- Welcome to The Carpentries Etherpad!
- This pad is synchronized as you type, so that everyone viewing this page sees the same text. This allows you to collaborate seamlessly on documents.
- Use of this service is restricted to members of The Carpentries community; this is not for general purpose use (for that, try etherpad.wikimedia.org).
- Users are expected to follow our code of conduct: https://docs.carpentries.org/topic_folders/policies/code-of-conduct.html
- All content is publicly available under the Creative Commons Attribution License: https://creativecommons.org/licenses/by/4.0/

Welcome to The Carpentries Instructor Training!

Sign in: Name (Pronouns), Institution, Preferred Email & Twitter (optional)

Please sign in so we can record your attendance. For an icebreaker, please put something that you have learned recently or are currently learning.

- Jordan Pedersen (she/her), University of Toronto (Librarian), jordan.pedersen@utoronto.ca - I recently learned how to drywall because our cat jumped into the rafters in our unfinished basement and fell between two panels that make up our walls, so we had to cut the wall to get him out. He's fine and you'll probably get to meet him over the next couple of days!
- Greg Wilson (he/him), Deep Genomics (programmer), gvwilson@third-bit.com - well, I gave my daughter her first Mohawk last week - don't know if that counts or not, but it was certainly a learning experience for _me_.
- Jess Whyte, jessica.whyte@utoronto.ca - Digital Assets Librarian at UofToronto. I recently learned how to slowly warm frozen pipes.
- Anjali Silva (she/her), University of Toronto Libraries, a.silva@utoronto.ca & @Silva_Anjali. Currently learning how to run serial jobs via high performance computing.
- Christie Barron (she/they), OISE - UofT, christie.barron@mail.utoroto.ca. Learned the general ideas of explanatory item response theory.
- David Jorjani (he/him), Sessional Lecturer at Department of Computer Science and Faculty of Information david.jorjani@utoronto.ca
- Andy Foster (he/him), Scholars Portal, andy.foster@utoronto.ca
- Julie Shi (she/her), University of Toronto (Faculty of Information, Graduate Student), juli.shi@mail.utoronto.ca. I recently learnt that cinammon makes coffee taste better than sugar does.
- Rachel Leung (she/her) rf.leung@mail.utoronto.ca Learning how to dance!
- Kirsta Stapelfeldt (she/they), Librarian, University of Toronto Scarborough, kirsta.stapelfeldt@utoronto.ca
- Pamela Alamilla (she/her), UofT (Molecular Genetics Undergraduate Student), pamela.alamilla@mail.utoronto.ca // Twitter @pam_alamilla // I recently learned that one portion of pasta is way smaller than I thought :(
- Kara Handren, University off Toronto Libraries (Librarian), kara.handren@utoronto.ca. I recently learned that ginger also goes well in coffee! And you can resteam dumplings in an instant pot.
- Grace Wang (she/her), UofT (Faculty of Arts and Science, Graduate Student), gr.wang@mail.utoronto.ca. I recently learned bits of information theory through toying around

with Wordle and many other versions of it
- Christina Nguyen (she/her), U of Toronto (Faculty of Information, graduate student), christinadinh.nguyen@mail.utoronto.ca. Recently re-learned highschool linear algebra.
- Sonia Dhaliwal (she/her), UTSC Library, Librarian, soniad.dhaliwal@utoronto.ca
- Amareena Saleh-Singh (she/her), UofT, (Political Science,) I took up knitting recently
- Emerson Grabke (he/him), University of Toronto (Institute of Biomedical Engineering, Graduate Student), e.grabke@mail.utoronto.ca. I recently learned that toilet levers are reverse threaded
- Michael Chan (he/him), U of T (Faculty of Engineering and Applied Science), michaelst.chan@mail.utoronto.ca
- Sarah Cherki El Idrissi (she/her), UTM, ICCIT, sarah.cherkielidrissi@utoronto.ca.
- Donna Vakalis (she/her), U of T , donna.vakalis@olympian.org
- Kelly-Marie Yokuda (she/her), UofT Department of Chemistry graduate student.
- kelly.yokuda@mail.utoronto.ca I recently learned how to ice skate
- Kashish Makhija (she/her) - U of T Engineering Undergraduate, kashish.makhija@mail.utoronto.ca, learned that a London Fog with substituted matcha is called a Tokyo Fog
- Vicki Zhang (she/her), UofT (Ecology * Evolutionary Biology PhD student), vm.zhang@mail.utoronto.ca. I'm just starting to learn vim!
- Curtis D'Hollander (he/him), UofT (Nutritional Sciences), curtis.dhollander@mail.utoronto.ca
- Nelly Cancilla (she/her), University of Toronto Mississauga, daniela.cancilla@utoronto.ca
- Guinsly Mondésir (he/him), Scholars Portal, guinsly.mondesir@utoronto.ca
- Franklin Perez (he/him), UTSC (Physical and Environmental Sciences), f.perez@mail.utoronto.ca, learning a growth based viability assay

If you have a moment before we begin and have not yet done so, please fill out the pre-training survey at https://carpentries.typeform.com/to/QVOarK#slug=2022-02-23-ttt-utoronto

Day 1 Schedule

Timing	Lesson
9:00	Welcome
9:30	Building Skill With Practice
10:30	**Morning Break**
10:45	Expertise and Instruction
11:30	Memory and Cognitive Load
12:15	Building Skill With Feedback
12:35	**Lunch**
13:35	Motivation and Demotivation
14:35	Equity, Inclusion, and Accessibility
15:15	**Afternoon Break**
15:30	Teaching is a Skill
16:30	Wrap-Up and Homework
16:50	**Finish**

NOTE: SCHEDULE DAY 2 is at https://pad.carpentries.org/2022-02-23-utoronto#L832 , but the line number (L816) will change as soon as we start typing into the etherpad, you can also control + f to search for "Day 2 schedule" to find it.

Welcome

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

- What is The Carpentries and how do we approach teaching?
- What should you expect from this workshop?

Objectives:

- Identify common ground with some of your fellow workshop participants.
- Understand a general structure and core goals of The Carpentries.
- Predict what will and will not be covered in this workshop.
- Know where to find The Carpentries Code of Conduct and how to report an incident.

Introductions

Code of Conduct:
To make clear what is expected, everyone participating in The Carpentries activities is required to abide by our Code of Conduct.
https://docs.carpentries.org/topic_folders/policies/code-of-conduct.html
Any form of behaviour to exclude, intimidate, or cause discomfort is a violation of the Code of Conduct.
In order to foster a positive and professional learning environment we encourage you to:

- Use welcoming and inclusive language
- Be respectful of different viewpoints and experiences
- Gracefully accept constructive criticism
- Focus on what is best for the community
- Show courtesy and respect towards other community members

If you believe someone is violating the Code of Conduct, we ask that you report it to The Carpentries Code of Conduct Committee by completing this form: https://goo.gl/forms/KoUfO53Za3apOuOK2

-- -- *Exercise: Reviewing The Carpentries Experience and Goals* -- --
For the multiple choice questions below, please place an “X” next to the response(s) that best apply to you. Then find yourself a spot in the Etherpad below to write a short response to the last question.

1) Have you ever participated in a Software Carpentry, Data Carpentry, or Library Carpentry Workshop?

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

2) Which of these most accurately describes your teaching experience?

- I have been a graduate or undergraduate teaching assistant for a university/college course.++++ ++++++
- I have not had any teaching experience in the past.

- I have taught a seminar, workshop, or other short or informal course.+++++++++
- I have been the instructor-of-record for my own university/college course.+++
- I have taught at the primary or secondary education level.+
- I have taught informally through outreach programs, hackathons, libraries, laboratory demonstrations, and similar activities.++++++++++++

3) Why are you taking this course? What goals do you have for today and tomorrow?

- Amareena - hoping to gain more experience in teaching coding skills.
- AndrewI would like more confidence to effectively teach technical things, which I'm finding myself doing more and more. I would also like to feel empowered to organise workshops.
- Anjali I was curious and wanted to see which areas I could improve in my teaching.
- Christie: hoping to improve my pedagogical skills. I teach a lot of workshops, and despite being an educational psychology student my teaching leaves much to be desired. I'm hoping to get better at practical teaching skills that will promote the learning of students I interact with.
- Christina: hoping to get a good introduction to teaching theory(?) and what it means to be flexible while also rigorous while teaching code at U of T.
- Curtis I think code is so important and want to effectively share this skill with others and also my passion for it.
- David I teach software engineering and data storytelling to U of T students (graduate and undergraduate) and want to get better at it
- Donna Want to improve my teaching; and get more familiar with The Carpentries
- Emerson: Hoping to learn more about how to effectively teach technical skills
- Franklin More teaching experience for coding, also learn about teaching practices
- Grace - hoping to learn how to effectively teach complex technical subjects to students with different backgrounds
- Guinsly learn to prepare a teaching lesson
- Jess - learn how to teach, and help support/teach software carpentries at UofT
- Julie: I'm hoping to improve my teaching skills and understanding of teaching theory so that I can more effectively engage with others match content to the contexts that people are learning in. I've also never taught (or consistently learnt) technical skills, so I'm looking forward to seeing best/better practices for teaching those.
- Kara I've recently moved into a role where teaching is a more significant portion of my day to day, so I'm hoping to improve my teaching skills and be better able to design my workshops moving forward
- Kashish I think skills covered in these workshops are invaluable life skills in today's day and age, and not just skills that should apply to students studying technology/engineering/computer science. I also want to work to eliminate the stigma around data science/coding skills. And I love teaching!
- Kelly-MarieI am taking this course to more effectivly teach programming to my students. My goals are to learn tools that I can impliment into my courses.
- Kirsta Looking forward to joining the Carpentries community here at U of T and learning moare about the Carpentries, as well as improve my teaching ability.
- Margot
- Meaghan
- Michael - pedagogy is fascinating and I think that, like communication, it is a valuable skill everywhere
- Nelly - wanting to improve upon my teaching skills for future coding workshops at the library
- PamelaI'd like to learn the proven methods I can use to become a good teacher, as I'd like to teach

programming workshops to other undergraduates, and maybe do some tutoring.
- Rachel I'd like to learn how to teach others, while combining it with a couple topics that I'm interested in
- Sarah I would like to learn better ways to teach technical topics such as data analytics.
- Solar
- Sonia I want to really improve my overall teaching, but in particular, be more comfortable with teaching more technical workshops.
- Vicki I want to learn more pedagogical skills when teaching technical lessons, and to be more familiar with different teaching techniques for different learners

This exercise should take about 5 minutes for responses, with an optional 10 for additional discussion as time permits.

A Brief Overview of the Carpentries

Image: Action figures in a workshop with Instructor, Co-Instructor, Helper, and Sticky Notes labeled https://carpentries.github.io/instructor-training/fig/Scene_1_blue_stickies_labeled.jpeg

- Software Carpentry focuses on helping researchers develop foundational computational skills
- Data Carpentry focuses on helping researchers work effectively with their data through its lifecycle
- Library Carpentry focuses on teaching data skills to people working in library- and information-related roles.

