labelled arcs,and adding any other concepts they think they need.
- Concept maps are also a useful formative assessment technique:having learners draw concept maps of what they think they justheard shows the instructor what was missed and what was misunderstood.

Why Guided Practice is Important

Callout: Why We Do not Use Minimal Guidance

An alternative to guided practice is a *minimal guidance* approach, wherelearners are given raw materials

(for example a text or reference) andasked to explore and learn to solve problems on their own.Minimal guidance practice comes from another teaching strategyvariously known as *constructivist*, *discovery*, *problem-based*, *experiential*or *inquiry-based* learning.
You may have heard of some of these strategies, and they are not withoutmerit! But they frequently fall flat. Cognitive load theory, introduced by Kirshner et al.in response to the popularity and uneven success of these approaches, applies what we know abouthuman cognitive architecture to understand why minimal guidance often fails.
Minimally-guided instruction requires learners to simultaneouslymaster a domain's factual contentand its search and problem-solving strategies.Fostering creativity and independence is intuitively appealing,but that does not mean it works.

Guided Practice at Work

Exercise: Create a Faded Example from a Lesson (Optional)

The following exercise should be done in groups of 2-3.

- Pick a block of code from an existing Carpentries lesson,or from another lesson you have taught recently.
- Replace 2-3 pieces of the code with a blank.
- Write a question to test the learner's ability to correctly fill in that blank.
- Paste your faded example in the Etherpad.

This exercise should take about 10 minutes.

jarrod: write a series of commands for version conrol with git. :
$ git ___
$ git ___ --all
$ git ___
$ git commit -__ -m "___";
$ git ___ origin ___
Tauana:
Make a boxplot of 'weight' by 'species' in the 'mammals' dataset, with a different color for marine vs. terrestrial 'habitat':

```
ggplot(data = _______,
       mapping = ___(x = species, y = ______)) +
   geom________(aes(_____ = habitat))
```

William:
Initial Example:

```
import spacy

text = "John plays basketball and John also eats fish in Kentucky."

def extract_single_ents(text):
```

```
    '''
    Takes in a text and returns all entities with duplicates removed.
    Example:
    text = "John plays basketball and John also eats fish in Kentucky." => [John, Kentucky]
    '''
    nlp = spacy.load("en_core_web_sm")
    doc = nlp(text)
    all_ents = []
    for ent in doc.ents:
        all_ents.append(ent.text)
    all_ents = list(set(all_ents))
    return (all_ents)
```

Faded Example:

```
found = extract_single_ents(text)
print (found)

text = "John plays basketball and John also eats fish in Kentucky."

def extract_single_ents(text):
    '''
    Takes in a text and returns all entities with duplicates removed.
    Example:
    text = "John plays basketball and John also eats fish in Kentucky." => [John, Kentucky]
    '''
    nlp = spacy.load(____)
    _____= nlp(text)
    _____ = []
    for ent in _____:
        all_ents.append(ent.text)
    all_ents = _________
    return (all_ents)
```

Jenna: Return the _line before_ and _two lines after_ each line containing the string "NNNNNNNNNN"

```
$ grep ___ ___ NNNNNNNNNN SRR098026.fastq
```

Mike O: It's not code but here it is anyway

- Go through example of how to properly organize raw data in a spreadsheet and record changes in a README.txt file. Run through the whole process with students.
- Give students a “working copy” of the data and README.txt file with steps required to reorganize data.
- Give students raw data and let them run through the process, paying attention to if they create a “working copy” and record their changes with a “README.txt” file.

Summary

Keypoints:

- Most adults can store only a few items in short-term memory for a few seconds before they lose them again.
- Things seen together are remembered (or mis-remembered) in chunks.
- Teaching consists of loading short-term memory and reinforcing it long enough for items to be transferred to long-term memory.
- Use formative assessments to avoid overloading short-term memory.

Building Skill With Feedback

https://carpentries.github.io/instructor-training/06-feedback/index.html

Questions:

- How can I get feedback from learners?
- How can I use this feedback to improve my teaching?

Objectives:

- Describe three feedback mechanisms used in Carpentries workshops.
- Give feedback to your instructors.

Surveys

Survey links

The survey links above are just for you to preview the survey as part ofInstructor Training. When you are teaching a workshop, make sure to share thelinks that gets generated on your workshop website. Doing so

will ensure thatyou will receive all the survey results from your workshop participants.

Callout: Timing Matters

We have found that learners are much more likely to fill out the post-workshop surveywhile they are still at the workshop than they are after they leave the venue. At the endof a two-day workshop, your learners' brains will be very tired. Rather than trying tofit in another 15 minutes worth of teaching, give your learners time to complete thepost-workshop survey at the end of your workshop. You will be helping them (they get abit of a rest), yourself (you will get more useful feedback), and The Carpentries.

Minute Cards

Callout: Be Explicit

Learners are more likely to give useful feedback if they feel that their feedbackis being taken seriously. Spending a few minutes talking about the feedback you gotand being explicit about what changes you are making in light of that feedbackwill encourage learners to continue to give informative feedback throughout the workshop.

One-Up, One-Down

Exercise: Give Us Feedback

Write one thing you learned this morning that you found useful onyour blue sticky note, and one question you have about the materialon the yellow. Do *not* put your name on the notes: this is meant tobe anonymous feedback. Add your notes to the pile by the door asyou leave for lunch.

https://forms.gle/TQ8uK8fZUB5SAoyU8

Keypoints:

- Give your learners time to fill out the post-workshop survey at the end of your workshop.
- Take the time to respond to your learners' feedback.

Lunch

https://carpentries.github.io/instructor-training/07-lunch/index.html

Questions:Objectives:

Keypoints:

DAY TWO

Motivation and Demotivation

https://carpentries.github.io/instructor-training/08-motivation/index.html

Sign in here:
Chris Moriarty: Concept maps were new to me. Question: are there any tools out there to make them nicely? (I assume visio and other generic charting tools would work, just wondering if there are specific ones).
Jarrod Scott: What I learned: formative assessment is a very powerful tool to gauge how well students are learning concepts. Question: Do you ever employ "living" concept maps over the course of workshop? For example, a map that students create at the beginning and then fill in as the course goes on?
Keri Thompson I learned about "faded examples" as a way of prompting ppl to remember what they've learned and for assessment. Q: If we're not doing trainings very often, how can we keep some of the things we're learning fresh in our minds? I'm specifically thinking maybe about the demotivational

language (I also overuse "just").
Nancy Kennedy: examples of strategic MCQ for getting a useful check-in (rather than the open ended 'anyone have questions')/ are there specific changes or recommendations for in person vs online success?
Jenna Ekwealor: I learned: mental models. I love that framing for learning; a person can know something but come to the incorrect conclusion if their mental model is broken! Question: I have been a helper a few times and don't recall any training for it. Is that true? Some version of this material might be good for Helpers, too.
Tauana Cunha: Learned: how to formulate MCQ and 'blank' exercises / how to use formative assessments | Q: with virtual/zoom trainings becoming common, can we use polls as formative assessments/MCQ adding to regular lesson content? Or are we expected to follow the lessons very closely?
William Mattingly: Faded Examples as a way to reinforce key concepts in a safe environment
Jaxine Wolfe: I learned that there is a technique to designing multiple choice questions (formative assessments) which is informative for the teacher and can be leveraged as a teaching tool. Question: I echo the question about approaching the virtual teaching.
Mike O'Mahoney: I learned about the theory of cognitive load
Carlos Arias: I learned about the Mental models and formative assesments.

Online workshop recommendations: https://carpentries.org/online-workshop-recommendations/

Questions:

- Why is motivation important?
- How can we create a motivating environment for learners?

Objectives:

- Identify authentic tasks and explain why teaching using them is important.
- Develop strategies to avoid demotivating learners.
- Recognize and overcome imposter syndrome in yourself and your learners.

Creating A Positive Learning Environment

Teach Most Useful First

Image: A stylized graph with y-axis labeled "usefulness once mastered" and and x-axis labeled "mean time to master". The upper left quadrant says "teach this first" and the lower right quadrant says "do not bother". https://carpentries.github.io/instructor-training/fig/what-to-teach.png

Exercise: Authentic Tasks: Think, Pair, Share

Think about some task you did this week that uses one or more of the skills we teach,(e.g. wrote a function, bulk downloaded data, built a plot in R, forked a repo)and explain how you would use it (or a simplified version of it) as an exercise or example in class.**Pair** up with your neighbor and decide where this exercise fits on a graph of “short/long time to master” and “low/high usefulness”.In the class Etherpad, **share** the task and where it fits on the graph.As a group, we will discuss how these relate back to our “teach most immediately useful first” approach.
This exercise and discussion should take about 10 minutes.

Tauana and Jaxine:
- In R: gather function on a dataset followed by ggplot with facets. Very useful and not so much time: facets in plots; harder/longer to master: gather function (more appropriate for a wrangling lesson)
- GitHub Collaboration: very useful but long time to master if youre not familiar with github. It should not be the first thing taught (should be taught at least after lessons about how to create your own repo, how to create and edit files in the repo, how to invite collaborators, etc)
Jenna Ekwealor & Carlos Arias: one task is to zip a bunch of files in a for loop. this is highly useful but medium in mean time to master. the other task is a multi-faceted plot in R. this is considered about medium useful and medium time to master. in both cases a simpler version can be presented first (zipping just one file, plotting just one of the facet combos, etc.). usefulness depends a bit on what type of data folks have but zipping and unzipping files is pretty common so we rated it highly useful!
William Mattingly: Preparing a tutorial for performing TF-IDF and K-Means topic modeling.
Jarrod Scott (with William Mattingly): Web scraping many webpages with R, pulling out useful info, and organizing data into dataframes
Chris & Keri:
- Git Branching: Very useful once mastered (10/10), takes some time to learn (5/10).
- Converting URL text strings to hyperlinks in Excel: Useful once mastered (7/10), very quick to learn (1/10).
Mike & Nancy
- One task is to loop through duplicated identifiers, and split out the records to unique values per data series. Highly useful for big impact, at scale (and for showing why one wants unique identifiers...); medium time to master. can be broken down into simple looping logic, which can help with concept model for how the metadata model is structured.
- Reading API Documentation: using APIs to batch download specimen data based on taxonomy and geolocation. Is readily useful to me but could be less useful to others so I think the first thing to teach there is how to seek out and read through documentation before creating queries

Callout: Actual Time

Any useful estimate of how long something takes to master must take into accounthow frequent failures areand how much time is lost to them.For example,editing a text file seems like a simple task,but most graphical editors save things to the user’s desktop or home directory.If people need to run shell commands on the files they have edited,a substantial fraction will not be able to navigate to the right directory without help.If this seems like a small problem to you,please revisit the discussion of expert awareness gap.

Other Motivational Strategies

Exercise: Strategies for Motivating Learners

How Learning Works by Susan Ambrose, et al.,contains this list of evidence-based methods to motivate learners.
In groups of two or three, pick three of these points and briefly describein the Etherpad how we can apply these strategies in our workshops.

- Strategies to Establish Value
    - Connect the material to learners' interests.++++++
    - Provide authentic, real-world tasks.+++++++++
    - Show relevance to learners' current academic lives.+
    - Demonstrate the relevance of higher-level skills to learners' future professional lives.
    - Identify and reward what you value.
    - Show your own passion and enthusiasm for the discipline.+++++++
- Strategies to Build Positive Expectations
    - Ensure alignment of objectives, assessments, and instructional strategies.
    - Identify an appropriate level of challenge.++++
    - Create assignments that provide an appropriate level of challenge.++++
    - Provide early success opportunities.++++++
    - Articulate your expectations.+
    - Provide rubrics.
    - Provide targeted feedback.++
    - Be fair.+
    - Educate learners about the ways we explain success and failure.+++
    - Describe effective study strategies.+
- Strategies for Self-Efficacy
    - Provide learners with options and the ability to make choices.+++++++
    - Give learners an opportunity to reflect.+++

This exercise and discussion should take about 5 minutes.

Callout: Provide an Example

Insert a personal story here about how you establish value in the classroom.
Or, insert an example story about establishing value, which goes like this:
"In the SWC Unix "Finding Things" episode,a haiku is used to to teach grep.This is a great didactic tool, but it can be hard for learners to see how it applies to research.After the didactic example, I connect my bioinformatics users with domain-specific examples by showinga list of one-line unix commandsconsisting of grep, sort, head, and uniq to explore biological sequence data.This emphasizes how they can apply what they learned with haikus to real bioinformatics research problems."