Instructor Training Workshop Overview

- How learning works
- Building teaching skill
- Creating a positive learning environment
- Carpentry history and culture

What We Leave Out

- workshop content & technical skills
- how to develop new lessons

What Questions Do You Have?

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 evidence-based teaching practices and how they apply specifically to The Carpentries.
- Learner motivation and prior knowledge vary widely, and can be quickly assessed with a 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 an analogy that can help to explain it.
- Apply a concept map to explore a simple mental model.
- Understand the limitations of knowledge in the absence of a functional mental model.

The Carpentries Pedagogical Model

Acquisition of Skill

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

- Novice
    - ask lots of questions / uncertainty - actually this isn't necessary true. There's the Dunning-Kruger effect, which states that the less people know, the more inaccurate their prediction of how skilled they are is (many will think they are more advanced than they are)
    - Novices don't yet have a mental model of what the key parts of a domain is and how they relate
    - Many questions may not even make sense, so the goal is not to give lots of information, but to help construct the mental model
- Competent practitioner
- Expert
    - it's not just having more facts, it's about having more connections between the pieces of information you have. It allows you to search for info / answers more effectively

Mental Models

https://carpentries.github.io/instructor-training/02-practice-learning/index.html
"All models are wrong, but some are useful."

The power (and limitations) of analogies

-- -- *Exercise: Analogy Brainstorm* -- --

1. Think of an analogy to explore. Perhaps you have a favorite that relates to your area of professional interest, or a hobby. If you prefer to work with an example, consider this common analogy from education: “teaching is like gardening.”
2. Share your analogy with a partner or group. (If you have not yet done so, be sure to take a moment to introduce yourself, first!) What does your analogy convey about the topic? How is it useful? In what ways is it wrong?

This activity should take about 10 minutes.

Analogies at Work: “Software Carpentry”

https://data-lessons.github.io/instructor-training/fig/mental_models.svg *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.*

Concept maps

-- -- *Exercise: Mapping a Mental Model* -- --
1) On a piece of paper, draw a simplified concept map of the same concept you discussed in the last activity, but this time without the analogy. What are 3-4 core concepts involved? How are those concepts related? (Note: if you would like to try out an online tool for this exercise, visit https://excalidraw.com .)
2) In the Etherpad, write some notes on this process. Was it difficult? Do you think it would be a useful exercise prior to teaching about your topic? What challenges might a novice face in creating a concept map of this kind?
This exercise should take about 5 minutes.

Misconceptions

The process of forcing abstract knowledge into a visual format can often reveal connections you may not have been aware of, or illuminate gaps. This can be especially useful when preparing to convey aspects of your mental model to someone else!

Misconceptions:

- Factual errors
- Broken models
- Fundamental beliefs

-- -- *Exercise: Anticipating Misconceptions* -- --
Describe a misconception you have encountered as a teacher or as a learner.
This exercise should take about 5 minutes.

Using Formative Assessment to Identify Misconceptions
How can you prevent hidden misconceptions from interfering with learning? Seek them out with assessment!

Formative vs Summative assessment

-- -- *Exercise: Formative Assessments* -- --
Any instructional tool that generates feedback that is used in a formative way can be described as "formative assessment." 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.
This exercise should take about 5 minutes.

This exercise should take about 5 minutes.

-- -- *Exercise: Identify the Misconceptions* -- --
Choose one of the wrong answers to the question below and write in the Etherpad what the misconception is associated with that wrong answer.
Q: what is 27 + 15 ?
a) 42
b) 32
c) 312
d) 33
This discussion should take about 5 minutes.

Formative assessments are most powerful when:
1) all learners are effectively assessed (not only the most vocal ones!) AND
2) an instructor responds promptly to the results of the assessment
*** every couple minutes should be checking if people are understanding, and the formative assessments should have **diagnostic power** (which means that you can see how an answer went wrong, and be able to help correct the mental model)

Exercise: Creating your own multiple choice questions
Jess Q: Who is the mayor of Toronto? a) John Tory b) Doug Ford c) Rob Ford
Meaghan
Vicki What does a p-value of < 0.05 mean? a) Probability that your result is significant; b) probability of seeing your results if the null is true; c) probability that the null hypothesis is true
Nelly How would you go about searching for artificial intelligence and theatre in a database? A) (artificial intelligence AND theatre) B) "artificial intelligence" AND theat* C) "artificial intelligence" AND

"theatre*"
Sarah What Informations Systems are? a) technology such as computers, networks and data centers b) technology, organization, processes and people c) technology, organizaton and people.
Christie: What makes a latent regression log-linear trait model doubly explanatory? **1)** it includes an interaction effect between multiple person-level covariates (e.g., SES and language background). **2)** in addition to estimating item difficulty/discrimination parameters it also incorporates item-level covariates (e.g., cognitive skill used). **3)** It includes both person-level (e.g., SES) and item-level predictors (e.g., cognitive skill required).
Grace: In a class, a sample of 9 was taken, with an average score of 20 and sums of square of 9.6, what is the variance of the class? a). 1.20 b). 1.07 c). 1.10
Franklin Where do scientists estimate there are more plastics? 1) Oceans, 2) Household, 3) Soil
Kelly-MarieWhich of the following is a Canadian province?
a) Ontario b) Toronto c) Ottawa
Donna Q: What do you call a group of <the animal called a hippopotamus>?
a) a bloat b) hippopotamuses c) hippopotami

- + I have no idea but this is fun :D - Jordan

Christina: [FR] How do we conjugate <<aller>> in present tense with <<je>>? (a) je vais (b) j'aller (c) j'alle
David: Which one is not one of Aristotle's rhetorical triangle? a)pathos-emotions, b)logos-logic, c)ethos-ethics, d)rulos- rules
Julie: What skill is most important for safe driving? (a) scanning the road ahead (b) memorizing all road laws (c) being familiar with the area that you are driving in
Curtis The recommended Estimated Average Requirement for a nutrient is the amount estimated to meet the needs of what % of individuals in the selected gender and life-stage group?
a.) 98% b.) 50% c.) 100% d.) 75%
Amareena:What is the plural form of human? a) Humen b) Humanses c) Human's d) Humans
Margot
Guinsly What is the airplane structure that is subject to the least impact in the event of a crash? a-Cockpit? b-Tail, C-Right Turbine, D-Left Turbine, e-Fuselage

- +doesn't this depend on the type of crash? I'm curious. - Christina

AndrewWhich of these islands is a British Overseas Territory? A) Bermuda B) Antigua & Barbuda C) Jamaica D) Barbados
Sonia Q: Where would you put the personal correspondance of an individual when sorting through their archival records? a) series b) file c) item
KirstaQ: You are committed to a milk-braised pork dish, but it calls for a boneless pork shoulder (you only have bone-in) and you do not have the amount of milk called for in the recipe. What is the most important part of the origianl recipe to preseve to retain the texture of the final dish?
a) Browning Pork
b) Removing bone from shoulder
c) Ensuring that there is sufficient liquid in the pot so that the pork is fully submerged.
KaraWhat is the most important foundation or skill to have before learning to paddleboard? a) A good quality board and paddle b) Proper stance and stroke form c) good swimming skills
Michael If two atoms are strongly ionically bonded, this could mean: a) They are sharing many electrons; b) They have similar electronegativity; c) They are very large atoms; d) Their charge number is relatively high
Rachel What is the first step for preparing the needle and thread when making stuffed animals?
a. stringing the thread through the eye of the needle

b. creating a double knot
c. wrapping the string twice around the needle
Kashish Identify the ordinary differential equation with the highest degree.
a) dy/dx = dy^2/dx^2 + 4x + sin(x)
b) dx/dy^2 = 52x^4
c) y'"= ln(5) + e^x
Solar
Pamela You are given a data matrix in Python named 'my_data'. There are 3 rows and 4 columns in this matrix. Which of the following would you use to access the value in the 1st row, 2nd column?
a) my_data(0, 1)
b) my_data[0, 1]
c) my_data[1, 2]
d) my_data(1:2)
Anjali: **Q: What are the minimal requirements of an R package directory?**
1. R subdirectory; man subdirectory; DESCRIPTION file; NAMESPACE file
2. R subdirectory; man subdirectory; tests subdirectory; README file
3. R subdirectory; man subdirectory; tests subdirectory; README file; LICENSE file
Emerson: If you wanted to create a function in C to reallocate the size of a pointer of type int *, what data type should your input parameter be?
a) int * because realloc() keeps the initial memory allocation
b) int ** because realloc() keeps the initial memory allocation
c) int ** because realloc() may change the location of reallocated memory

- -- *Exercise: Handling Outcomes* -- --
Formative assessments allow us as instructors to adapt our instruction to our audience. What options do we have if a majority of the class chooses:

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

Choose one of the above scenarios and compose a suggested response to it in the Etherpad.

This discussion should take about 5 minutes.

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."

Meeting learners where they are

Keypoints:

- Our goal when teaching novices is to help them construct useful mental models.
- Exploring our own mental models can help us prepare to convey them.
- Constructing a useful mental model requires practice and corrective feedback.
- Formative assessments provide practice for learners and feedback to learners and instructors.

BREAK (15 min)

When you're back from break, please let us know you're back by writing whether you prefer coffee, tea, or no caffeine on your break:
AmareenaTea
AndrewTea but only because coffee upsets my stomach
Anjali: Tea
Christie: non-caffinated Tea :)
Christina: no caffeine, lots of fruit juice!
Curtis same as Vicki!
David hot water
Donna Cawfeeeeeeeeeeeeeeee
Emerson Coffee
FranklinTea
Grace Tea :)
Guinsly Hot Chocolate or Tea during the day.
Jess coffee in the AM, water in the PM
Julie ditto @Donna :)
Karacoffee
Kashish tea
Kelly-Mariecoffee
Kirsta: Tea
Margot
Meaghan
Michael
Nelly
Pamela Decaf, but right now I have a tea
Rachel Tea
Sarah Coffe
Solar
Sonia Coffee
Vicki coffee in the AM but tea in the afternoon :)

Expertise and Instruction

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

Examining Your Expertise

You may not think of yourself as an "expert" but many advantages -- and pitfalls -- may apply to you.

What Makes an Expert?

-- -- *Exercise: What Is An Expert?* -- --
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?

- Amareena
- Andrew
- Anjali
- Christie
- Christina
- Curtis
- David
- Donna
- Emerson
- Franklin
- Grace
- Guinsly
- Jess
- Julie
- Kara
- Kashish
- Kelly-Marie
- Kirsta
- Margot
- Meaghan
- Michael
- Nelly
- Pamela
- Rachel
- Sarah
- Solar
- Sonia
- Vicki

This discussion should take about 5 minutes.

Experts have more connections among pieces of knowledge.

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://data-lessons.github.io/instructor-training/fig/mental_models.svg

Expertise and Teaching

Mind The Gap

-- -- *Exercise: Awareness Gaps* -- --

- Is there anything you are learning how to do right now? Can you identify something that you still need to think about, but your teacher can do without thinking about it?
- Think about the area of expertise you identified for yourself earlier. What could a potential awareness gap be?

This exercise should take about 5 minutes.

Switching Language

-- -- *Exercise: What do you use interchangeably?* -- --
In the Etherpad, share an example of words or notation that you sometimes use to accomplish or refer to the same thing. If possible, try to think of an example that might occur in a Carpentries workshop.

Building awareness of how you can represent the same concept in multiple different ways will help you avoid doing so without explanation while teaching.

Amareenaavg/average, std/standard deviation
AndrewFunction/Method, Object/File, Container/Bucket, Dictionary/Map/Hash, List/Array
Anjali: R package and R project
Christie: Lots of acronyms (not quite interchangable, but definitely one concern). data wrangling & data cleaning. continuous & quantitative variable, nominal/qualitative variable. Gaussian/normal distribution.
Christina: stemming/lemmatization (*please don't get mad at me, linguists)

- + I'd love to hear more about this (especially that asterisk)! - Jordan -ok, i'm willing to do that!

Curtis binary/dichotomous (slightly different)
David DevOps or automation. Not the same but a simplification for the level the students are at
Donna IAQ, MRT
Emerson terminal / command prompt
Franklin mix/shaker
Grace: functional lateralization in the brain/ hemispheric specialization
Guinsly Inheritance/reusable, Polymorphism/reusable
Jess retrieve/get/request, post/send, ingest/deposit/intake,
Julie: ALA/American Library Association (and all the other library associations and their acronyms),
KaraGIS/Geospatial Data. Not the same, one is an umbrella, but I often use them interchangeably or with added nouns, and beginners often use them interchangeably.
Kashish return vs. print in Python
Kelly-Mariefunction vs method in programming (tehcnically they're different but to the beginner programmer who does not know object oriented programming they can mean the same thing/very similar thing)
Kirsta linux/bash command
Margot
Meaghan

1. Michael - electron 'orbital' vs. electron 'cloud'

Nelly
Pamela fragment vs. read vs. contig (are actually different but beginners use them interchangably sometimes), also node vs. individual vs. allele
Rachel parent class / superclass

Sarah IS/IT, data/information
Solar
Sonia access/disseminate, preserve/preservation copy
Vicki selection/evolution (don't mean the same thing but sometimes used interchangeably), gene flow/migration/colonization; mutation versus genetic drift

This exercise should take about 5 minutes.

What Problem?
Experts sometimes solve problems before even stopping to recognize that they have encountered one.

1.

-- -- *Exercise: Diagnosis* -- --
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 the error and your explanation in the Etherpad.

This discussion should take about 5 minutes. (Optionally, this may be discussed in group breakouts, adding 5 minutes.)

“Just” and Other Dismissive Language

-- -- *Exercise: Changing Your Language* -- --
1) What other words or phrases, besides “just”, can have the same effect of dismissing the experience of finding a subject difficult or unclear?
2) Propose an alternate phrasing for one of the suggestions above.
Write your examples and alternatives in the Etherpad.

This exercise should take about 5 minutes.

"Any Questions?"

You Are Not Your Learners

- Primary goals
- Concerns about time investment

The Carpentries Is Not Computer Science

Expert Advantages

The Importance of Practice (Again)

Keypoints:

- Experts face challenges when teaching novices due to expert awareness gaps.
- Things that seem easy to us are often not experienced that way by our learners.
- With practice, we can develop skills to overcome our expert awareness gaps.

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.
- Distinguish desirable from undesirable cognitive load.
- Evaluate cognitive load associated with a learning task.

Types of Memory

- short-term vs long-term memory
- 7±2

-- -- *Exercise: Test Your Working Memory* -- --
This website implements a short test of working memory.
https://miku.github.io/activememory/
What was your score? If you are comfortable, share your answer in the Etherpad.

-
-

If you are unable to use this activity, ask your Trainer to implement the analog or adapted version of this test.
This exercise should take about 5 minutes.

Most people will have found they only remember 5-7 words. Those who remember less may be experiencing distraction, fatigue, or (as we will learn shortly) “cognitive overload.” Those who remember more are almost invariably deploying a *memory management strategy*.

Strategies For Memory Management

Chunking

Image: A list of words: cat, apple, ball, tree, square, head, house, door, box, car, king, hammer, milk, fish, book, tape, arrow, flower, key, shoe. Underneath, the same words are organized into boxes with related terms e.g. cat fish milk ball and apple flower tree"
https://carpentries.github.io/instructor-training/fig/chunking.svg

-- -- *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?

-
-
-
-
-

This exercise should take about 5 minutes.

Using Formative Assessment to Support Memory Consolidation

Frequency of assessment

Group Work

Opportunities for Reflection

Limit Concepts

Attention is a Limited Resource: Cognitive Load

3 types:

- Things they have to think about in order to *perform a task* (“intrinsic”).
- Mental effort required to *connect the task* to new and old information (“germane”).
- *Distractions* and other mental effort not directly related to performing or learning from the task (“extraneous”).

Is Guided Practice "Hand Holding"?

-- -- *Exercise: Mapping Cognitive Load* -- --
Look in the curriculum that you chose to prepare for this workshop and focus on one step or task that

learners will be asked to complete.

- What concepts will learners need to understand and hold in short-term memory in order to complete this task?
- Draw a concept map connecting these concepts. What relationships do learners need to understand to connect them?
- How many of these concepts and relationships have been introduced since the previous step or exercise?

With a partner or in small groups, discuss what you have found. Are your learners at risk of cognitive overload at this point in your workshop? Why or why not?
This exercise should take about 15 minutes.

Build a faded example (3 steps - fully worked, partially, all blanks - another way to think of this is one exercise instructor demonstrates, one we do together, and one you do)

Amareena Group the DataFrame by 'sex' and calculate for summary statistics

1. Using the pandas .groupby function to group the Dataframe by the column 'sex'. Use = to assign the grouped data .

grouped_data = surveys_df.groupby('sex')

Use the .describe function to calculate summary statistics for column 'sex'

grouped_data.describe()

2. Group the DataFrame by 'sex' using the pandas grouby function and calculate for summary statistics using the .describe function.

_____ = surveys_df.____('sex')

_____.describe()

3. Group the DataFrame by 'sex' and calculate for summary statistics

Andy

Anjali: Full solution: Write a function that takes two arguments, x and x2, ensure they are integers, then return their sum. Solutions may slightly vary.

```
sumFunction <- function(x, x2) {
  # checking
  if (is.integer(x) != TRUE) {
     stop("x should be an integer")}
  if (is.integer(x2) != TRUE) {
     stop("x2 should be an integer")}
  sumResult <- x + x2
  return(sumResult)
}
```

Partial: Write a function that takes two arguments, x and x2, ensure they are integers, then return their sum.

```
sumFunction <- function(x, x2) {
  # checking
  if (is.integer(__) != TRUE) {
     stop("___")}
  if (is.integer(__) != TRUE) {
     stop("___")}
  sumResult <- __ + __
  return(____)
}
```

Blank: Write a function that takes two arguments, x and x2, ensure they are integers, then return their

sum.
sumFunction <- function(x, x2) {

}

Christie: How do you import a datafile and check the first 5 rows in R?
Fully worked:
surveys <- readr::read_csv("data_raw/portal_data_joined.csv")
head(surveys)
Partially worked:
surveys <- readr::function("datafile/path.extension")
function(surveys)
Minimal support: datafile is "df".
Christina: Explain to me how to make shortbread.
[Fully worked:] Making shortbread.
Preheat the oven to 170C/gas3/325F.
Mix flour and sugar together in a bowl.
Rub in the butter with your fingers gently. Do not overmix or your outcome will not be short.
Roll out the dough to 1 cm thickness.
Score lines on the shortbread so you can click the biscuits off into pieces later.
Sprinkle some caster sugar and then bake for 20 to 30 minutes.
Put in an airtight tin to serve. It will keep well for 2 or 3 days.
[Partially:] Making shortbread.
Preheat the oven to 170 C/__/__.
Mix flour and sugar together in a bowl.
Rub in the butter with your fingers gently. Do not overmix or it will not be short.
Roll out the dough to __ thickness.
Score lines on the shortbread so you can click the biscuits off into pieces later.
Sprinkle some caster sugar and then bake for 20 to 30 minutes.
Put in an airtight tin to serve.
[Blank] Making shortbread.
Preheat the oven to ____.
Mix ___, ___, and ___ together in increments as follows: _____. Do not ___ because it will not be short.
Roll out the dough to __ thickness.
_____ on the shortbread so you can click the biscuits off into piecse later.
Sprinkle some caster sugar and then bake for _____ minutes.

Curtis
[BMI = wt(kg)/ht(m)^2]

1. Tim is 1.62m and 80kg. What is his BMI?
BMI = 80kg/1.62m^2
= 80/2.6
=30.7

2. Jane is 1.5m and 60kg. What is their BMI?
BMI= 60kg/1.5m^2
= 60/____

=____

3. Bob is 2m and 100kg. What is their BMI?

David What are the types of variables you can store in Python?
integer
.....
.....
Donna...
lambda argument(s): expression

example:
Write a lambda function that returns x + x
lambda x: x+x

Write a lambda function that returns x*x
____ x: x^2

Write a lambda function that does y+1
lambda y_ ____

Emerson Write a loop that prints the elements of a list
wordlist = ['apple', 'banana', 'celery']
for food in wordlist:
  print(food)
Partially:
wordlist = ['apple', 'banana', 'celery']
for ___ in ___:
  print(___)
Blank:
wordlist = ['apple', 'banana', 'celery']
pass # Complete code here
Franklin apple = (1, 2, 3), banana = (4, 5, 6)
1. Apple + Banana = (5, 7, 9)
2. Apple + Banana = (5, _, 9)
3. What is apple - banana?
Grace: build a coffee graph using ggplot
Fully worked:
library(ggplot2)
ggplot(dataset, aes(x=coffee, y= cups, color = weekday)) +

- geom_point() +
- labs(title = "Types of Coffee Intake per week")

Partially:
library(_____)
ggplot(____, aes(x=___*variable for the types of coffee*__, y= cups, color = ____)) +

- geom_point() +
- labs(title = "__*type in the title of your graph*__")

All Blanks:
- import your ggplot library
- create ggplot with types of coffee on the x axis, the numer of cups on the y axis, and days of the week in coloured groupings
- try to show the data points (using geom_point()) and add a title to the graph (using labs())
Guinsly
Jess - parse a field's values from an API's JSON response (using a recipe API)
I Do: make a GET request requesting a recipe, and parse out the "bread type" field value
We Do: pick a recipe, construct the GET request yourself, and parse out the "ingredients" field values
You Do: pick a recipe, construct the GET requst, and parse out value(s) of your choice
Julie: Create an English Wikidata item for a journal article (not going into adding statements)
#fully worked
Search in Wikidata to confirm that an item for that article doesn't already exist
Select "Create a new item" in the left sidebar
For the Language dropdown, make sure "en" for English is selected
In the Label field, enter the title of the journal article
In the Description field, enter "scholarly article by [name of authors] ([year of publication])"
In the Aliases field, enter the short title of the article (i.e., the title without the subtitle or text after a colon)
#partially
Pick another article together
Have learners talk through steps for searching to see if the item exists, where to go on the page to create an item, identify what values for the teacher to fill in for each field
#all blanks
pick an article, make sure it doesn't exist, fill in the fields with their corresponding values
Kara Run a text analysis algorithm in the Proquest TDM Studio Viualizations Lab
I do: Create an account, select algorithms, define a search query, limit that query by facets to fit requirements of tool / algorithm, execute query and review outputs
We do: Pick a query together with defined limits (ie. databases, language) and a desires output/algorithm, you run that query and we review outputs together
You do: Pick a topic and algorithm of interest, create your query and run that search, limit search results based on your desired output. Review your results and refine / rerun if needed.
Kashish
Kelly-Marie Write and call a function fx that returns 2 + x = 4
Worked:
def fx(x):

- return 2 + x

print("Two plus two is," f(2))
Partially:
def fx(?):

- return 2 + x

print("Two plus two is", f(?))
Blank:
def fx(?)