Exercise: Brainstorming Motivational Strategies

Think back to a computational (or other) course you took in the past, andidentify one thing the instructor did that motivated you.*Pair* up with your neighbor and discuss what motivated you.*Share* the motivational story in the Etherpad.
This exercise should take about 5 minutes.

Callout: Not Just Learners

What is missing from this list is strategies to motivate the *instructor*.As we said in the introduction,learners respond to an instructor's enthusiasm,and instructors need to care about a topic in order to keep teaching it,particularly when they are volunteers.

Exercise: Why Do You Teach? (Optional)

We all have a different motivation for teaching, and that is a really good thing!The Carpentries wants instructors with diverse backgrounds because you each bring something unique to our community.
What motivates you to teach? Write a short explanation of what motivates you to teach.Save this as part of your teaching philosophy for future reference.
This exercise should take about 5 minutes.

William Mattingly: To help others learn generally and learn from and avoid my mistakes
Jenna Ekwealor: I think of lot of this can seem mysterious and far out of reach for many folks. i don't like that kind of barrier existing so i want to teach and show people that it is within their reach!
Tauana Cunha: satisfaction in seeing learners be succesfull and happy about learning/using something new; also usually helps me learn things better myself
Jaxine Wolfe: I want to make other peoples lives easier in giving them the tools I use to work with data. I also think teaching will be a personally enriching experience for myself and will strengthen my mental models of the concepts I'm teaching
Jarrod : to desmystify complicated ideas/concepts , to help students avoid all of the mistakes I made. Show them mistakes are ok :)
Nancy Kennedy: I want to help my users gain more confidence and skill in planning or executing projects. Lift more boats!
Carlos Arias: I love teaching because I help me to clarify my own concepts. Many times I foud we I am teaching that i really did not knew the concept. Also It helps other to no re do the wheel...
Chris: I have improved my team's process and project management through using ticket systems, version control, and better programming practices - but I am also responsible for teaching them how to use it.
Keri: to give other people the knowledge and tools to help them become more self-sufficient and efficient
Mike O: I teach to help enrich my understanding of the topics I'm teaching. Often times I feel I have a competent grasp on a topic only to be hit with a question I hadn't thought of. It's fun to wrestle with these ideas and work them out with the group.

How Not to Demotivate Your Learners

BREAKOUT ROOMS: motivational vs demotivational stories

Keri and Christopher: Something demotivational was a time where an instructor didn't give feedback so it was difficult to know how they were doing
(Chris) - Something motivating was that an instructor clearly stated the goal of the class, and it aligned with my expectation so I knew I was in the right place.

Mike & Nancy:
-Demotivational: Jargon and starting out assuming too much prior/specialized knowledge.An instructor not confronting the expert awareness gap
- Motivational: Faded examples, with early success/confirmation. Instructor talking about whenhow they learned this skill themselves

Tauana & Jaxine:
- Motivating: Hands-on practice; challenge exercises once we have the resources to accomplish them
- Demotivating: not connecting the material to the learner's interests

Jenna and Carlos: we both have motivating stories from when an instructor noticed and commented on our hard work and success, even when we didn't think we were succeeding. that was very motivating! we have demotivating experiences that are (1) along the lines of "you should have done xyz," and (2) "you're not meant for this." the latter one in particular makes the outcome seem literally impossible and thus is extremely demotivating.

Jarrod (with William M.): **motivating**: Mistakes are ok and common--you can learn from mistakes. **demotivating**: telling someone that they cannot do something. Sometimes, this can actually be motivating, but other times it can cause someone to quit

Exercise: Brainstorming Demotivational Experiences

Think back to a time when you were demotivated as a student (or when you demotivated a student).*Pair* up with your neighbor and discuss what could have been done differently in the situation to make it not demotivating.*Share* your story in the Etherpad.
If time, what themes do you see among the stories? What are positive actions you could take to avoid these?
This exercise should take about 5 minutes.

Things You Should Not Do in a Workshop

Systemic and Psychological Demotivators

Stereotype Threat

Callout: Never Learn Alone

One way to support at-risk learners of all kinds is to ask people to sign up for workshops in small teamsrather than as individuals when possible.If an entire lab group comes,or if attendees are drawn from the same (or closely-related) disciplines,everyone in the room will know in advancethat they will be with at least a few people they trust,which increases the chances of them actually coming.Furthermore,if people attend a workshop with their labmates, it is more likely they willwork together to implement what they have learned after the workshop has ended.

Impostor Syndrome

Image: One stick figure introducing another to a third says, "This is Dr. Adams. She is a social psychologist and the world's top expert on imposter syndrome." Dr. Adams responds "Haha, do not be silly! There are lots of scholars who have made more significant - oh my god."
https://imgs.xkcd.com/comics/impostor_syndrome.png

Exercise: Overcoming Imposter Syndrome (Optional)

Think of a time when learning something was difficult for you, oryou made a mistake that seemed silly or embarrassing. Is that task still hard for you?In the Etherpad, describe how you might use this as a motivational story to help your learnersovercome their own imposter syndrome.
This exercise should take about 5 minutes.

Accessibility Issues

Callout: It Helps Everyone

Curb cuts(the small sloped ramps joining a sidewalk to the street)were originally created to make it easier for wheelchair users to move around,but proved to be equally helpful to people with strollers and grocery carts.Similarly,steps taken to make lessons more accessible to people with various disabilitiesalso help everyone else.Proper captioning of images,for example,benefits people with no or limited vision by giving screen readers something to say:but it also makes the images more findableby exposing their content to search engines.

Exercise: Learning about Accessibility

The UK Home Office has put together a set of posters of dos and do nots for makingvisual and web-based materials more accessible for different populations. Take a look at one ofthese posters andput one thing you have learned in the Etherpad.
Note: There are translationsavailable in a number of languages, including Dutch, French, Spanish, Swedish, Portuguese, German, andChinese.
This exercise should take about 5 minutes.

Callout: Accessibility and PDFs

The posters above are in PDF format - which itself can sometimes be inaccessible to peoplewho use screen readers. If you know of a similar resource describing accessibility guidelinesthat would be more accessible than what is linked above, open an issue on our instructortraining curriculum respoistory here: https://github.com/carpentries/instructor-training/issues

Exercise: What Happens When Accessibility is an Issue? (Optional)

Think of a time when you have been affected by, or noticed someone elsebeing affected by issues with accessibility. This may have been at aconference you attended where the elevator was out of service, or maybea class you were taking relied on audio delivery of content. Describe what happened,how it impacted your (or someone else's) ability to be involved and what couldhave been done to provide better accessibility in this case.
This exercise should take about 5 minutes.

Callout: Every Little Bit Counts

Looking at people who work with disability and accessibility, it iseasy to be overwhelmed by all the different ways we could makeinstruction more accessible. *Do not panic.* Instead:

- *Do not do everything at once.*We do not ask learners in our workshops to adopt all our best practices or tools in one go,but instead to work things in gradually at whatever rate they can manage.Similarly, try to build in accessibility habits when preparing for workshopsby adding something new each time.
- *Do the easy things first.*There are plenty of ways to make workshops more accessiblethat are both easy and do not create extra cognitive load for anyone:font choices, general text size,checking in advance that your room is accessible via an elevator or ramp, etc.

Callout: Accessibility Testing

Find the nearest public transportation drop-off point to your buildingand walk from there to your office and then to the nearest washroom,making notes about things you think would be difficult for a wheelchair

user.Now borrow a wheelchair and repeat the journey.How complete was your list of challenges?And did you notice that the first sentence in this challengeassumed you could walk?

Inclusivity

Setting Expectations with the Code of Conduct

Keypoints:

- A positive learning environment helps people concentrate on learning.
- People learn best when they see the utility in what they are learning, so teach what is most immediately useful first.
- Imposter syndrome is a powerful force, but can be overcome.
- Accessibility benefits everyone.

Mindset

https://carpentries.github.io/instructor-training/09-mindset/index.html

Questions:

- How does mindset influence learning?
- How should we praise our learners?
- How should we talk about errors?
- What are successful habits of lifelong learners?

Objectives:

- Explain the difference between fixed and growth mindset and its implications for classroom performance.
- Develop strategies for giving effort-based and improvement-based praise.
- Respond positively to learner errors.
- Model habits of lifelong learners.

The Importance of Mindset

Exercise: Does Mindset Matter?

Think: What kind of mindset do you have about different areas? Is there anything you believe you are “not naturallytalented” at? Mindset often varies in different areas – someone might have a fixed mindset with respect to artisticability, but a growth mindset with respect to computing skill. Then, think about your learners. How might a learner’smindset about computational skill influence their learning in a workshop setting?
Pair: Discuss your thoughts about the influence of mindset in a workshop. Try to come up with a few different ways orsituations in which mindset might be relevant.
Share: A few thoughts in the Etherpad (or go around the room and discuss)
This exercise should take about 5 minutes.

Praise Influences Mindset

Exercise: Choosing our Praises

Since we are so used to being praised for our performance, it can be challenging to change the way we praise our learners. Which of theseare examples of Performance-based, Effort-based, or Improvement-based praise?

- I like the way you tried a couple of different strategies to solve that problem.EEEEEeeEEPE
- You are getting really good at that. Keep up the hard work!IiiPIIIEpIIIEEI
- You are really good at that.PPPPpPpPP
- That was a hard problem. You did not get the right answer, but look at how much you learned trying to solve it! IEEIePEIeieiEEI
- You are a natural!PPPPppPP

Errors are Essential to Learning

Typos

The typos are the pedagogy.— Emily Jane McTavish

Exercise: Helping Learners Learn From Mistakes (optional)

A learner at your workshop asks for your help with an exercise and shows you their attempt at solving it. You see they have made an errorthat shows they misunderstand something fundamental about the lesson (for example, in the shell lesson, they forgot to put a space betweenls and the name of the directory they are looking at). What would you say to the learner?
In the Etherpad, describe the error your learner has made and how you would respond.
This exercise and discussion should take about 5 minutes.

Perseverance Predicts Success

Exercise: How Are You Gritty? (Optional)

A previous exercise asked you to think of a time when learning something was difficult for you, or you made a mistake that seemed silly or embarrassing.
How did you motivate yourself to continue learning? How did it feel to persist in the face of challenge? How do you feel now about your capabilities in this area?
In the Etherpad, describe how you could use this story to illustrate the importance of grit for your learners.
This exercise should take about 5 minutes.

Habits of Lifelong Learners

Keypoints:

- Growth mindset and grit promote learning by making effort a positive thing.
- Presenting errors as essential to the learning process helps learners learn from their mistakes.
- Successful lifelong learners are not embarrassed to ask for help.

Afternoon Break

https://carpentries.github.io/instructor-training/10-coffee/index.html

Questions:Objectives:

Keypoints:

Teaching is a Skill

https://carpentries.github.io/instructor-training/11-practice-teaching/index.html

Questions:

- How can I improve my teaching?

Objectives:

- Use peer-to-peer lesson practice to transform your instruction.
- Give thoughtful and useful feedback.

- Incorporate feedback into your teaching practices.

Lesson Study: Applying a Growth Mindset to Teaching

Callout: Reading It Is Not Enough

Several research studies (in 2007, 2012, and 2015) have shownthat teachers do not adopt instructional practices based on reports about the effectiveness of those practices.Social norms, institutionalculture, and lack of time and support prevent many teachers from moving out oftheir accustomed teaching habits. Change in teaching does not come about through reading about new teaching practices, but by seeingthese practices in action, practicing them and getting feedback from other instructors.

Exercise: Giving Feedback

We will start by observing some examples of teaching and providing some feedback.
Watch this example teaching video https://www.youtube.com/watch?v=-ApVt04rB4U as a group and then give feedback on it. Put your feedback in the Etherpad. Organize your feedback along two axes: positive vs. negative and content (what was said) vs. presentation (how it was said).This exercise should take about 10 minutes.

Positive Content (what was said):
reviwing/recapping content that was covered before the break
Highly key functions.
Recap what was done/learned before the break
+1 to the brief reminder of where they were before the break
+1 from me too

Needs-Improvement Content (what was said):
Using jargon that might go over learners heads if they werent defined already+1
Addressing the standing student overly negatively and then even saying "geez" afterwards
Using "just" and "even excel users can do this" is both de-motivating and not inclusive+1
use of de-motivational language
material is presented very fast and is disorganized. Also, the presenter skips over many parts
not using the mistakes he made as a learning tool+1
quick references to jargon -- learners may not know what those are
kind of stream-of-consciousness running through code, not really organized into a lesson.+1
He recognized that members in the audience may have never encountered functions before. Instead of just jumping in, he could have spent a good few minutes explaining conceptually what a function is. Also, maybe describe the key terms, i.e. arguments. It's good that he recognized the weakness of the audience, but that acknowledgment should be followed up with assistance to them.
Not taking it slow and thinking through how he's going to approach the presentation of content

Positive Presentation (how it was said):
some moments of using different ways to say the same thing "new word or idea"
Pointed at the screen to the specific part he was referring to+1+1+1
Live coding is a plus, rather than canned examples+1+1+1
Said 'sorry, my bad' showing that instructors make mistakes (although the follow up was not very good - didn't explain the error) +1+1

Needs-Improvement Presentation (how it was said):
Didn't use the typo as a learning experience, fixed it himself and told them not to worry about it+1
"Even Excel users can understand this..." -- Probably not the best thing to say to a room full of people who likely use Excel+1
"Could you sit down please" was said with polite words, but extremely snarkely (is that a word)
The code was not zoomed in at all. Very illegible
He doesn't appear to have fully prepared?
showed irritation with the class, used demeaning language (esp. towards excel users), uses the word "simple" a lot.
tiny code on the screen and pointing (badly) to the top of the screen
"any questions" implying there shouldn't be any; genuinely didn't seem to want to hear a real answer to that question
"jeez" , simple, and just are not helpful
also in terms of presenting, the screen text size is too small to see and descriptions too fast
"trust me"
checking his phone!? X
Could increase the size of text in the terminal. Moved increadibly quickly through the subject material+1
didn't explain what the mistake was just said ignore it
Highly errors and explain why they are may help students to understand the funtions and coding
Screen was small and difficult to observe maybe zoom to the region where you are writing can help students to follow the explanation
Approch students in a more respectful manner
Use of demotivating words, try to encourage students to learn.

Exercise: Feedback on Yourself
The goal of this exercise is to practice giving and receiving feedback, so do not beoverly concerned about creating a perfectly polished presentation.We do not give you a lot of time to prep and the teaching time is short, so embracethe challenge (and improvisation) of the exercise and see what you can learn bywatching other people teach, thinking about how to give them feedback, and how itfeels to get feedback on your own teaching.
Trainings where trainees are co-located:

- Split into groups of three.
- Individually, spend 5 minutes preparing to teach a 90-second segment ofthe lesson episode you chose before the start of the training course. You will not be live coding; you can use a whiteboard or other visual aids if available (butthis is not required!). We recommend using this 90 second teaching momentto introduce the topic of your lesson.
- Get together with your group and have each person teach their segment to the group,while one person records this (video and audio)using a cell phone or some other handheld device.Keep a strict time limit of 90 seconds per person (one personshould be responsible for the timekeeping).
- After the first person finishes,rotate roles(they become the videographer,the audience becomes the

instructor,the person who was recording becomes the audience)and then rotate roles again.
- After everyone in the group of three has finished teaching,watch the videos as a group.Everyone gives feedback on all three videos,i.e., people give feedback on themselves as well as on others.
- After everyone has given feedback on all of the videos,return to the main group and **put everyone's feedback about you into the Etherpad**.

Distributed trainings: Your Trainer will split the group into virtual break-out rooms. Follow the instructions abovebut do not record each other. Instead, give each person feedback immediately after they finish theirturn teaching. Also with in this setup one person should be responsible for the timekeeping. This exercise should take about 25 minutes.

FEEDBACK: TEACHING PRACTICE

Jenna: to improve, i should let learners know the plan: "ok, let's return to the terminal/command line." review jargon ("what is a command? what is a flag?"). things i did well: presented clearly and slowly enough.
William: I went about 30 seconds over. I forgot to set my timer so that I could monitor my speed. Presented a python tutorial. The tutorial picked up in the middle of a lesson after a break. Instructor did a great job of recapping what was covered before the break and then summarized the goals of the next lesson. Great job! Though some jargon was necessary (e.g., concatonate) instructor did a nice job of introducing the term and explaining it in straightforward language. Pace and tone of the lesson was excellent. Especially effective was showing how the same task could be accomplished in different ways. Lesson revolved around introducing an authentic problem and providing a solution. Use of live coding was a great teaching tool.

Carlos Arias: I was to specific at the begining on the programs that students will be used and that can make some students to panic. Y need to be careful with jargon, I have use "remember from my previous lesson" this can be demotivating for some students. +: present workflow, main question? and objetives of the lesson.
Chris Moriarty: Didn't introduce or define the topic (version control) before talking about it. Also didn't even get into the actual material. Did use a story to relate my learning experience.
Keri Thompson: didn't use demotivational language :D I think he said i was clear? maybe I'm making that up
Jaxine Wolfe: Taught starting w Data - welcomed the class back, introduced the new lesson with a recap on the previous lesson, assumed that learners knew what the tidyverse library was but offered for a helper to go around and provide assistance
Tauana Cunha: Positives: did not use jargon; walked through steps; no discouraging language; welcomed people back | Negatives: did not open room for questions; did not use green marks or other strategy for keeping track of progress
Mike O: + giving examples of the types of data that you can put into spreadsheets and ways to properly organize them. Giving reasoning for why formatting matter. - Didn't get through the episode and using declarative language when highlighting errors
Nancy: +pace was good, not dismissive, openness to other formats at the break / - didn't finish the material; not interactive/visual; increase eye contact, and increase volume
jarrod: Does a really good job presenting the basic components of what a terminal is. Great job explaining key words, GUI => Graphic User Interface.Great way of explaining what is happening behind the GUI and why a Shell is useful as opposed to a GUI. Zoomed in very nicely. Very good, slow introduction to commands, pwd and ls. In all, a great demonstration of live coding with something that many viewers might not have ever encountered or experienced before. Great explanation of this being difficult, "cryptic", so if the student struggles, they know its not just them. Improvement Mentioned he didn't know

the name in Windows. Maybe add a brief statement, "but I will look it up and let you know next time."
My partner was very good at giving thorough feedback

Feedback Is Hard
Image: A three panel comic. In the first panel, a smiling figure is surrounded by speech bubbles with mostly positive feedback. In the second panel, the figure is eating dinner. All of the previous speech bubbles appear faded out, except the one negative bubble. The third panel shows the figure in bed, with an unhappy face, with the one piece of negative feedback lingering after all others have faded.
https://carpentries.github.io/instructor-training/fig/deathbulge-jerk.jpg

Exercise: Feedback on Feedback (Optional)

Watch either this scipy tutorial (8:40)or this other tutorial (11:42).For each, give feedback following the 2x2model. Put your feedback in the Etherpad.
This exercise and discussion should take about 15 minutes.

Exercise: Using Feedback

Look back at the feedback you received on your teaching in an earlier exercise.How do you feel about this feedback? Is it fair and reasonable? Do you agree with it?
Identify at least one specific change you will make to your teaching based on this feedback.Describe your change in the Etherpad.
This exercise should take about 5 minutes.

Optional Exercises

Exercise: Skill Acquisition: What level are your teaching skills?

As with computational skills, people have a tendency to think of teaching as something you are “just good at” or not. However, teaching is a skill, and expertise develops with attentive practice.Examine the descriptions of “novice,” “competent practitioner,” and “expert.” Where do you think you fall with regard to teaching? What have you learned about teaching? What are you aware of that you still need to learn? Discuss with a partner and then write some thoughts in the Etherpad.

Keypoints:

- Like all other skills, good teaching requires practice and feedback.
- Lesson study is essential to transferring skills among teachers.
- Feedback is most effective when those involved share ground rules and expectations.

Wrap-Up and Homework for Tomorrow

https://carpentries.github.io/instructor-training/12-homework/index.html

Questions:

- What have we learned today?
- What needs to be done to prepare for tomorrow?

Objectives:

- Describe overnight homework.
- Produce a paragraph, drawing, or diagram that summarizes what was taught today.

Exercise: Feedback

The Trainer(s) will ask for feedback on the day in some form.
This exercise should take 5 minutes.

Exercise: Reflecting on the Day

Before we wrap up for the day, take 5 minutes to think overeverything we covered today. On a piece of paper, writedown something that captures what you want to remember aboutthe day. The Trainers will not look at this - it is just for you.
If you do not know where to start, considerthe following list for a starting point:

- draw a concept map, connecting the material
- draw pictures or a comic depicting one of the day's concepts
- write an outline of the topics we covered
- write a paragraph or "journal" entry about yourexperience of the training today

- write down one thing that struck you the most

This exercise should take about 10 minutes.

Keypoints:

- Today we learned about how people learn, how to build a positive classroom environment, and how to give feedback.
- Tomorrow we will cover specifics of Carpentries workshops and teaching practices.

Welcome Back

https://carpentries.github.io/instructor-training/13-second-welcome/index.html

Sign in: (Name, Github ID, Favorite Soup)
Carlos Arias: solracarias, tomato soup
Tauana Cunha: tauanajc, mushroom soup
Jenna Ekwealor: jenna-tb-ekwealor, a tie between black bean and broccoli cheese. ooh split pea is good, too
Nancy Kennedy kennenc; today i'm making an eggplant & peanut soup. i can't choose fav!
William Mattingly | wjbmattingly | Lobster Bisque
Christopher Moriarty, ChrisMoriarty, plain ol' chicken noodle soup
Michael O'Mahoney OMahoneyM, butternut squash and sage
Jarrod Scott jarrodscott sancocho
Keri Thompson digikeri, vegetarian hot n' sour soup
Jaxine Wolfe: jaxinewolfe; tomato basil

Questions:

- What have we learned so far?
- What will we focus on today?

Objectives:

- Review main points we discussed yesterday.
- Introduce topics we will discuss today.

Exercise: Questions

Yesterday we asked you to read some resources about the logistics of teaching and running Carpentries workshops. Please add your questions about logistics and preparation to the Etherpad. We will answer these questions in the Etherpad during your work time and will return to this list later today.
This activity should take about 5 minutes.

Carlos Arias: If you want to create a new workshop in a different language? who you contact? How free are you to create new content for workshops in other language?

- *Looking into this*

Tauana Cunha: 1) How does it work for us to volunteer to be instructor in a workshop when you are comfortable with one part of the material but not all of it (e.g. can teach shell/R but don't know OpenRefine)? 2) Can I offer a workshop online in Portuguese, for example, if the lesson doesn't officially exist written in that language?

- 1) For the centrally-organized workshops, and the SI internal workshops, we ask specifically which lessons you would like to teach.
- 2) Yes, definitely. Lesson materials exist mostly for the instructors, and aren't necessary for the learners. If you are able to follow a lesson and give explanations in Portuguese, this can work. I (Mike) have also seen that learners who might not be able to understand spoken English are still able to follow along with the English language lesson materials -- at least in terms of following the commands to type, and seeing what happens in response. - Thanks!

Jenna Ekwealor: I asked something along the lines of this before but--i've been a helper a few times with no special training. Is there, perhaps optional, training for helpers? I haven't seen anything but I think some of these lessons would be very helpful (e.g. motivating and demotivating language & actions! I wish i knew that as a helper. Now i'm worried about whether i was demotivating. :s

- Once upon a time, Mirian contributed this as a section in the Carpentries Handbook (https://docs.carpentries.org/topic_folders/hosts_instructors/hosts_instructors_checklist.html#helper-checklist). I think there is a nice handout somewhere, and will try to track that down.

Nancy Kennedy If federal employee at the SI, are there any conflict-of-interest, honorarium issues to be aware of? we are volunteer not paid if teaching carpentries, but i wonder about the logistics of $ flow when fed is involved? do you need to use personal leave to do this?