- return ?

print("Two plus two is", ?)
Kirsta

I do:
Select the column in your spreadsheet program where you wish to split values on the semicolon character.
From Data, select Text to column. From the drop-down, select the semicolon character.
Take column A and recast this as date format, by navigating to the format ribbon and selecting Date. In the drop-down you will see various date formats you can select to manage this data.

We do:
Download the data set and review the structure of available information to determine the parts that need to be divided, and try to separate them and set column data types.

You do:
Find a file with concatenated data values separated by some semi-unique character and attempt to divide the data into separate columns.

Margot
Meaghan
Michael
1. Calculate the formation enthalpy for a molecule of benzene by counting all the bonds and summing the bond enthalpies
2. Calculate the reaction enthalpy for combustion of benzene by having students sum the formation enthalpies on both sides of the reaction
3. Calculate the enthalpy for a novel reaction by having students first balance the equation and then sum the formation enthalpies

Nelly
Pam Write a while loop that will take the RNA sequence 'AUGCCUAGA', seperate it into codons (ie. 3 base segments), and return the codons in a new list.
{Fully Worked}

```
RNA_seq = "AUGCCUAGA"
codon_list = []
i = 0
while i < len(RNA_seq):
    codon = RNA_seq[i:i+3]
    codon_list.append(codon)
    i = i + 3
```

{Partially}

```
RNA_seq = "AUGCCUAGA"
codon_list = []
i = 0
while i < len(_____):
    codon = RNA_seq[__:__]
    codon_list.append(___)
    i = i + 3
```

{Blank}

```
RNA_seq = "AUGCCUAGA"
codon_list = _
i = _
```

```
while _ < len(____):
    codon = RNA_seq[__:__]
    _____.append(____)
    i = ___
```

Rachel Give a brief overview of the human genome.
Fully worked:
In the human genome, there are 3 billion base pairs per genome, meaning there are 6 billion bases in total. 23 chromosomes come from each parent. 1.5% of the genome encodes for protein, while approximately 50% is repetitive DNA.
Partially:
In the human genome, there are 3 billion base pairs per genome, meaning there are ____ bases in total. __ chromosomes come from each parent. 1.5% of the genome encodes for protein, while approximately ___ is repetitive DNA.
Blank:
How many base pairs are in the human genome?
How many chromosomes come from each parent?
What is 50% of the genome comprised of?

Sarah
Solar: Dates in Excel
Demonstration:
1- Download the Excel file.
2- Extract the components of the date to new columns. For this we can use the built in Excel functions:
=MONTH()
=DAY()
=YEAR()
Apply each of these formulas to its entire column.
4- Make sure the new column is formatted as a number and not as a date.
Doing it together:
1- Download the Excel file.
2- Extract the components of the date to new columns. For this we can use the built in Excel functions:

3- Make sure the new column is formatted as ---- not as ----.
Do it yourself:
1- Download the Excel file.
2- Extract the components of the date to new columns making using Excel functions.
Sonia When introducing passe compose in french

ex.1	ex. 2 (focus on gender)	ex. 3 (fill in the correct conjugation to the gender)
Je suis allé(e)	Je suis allé**(e)**	Je suis _____ (m)
Tu es allé(e)	Tu es allé(e)	Tu es _____ (f)
il/elle/on est allé(e)	il/elle/on est allé(e)	on est _____ (n)
nous sommes allé(e)s	nous sommes allé(e)s	nous _____ _____ (f)
vous êtes allé(e)s	vous êtes allé(e)s	vous _____ allés (m)
ils/elles sont allé(e)s	lls/elles sont allé(e)s	elle _____ _____

Vicki Given the Hardy-Weinberg Equilibrium ($p^2 + 2pq + q^2 = 1$ and $p + q = 1$), calculate the frequency of heterozygotes, if you have sampled a population in which you know that the percentage of the homozygous recessive genotype (aa) is 36%.

Fully worked:
aa = 0.36
a = sq(0.36) = 0.6
So, A = 1-0.6 = 0.4, and AA = 0.16
That means heterozygotes = 2(AA)(aa) = 2 * 0.4 * 0.6 = 0.48 = 48% of the population are heterozygotes
Partial:
a = sq(0.36)
A = 1 - _____ - ____, so AA = ____^2
Heterozygotes = 2(AA)(aa)
Blank: Do it yourself!

- AmareenaCourse content poorly aligned with what we were being tested on, and eventually everyone started skipping class and choose to self-teach instead.
- AndrewTeacher clearly being sick of having to deal with me because I wasn't as smart as other students
- Anjali: I was asked not to ask questions after class, but to rather go to the TA. Then TA said the same thing.
- Christie: Misalignment between my background knowledge and the prerequisits of the course. Lots of ideas and content they were referencing as obvious was difficult for me.
- Christina: Studied three-stroke engine for piloting license, teacher did not use video or animated gif, instead they used plain pictures (1 for each stroke) so I didn't understand how the three strokes fit together. My questions weren't clearly answered after that either. Stopped taking those lessons from that center, switched to new teaching center which was willing to slow down to my pace and explain the same things in a different way.
- Curtis: Class with numerous guest speakers (each lecture different speaker), and each lesson was supposed to build on the next. The schedule was shuffled about 5 times as speakers had scheduling conflicts and content ending up being delivered all out of order and there was no "on-ramp " just a "cliff" to overcome each lesson. The priority should have been the order of the content and not who was delivering it.
- David I went to a technical university where most students had background in programming and my high school didn't have proper curriculum to prepare me to be at the same level as other students. I started off far behind others and have never seen myself as an excellent programmer. Going to a better high school (or a worse university) would start me off at the right level as others :)
- Donna High school computer science class was pitched by the teacher as 'not mathy' (as if this was a 'pro')... and seemed to appeal to the guys who were into computer-building (rather than theoretical or abstract students who were like me). I would have loved the content if the teacher had been honest, i.e., it was logic-based and mathy...but I avoided it because it seemed "bro-ey" and too mechanical/applied. It would have been difficult to course-correct because the teachers weren't on the lookout for someone who didn't enroll. How would they know their 'not-mathy' description was alienating?
- Emerson A music teacher at my high school had heard of my talent on the violin from some of my friends the previous year, and on my first day of school pulled me into 3 separate musical extracurricular activities. I tried to keep up with it for the first few months but eventually couldn't keep up and dropped them all at once. It turned me off from doing any school-related music through the rest of my high school journey.
- Franklin I was compared to another student during parent-teacher interviews
- Grace A statistics professor was really enthusiastic about the course content but sometimes overwhelm us with all the informations and the slides were constantly being updated on the

fly/during lecture where there were so many unnumbered versions and the content were so disorganized that it became difficult and confusing for us to related the different models and topics clearly. This could have been fixed with having a co-instructor or even a TA-lead to clearly organize and update the course content for the students since these would eventually be a stastical toolbox we will all draw on for our research.

- Guinsly (high school) It was at the beginning of a winter term and my proffessor praised me because I had an outstanding result in my previous Math course. I don't like too much attention toward me and I felt that I was getting too much attention in that class from my proffessor. I was getting difficutly socializing with my classmate. That class demotivated me.
- Jess - a teacher that often asked gotcha or trick questions, eventually none of us would answer for fear of being publicly tricked.
- Julie: favoritism in class that resulted in digressions from content, with discussions at the beginning of class being less about what we would be learning and more about the teacher trying to get on the student's good side for whatever reason. It's hard to sustain interest and engagement in a class when it feels like the teacher responds differently to different students and doesn't appear to focus their effort on ensuring understanding.
- Kara A professor in an undergrad nutrition course. I had to miss a mini quiz due to a medical appointment, which was approved (my next mini quiz would be worth extra). She forgot she approved this and graded me 0 on the quiz, and when I reminder her of the email confirmation to bump the marks to the next week she was quite upset and felt she was being "called out", and acted like I was causing a ton of extra work. I took the course as an extra since I was genuinely interested in the subject matter. I never took another nutrition course after this. The whole thing was completely unnecessary.
- Kashish a TA refusing to answer questions until the end of the class. Without clarification on the fundamental topics, I wasn't able to build on my understanding and fell behind by the end of the 50 minutes. Solution - plan a lesson plan with planned breaks for questions and prepare extra time every 10-15 minutes rather than at the end of the 50 minutes, even if less content in covered by the end. In this case, it felt as if the priority was not learning, it was simply crossing off the material from the curriculum
- Kelly-MarieFavoritism in high school band caused me to quit studying music entirely. It could have been fixed if the teacher adjusted his behavoir to value all students equally and didn't focus all his attention to a handful of students after it was brought to his attention or if he had someone hold him more accountable.
- Kirsta An elementary school teacher found my name hard to pronounce and so renamed me "Penny" for the year.
- Margot
- Meaghan
- Michael
- Nelly not being good at guitar and not having an encouraging teacher or songs to practice with that i enjoyed. the instructor pushed music he liked and didn't seem invested in my success.
- Pamela A class I'm taking right now is really frustrating because they don't teach all the steps needed to answer the sorts of questions they ask. It's like if you taught someone to add and then asked 'how do you use a calculator to multiply'. Like,,, you neither taught me to multiply nor how to use a calculator. Solution - at least teach your students WHERE to look to have their questions answered (online resources) if you're not going to teach concepts in as much detail as you ask on assessments.
- Rachel A teacher called on me in high school, and I didn't know the answer so I was straightforward with it – I apologized and told her I didn't know. Her tone was degrading, and from thereon I was too shy to participate in the class. Solution – teacher could have used uplifting

and encouraging tone, either move on or quickly walk through, don't dwell

- Sarah: Maths professor favored one student over all others so he interacted mostly with that specific student. It could have been better if the professor gave chance to all students equally to pariticpate even if we make mistakes
- Solar
- SoniaJavaScript class in grad school where the prof wrote people off by saying "oh you don't need to know that, it's not in the syllabus and it won't be on the exam". Most of the students stopped going to the lecture and labs. We ended up making own study groups and teaching each other off of W3C. Prof could have heard people out and provided answers to 'extra content' either after class or outside of class. I also feel the questions being asked could have informed the course content.
- Vicki I took RCM theory class after school for years in a small class, and the instructor's family friend's daughter was always in my class. She got preferential treatment (e.g., instructor would always privately answer her questions, and praised her homework), and so she always scored higher on the history & harmony exams, so naturally, the instructor kept on comparing my work to hers.