- *Looking into $ aspects*
- In terms of leave, I (Mike) have personally taught at workshops at other DC-area institutions without taking leave by convincing supervisor that making connections with local institutions met SI goals and own performance plan. Your Experience May Vary

William Mattingly: How is the travel pay moved from host institution to carpentry member's account? Also, is it possible to do multiple carpentry workshops across a continent and use that as a way to travel

(one month in country X, then next month in country Y, etc.)? Or is there a limit to how many you can do in a given period of time?

- *Looking into $ aspects*
- No Carpentries-imposed limit on how many workshops you can teach in a given time period.

Christopher Moriarty
Michael O'Mahoney In the providing support section of Self-organized workshops, the carpentries will provide AMI instances for Genomics workshops. What are AMI instances?

- AMI is an acronym specific to cloud resources provided by Amazon Web Services (AWS). It stands for Amazon Machine Images, which are pre-built and pre-configured virtual machines that have all of the neccesary files and software installed for the Genomics lesson. Learners can then connect to the Virtual Machine via SSH, like we can connect to Hydra.

Jarrod Scott How do we go about initiating a workshop? Can we run a carpentry workshop that incorporates different elements from several pre-defined workshops? In other words, create a workshop based on other workshops and the Carpentires model. How do we build collaboartive teaching teams and where do we recruit students?

- Tomorrow, I will be covering the rules for what is required for a workshop to be officially be called a Carpentries workshop, use the Carpentries logos, etc (https://carpentries.github.io/instructor-training/21-carpentries/index.html#what-is-a-carpentries-workshop-the-rules). However, you can call any workshop a "Carpentries-style" workshop, and follow your own format, use outside lessons, etc.

Keri Thompson
Jaxine Wolfe: Can you (an instructor) be contacted to teach any carpentries workshop internal or external to the Smithsonian which is within your 'scope' of expertise?

- Both the Carpentries-organized and SI-organized workshops, they/we follow a more passive model of recruiting instructors. We will decide a workshop and dates, and then ask for volunteers for the different lessons. We might reach out to specific instructors if we do not have volunteers, but it's still optional/voluntary.

Keypoints:

- Instructors guide learners to construct the proper big picture (accurate mental model) of the topic rather than focus on details.
- Instructors rely on frequent feedback from learners to monitor their own presentation of the material.
- Instructors introduce a few concepts at a time to avoid cognitive overload.
- The best way to motivate learners? Show them how to do something they can immediately put to use and be enthusiastic about it.
- Teaching is a learned skill.

Live Coding is a Skill

https://carpentries.github.io/instructor-training/14-live/index.html

Questions:

- Why do we teach programming using participatory live coding?

Objectives:

- Explain the advantages and limitations of participatory live coding.
- Summarize the key dos and do nots of participatory live coding.
- Demonstrate participatory live coding.

Why Participatory Live Coding?

Exercise: Up and Down

List some advantages and challenges of participatory live codingfrom both a learner’s and an instructor’s point of viewin the Etherpad.
This discussion should take about 10 minutes.

Carlos Arias : Advang: Students get the opportunity to see professor make mistake and how they solve those mistakes. Also, since teacher is type the pace of the instroctions are maybe easy to all students to follow. Disavnatges: if something is not working properly can make teacher to spent more time on solving the problem than explanining to the students.
Tauana Cunha: Advantages learner: seeing how someone more experienced does things; seeing errors happen in real time and how to fix them. Challenges learner: keeping up with your own coding as you try to watch and type things yourself; not being able to scroll back up (on instructor's screen) if you get lost/behind. Advantages instructor: possibly catch issues in your tutorial and fix them (instead of having people come across unexpected problems on their own); interact with students and get more questions; you also get to learn that better. Challenges instructor: keeping up with a reference material, the script and the zoom window; no seeing students well, especially online

Jenna Ekwealor: Advantages from learner POV: opportunity to ask questions at any point (from helper, perhaps), rather than a static slide of code all at once, e.g. also as we talked about, typos can both give the learners confidence (that even instructors make mistakes) and offer a learning experience. Disadvantages from learner POV: if done too quickly, or too much at once, can probably have the opposite effect and instead overwhelm learners. Disadvantages from instructor POV: there are opportunities for unexpected technology failure/setbacks, such as with using packages or, differences in OS and syntax between instructor and learners, etc. a lot of opportunity for things to get confusing or frustrating.
Nancy Kennedy Adv: Probably slows the instructor down to type rather than display pre-typed; Student sees the real-time progress or mistakes; Student can focus attn on the current code snippet (not peaking ahead); Instructor can pause in the middle if Q or something happens // Disadvantage: Surprise updates/patches pushed through with no chance to delay. Technical difficulties; In online, a lag or internet blip. Typos (not nec. too bad if that happens though); Unforeseen errors/mistakes. New instructors may have to overcome stagefright. It can be harder to spell when everyone is watching!
William Mattingly Advantage: It allows for better pacing because the presenter can't just zoom (no pun intended) through the lesson. Instead, the students have time to follow along. Disadvantage: This is really both, but the potential for mistakes. In one sense, it can allow for learning opportunities, i.e. explaining errors and debugging, but for an uncomfortable instructor, it may through them off and quick sand them for the remaining time.
Christopher Moriarty:
Learners:
+ There are obvious benefits to actually having to code with the instructor, but one subtle one is that there are often little hurdles to jump over that have nothing to do with the lesson. For example maybe the learner has never used the terminal on their macbook, and isn't sure how to launch one.
- Many live coding events are plagued with wifi and other issues, resulting in lost time lost.
Instructors:
+/- This is kind of both a plus and minus, but having to live coding means you will definitely have to provide the correct syntax and commands, and will have to explain in detail each step (rather than to just say, open a jupyter notebook and run some code.
Michael O'Mahoney:
Learner
Adv: Get to see errors made in real-time and know that competent practitioners or experts still make silly mistakes
Disadv: Juggling between following along and watching can be cumbersome when the difficultly of a task increases
Instructor
Disadv: More prone to slip ups and using dismissive language when not reading from a prompt. Technical issues
Adv: slows down coding so that fewer people might be left behind

Jarrod Scott advantages: forces instructor to slow down. allows for mistakes (great teaching tool) students can code in real time. easier to follow what is happening with the code. disadvantages: instructors must be proficient with their coding and be able to quickly identify problems/mistakes. I am sure it takes a lot of practice to be effective with live coding. Students (instructors) may have a hard time listening (speaking) while typing? I know I do
Keri Thompson disadvantages: technical problems/freezing/crashing, instructor has to be very familiar with what they're doing.
advantages: following along seems to require more active attention than just reading (for me), instructor can use any errors as additional teaching opportunities, ensures the pace is more consistent so instructor doesn't rush/gloss over certain things

Jaxine Wolfe: Advantages: real time learning; able to encounter and troubleshoot errors in a constructive way; allows students observe good coding practices and gain confidence when their code works | Disadvantages: technical issues; in virtual learning environments you can't easily see student's screens

Exercise: Compare and Contrast

Watch this first participatory live coding demo video (https://www.youtube.com/watch?v=bXxBeNkKmJE&feature=youtu.be) and this second demo video (https://www.youtube.com/watch?v=SkPmwe_WjeY&feature=youtu.be) as a group and then summarize your feedback on both in the Etherpad.Use the 2x2 rubric for feedback we discussed earlier.
In the videos, the bash shell for loop is taught,and it is assumed learners are familiar with how to use a variable,the head command and the content of the basilisk.dat unicorn.datfiles.
Note: Sometime sounds in the room can be poor. Turning on closed captioning by pressing the cc button will improve the accessibility of these videos.
This exercise and discussion should take about 15 minutes.

2x2 rubric:
Content (+)
Content (-)
Presentation (+)
Presentation (-)

Carlos Arias Video(1) Content(+) Give several examples of how to use the command.
(-)Do not explain errors due to typos and do not for seen future common errors. Not clear presentation of the commands and its usage.
(-)presentation: Several distractors during the presentation (screen and cell phone). Screen very small difficult to follow. Fast pace.
Video (2) Contente(+) better with explanining how the command works, several examples on how you can used the command, and also explains possible errors.
Presentatio(+) no external distractors, screen more clear and easy to follow. Slower pace.
Tauana Cunha: (video 1) Content (+): Repeated the example with small changes; Presentation (+): Verbally explained what the > means when replacing the $ automatically; Content (-): Typed the whole loop without explaining verbally at the same time; Presentation (-): Explained too fast.
(video 2) Content (+): Explained what error means; Presentation (+): Verbally explained while typing the loop; pointed to screen a lot; Content (-) / Presentation (-)
Jenna Ekwealor
First video:
Content (+) good job orienting where we are and where we are going at the beginning
Content (-) explaining the loop in a way that makes it seem very easy and not really showing the steps. i'm not sure the solution but perhaps explaining those steps as typing each line of the loop
Presentation (+) i like that the instructor pointed out the dollar sign change..... seems upbeat.
Presentation (-) I think I would prefer the instructor says the words as they're typing them, since it can be hard to watch and type
Second video:
Content (+) the content isn't all that different, just much improved presentation. a good presentation/explanation of the up arrow and one-line for loop. repetition/reinforcement of the concept by using different variables.
Content (-)

Presentation (+) standing, pointing, and text is bigger! looking at learners. saying words as typing
Presentation (-) maybe a touch fast!
Nancy Kennedy 1: C+ shows different variables give the same result ; C- brushes over details somewhat quickly ; P+ live coding; P- can't see the screen, type is too small | 2: C+ shows examples, including the typo and explanation; C- ; P+ more upbeat, standing posture, narrates as typing. showing the code, then a recap to point out which parts do what from the screen; recommendation for not one-liner, admitting to having been there; P- maybe slightly slower, but this was much better than 1st version
William Mattingly
Presentation (+) Good job handling a typo and using it as a teaching opportunity
Presentation (-) While writing out the code, he hasn't taken many times to look up at the audience. Reading the audience is ESSENTIAL to understand if you are conveying material well. Are eyes glazing over? Maybe slow it down and repeat a few things. Do they look bored? Maybe throw out something a bit more complex to bring them back in. Maybe a break? All of that comes from looking at your audience. Also, the one student has a red sticky note up...

Content (+) Good job explaining variables by showing different variables resulting in the same thing. He kept coming back to this point, which tells me that this was the core concept he was trying to teach or reinforce from an earlier lesson while teaching for loops
Content (-) I cannot think of a negative here for the content.
Christopher Moriarty
Video 1:
Content (+) Good to show the same example again with a slight tweak for repetition.
Content (-) There seemed to be a long moment of no explanation while he was typing code.
Presentation (+) The dark background terminal with syntax highlighting is a good choice, and the font seemed big enough
Presentation (-) The teacher seems to only be looking into their screen, and not engaging the students.
Video 2:
Content (+) Used the typo as an example, and did well to explain why it was wrong, and even explained the up arrow command.
Content (-)
Presentation (+) I immediately noticed that he was standing, and found that more engaging to watch (rather than the teacher sitting and looking into only their screen). He also talked more as he was coding, and stopped in short intervals to explain and engage with the students in a more expressive way, making eye contact and pointing at the screen.
Presentation (-) The white background with no syntax highlighting is boring and can make the screen just look like a bunch of unstructured text (rather than a properly formatted code).
Michael O'Mahoney
Vid 1
Content + : Gives time to explain content after the code is written
Content - : uses a lot of jargon
Pres + : Projects his voice
Pres - : lots of dead air while coding
Vid 2
Content + : Used mistake as a learning experience. Explained a keyboard shortcut
Content - :
Pres + : Checks with learners to make sure they are caught up before starting the lesson
Pres - : Still moving at a quick pace
Jarrod Scott (+ content) discusses multiple ways of doing the same task, icorporates several concepts/tools in lesson (+ presentation) clear instruction, goes relatively slow through the material (-

presentation) should turn off notifications, do not assume students will make mistakes (using semicolons) (- content) explain more while typing,
Keri Thompson First video: Content + shows additional examples | Content - doesn't explain the goals/end result before starting
First video Presentation + does explain the result | Presentation - doesn't explain as he types, window is low can't see all the code
Second video: Content + gives more options and variations | Content - maybe shows too many options?
Presentation + checks sticky note status, code is kept to top of window so everyone can see | Presentation - ??
Jaxine Wolfe
Video 1: + A digestable amount of content was presented with a lot of examples, the instructor explains the product of each step | - the instructor getting notifications and having some news source up in the background is distracting; talking into the computer; when an error was made the instructor said nothing of it; font was pretty small and the bash shell wasn't default coloration
Video 2: + the font was default and a lot larger, the instructor was standing up and looking at the class and refering to the code, dictating as he was typing

Top Ten Tips for Participatory Live Coding in a Workshop

Sticky Notes

Callout: Accessibility of Sticky Notes

We strongly encourage you to get sticky notes in colors other than red and green,as we have found that some learners (not to mention helpers and instructors!)may have colorblindness and thus cannot properly ask for/give help this way.Alternate ideas are to use differently-shaped sticky notes (stars and squares,thumbs up that can be turned into thumbs down stickies), or to use one sticky noteas a flag for help.

Exercise: Practice Teaching

Teach 3 minutes of your chosen lesson episode using live coding to one or twofellow trainees, then swap and watch while the other person(s) live codes foryou. (For this exercise, your peers will not “code-along”, but will instead observe and give feedback.)
Explain in advance to your fellow trainee(s) what you will be teachingand what the learners you teach it to are expected to be familiar with.
Do not record this exercise. Give each other feedbackusing the 2x2 rubric we discussed previously and enter the feedbackyou received in the Etherpad.
This exercise should take about 25 minutes.

- Carlos Arias (Feedback From Jaxine)
    - Content (+) Great recap of previous lesson and connect to todays lesson; clearly explained

the goals of the lesson; explained jargon
    - Content (-) Could it be useful to have a visual diagram that accompanies what you're doing in the command line?
    - Presentation (+) Went slowly (at a great pace!); no distractions; waited for people to open their bash scripts
    - Presentation (-) Use default bash to mirror what the students might be seeing
- Tauana Cunha (Feedback from Nancy)
    - Content (+) Great summary of previous day, and preview of where we're headed today. Helpful to see the commands typed, live & narrated.
    - Content (-) When in the 1st example, just mention the Run button. Introduce the keyboard option on the next example
    - Presentation (+) Excellent pace, and energetic tone. Great at showing interest, engagement
    - Presentation (-) There's some background noise, might be earrings.
- Jenna Ekwealor (Feedback from William)
    - Content (+) Really great recap from the previous lesson. By showing a common error, a student will know what to do and not panic when they encounter that error AND! how to solve it.
    - Content (-) Explanation of the ..
    - Presentation (+) Very slow (in a good way) pace. I was able to follow along really easily. Great on the fly description of trouble shooting by using pwd. Great use of the blue stickies.
    - Presentation (-)
- Nancy Kennedy (Feedback from Tauana)
    - Content (+): Layed out the goals of the day; explained the usefulness of the tools that were gonna be presented and relevance for the learners possible objectives
    - Content (-): A bit too fast for a novice on OpenRefine; MDPI AG not explained
    - Presentation (+): Moves mouse carefully around screen showing where she was at; showed examples of how to do things in that interface
    - Presentation (-): Even going at a good pace, the OpenRefine screen has a lot of information, so still hard to follow the mouse
- William Mattingly (Feedback from Jenna)
    - Content (+) great review of previous content, and excellent use of comments at the start to list 4 key terms. great job re-defining the jargon of the word "loop." ("think of it as..")
    - Content (-) it was mentioned, but i sort of missed why print(words) wasn't sufficient and what was the motivation for creating a loop? the function of the loop was very clear but i would find it more compelling/motivating to learn if it connected with me why it's useful/when it's needed
    - Presentation (+) really confident and comfortable pace. good emphasis on different words, etc. the use of a text editor (?) with color for syntax was VERY helpful, especially in helping reinforce the components of a loop ("for i in words").
    - Presentation (-) this may have been in the tutorial and thus somewhat unchangeable, but i might like to see a more intuitive variable used first, such as "for word in wordslist" or something. to me, it would help show the relationship between those from the start, then introduce them to "i" after as it will so often be written that way in tutorials/example code/etc. (they clearly need to recognize it).
- Christopher Moriarty (Feedback from Jarrod) <u>Presentation on version control in git.</u>
    - Content (+) I especially liked that Christopher began with an overview of the objectives and then discussed the problem. Description of specific steps very clear and easy follow.
    - Content (-) Suggest getting familiar with the text editor in the lesson (nano). This is a little

nitpicky on my part since in a real situation, Christopher would have learned nano :)
    - Presentation (+) Clear explaination of the process, especially how to use vi editor (which I can never figure out how to use)
    - Presentation (-) Could benefit from from a visual conceptual overview at the start. Again, in real world situation this would be easier to accomplish with graphics, etc. Just not really possible here. Perhaps there are other ways of accomplishing this?
- Michael O'Mahoney (Feedback from Keri)
    - Content (+) gave good overview of goals and recap of what was learned earlier, clearly explained what punctuation and commands meant
    - Content (-)
    - Presentation (+) pace was good easy to follow, explained clearly as he typed including what the results were
    - Presentation (-) was a little hard to read w/ black background on my small screen
- Jarrod Scott (Feedback from Christopher) Presentation on for loops in bash
    - Content (+) Showed how to gather a list of items slowly, and in multiple different ways (typing out all names, using tab completion, and was about to show the wildcard next). Explained the goal and objective of the lesson clearly, and showed an example as part of the overview. This was nice, and functioned as the "fading" example, where you see an example, and then have to actually type it out.
    - Content (-) Terminal had a long prompt that takes up most of the line when you zoom in. This makes commands bleed into the next line. This also happened on my presentation. It might be a good idea to try and configure the terminal to have a small prompt so commands can fit on one line even when you zoom in.
    - Presentation (+) Rather than sharing the whole desktop, he used zoom to pick only the two windows he wanted to share. Minimizes distractions, and possible notifications.
    - Presentation (-) Pretty minor but, the right panel already had some text in it, and while it was relevant text, I found myself reading it rather than listening to Jarrod. Also this one isn't his fault, but he wasn't able to show video.
- Keri Thompson (Feedback from Michael)
    - Content (+) Explained facets and filters plainly and clearly
    - Content (-) Could have talked a bit more about parameters when importing data into OpenRefine
    - Presentation (+) Stopped to check and see if learners were ready for the lesson with the software installed and data downloaded. The pace was nice.
    - Presentation (-) Used a lot of filler words to begin with though that subsided in a major way when she found her flow. Font size was small to start, but was addressed later in the presentation
- Jaxine Wolfe (Feedback from Carlos)
    - Content (+) Great description of Rstudio, objetives of the class, and Recap from previous lesson.
    - Content (-) Maybe explain better the window for writing script and console, where you see the command type and execute.
    - Presentation (+) Great choose of color background. Great!! ask for feedback from the class.
    - Presentation (-) Maybe a bit small to see the command on the left corner on your screen, size and position.

Keypoints:

- Live coding forces the instructor to slow down.
- Coding-along gives learners continuous practice and feedback.
- Mistakes made during participatory live coding are valuable learning opportunities.

Preparing to Teach

https://carpentries.github.io/instructor-training/15-lesson-study/index.html

Questions:

- How should I prepare to teach?

Objectives:

- Use a learner profile to think about someone likely to attend a workshop you will teach.
- Classify the level of a learning objective in terms of Bloom's taxonomy.
- Critically analyze a Carpentries lesson's objectives.
- Describe reverse instructional design and explain why this is useful when preparing to teach.
- Identify checkpoints in a lesson for formative assessment.
- Recognize instructor notes as a resource for preparation.

Learner Profiles

João is an agricultural engineer doing his masters in soil physics.His programming experience is a first year programming course using C.He was never able to use this low-level programming in his activities,and never programmed after the first year.
His work consists of evaluating physical properties of soil samples from different conditions.Some of the soil properties are measured by an automated device that sends logs in a text format to his machine.João has to open each file in Excel,crop the first and last quarters of data values,and calculate an average.

Software Carpentry will show João how to write shell scripts to count the lines and crop the right range for each file,and how to use R to read these files and calculate the required statistics.It will also show him how to put his programs and files under version controlso that he can re-run analyses and figure out which results may have been affected by changes.

Exercise: Learner Profiles

Read Software Carpentry's learner profiles. Note that these example profiles contain moreinformation than you will ever know about a learner; this is a creative exercise in imagining (and empathizing with) thewhole people behind the faces. Now, sketch out a profile of someone you might expect to attend your first workshop.Who are they,what problems do they face,and how might this training help them?Be as specific as possible.
Enter your learner profile into the Etherpad.
This exercise should take about 10 minutes.

https://software-carpentry.org/audience/

Carlos Arias : Pepe Rodriguez is a Ph.D student in University X studying Genome architecture of the colour pattern genes in Ithominae butterflies. He has taken some beginners bioinformatic course at his university, but he has not been exposed yet to real data.
Pepe has spent last year collecting and sequencing samples for different populations across South America. However, he do not know how good is his data and how to process, analyze his files.
Software Carpentry will teach him how to quality check his data, and how he can transfer this data to other genomic tools to get answers of his genomic questions.
Tauana Cunha: Alex is a lab technician in an ecology and evolutionary biology lab. She has a Masters and several years of experience as a lab tech in diverse labs working on different topics, but mostly in lab/bench practices, not so much in data analyses. A colleague passes a dataset for her to analyse hopefully towards a paper. The dataset has both biotic data, with species information and abundances, and physical variables, with water temperature, pH, depth, locality etc. She decides to take an R course to help her manipulate her data appropriately, to test relationships and to plot graphs. She is eager to learn and a hard-worker, but lack of background on the project original goals brings another layer of difficulty in not being certain of which specific tasks she needs to do or which relationships to test with that data. Data Carpentries will help Alex get started with using R, importing and subsetting her dataset in different ways to do an initial data exploration and decide on best relationships to test and how to present her data.
Jenna Ekwealor: Maria is a lab manager and researcher in an evolutionary biology lab. She is extremely knowledgeable about the biology and fundamental methods in evolutionary biology, but data sets are getting larger and larger and the go-to manual methods are not longer feasible. She has browsed online tutorials and watched others do some command-line coding, but has no major experience with it.

Maria's current project involves aligning thousands of DNA sequences for hundreds of loci. In past projects, these numbers would have been something like tens of sequences for a few loci. These files are so large they crash the app to even open them. Thus, she needs to learn some command line methods to do the techniques she is already familiar with via GUIs.

Maria has been out of formal education for a long time and this sometimes makes her insecure about her ability to learn new things. This can shake up her confidence during workshops, especially if they go too

fast or assume she should know things already.

Data Carpentries will teach Maria how to navigate files in terminal, which is probably the biggest hurdle to reaching her goals. Software Carpentries or specific Data Wrangling Carpentries may be able to help teach her to install and use command-line software for her project.

Nancy Kennedy : Alex is a processing archivist who works on arrangement, description, and collections management functions. They have never taken a programming course, but have used various spreadsheet applications to work with bulk data imports or exports and is trained in a range of library and archival encoding standards like MARC or EAD.
For the last three years, Alex has worked on transferring catalog records from various home-grown systems to a central data repository. They have inventories from previous staff projects, donors, in various formats including a wide range of spreadsheets. Their task now is to clean up and analyze the sets of spreadsheets so that they can start to reconcile the collection identifiers, creators, subject terms and accession files.
They are working from home during COVID, with 2 small children, a newborn, and an energetic dog, which they have learned to manage alongside an increasing workload. They will need breaks and accommodations for nursing or pumping.
Library Carpentries will help Alex learn to use OpenRefine to filter, facet, and export data.
William Mattingly :
Ted works in an office. He spends most of his days working with texts, specifically to extract all the people, dates, organizations, and places referenced within those texts. He currently is doing this by hand and is able to process 10, 1,000 word documents a week. A few weeks ago, Ted accidently spilt coffee on his boss, Jeremiah, a San Francisco business Tycoon. Now, Ted's boss has it out for him. He's given him an impossible task! He has given Ted 100,000 documents in the hopes that it will discourage him and make him quit. Have no fear, Ted. We are here to help!

During our course, Ted will learn how to process texts via Python. He will learn the basics of opening text documents, how to open multiple files in loops, and the basics of natural language processing. Ted will even learn more advanced NLP tasks, such as named entity recognition which will allow him to automatically extract all the desired entities from texts.