Attention Management in Your Workshop

Using Formative Assessments for Memory Management
There are many different types of exercises that can focus attention narrowly and help to avoid cognitive overload. Carefully targeted multiple choice questions can play this role. A few more that you may wish to consider are:

- Faded examples: worked examples with targeted details “faded” out – essentially fill-in-the-blank programming blocks
- Parson’s Problems: out-of-order code selection & sorting challenges
- Labelling diagrams or flow charts (may also be organized as a fill-in-the-blank)

What to Display

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.
- Cognitive load should be managed through guided practice to facilitate learning and prevent overload.
- Formative assessments can help to consolidate learning in long-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
For links to our surveys see: https://carpentries.github.io/instructor-training/06-feedback/#surveys

The survey links above are only for you to preview the survey as part of Instructor Training. When you are teaching a workshop, make sure to share the links generated on your workshop website. Doing so will ensure that you will receive all the survey results from your workshop participants.

Image: Screenshot of a workshop website showing location of customized survey links https://data-lessons.github.io/instructor-training/fig/surveyscreenshot3.svg

Timing matters

Minute Cards

Example positive prompts:

- One thing you liked about this section of the workshop
- The most important thing you learned today
- A new skill, command, or technique you are most excited about using

Example constructive prompts:

- One thing you did not like or would change about this section of the workshop
- One thing that is confusing / you would like clarification on.
- One question you have

Be Explicit About Using Feedback

One-Up, One-Down

-- -- *Exercise: Give Us Feedback* -- --
Write one thing you learned this morning that you found useful on one of your sticky notes, and one question you have about the material on the other. Do *not* put your name on the notes: this is meant to be anonymous feedback. Add your notes to the pile by the door as you leave for lunch.

Key Points

- 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.

END HALF DAY / LUNCH (1 hour)

Motivation and Demotivation

https://carpentries.github.io/instructor-training/08-motivation/index.html
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.
- Distinguish praise based on the type of mindset it promotes.

Motivation Matters

- Any technique can fall flat when learners are not motivated
- In a short workshop, motivation to continue learning independently is a critical outcome

How Can Content Influence Motivation?

- Believing that something will be too hard to learn often becomes a self-fulfilling prophecy.

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://data-lessons.github.io/instructor-training/fig/what-to-teach.png

-- -- *Exercise: Authentic Tasks: Think, Pair, Share* -- --
1) 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.
2) Pair up with your neighbor and decide where this exercise fits on a graph of “short/long time to master” and “low/high usefulness”.
3) 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 should take about 10 minutes.

How Can You Affect Motivation?

-- -- *Exercise: Brainstorming Motivational Impacts* -- --
Think back to courses you have taken in the past and consider things that an instructor has said or done that you found either motivating or demotivating. Try to think of one example in each case, and share your example under the appropriate heading in the Etherpad.
This exercise should take about 5 minutes.

Motivating experiences

-
-

Demotivating experiences

-
-

Invite Participation

- Establishing norms for interaction
- Encouraging learners to learn from each other
- Acknowledging when learners are confused

Encourage a Growth Mindset

- Positive error framing

-- -- *Exercise: Helping Learners Learn From Mistakes* -- --
A learner at your workshop asks for your help with an exercise and shows you their attempt at solving it. You see they've made an error that shows they misunderstand something fundamental about the lesson (for example, in the shell lesson, they forgot to put a space between ls 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 should take about 5 minutes.

- Presenting the Instructor as a Learner
    - "The typos are the pedagogy"
- Praising effort or improvement, not performance or ability

-- -- *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 these examples of praise do you think are based on performance, effort, or improvement?

- That's exactly how you do it – you haven't gotten it right yet, but you've tried two different strategies to solve that problem. Keep it up!

- You’re getting to be really good at that. See how it pays to keep at it?
- Wow, you did that perfectly without any help. Have you thought about taking more computing classes?
- That was a hard problem. You didn’t get the right answer, but look at what you learned trying to solve it!
- Look at that - you’re a natural!

This exercise should take about 5 minutes.

- Leveraging the power of "yet"

First, Do No Harm!

Things not to do in a workshop:

- Talk contemptuously or with scorn about any tool or practice, or the people who use them.
- Dive into complex or detailed technical discussion with the one or two people in the audience who clearly don’t actually need to be there.
- Pretend to know more than you do.
- Use the J word (“just”) or other demotivating words we talked about in a previous lesson.
- Take over the learner’s keyboard.
- Express surprise at unawareness.

Not Just Learners

- Why does your motivation matter?

-- -- *Exercise: Why Do You Teach?* -- --
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.

Keypoints:

- A positive learning environment helps people concentrate on learning.
- People learn best when they see the utility in what they're learning and believe it can be accomplished with reasonable effort.
- Encouraging participation and embracing errors helps learners to stay motivated.

Equity, Inclusion, and Accessibility

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

- Why are equity, inclusion, and accessibility important?
- What can I do enhance equity, inclusion, and accessibility in my workshop?

Objectives:

- Identify instructional strategies that are consistent with universal design.
- Recognize systemic factors that can distract and demotivate learners.
- Understand the role of The Carpentries Code of Conduct in maintaining an explicitly inclusive environment.

A Positive Environment for All

Definitions

- Equity: The proportional distribution of desirable outcomes across groups. Sometimes confused with equality, equity refers to outcomes while equality connotes equal treatment.
- Inclusion: Actively engaging traditionally excluded individuals and/or groups in processes, activities and decisions in a way that shares power. Inclusion promotes broad engagement, shared participation, and advances authentic sense of belonging through safe, positive, and nurturing environments.
- Accessibility: Refers to the intentional design or redesign of technology, policies, products, and services (to name a few) that increase one's ability to use, access, and obtain the respective item. Each person is afforded the opportunity to acquire the same information, engage in the same interactions, and enjoy the same services in an equally effective and equally integrated manner, with substantially equivalent ease of use.

The Carpentries Core Values

-- -- *Exercise: Discuss The Carpentries Core Values* -- --

- Take a moment to read through the Core Values on this page: https://carpentries.org/values/

Accessibility

-- -- *Exercise: What Happens When Accessibility is an Issue?* -- --
Think of a time when you have been affected by, or noticed someone else being affected by barriers to accessibility. This may have been at a conference you attended where the elevator was out of service, or maybe a 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 could have been done to provide better

accessibility in this case.
This exercise should take about 5 minutes.

Amareena
Andy
Anjali
Christie
Christina
Curtis
David
Donna
Emerson
Franklin
Grace
Guinsly
Jess
Julie
Kara
Kashish
Kelly-Marie
Kirsta
Margot
Meaghan
Michael
Nelly
Pam
Rachel
Sarah
Solar
Sonia
Vicki

From Accomodation to Universal Design

Image: Cartoon showing strollers, suitcases, bicycles, carts, and wheelchairs using curb cuts
https://carpentries.github.io/instructor-training/fig/sketchplanations-the-curb-cut-effect.png

Universal Design in Learning (UDL)
The key to UDL is creating redundancies such that learners have multiple options in how they:
1) receive
2) engage, and
3) share information.

-- -- *Exercise: Activity: Applying Universal Design in Your Teaching* -- --
Consider some of the teaching tools and strategies we have discussed so far in this workshop, or others you have observed in your experience. How do these meet UDL goals of providing multiple options for learners?
Consider multiple ways for learners to:

- receive information

- engage with you, the material, and other learners
- share what they have learned

This exercise should take about 10 minutes.

Every Little Bit Counts

Accessibility Testing

Systemic Exclusion

Stereotypes

- may be explicit (conscious and deliberate) or implicit (unconscious and automatic)
- guide what we notice about people
- guide how we interpret people's behaviors
- can facilitate quick judgements in appropriate situations (e.g. stopping a child from driving a car)
- can lead to systematically negative attitudes and behaviors towards members of certain groups

When Instructors have stereotypes about learners
When learners experience stereotypes about themselves

What can we do about our own stereotypes?

Better Together: Learning with Friends

Equity versus Equality

Inclusive Practices in a Carpentries Workshop

Setting Expectations with the Code of Conduct

Listening with Assessment and Feedback

Examining your Actions

Looking for More? Want to Contribute?

The Carpentries is actively working on improving our content and practices with respect to equity, inclusion, and accessibility. If you are interested in being involved in the development of this content, please let us know! Contributions to this page may be made on GitHub (click the "improve this page" link at the top), though our #accessibility channel on The Carpentries Slack, or by emailing team@carpentries.org.

Specific resources:

- Autobiography of a blind programmer
  https://www.parhamdoustdar.com/2016/03/27/autobiography-blind-programmer/
- Literature review for making programming accessible for people with visual imparements
  https://files.eric.ed.gov/fulltext/EJ1207407.pdf
- Making accessibility a priority when teaching online
  https://www.insidehighered.com/advice/2020/09/02/making-accessibility-priority-online-teaching-even-during-pandemic-opinion

Keypoints:

- Inclusivity is a key attribute of a positive learning environment.
- Universal design benefits everyone.

BREAK (15 min)

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

Jugyokenkyu or "lesson study": the power of classroom observation

Reading It Is Not Enough

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://data-lessons.github.io/instructor-training/fig/deathbulge-jerk.jpg

- Initiate feedback
- Be specific
- Balance positive and negative feedback
- Provide a clear next step
- Communicate expectations
- Remember that giving feedback is a skill
- Use a feedback translator

Lunar Babboon comic: https://web.archive.org/web/20210513225525/http://www.lunarbaboon.com/comics/feedback.html

-- -- *Exercise: Giving Feedback* -- --
We will start by observing some examples of teaching and providing some feedback.

Watch this example teaching video as a group and then give feedback on it. https://www.youtube.com/watch?v=-ApVt04rB4U Put your feedback in the Etherpad. Organize your feedback along two axes: positive vs. opportunities for growth (sometimes called “negative”) and content (what was said) vs. presentation (how it was said).

Note: there is a version of this video with subtitles in both Spanish and English here: https://www.youtube.com/watch?v=jxgMVwQamO0

What is the single worst thing you see this instructor do? (Please limit yourself to just one)
Responses to Video https://www.youtube.com/watch?v=jxgMVwQamO0

- Amareena Opening his phone mid-lesson, not showing engagement to students.
- AndyInstructor is not engaged, plowing through the content far too fast
- Anjali Expectation of what is referred to as 'simple'.
- Christie: In addition to dismissive language, there's minimal scaffolding or explanations provided.
- Christina: "for those of you who haven't seen f(x)s before, **trust me**"
- Curtis Agitated, dismissive language
- David Hard to see code! Why so small?! font size ++++ (So many things wrong with this! Hope this was planned?!)
- Donna: : "this is really simple stuff."
- Emerson "this is really simple stuff, I mean even Excel users can understand this" (being dismissive and casting judgment within the same sentence)
- Franklin Said "this" and "that" was confusing to know which part was being referred to
- Grace: no legitimate peripherial participation for students to ease into the start of the session
- Guinsly Impolite, assume that excel users can use it - too simplistics; Answering question himself; the font seems small..
- Jess - keeps reiterating how simple the concept is, "it works like what you expect"; assumes knowledge e.g. what an integer is or that foo is a common example variable and not, say, part of the programming language; dismissive of other skills (e.g. excel)
- Julie: not great classroom management when transitioning back to class content from the break e.g., "Could you sit down? We're starting"
- Kara assumes knowledges, dismissive "This is so simple even excel users can do it"
- Kashish - disorganization, no lesson introduction/overview of the arching topic
- Kelly-Marie Be dismissive of a student's hardships.

- Kirsta- he seems nervous to me. Maybe not confident with material? Disorganized. Seems like he doesn't want to be there.
- Margot
- Meaghan
- Michael
- Nelly
- Pam Speak super quickly and use jargon not everyone knows
- Rachel demeaning tone, expectation of high familiarity of the concepts
- Sarah Really fast, using a lot of "this is really simple",
- Solar
- Sonia frustration with student; dismissive language, jumping through concepts. Just not approachable.
- Vicki pulling out his phone, but it was all bad

Video #1: live coding
https://www.youtube.com/watch?v=Vacuk_kNOz8
Positive
- Content

- says "we did this, now we will do this"
- thoroughly demonstrate how variable is flexible in this context++++
- shows making mistakes e.g. "oops"+++++
- Seemed to have relevant examples
- Seems like he understands the content
- doesn't get tripped up over the typo they make+++
-

- Presentation

- did not make eye contact once in the 2 minutes as he was speaking, shows a lack of engagement
- Speaking at a good speed.+++
- phone notification sound during the workshop (distracting)
- stuck behind desk all the time
- Presenter improved significantly when they stood up and pointed to the screen and walked through what happened. (telling the audience the content would be explained more in-depth soon would be helpful)
- Good pace+
- Seems approachable

Growth opportunities
- Content

- suggest they explain the results and why they appear how they do++
- Suggesting to explain what went wrong - when the speaker had an error on the command line+++
- Point out what they are referring to on the screen when explaining concepts+
- repetition and explaining as they type would help with reinforcing previous concepts and making connections e.g., what is "do" and "head"
- Distracted by an incoming message around 0:25
-

- Presentation

- make shell fullscreen so that you don't see the background internet browser ++++++
- had notifications on during the lesson (distracting)++++++
- not speaking very clearly/not projecting
- suggest they speak aloud while demonstrating +++
- eye contact ++++++++++
- periodical stop-and-checks req'd+
- not pointing to the content he is referencing++++
- no engagement with audience+++
- No eye contact
- Recommend more exercises or opportunities for the class to practice along

https://www.youtube.com/watch?v=SkPmwe_WjeYVideo #2
What's changed - better and worse
Positive
- Content

- physically points to the contents being referred to +++
- demonstrating with different variable names helps learners understand the concept
- demonstrates a common error (typo on head) and therefore how to understand an error message + +++++
- referred to what was being taught previously and re-enforce it by explaning and demonstrating it again +
- shows clear input and output
- Liked that he included little side tips e.g. using the up arrow
- described how to interpret the output (and described input a bit too)
- At the start of the video it seemed like he had addressed a student's question, unlike last time
- shows a more concise way of representing the code without pushing too far ahead

- Presentation

- much better/cleaner presentation with defaults
- more interactive with audience, pointing to the screen, taking questions, etc.+++++
- Explaining each step as he goes, instead of all at the end ++++
- Zoomed in - easier to view the different fragments of code++++
- pointing out & explaining the code ++++
- Clear instruction
- Great pace. Easy to follow+
- Pointing at things and taking time to explain
- Explained why the prompt changed++
- Seems more engaged to me because he's standing up + pointing out lines on the screen clearly++
- standing up now - can more easily see the class+

Growth opportunities
- Content

- when going through the error, jumps to identifying the typo first before addressing the error

message
- perhaps the speaker covered this earlier, but explaining the "-n 3" as well would be great++++
- Perhaps could have explained how to search for and interpret error messages
- Perhaps take time to seek feedback/questions
- Was still being dismissive when saying "trust me, it happened to me"
-
-
-

- Presentation

- maybe the instructor can use their cursor as a pointer instead of pointing with their hand because then they don't face away from the class, and they don't block the code
-
-
-
-

-- -- *Exercise: Sharing Feedback* -- --
The prep time for this exercise is intentionally short – the point is to practice giving and receiving feedback, not to create a perfect presentation. Imperfect presentations will give you more to work with!
Distributed trainings:

- Split into groups of three.
- Individually, spend 5 minutes preparing a 90-second introduction to the topic of the lesson episode you chose before the start of the training course. You will not be live coding.
- Get together with your group and have one person teach their segment to the group. Keep a strict time limit of 90 seconds per person (one person should be responsible for the timekeeping).
- After the first person has finished teaching, share feedback. The person who performed should start by offering feedback on themselves. The timekeeper should help to keep feedback to about 5 minutes per person to ensure everyone has time to perform and discuss.
- Rotate roles and repeat steps 3 & 4
- Return to the main group and briefly summarize the feedback you received in the Etherpad. Your Trainer will split the group into virtual break-out rooms. Follow the instructions above but do not record each other. Instead, give each person feedback immediately after they finish their turn teaching.

Trainings where trainees are co-located:

- Split into groups of three.
- Individually, spend 5 minutes preparing a 90-second introduction to the topic of the 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 (but this is not required!).
- 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 person should 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. Keep an eye on the time during feedback, especially if your group has more than 3 people, to be

sure to leave time for everyone.
- 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.

This exercise should take about 10 minutes.

Amareena Spoke too fast, could have gone more into detail.
Andy I have to prepare!
Anjali: Can work on explaining some concepts, but did ok given the time.
Christie: speaking too fast, jargon, (similarly, assuming background knowledge), structure of content was a bit confusing.
Christina: speaking slower, backtrack if necessary
Curtis: good logical structure, can be more to the point - less repetitive
David Speak fast and say "um" more than I want to. Forgot a key word in the lesson
Donna We didn't get to feedback... I think I could have spoken more 'succinctly'. And had a few images.
Emerson Can work on brevity in explanation. Also good to solicit what the audience already knows, to build off of the existing knowledge instead of explaining from the beginning. Also getting feedback of what the audience is looking for, where different perspectives may be more interesting to the audience and still get the same point across.
Franklin speak slower
Grace: have to be careful with using jargons and assuming what the audience may already know
Guinsly I should have define the scope of my role in coordinating the chat service.
Jess I should have asked someone to give me a time warning! I went over and left Kara short on time for her presentation.
Julie explaining the scope of the topic better and giving myself time to think through the process that I want to explain
KaraShould have scoped out (bullet point) what I wanted to cover a bit more
Kashish
Kelly-Marie Became a little lost for words (couldn't think of what I was suppose to say) so probably should be more rehursed in the future.
Kirsta
Margot
Meaghan
Michael
Nelly Taught 3 easy steps to create a spell.i need to stay on point and not jump around. watch for use of ums and uhhs
Pam Need to have a better sense of the exact steps I want to cover
Rachel Might need to break down the concept a little more for beginners, need a bit more time to prepare what I say
Sarah I did not organize my lesson inspecific steps.
Solar
Sonia I went over time by about 20 second, probably becasue I tried to keep simplifying something that was already simple
Vicki I didn't even realize that I forgot to define jargon that I thought was so obvious, but is not obvious to those who don't study ecology/evolution. I was trying to be brief :(

-- -- *Exercise: Using Feedback* -- --
Look back at the feedback you received on your teaching. 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.

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

Etherpad structure was difficult to follow - hard to know where we were

- Amareena: how to make a comfortable teaching environment?
- Andrew
- Anjali: a lot of talking at times
- Christie: etherpad for group learning
- Christina: zoom fatigue
- Curtis: what if you get completely stuck in your code?
- David: lots to digest, don't know what to prep for tomorrow
- Donna
- Emerson: continuous flow of information - would have preferred chunks
- Franklin: interaction with other people / their thoughts
- Grace: pacing in live teaching
- Guinsly
- Jess
- Julie
- Kara
- Kashish
- Kelly-Marie
- Kirsta
- Margot
- Meaghan
- Michael
- Nelly
- Pamela
- Rachel
- Sarah
- Solar
- Sonia
- Vicki

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

- What have we learned so far?
- What needs to be done to prepare for the next part of the training?

Objectives:

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

-- -- *Exercise: Feedback* -- --
The Trainer(s) will ask for feedback on the day in some form.

This exercise should take 5 minutes.

-- -- *Exercise: Reflection Exercise* -- --
Before we wrap up for the day, take 5 minutes to think over everything we have covered so far. On a piece of paper, write down something that captures what you want to remember about the day. The Trainers will not look at this - it is just for you.

If you do not know where to start, consider the 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 your experience of the training today
- write down one thing that struck you the most

This exercise should take about 10 minutes.

Keypoints:

- So far 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.

END DAY 1

Day 2 Schedule

**** DEVIATES FROM THE SUGGESTED TIMING IN THE SAMPLE SCHEDULE

Timing Lesson

9:00 Welcome Back

9:10 Getting Started on Instructor Certification

- The Carpentries: How We Operate

9:30 Live Coding is a Skill

10:30 Morning Break

10:45 Preparing to Teach

11:45 Lunch

12:45 More Practice Live Coding

14:00 Working With Your Team

15:10 Afternoon Break

15:25 Launches and Landings

Putting It Together

16:00 Wrapping Up

16:20 Q&A with other instructors

Post-training survey

17:00 Finish

Welcome Back

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

Questions:

- What will we focus on today?

Objectives:

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

What is the most useful, interesting, or surprising thing you learned in this class yesterday?