At the end of this carpentry lesson, Ted will not only be able to do the seemingly impossible task of extracting entities from 100,000 documents, he will impress his boss' bosses and use his new found skills to explore more about Python and text analysis. Way to go, Ted!
Christopher Moriarty:
Jennie is an accomplished radio astronomer and has had experience in a few programming technologies, such as IDL and Matlab. She hears all the kids talking about how great python is, and figures its a passing fad, and went a several years without trying to learn it. Now the team Jennie is on has made the decision to convert all their code to python, and she's decided to take a software carpentries class to start ramping up.

Jennie is also going to run into some other hurdles, due to sticking with old technologies for so long. She's never used version control officially, and usually asks her students to provide their code over email and usb sticks.

Luckily this is a path many astronomers have walked before, and the transition from IDL/Matlab to python is well known and documented online. The carpentries class will be a great kick start, and after that Jennie should be comforted to know that google can help find equivalent syntax, tutorials and

commands for things she already knows how to do in python.

Michael O'Mahoney
After following Phish for the better part of his 20s, Squiliam Fancyson recently graduated from university with a BS in Entomology and is working on a project to clean up 10,000 collection records from Army collections in Kenya. His program looks to integrate these records into a wider ecological mapping effort. These data are often incomplete and riddled with misspellings.
He has never used the terminal before. Data Carpentry will teach him how to speed the cleaning of this data using OpenRefine for ingestion into their model.
He is deathly afraid of leeks.
Jarrod Scott: Lucy is a postdoc fellow who studies adaptation of marine animals to changing conditions. Lucy has experience with R---data wrangling, creating maps, stats, etc.---however Lucy does not have any experience with Shell commands. Lucy is beginning a collaborative project involving microbial data but she has no experience in this area. As part of the project, her collaborators use git/GitHub for version control. The collaborators also want to document the workflows Lucy writes for analyzing the microbial data in R Markdown or similar tool. Carpentries will help Lucy learn how to use Shell commands, how to properly document workflows for reproducibility, and be efficient at git/GitHub.
Keri Thompson Linda is a library technician who primarily works with physical collections circulating books, processing ILLs and checking in serials. She occasionally works with spreadsheets and is familiar with basic sorting, but not much more. In general she is very nervous around technology and has only recently purchased a smart phone.
Now that she is working from home, she's been assigned several new projects which include going through reports generated from the catalog into .xlsx files and analyzing serial gaps and overlaps with other branch libraries. The files she works with contain hundreds of lines each, some with errors and some without. Her laptop screen is very small, so she often resorts to printing out reports to look at them and make notations.
Open Refine will walk her through merging all the files she's given, finding errors and anomalies through faceting and clustering, and then exporting the saved results to save for later so that when she returns to work she can use the results to pull serials for transfer to offsite storage.
Jaxine Wolfe: Ida is a undergraduate research fellow completing a summer internship in which she is analyzing the community composition and trophic level interactions of a fish community across the Northeast continental shelf. Samples of this community have been collected in trawl surveys and she has spent all summer dissecting and processing the fish. With the end of her internship fast approaching, her advisor suggests that she use R to standardize, merge and analyze the datasets assembled from stomach content and stable isotope analysis. She hasn't used R outside of a biostatistics class but is excited at the possibility of expanding upon her baseline knowledge of the language.

Reverse Instructional Design (and Preparation!)

Carpentries Curriculum Development Handbook: https://cdh.carpentries.org/

Working With Learning Objectives

Image: A six level pyramid labelled from bottom to top: remember, understand, apply, analyze, evaluate, create. Next to each level is a description of that stage and a list of action verbs associated with each level. From the bottom - Remember is recall facts and basic concepts: define, duplicate, list, memorize, repeat, state. Understand is explain ideas or concepts: classify, describe, discuss, explain, identify, locate,

recognize, report, select, translate. Apply is use information in new situations: execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch. Analyze is draw connections among ideas: differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test. Evaluate is justify a stand or decision: appraise, argue, defend, judge, select, support, value, critique, weight. Create is produce new or original work: design, assemble, construct, conjecture, develop, formulate, author, investigate. https://carpentries.github.io/instructor-training/fig/Blooms.png

Exercise: Evaluate Learning Objectives

Select one learning objective from the episode you've used for teaching practice,then complete the following steps to evaluate it.

- Identify the learning objective verb. How specifically does this verb describe the desired learner outcome?
- Where does this verb fit on Bloom's taxonomy? Do you think this is an appropriate level for your learners?
- In your opinion, does the lesson do an effective job of meeting the stated objective?
- What would the next level on Bloom's taxonomy look like for your learners? How might you be able to help them think aheadto the next level without attempting to get them there during your workshop?

This exercise should take about 10 minutes.

Carlos Arias
Tauana Cunha
Jenna Ekwealor
Nancy Kennedy
William Mattingly
Christopher Moriarty
Michael O'Mahoney
Jarrod Scott
Keri Thompson
Jaxine Wolfe

Using Formative Assessments

Exercise: Where are your checkpoints?

Have a look at your learning objective again and identify*where* in the lesson that objective should reasonably be achieved. How willyou know that that objective has been met for all learners? Will this be clearto them?
Make a plan for *where* in your lesson you will use different types offormative assessment to help everyone in the room monitor their progress. Keepin mind that formative assessment can take many

forms, including multiplechoice questions, faded examples, spontaneous questions and calls for stickynotes. Write some notes or thoughts about this process in the Etherpad fordiscussion.
This exercise and discussion should take about 10 minutes.

Callout: You Cannot Just Ask

Self-assessments of skill level are usually inaccuratebecause of the Dunning-Kruger effect:the less people know about a subject,the less accurate their estimate of their knowledge is. This is one reason why assessments should be specific, asopposed to asking if everyone understands.

Callout: Instructor Notes

Many of The Carpentries lessons haveinstructor's notes, with informationfrom instructors who have already taught the material. This can be a valuableresource when preparing lessons, especially when teaching a lesson for the first time.
The instructor notes are linked on each lesson page under the "Extras" pull down menu.In addition, configuration problems and othertechnical hurdles common across multiple lessons are detailed here along with suggested solutions. This link is on the workshop page as well for easy access by learners and during workshops. We will see more about workshop pages this afternoon.

Exercise: Feedback On Your Challenges (Optional)

With these goals in mind, pair up with a partner to discuss the MCQ and faded example problems that you wroteyesterday. Give each other specific, actionable feedback that follows our 2x2 framework. Use that feedback tomake at least one modification to your exercise(s). Discuss in the Etherpad the change you made and how it willhelp you get more useful information about your learners.
This exercise and discussion should take about 15 minutes.

Keypoints:

- To teach effectively, you have to know *who* you are teaching.
- Good learning objectives communicate the intended effect of a lesson on its learners.
- A good exercise provides useful guidance to instructors about next steps needed in teaching.

Any Questions???

Do you as instructors ever ask for Learner Profiles before a course?

Morning Break

https://carpentries.github.io/instructor-training/16-coffee/index.html

Questions:Objectives:

Keypoints:

More Practice Live Coding

https://carpentries.github.io/instructor-training/17-performance/index.html

Questions:

- How did you change your teaching in response to feedback?

Objectives:

- Use feedback to improve your teaching.

Exercise: Round Two

First, have a look at the rubric that is given to trainers as a suggested framework for evaluating the online teaching demonstration sessions that are part of instructor checkout.Does this rubric make sense? Take a

moment to think about things you would like to do differently with your next live codingpractice. This is also a good time to ask questions about teaching demonstration.
Next, get back into the same groups you did your live coding with.Take turns re-teaching your chosen live coding session, making sure to incorporate changes based on the feedback you received and any new ideas based on reading the rubric.This time, give feedback to eachother using the checkout rubric you just discussed. When you are finished, add some thoughts on this process to the Etherpad:

- **What did you change?**
- **Did it work better or worse with the change?**
- **How might you do it if you were to teach it again?**

This exercise should take about 25 minutes for teaching, plus 20 minutes for pre and post discussion.

Link to the rubric: https://carpentries.github.io/instructor-training/demos_rubric/
*I am guessing this is where to put it? Here is good :) yay!

William (for Jenna):
Positive
- Uses Carpentries curriculum with only minor deviations
- Teaches content correctly
- Manually types out all their code
- Uses appropriately sized fonts and windows
- Explains all typing
- Uses mistakes/typos as opportunities for learning
- Speaks clearly

Negative
- Uses shortcuts or tools that are unfamiliar/unavailable to learners (the ever prevalant double tab!!!)

What did you change?: My initial feedback was mostly positive, except for my delivery of the structure of a for loop. I spent more time this time explaning the different components in more detail.

Jenna (for William):
Positive content:
Uses Carpentries curriculum with only minor deviations
Places content in context and explains relevance/utility to learners
Teaches content correctly

Negative content:
Jumps into the content without context

Positive delivery:
ALL of the positive on the rubric
Negative delivery:
Truly none on this rubric

My feedback was generally positive and the negative things i was mostly aware of as I did them, so it was reinforcing to hear it. The first time I had some issues with "muscle memory" and tab completion and the second time i think i reduced that! I took more time to explain the specialized command "cd .." Feedback

definitely helped!

Jarrod: I made my prompt shorter (that was better) I used a pad to write notes on that outlined the basic structure of the command. THIS TIME, I typed it out while I explained it and I also minimized the window when I began live coding. SOMETHING I will do next time: My partner (Christopher) said all of the spaces and dashes when he typed his commands: Like "git space commit dash m space..." I loved that!

Nancy:

- What did you change? - I added more scaffolding context, reminder for what we did 'yesterday' and what ORefine is. I aimed for a slower pace. And, zoomed the screen in more, so there was less on the screen to overwhelm / look at. I also tried to provide brief definition of what the text abbreviations were, so they didn't sound as confusing (the data set has abbreviations in it that people may not recognize).
- Did it work better or worse with the change? Better. Got more across, even if seemed slower pace.
- How might you do it if you were to teach it again? Aim to have less on screen

Tauana

- What did you change: I added the relevance/usefulness of plotting skills at early and late stages of research
- Better or worse: the addition itself was better, but added a bit more content, and I ended up going faster than the previous practice
- How would do it in the future: add suggestion to learners about moving zoom window of instructor to avoid overlapping with content

Chris Moriarty:

- I worked on making the terminal window better for presenting, and it definitely helped keep commands on the same line, and reduce the amount of clutter on the screen.
- Expanded the introduction and objections section to be more clear
- Still used vi (I will learn nano, I promise!), but focused less on how to use vi and just spoke out loud what I was typing.

Jaxine:
What did you change: I took more time to introduce and set up the workspace; increased my font size
Did it work better or worse? Better
How might you do it if you were to teach again: be cautious about introducing R jargon without defining it; I'd also like to make my introduction to the learning objectives more smooth

Carlos: What did you change: I receive the recomendation to change the background of my shell to white and black. I try to talk slower an more clear.
Maybe be careful to forget to explain in more detail some of the commands and what you are typing.

Mike O
I enlarged the font of the program I was using to make it easier to read. it was easier to see the text on the GUI, but it had the unintended consequence of increasing the character spacing of the text in the utput windows. This unfortunately made the results hard to read. We found that changing the view in Zoom helped to increase the size of the font to a better extent. Next time I would work with folks to switch their

view away from gallery to standard.

Keri -

- What did I change: added more of the curriculum content that I left out in the beginning, including formats for importing, also started out with OpenRefine already launched and described what the learner should see when launching instead of waiting for it, also tried to be more conscious of use of filler words
- Did it work better: yes, however I forgot to change the font/screen size and ask if everyone could see which I did in the first round
- How would I do it again: include all the positive things from all iterations, change the browser so that existing tabs aren't open when it launches

Keypoints:

- (Reflective) Practice makes perfect.

Managing a Diverse Classroom

https://carpentries.github.io/instructor-training/18-management/index.html

Questions:

- How can I prepare for effective co-teaching?
- What are the challenges of managing a heterogeneous classroom?
- What do I do if there is a Code of Conduct violation?

Objectives:

- Evaluate different strategies for managing a class in which learners have diverse backgrounds and skill levels.
- Know what to do if someone at your workshop violates the Code of Conduct.

Managing a Diverse Classroom

Exercise: What Are the Challenges?

What are some of the challenges you might expect when teaching learners with a broad range of expertise? Discuss witha partner and put your thoughts in the Etherpad.
This discussion should take about 10 minutes.

Jaxine & Carlos:

- More Advace students can feel bore and feel that the class is going slow, find ways to matain the student interested in the topics. Finds ways to look at what is present in a different view/lens.
- Novice learners may need extra help if they have technical issues or are getting frustrated when they fall behind (helpers can help! Also in person, you could pair an advanced learner with a novice one)
- Personalities...how an advanced or novice learner approaches the situation of feeling bored or overwhelmed by the content can make a difference

William and Jenna

- More advanced students will ask questions that are beyond the scope
- One student may need more time than the rest at each step, creating a time crunch for all!
- Varied computer setups
- Different environment setups

Keri and Michael

- some students may be proficient in other languages/similar programs and technically be 'novices' but actually have a good grasp of the basic concepts - different levels of 'novices'
- keeping novices motivated if they're having trouble getting the right answer - more effort based praise
- keeping 'experts' from zoning out

Chris & Jarrod

- Teaching basic software to a group of expert astronomers faces the challenge that even though they've never receieved any formal training, they think they are experts. This often results in the students challenging the trainer during the class (ex: That's not a good way to do that, or there's a better way).
- Jarrod had an experience teaching R markdown where one student was more advanced, and was dismissing R markdown as a tool, and was interuppting the class.

Tauana & Nancy:

- Keeping more advanced students motivated
- Distinguishing who is not interested anymore vs. who is falling behind
- Niche questions, heading off into side questions

Callout: Learners Use Their Own Machines

Learners tell us that it is important to them to leave the workshopwith their own machine set up to do real work. We therefore continueto teach on all three major platforms (Linux, Mac OS X, and Windows),even though it would be simpler to require learners to use just one.

We have experimented with virtual machines (VMs) on learners'computers to reduce installation problems, but those introduceproblems of their own: older or smaller machines simply are not fastenough, and learners often struggle to switch back and forth betweentwo different sets of keyboard shortcuts for things like copying andpasting.

Some instructors use Virtual Private Servers (VPS) over Secure Shell(SSH) or web browser pages instead. This solves the installationissues, but makes us dependent on host institutions' WiFi (which can beof highly variable quality), and has the issues mentioned above with thingslike keyboard shortcuts.

Code of Conduct Violations

Code of Conduct Committee Reports: https://github.com/carpentries/executive-council-info/tree/master/code-of-conduct-transparency-reports

Never Teach Alone: How to Be a Co-instructor

Callout: How to Help

Many people are willing andable to provide in-class support. We call these people "helpers."

Helpers can assist in a varietyof ways: help learnerswith setup and installation, answer questions duringexercises, monitor the room to spot people who may need help, orkeep an eye on the shared notes and either answer questions there orremind the instructor to do so during breaks.The helper checklist describes what helpers can do tohelp instructors in more detail.

Helpers are sometimes people training to become teachers (i.e.,they are Teacher B in the teach and assist model), but they can alsobe advanced learners who already know the material well, previousworkshop participants, or members of the host institution's technicalsupport staff.Using advanced learners as helpers is doubly effective: not only are theymore likely to understand the problems their peers are having, italso stops them from getting bored.

Exercise: Teaching Together - Nuts and Bolts

With a partner, imagine that you are planning a workshop togetherand answer the following questions:

- ~~How would you prepare to teach a workshop together?~~
- **During the workshop, what are some things the assisting instructor can do (or should not do!) to support the main instructor?**

As an entire group, discuss what you came up with and then compareto the recommendations below.

William - *Don't do: Overtalk the lead instructor and say things like "That's not how I would do it.". A. It will add confusion to the students. B. It will really irritate the lead instructor. (I may have been in this situation before...).

- Do : Walk around and offer assistance to those who need it. Follow the lead of the one leading the class at the time and try and follow their requests. When the times to swap, behave the precise same way that the other behaved for you (presuming it was good, of course).

Jenna:
Should do: Offer students assistance. Be ready offer an answer/confirmation if the main instructor requests it of them (sometimes the instructor just needs an encouraging nod!!).
Should not do: Repeatedly interrupt or correct the main instructor. If there's something critical, of course, but otherwise save it for later or ignore it. Should not cause other distractions in the room/zoom.
Tauana: Can do: keep track of people's questions and reactions on zoom chat/etherpad; look for external information that might be missing from tutorial and requested more suddenly.
Should not do: interrupt the lead instructor in a rude way to correct/add; disappear of the session and leave them hanging
Mike O: Rove the classroom with an eye on yellow sticky notes and offer help to those users who are lost or confused about a topic
Jaxine: (Do) help out your co-teacher while their teaching by looking out for people that need help (helping those ppl or sending a helper over), recap with your co-teacher at the end of each day to review how the workshop went and if you need to adjust any teaching approaches. (Don't) interrupt your co-teachers instruction, ignore the workshop when youre not teaching (be present, even if its virtually)
Keri: keep an eye on the classroom to see if anyone looks frustrated or is struggling but isn't putting up their sticky note. take note of anything the main instructor is doing that could be improved (rubric). Keep an eye on the time. shouldn't interrupt even with helpful information - say if the lead has left something out. this is disruptive. unless it's a really key piece of information in which case they could ask a question at an appropriate time
Carlos: the co-instructor can be putting atention to the pace of the students in order to help students that are finding problems.
Nancy: Watch the chat or room for questions; Help with schedule and timing; Esp help with accomodations that come up. Be available during the breaks, so main teacher can take a break!
Should not jump ahead of the main lesson when helping an individual; not interrupt.
Chris: The assistant instructor shouldn't abruptly correct the instructor many times, perhaps instead talk to them quietly, pass a note. They should be very aware of what the students are doing, and try to catch cases where students get stuck but to don't ask for help.
Jarrod: discuss and agree upon specific roles and tasks before the workshop. In my view, there should be a lead instructer and the co-instructor is there to support the lead instructor (unless the lead instructor is doing something that violates the code of conduct). If the co-instructor has an issue, they should sicsuss in private with the lead instructor, not in front of class. Communication is crutial

Exercise: Minute Cards Revisited

Use your sticky notes to write minute cards as discussed yesterday.

Feedback Form: https://forms.gle/TQ8uK8fZUB5SAoyU8

Extra Homework: Please fill out https://amy.carpentries.org/forms/request_training/. Choose "Pre-approved registration", and enter code "smithsonian91". You are pre-approved, so do not worry about the optional or free-response questions.

Keypoints:

- Working with a broad range of learners can be challenging, but there are many ways to keep a classroom happy and motivated.
- Response to a Code-of-Conduct violation at a workshop is subject to instructor discretion, but all violations should be reported to the Carpentries for follow-up.

Lunch

https://carpentries.github.io/instructor-training/19-lunch/index.html

Questions:Objectives:

Keypoints:

DAY 4 (OF 4)

SIGN IN (Name and favorite season)
Chris Moriarty: Fall
Jenna Ekwealor: SUMMER!
Keri Thompson Fall
Tauana Cunha: Summer
William Mattingly - Winter (Florida) =basically summer minus 5 degrees =) fair!
Nancy: whichever season is next :) haha!
Michael O: Summer
Carlos Arias: Summer (dry season)
Jarrod Scott. dry season

Jaxine Wolfe: spring

Checkout Process

https://carpentries.github.io/instructor-training/20-checkout/index.html

Questions:

- What do I need to do to finish certifying as a Carpentries Instructor?

Objectives:

- Describe the final steps required to qualify as an Instructor.
- Schedule your community discussion session.

Application form

https://amy.carpentries.org/forms/request_training/
This was homework from yesterday, but please register if you didn't have noot yet. Choose "Pre-approved registration", and enter code "smithsonian91". You are pre-approved, so do not worry about the optional or free-response questions.

Instructor Checkout

What is in a Badge?

Callout: Carpentries Tools: Etherpad

The Etherpad is a widely used tools in Carpentries workshops and many other activities in the community.There are etherpads about a many topics, like the two linked in the checkout instructions above.To make them all findable, the Carpentries manage a “pad of pads”.This is a great one to bookmark and use as a reference throughout your checkout process and as a newly minted memberof The Carpentries community.

Exercise: Checking Out Review with Questions and Answers

In small groups, read and discuss one of the three checkout procedures listed above and described in detail at this page.Make notes in the Etherpad and when you are done, report back to the full group about the requirements for that stage of the process.What questions do you still have about the checkout process?
This exercise should take about 5 minutes.

Exercise: Schedule a Discussion or Demo

- Visit the discussion Etherpad https://pad.carpentries.org/community-discussions to sign up for a session.If the session you would like to attend is full, contact the discussionhost and co-host to ask if you can attend.
- Add a reminder in your calendar
- If you would prefer to do your teaching demonstration before your discussion,visit the demo Etherpad and sign up there. This demo rubric is provided as a guide for Trainers evaluating potential new Instructors during the teaching demonstration.

Note: When you're scheduling you may see extra information on some sessions. These sessions may be themed (community discussions) or sub community focused(teaching demos), be careful to select a session that matches your interests and needs. A themed Community Discussion may not leave you time to ask questions about your upcoming workshop. A focused teaching demo may, for example, be offered in a language other than English.
This exercise should take 5 minutes.

Pay special attention to the upcoming themed discussion "Carpentries Conversations: Executive Council and Governance in The Carpentries", on Monday, Feb 21 at 10 AM and 5 PM EST. I highly recommend signing up for one of these.

- Carlos Arias Done , Monday 22 Feb 2021
- Tauana Cunha
- Jenna Ekwealor
- Nancy Kennedy - Monday Feb 22, 2021
- William Mattingly - Done 2 March 2021
- Christopher Moriarty - Tuesday 2 March 2021 2:00 PM EST
- Michael O'Mahoney Done | 22 Feb 2021 5pm
- Jarrod Scott Done | Monday 22 February 2021
- Keri Thompson
- Jaxine Wolfe - Done | Feb 22, 2021

Lesson Demo

https://pad.carpentries.org/teaching-demos

https://www.youtube.com/watch?v=FFO2cq-3PPg

Lesson Contribution

Exercise: Look at possible issues for the lesson you have been teaching

- Go to the GitHub page for the lesson you worked with over the past two days and click on the “Issues” tab.
- Do you see any Issues or discussions that you might want to contribute to? Do you have any other ideas for a contribution?

- Carlos Arias
- Tauana Cunha
- Jenna Ekwealor
- Nancy Kennedy
- William Mattingly
- Christopher Moriarty
- Michael O'Mahoney
- Jarrod Scott
- Keri Thompson
- Jaxine Wolfe

Exercise: Check Out the Discussion (Optional)

As an instructor, your voice is important! We want you to be actively involvedin discussions about the lesson materials (and other aspects of The Carpentries community).Go to the GitHub page for the lesson you worked with over the past two days and click on the“Issues” tab. Read through some of the discussions and, if you have anything to add, please add itto the conversation! If you wish to make a pull request, be sure to examine the contribution guidelines forthe repository you are working in. If you do make a significant contribution to the discussion, send a link tothe issue to checkout@carpentries.org. Congratulations! You havejust completed one of the three remaining steps in becoming a Carpentries Instructor.
Leave about 5-10 minutes for this exercise.

Callout: Ongoing support

Discussion sessions are not only for instructors-in-training working towards their certification.Instructors are highly encouraged to participate in discussions before and after each of their workshops,so that they can continue to learn from each other and advance their teaching skills. For even more support, considerparticipating in our Carpentries Mentoring program!

Keypoints:

- To certify, you must contribute to a lesson, take part in a discussion, and do a teaching demo within 90 days of your training event.

The Carpentries: How We Operate

https://carpentries.github.io/instructor-training/21-carpentries/index.html

Questions:

- How is The Carpentries organized and run?
- What is the difference between SWC, DC, and LC workshops?
- How do you run a Carpentries workshop?

Objectives:

- Get connected with The Carpentries community.
- Describe where you can go to get information on running a workshop.