- Amareena
- Andrew I enjoyed watching the two contrasting teaching styles and discussing what they did and didn't do
- Anjali
- Christie: Being cognizant of accessibility concerns and using universal design.
- Christina like @Donna and @Julie, I also liked the concept maps! Also, the idea of on-ramps/slowly building up to ideas is great.
- Curtis3 strongest motivators of learning
- David Greg's dad's quotes
- Donna: like @Julie, I liked the concept mapping examples of R functions in Greg's github.
- Emerson The effect of a teacher on student motivation/demotivation
- Franklin teaching videos and theories of memory were helpful
- Grace: how instruction language can have so much impact on teaching and how people may say demotivating words unconciously
- Guinsly
- Jess: Most interesting was the demonstrative value of watching the two example teaching videos and commenting on them.

- Julie: concept mapping and constructing/correcting mental models were really interesting. I think hearing explicitly about dismissive language was really helpful, because while I was aware of it, it wasn't something I consciously thought about as a student.
- KaraThe idea of having a separate account on my laptop for teaching!
- Kashish the power of concept maps
- Kelly-MarieThe different types of motivation and concept maps!
- Kirsta+1 for concept maps
- Margot
- Meaghan
- Michael
- Nelly
- Pamela Definitely the differences between Novices, Working Practitioners, and Experts
- Rachel Mental models and the differences in the gaps and connectivities between the three levels of 'mastery'
- Sarah
- Solar
- SoniaConcept maps for sure!
- VickiConcept maps are so

-- -- *Exercise: Questions* -- --
Yesterday we (didn't) ask 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.

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.

Checkout Process

https://carpentries.github.io/instructor-training/14-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.

Instructor Checkout

Contribution to lesson or glossario:

- https://glosario.carpentries.org/
- https://carpentries.github.io/instructor-training/14-checkout/index.html
- More information on translation of lessons here: https://carpentries.org/blog/2021/01/help-inform-resource-translation-priorities/

Community Discussion

- schedule a discussion here: https://pad.carpentries.org/community-discussions

Teaching demonstration

- schedule a demo: https://pad.carpentries.org/teaching-demos

What does a badge mean?
- teaching
- voting
- bonus modules
- sharing

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.

Questions:

- Instructors are volunteers?
    - Yes, but if you're travelling to another isntitution they will pay travel expenses, and in some cases there are honorarium (i.e. UofT has honoraria for grad students and undergrads)
- Are there a lot in person right now?
    - Not so much, but some countries (i.e. Denmark) are opening up and hosting things in person. Do what you're comfortable with and be safe!

The Carpentries: How We Operate

https://carpentries.github.io/instructor-training/15-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

Global & Local Carpentries communities

Image: A very brief history of The Carpentries. A timeline. https://data-lessons.github.io/instructor-training/fig/SWCDChistory.png

Similarities and Differences between The Carpentries Lesson Programs

Similarities between Data Carpentry, Library Carpentry, and Software Carpentry workshops include:

- a focus on technical skills,
- a two-day format taught by volunteer instructors, and
- a focus on filling gaps in current training for learners.

Image: Three intersecting circles labelled Software Carpentry, Data Carpentry, and Library Carpentry. https://data-lessons.github.io/instructor-training/fig/carpentries-venn-diagram_20200904.svg

Question:

- Does the Carpentries offer workshops for instructors who want to teach outside their subject area (i.e. used to genomics, want to teach library carpentries)
    - Not formally, recommend volunteering to help at another workshop to build those skills

What is a Carpentries Workshop? The Rules.

Using the Names and Logos
https://carpentries.org/workshops/#workshop-core

Recruiting helpers:
https://docs.carpentries.org/topic_folders/hosts_instructors/hosts_instructors_checklist.html#helper-checklist

Materials
https://carpentries.github.io/instructor-training/LICENSE.html

Reporting a ‘Mix and Match’ Workshop
https://amy.carpentries.org/forms/workshop/

Instructor Certification is Comprehensive

Carpentries Jargon Review
-- -- *Exercise: Test yourself!* -- --
As a class or in groups, see how many of the following terms you can define.

- Lesson
- Episode
- Workshop
- Lesson Program
- Instructor
- (Instructor) Trainer

This should take about 5 minutes.

How to Organise a Carpentries Workshop Locally

https://carpentries.org/workshops/#workshop-organising

The Carpentries Handbook: https://docs.carpentries.org/ includes:

- templates and checklists https://docs.carpentries.org/topic_folders/hosts_instructors/index.html
- policies https://docs.carpentries.org/topic_folders/policies/index.html
- much more!

Callout: Teaching Opportunities: Local and Global
Instructors mailing list: https://carpentries.topicbox.com/groups/instructors

Setting Out On Your Own… Together: Lesson Incubation

https://github.com/carpentries-incubator/proposals/

A Culture of Contribution

-- -- *Exercise: Community Roles* -- --
Select one role from the list below that interests you. Using the the descriptions on The Carpentries community website, write 1) a short definition of the role and 2) a question that you have (or that you imagine someone else might have) about the role. Are there roles you would like to see that are not listed? Note that, too!

- Executive Council
- Mentors

- Instructor Trainers
- Lesson Developers
- Code of Conduct Committee
- Instructor Development Committee
- Community Facilitators
- Maintainers

This exercise should take about 5 minutes.

Keeping In Touch

Want to listen?

- Sign up for our newsletter
- Follow us on Twitter, Facebook, or LinkedIn

Want to interact (or listen with options to engage)?

- Join our Slack organisation
- Join our Email lists (start with “Discuss”!)

Want to join meetings (to meet new people or listen in)?

- Sign up for Community Discussions (or just drop in if there is space!) or other events when announced
- Explore taking on one of the Roles identified above

-- -- *Exercise: Get Connected* -- --
Take a couple of minutes to sign up for The Carpentries channels you want to stay involved with on this page: https://carpentries.org/connect/ When you are done, share a channel you find interesting or useful on the Etherpad.
This exercise should take about 5 minutes.

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).
- Useful links:
  - Carpentries handbook https://docs.carpentries.org/
  - Carpentries community lesson https://carpentries.org/community-lessons/

Live Coding is a Skill

https://carpentries.github.io/instructor-training/17-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: Live Coding Demo with Jordan and Greg* -- --
Jordan will give a demo and Greg will give feedback. Feel free to give feedback below if you want to practice your feedback-giving skills
https://carpentries.github.io/instructor-training/demos_rubric/

This exercise and discussion should take about 10 minutes.
Content

- Positive

- Constructive

Delivery

- Positive
- Constructive

Top Ten Tips for Participatory Live Coding in a Workshop

1) Stand up and move around the room if possible. This makes the experience more interactive and less monotonous. Use a microphone if one is available to make it easier for people with hearing difficulties to hear you.
2) Go slowly.
3) Mirror your learner's environment.
4) Use your screen wisely.
5) Use illustrations
6) Turn off notifications
7)Stick to the lesson material.
8) Leave no learner behind.
9) Embrace mistakes.
10) Have fun!

-- -- *Exercise: Practice Teaching* -- --

- Split into groups of three.
- Assign roles, which will rotate: presenter, timekeeper, note-taker.
- Have each group member teach 3 minutes of your chosen lesson episode using live coding. For

this exercise, your peers will not “code-along.” Before you begin, briefly describe what you will be teaching and what has been learned previously. Record your own exercise if you have a smartphone you can prop up to just record you.

- After each person finishes, each group member should share feedback (starting with themselves) using the same 2x2 rubric as yesterday. The timekeeper should keep feedback discussion to about 1 minute per person; this may leave some time at the end for general discussion. The note-taker should record feedback in the Etherpad.
- Trade off roles.

This exercise should take about 40 minutes.

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.

Amareena
+ Good pace, clear voice, made correction and explained correction when a mistake was made.
- Assumed some prioir knowledge, didn't clarify some definitions.
Andy + well paced
- Keep the command prompt high up
- Explain why I’m doing things, no context
Anjali:
+ really appreciated the explanation of the terms used in a completed function and that each term was highlighted as it was discussed so that we had a sense of what we would be learning, what it would look like; good pacing and clear voice; overview of the layout of the RStudio interface was helpful
- a bit more practice beforehand to make delivery smoother
Christie: a bit fast pace. Assumptions about prior knowledge with RStudio, project-oriented workflow, better description of the function/arguments.
Christina
Curtis
David Made some assumptions on prior knowledge of the students. Overlooked "basic commands" but explained the main topic well. The audience were able to trust the teacher knows what he's talking about
Donna
Emerson+Very clear, spoke slowly (great pacing). Good grasp of the material and pointed to everything he was referring to
- Felt a bit like jumping into the lesson halfway. Glossed over the environment a bit ie. things were running in the background of the environment which could be confusing (Condas)
Franklin
+ Good pace; good explanation of terms (e.g., what is a variable) at the beginning of the presentation.
- Can leave old code on the screen; rather than altering/deleting old code, write in a new line so users can see both old and new code.
Grace
+ Good roadmapping & explanation for why certain tasks are being done. Good initial handling of an unexpected error
- Could have filled some time during the unexpected error (e.g. further explanations, answering questions)
Guinsly
Jess

Julie
+good explanation of terms before starting and easy to understand
-make sure we can see the colomn names and work on speaking pacing
Kara
+ Good pace and clear explanations of the content. Take the time to explained functions and definitions
- There are some stops and bursts of explanations
Kashish
Kelly-Marie + well paced and well delivered
- Not clear to me if the value is stored or if the equation is stored
Kirsta
Margot
Meaghan
Michael:
+ competent at live-coding (comfortable); really great how demonstrated motivation
- need to test-run the interpreter ahead of time; increase interaction; give an opportunity to revisit an error (i.e.,
Nelly
Pam Positive
Rachel
+ good pacing, went slow and started from beginning assuming no prior knowledge, careful not to leave gaps. cleared up common misconceptions
- circled back a couple times, evident self doubt
Sarah
Solar
Sonia + well paced and clear delivery
- Write examples as you're talking, difficult to visualize
- Too much data on the screen - we're just explaining dates!
Vicki

BREAK (15 min)

Intersted in getting involved in teaching at UofT already?
https://utoronto-my.sharepoint.com/:x:/g/personal/jordan_pedersen_utoronto_ca/EWfVTAO7mL9Lvm43XFRolecB6REeq-a1guaUH74wVylyjA?e=Na5gay

Preparing to Teach

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

- How should I prepare to teach?

Objectives:

- Critically analyze a learning objective for your workshop.
- Identify checkpoints in a lesson for formative assessment.

1. Jorge just moved from Costa Rica to Canada to study agricultural engineering. He has joined the college soccer team and is looking forward to learning how to play ice hockey.
2. Other than using Excel, Word, and the internet, Jorge's most significant previous experience with computers is helping his sister build a WordPress site for the family business back home.
3. Jorge wants to measure properties of soil from nearby farms using a handheld device that sends data to his computer. Right now he has to open each data file in Excel, delete the first and last column, and calculate some statistics on what's left. He has to collect at least 600 measurements in the next few months, and really doesn't want to have to do these steps by hand for each one.
4. Jorge can read English well, but sometimes struggles to keep up with spoken conversation that involves a lot of jargon.

You will never know everything about the whole people who come into your classroom.
Thinking deeply about learners as people can help you prepare to bring your best self and provide an inclusive environment for everyone.