A Brief History

Image: A very brief history of The Carpentries. A timeline - 1998 Software Carpentry is founded by Greg Wilson and Bret Gorda to teach researchers better software development skills. 2005 lesson materials are made open source with support from the Python Software Foundation. 2012 Software Carpentry workshop efforts scale with support from the Alfred P. Sloan Foundation and the Mozila Science Lab. 2013 the first Software Carpentry for Librarians workshops are organized in the US and Canada. 2014 Data Carpentry is founded by Karen Cranston, Hilmar Lapp, Tracy Teal, and Ethan White with support from the National Science Foundation. James Baker receives support from the Software Sustainability Institute to develop and implement Library Carpentry. Software Carpentry Foundation is founded under the auspices of NumFOCUS. 2015 - Data Carpentry workshop efforts scaled with support from the

Gordon and Betty Moore Foundation. 2018 in January, Software Carpentry and Data Carpentry merge to form The Carpentries, a fiscally sponsored project of Community Initiatives. In November, Library Carpentry joins as a Lesson Program.
https://carpentries.github.io/instructor-training/fig/SWCDChistory.png

Similarities and Differences between The Carpentries Lesson Programs

Image: Three intersecting circles labelled Software Carpentry, Data Carpentry, and Library Carpentry. Software and Data Carpentry both focus on research focused computational skills. Data and Library Carpentry are both domain targeted. Software and Library Carpentry both have modular a curriculum. All three Lesson Programs provide novice-level training, two-day workshops to address gaps in computational skills, taught by volunteer instructors applying Carpentries teaching practices.
https://carpentries.github.io/instructor-training/fig/carpentries-venn-diagram_20200904.svg

What is a Carpentries Workshop? The Rules.

Using the Names and Logos

Materials

What is the Core Curriculum?

Who Can Teach What

Callout: Local Support

There is a great list here in the handbook Helper Checklist and Suggestions.

How to Run a Carpentries Workshop

Callout: Workshops as an Instructor

As an Instructor, you may be primarily teaching at local workshops or youmay not have local opportunities, or you may just want toteach somewhere else.
If you want to teach non-locally, you should be sure to join our Instructormailing list during the community exercise below, so that you hear aboutupcoming teaching opportunities.
Note that The Carpentries does not guaranteethat instructors will get to teach at workshops after they are trained, so thebest way to make sure that you get to teach (if you want) is to try runninga workshop or even a single lesson yourself. It can seem daunting to organizeyour own workshop, but as long as you have 1-2 people who can either help orco-instruct, The Carpentries Core Team and community can providesupport and guidance so that it is not so scary!

Setting Up

Exercise: Practice With The Carpentries Infrastructure

Go to the workshop template repositoryand follow the directions to create a workshop website using your local location and today's date.Put the link for your workshop website into the Etherpad.
This exercise should take about 25 minutes.
Note: Sometimes web browsers will cache the workshop webpage, so whenyou make changes in GitHub, they do not show up on the workshop webpageimmediately. Two ways to avoid this are to use a "private" or"incognito" mode in your web browser or by following theseinstructions to bypass your browser cache.

Exercise: Question and Answer

What questions do you have about running and teaching at a workshop? Talk with a partner andenter your questions into the Etherpad. At this time we will also return to discuss questions remaining from the beginning of the day.
Leave about 10 minutes for this discussion.

A Culture of Contribution

Callout: Lesson Incubation

Maybe this instructor training has inspired you to go home and write yourown fantastic lesson! If you would like to model it after the Software, Data andLibrary Carpentry lesson format, you can find a template and instructions inThe Carpentries lesson example repository,and a place to develop it in The Carpentries Incubator.

Any lesson that uses The Carpentries lesson template,follows our Code of Conduct, and is licensed either CC-BY or CC-0can be hosted in The Carpentries Incubator.Another resource, The Carpentries Curriculum Development Handbook, provides a guide tothe backwards design approach we recommend for lesson development.

Callout: Many Ways to Contribute

We recognize that the medium of GitHub may be restrictive to thosewho wish to contribute to our lessons. We are always searching forways to make the process more friendly to all, whether that becontribution training, or alternative routes to contribution. If youhave any ideas how we might make contribution more contributor-friendly,please let us know.

The Carpentries Community

Exercise: Participating in The Carpentries – What is Your Role?

If you are at an in-person training, your Trainer will hand out paper copies of a worksheet. If you are at an online training, you can get a digital copy here.
Take a moment to review member community roles on The Carpentries community website. Working on your own, match up the roles with the descriptions. When you are done, think about the question at the bottom of the worksheet about what roles you might play, and enter your thoughts in the Etherpad.
This exercise should take about 10 minutes.

Exercise: Get Connected

Take a couple of minutes to sign up for The Carpentries discussion channels you want to stay involved with.

https://github.com/SmithsonianWorkshops/2021-02-16-si-instructor-training/blob/gh-pages/staying_engaged.md

Keypoints:

- The Carpentries materials are all openly licensed, but names and logos are trademarked.
- Carpentries workshops must cover core concepts, have at least one certified Instructor, and use our pre- and post-workshop surveys.
- [Guidance for teaching and hosting workshops](https://docs.carpentries.org/topic_folders/hosts_instructors/index.html) is provided in [The Carpentries Handbook](https://docs.carpentries.org).

Afternoon Break

https://carpentries.github.io/instructor-training/22-coffee/index.html

Questions:Objectives:

Keypoints:

Workshop Introductions

https://carpentries.github.io/instructor-training/23-introductions/index.html

Questions:

- How do you actually start a workshop?

Objectives:

- Create an outline of important topics to cover in an introduction.

- Describe three ways to start workshop participants talking to each other.
- Receive one piece of feedback on your own introduction

Setting the Workshop Environment

Discussion: Your Academic Past

Think back to courses or workshops you really liked or did not like.

- How did those courses start?
- Were you confident in the instructors abilities?
- Did you feel like they were enthusiastic about the course and invested in you?
- Was it clear what you were going to be learning?
- Were you excited about the material?
- Did you leave that first day thinking the instructor was uninterested,that you were not the learners they wanted to be teachingor you had no idea what the course was supposed to be about?

Discussion: What is in an Introduction?

Get into small groups (3-4 people) and discuss these questions for 10 minutes.Take notes on your answers – we will combine them later.

- What do you hope to accomplish in a workshop introduction?
- What information do you need to include in an introduction to accomplish these goals?

After 5 minutes, come together, and combine ideas as a large group.
Finally, compare your ideas with the list of topics below. Did you miss anything?Did you come up with something that is not listed below?
Optional question: what did you (the leader) do or not do in your introduction to the session?

Goals For the Introduction

William

Components of the Introduction

1. Set Positive First Impressions

2. Introduce Yourself Effectively

Callout: Introductions for Everyone

If you are teaching a typical Carpentries workshop, then you areprobably not teaching alone! After introducing yourself, makesure that you give everyone involved in the workshop - instructors,helpers, organizers - a chance to introduce themselves as well.
If you are the workshop organizer, this can also be a good timeto thank volunteers who are instructing or helping.

3. Clarify Learning Objectives and Your Expectations

4. Help Learners Learn About Each Other

Callout: Example Icebreaker

Here is one example of an icebreaker you can use:Have everyone turn to a partner and introduce themselves with theirname, one word about their research (e.g.'microbes', 'dogs', 'vectors','stars') and a thing they are proud of that they made.

5. Set the Tone for the Workshop

6. Collect Baseline Data on Learners' Knowledge and Motivation

7. Whet Learners' Appetites for Workshop Content

8. Inform Learners of Logistics

Exercise: Practice Your Introduction

Imagine you have completed instructor training and you are about to teach a full lesson around the material you have been practicing teaching today.

- Write out some notes, covering some of the topics described above:
    - Introduce yourself effectively
    - Clarify learning objectives and expectations
    - Set the tone for the workshop
- Return to your groups of 2 or 3 and each give 2 minutes of your introduction. (5-6 min)
- After each introduction, provide 2-3 minutes of feedback.

This exercise will take 15-25 minutes depending on whether time is included for feedback or not.

Keypoints:

- A planned introduction is a helpful tool in setting the workshop environment.
- Introductions should both include practical information and start building relationships.

Putting It Together

https://carpentries.github.io/instructor-training/24-practices/index.html

Questions:

- How are the teaching practices we have learned used in our workshops?

Objectives:

- Organize your knowledge of teaching practices and create a plan for using these practices in a Carpentries workshop.

Exercise: Picking up the Pieces (optional)

In small groups or on your own, make a list of all the concepts and skills you haveencountered in this training. Your list can include everything fromeducational/teaching theories to specific in-classroom practices.

List Concepts and Skills:
motivating and demotivating language/behavior
"just"
intrinsic vs growth mindsets
performance-based vs effort-based vs imporovement-based praise
grit
faded examples
pre/pos-surveys
growth mindset
improvement-based praise
teach this first (usefulness x time to master plot)
give learners early success opportunities
feedback: be positive, be specific, give a next step
embrace the typos or errors, teaching moments
feedback translation
2 by 2 rubric splitting up content and delivery to get feedback on both
tacit knowledge transfer as part of live coding
importance of accessibility and inclusivity to make a positive learning environment
Carlos: Mental models, MCQ, cognitive load, growth mindset, teaching skills, demotivating/motivating sentences
formative assessments!!!!!
teaching is a skill
teach in a way that encourages continued learning (the growth mindset)
indentifying your expert awareness gaps (and being aware of them)
perseverance predicts success
be nice
its all skills, live coding, teaching, learning
Chris:

- Avoiding dismissive language ("just, easy", etc).
- Always having a helper/co-instructor, not just to help out with the lessen, but also as a feedback and improvement mechanism.
- Practical live coding tips (eg, terminal appearance, talking out what you are typing, and still engaging the class)

Faded examples --***Thanks! :) Errased examples (I can't remember the exact word, but the ones where you fill in the blanks in sample code)
cognitive load
expert awareness gap
mental models = good
errors are good as long as you use them as teaching moments :)
Plausible assessment with diagnostic power
concept maps for generating word lessons and goals for students
the sticky note concept of slow down or good

That the "funny" option in MCQ is actually bad all around for students
How to use wrong answers in MCQ to understand specific areas to target for teaching

Exercise: Organize Your Knowledge
Let us put the pieces together by creating a visual organization of information.
We suggest doing this in two ways:

- If you are comfortable with / like concept maps, trying integrating all thetopics above into a single concept map.
- Use the provided handout to organize topics. Here are two examples:
    - Handout One (with example content: example)
    - Handout Two

Work on this on your own. There is no “right answer” – this is about you buildingup a mental model, moving from “novice” to “competent practitioner”.
Once you have organized your thoughts, move to the next exercise.

Exercise: Parting Thoughts

If you did not think about these issues when organizing your topics in the previous exercise, now consider:

- What is your mental model of teaching?
- Can you identify why each topic above applies to teaching for the Carpentries?

Keypoints:

- Having a plan makes it easier for you to remember to implement the important teaching practices you have learned.

Wrapping Up

https://carpentries.github.io/instructor-training/25-wrap-up/index.html

Questions:

- What can we improve in this training?

Objectives:

- Reflect on the two-day course.
- Articulate constructive feedback.

Exercise: One Up, One Down

Provide one up, one down feedback on the entire two-day course.
Just as in our regular workshops,we collect post-instructor-training-workshop feedback.Your participation will help us evaluate the efficacy of this trainingand improve the content and delivery of the lesson materials.
This exercise should take 5 minutes.
https://docs.google.com/forms/d/e/1FAIpQLSeqMrXquLNQFl6LwSe8kRnBC6WCmzObg7JmdisoOfSojJ5AvQ/viewform

Exercise: Minute Cards

In addition to giving one up, one down feedback. Please also fill out your stickynotes to give your instructors anonymous feedback.
This exercise should take 5 minutes.

https://docs.google.com/forms/d/e/1FAIpQLSfcUwvkSzobRrEWYLYI9_7pDUQzAYstFY44R4JPOTXEdiAAoQ/viewform

Exercise: Post Workshop Surveys

Assessment is very important to us! Please take 5 minutes to completethis five-minute post-workshop survey.
This exercise should take 5 minutes.

https://www.surveymonkey.com/r/instructor_training_post_survey?workshop_id=2021-02-16-ttt-online-SI

Any outstanding quetions??:

Thank You

Keypoints:

- Feedback applies to all kinds of learning, including learning how to teach.

BEFORE YOU LEAVE
Please fill out the post-training survey at
https://www.surveymonkey.com/r/instructor_training_post_survey?workshop_id=2021-02-16-ttt-online-SI