Amareena
- Jake is an undergraduate student studying economics at Uoft. He loves soccer, and politics, and is the leader of a political party club.
- He has some technical experience from courses in high school, but struggles in commiting and staying interested.
- He wants to gain more skills in analyzing stock data using excel, rather than reading long reports or purchasing the data.

Andy

- Alan is a TA in high school with a background in musical theatre
- He has very little techincal experience other than what he learned in high school, and often finds it difficult to grasp technical concepts
- He wants to gain more skills with Word, Excel etc. so that he doesn't feel that his students know more than he does

Anjali
1. Emily moved to Canada from India when she was in highschool.
2.

Christie: 1. Camille is an international first-year master's student in Educational psychology from Paris, with an undergraduate in French literature. 2. She has a good knowledge of Word, Powerpoint, and a bit of excel, but has no experience coding. She has no knowledge of programming jargon. 3. The lab she is a part of uses a lot of psychometrics, natural language processing, and machine learning with rolling data collection (new participants every day). 4. She wants to know the basics of data cleaning and statistical analysis that can be automatically re-run as more participants complete. She has good receptive English skills, but requires additional time for planning productive English (writing, speaking).

Christina:
- Jason grew up in Toronto and finished his undergraduate studies in musicology.
- He's now a graduate student looking for ways to automate music transcription from .mp3 files, e.g. to the .midi format. He's coming to the workshops with a specific task in mind
- Jason also has experience in Python for textual data analysis, but has never used any music transcription

methods. He wants to know if it is possible to do this in Python at all, or if he should look elsewhere.
Curtis
1. Tania is a local to Toronto and avid sports fan. She plays all sports in her free time and enjoys sports betting lol.
2.Tania recently completed first year at the U of T in Sociology. She completed a first year statistics course. She has novice knowledge level in R and linear regression.
3. Tania wants to develop sports prediction models to improve her sports betting.
4. Tania is unavailable after 12pm. Lives in small apartment with 4 others – many distractions. Query gambling issue...
David
- Zhao is an international student who has come to the University of Toronto to study Computer Science. She lives alone and is capable but not confident in her English. She has learned Python and Django plus some JavaScript in her courses but wants to learn to work in a software engineering team.
She wants to be able to find an internship in one of the top tech firms in Canada.
Donna:
- Sandra worked as an engineer for a few years before returning to do a PhD in public health.
- She uses Excel on an almost-daily basis and has taken an online MOOC about python...
- But wants more familiarity and practice, with structure, to be able to see whether/where she can use python in her resarch (perhaps to do better statistical anlyses and make better plots etc.)
- She has really high proficiency in technical areas (math, physics), but very little exposure to coding. Wants to advance with minimal time commitment!
Emerson
- David is a first year undergraduate chemical engineering student at the University of Toronto
- Despite achieving top grades in his high school education, he is currently struggling with his courses
- He is considering dropping out of his program to pursue independent learning in programming before moving to San Francisco in the hopes to join a tech startup
- He has no programming background beyond a few lectures. He is proficient in math but struggles with the application of knowledge to everyday problems
Franklin
1. Adam grew up in Toronto and studied environmental science at UofT. Joined school clubs and played in sports teams
2. Knowledgable on excel, word, data analysis. Some experience (2 years) with computers for microbiology research using python
3. Wants to use python to analyze bacterial growth curves and make programs for future experiments. Right now the growth curves need to manually normalized, but this is too tedious and a coding script would improve accurate and reproducibility
4. Adam know English well but gets confused over python code sometimes
Grace
- Mabel is a new graduate student who just started her psychology program. She is passionate about research and making music
- Has some experience in excel and little in SPSS data viewer when she volunteered in a lab during her undergrduate but did not learn coding during her undergraduate courses. She did not expect her graduate program to require so much statistics and coding background.
- Wants to learn either SPSS or R to better analyze her data and plan for her new project but she has limited time while trying to balance her other coursework and research
Guinsly
Julie
1. Natasha is a high school senior from Toronto who enjoys her history and literature classes. She has recently become interested in digital humanities projects and is trying to decide if it is an area she wants

to pursue in her undergraduate studies.
2. She has used word processing software for lots of her high school assignments, and created basic slide presentations and spreadsheets, but isn't confident in her ability to use them.
3. She enjoys video games for their storytelling and is familiar with downloading, installing, and updating software. She is also aware of game-style digital humanities projects but hasn't looked into how they're developed yet.

Kara

1. Vera is an undergraduate student in her first year who is studying political science, but is still exploring other topics and course options. She grew up in Saskatchewan and has just moved to Toronto
2. She grew up helping her parents to install software and troubleshoot their computer issues, but other than using Microsoft software for high school projects (word processing basic spreadsheets) she doesn't have much computer and no coding experience.
3. As she's still exploring her options, and she's heard that coding skills are in high demand, she's looking to learn but finds it hard to make time for learning outside of her course materials

Kashish

Kelly-Marie

- Daren is a 2nd year chemistry student who has taken a full year of undergraduate calcualus and considers himself to be "somewhat proficent in Excel" (i.e., he knows how to make basic spread sheets and plots). In his free time he enjoys hiking with his dog and seeing movies with friends on the weekends. He has no experience in coding but wants to learn because he heard on Twitter that it would increase his likelihood of getting into a physical sciences graduate program someday. He is starting from square one and needs a lot of encouragment along the way because he often gets distracted by his other course assignments that are on his mind.

Kirsta

Sara is a liaison librarian interested in learning how to support her subject department with a more advanced set of instruction related to computational tools. She is an intelligent, busy, and service-focused person with a wide skill set and a lot on her plate who wants to leave with something new that she can teach.

Margot

Meaghan

Michael

- N is a grade 10 student at a public high school in Canada
- Has taken math in junior high (public school curriculum) and has done well ~80%
- Wants to use knowledge to improve grades in school
-

Nelly

Pam

- Fran is a second-year undergraduate student who enjoys reading, watching movies with her family, and taking university yoga classes.
- Fran has grown up using computer programs such as Word and Google Docs, with some occasional graphing in excel, but has never really thought about programming. She is an average student in math and statistics, and does quite well in her biology courses, but would prefer not to dive into complex math or stats concepts.
- Fran has been looking for research positions since finishing her first year, and has found that many require data input and caretaking skills. She wants to apply to these positions, but doesn't know how to gain these skills.
- Fran is easily fatigued by online learning, and would prefer to work alone.

Rachel

1. Megan is an undergraduate student from Taiwan who is studying life sciences but is open to exploring

other topics. In her free time, she likes to engage in creative activities such as crocheting, painting and plant collecting, and is mildly worried about finding a job but decides to take her time with it.
2. She has no experience whatsoever in coding and does not know the difference between programming languages. She perceives coding to be intimidating and has always avoided it in high school when given the opportunity.
3. Megan wants to learn how to build a website and design things for her own creative purposes. She knows there is a lot of flesibility with coding. She doesn't know which languages will help her, but she has experimented with websites like Wix which caught her interest.
4. She is not very technical or math oriented, and while she is pretty fluent in English, she will still need things introduced to her in very simple terms.
Sarah
Solar
Sonia 1. Niamh is a first year international PhD student from Ireland in the Humanities. She enjoys watching reality tv and found it helpful in helping bridge the cultrual gap between Ireland and Canada. 2. Niamh is working as a TA for an intro class with 200 students. She is responsible for managing their grades and ensuring the weight of each assignment is calculated correctly. Her past experience with spreadsheets is minimal, as she took a Business Tech credit in high school that showed her very basic functions. 3. Over the course of the semester Niamh has found that her spreadsheet has become very difficult to manage. Some students have handed in assignments late, others have been given exceptions and she must now figure out how to correctly weigh their grades, but is unsure of how to do all this with the large amount of data she has. 4. Although English is Niamh's first language, she finds that people often have a hard time understanding her. She is also dealing with an ailing grandparent back home and feels homesick.
Vicki 1. Amanda is a graduate student who is studying neurobiology. She loves research, and on her off-time, her hobbies include rock climbing and crochet. 2. Amanda has a good grasp of basic statistics (ANOVAs mostly), which she has mostly done on Excel and JMP. 3. She wants to use different software for her data, which she has a lot of, and also wants to learn different statistics methods (linear models, Bayesian, etc.). 4. Because of her mild dyslexia, she needs extra time preparing before lessons in order to read through the entire lesson plan, and requires multi-sensory approaches.

Building Teaching Skill

Over-preparing on technical content can be tempting. Don't forget to prepare to teach!

A note on cutting: This episode is a common place for Trainers to plan cuts while preparing to teach. That’s not because this is not important – this page is a valuable resource – but we feel this is one of the sections that trainees can use effectively as a resource when actually preparing for a workshop, even without spending a lot of time doing activities on this material during their Instructor Training event.

Anticipate Your Audience

Image: A tree diagram of Carpentries instruction and audience in which Instructor Trainers teach Instructors and Instructors teach Learners https://data-lessons.github.io/instructor-training/fig/instructor-training-program.png

Remember Your Pre-Workshop Surveys

Examine Learning Objectives

-- -- *Exercise: Evaluate Learning Objectives* -- --
Select one learning objective from the episode you've used for teaching practice. Copy it into the etherpad then add numbers below your objective to address the following:

- Write your learning objective in the Etherpad.
- Suppose a learner had mastered this objective, and wanted to try something more cognitively challenging on the exact same topic (i.e. not a next step in a workflow). Identify an objective they could work towards next.
- Suppose a learner struggled to meet the specified objective. What might they be missing? Identify one more fundamental thing a learner needs to be able to do in order to be successful in meeting this objective.

This exercise should take about 10 minutes.

Beware the Urge to Complicate

Prepare to Use Formative Assessments

Metacognition: learner awareness of their own process and progress can support continued effort beyond the workshop

-- -- *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.
This exercise should take about 5 minutes.

-- -- *Exercise: Assessment is for Everyone* -- --
How might you apply formative assessment to:
a) verify that that achievement has been met by all and
b) make learners aware of their accomplishment?
Keep in mind that formative assessment can take many forms, including multiple choice questions, other exercises, spontaneous questions and calls for sticky notes. Write some notes or thoughts about this process in the Etherpad for discussion.
This exercise and discussion should take about 10 minutes.

How Frequent?

- Formative assessments of some kind should ideally be used every 5 minutes and at least every 10-15 minutes
- "Do You Understand" is ineffective as formative assesment

Exercise questions

- parsons problems (shuffled ordered)
- fill in the blanks
- multiple choice

- trace the execution of code (make up a grid of all the variables, tell me line by line how variables change value). This is helpful for debugging, highlight misconceptions.
- reverse execution (here is the code, here is the output, figure out what the input was). Useful after students can trace forward, then this allows them to trace backward.
- calibrated review - take a piece of code, instructor to do a code review of what's good and bad, ask student to do the same, compare the two

Amareena: Photography course - taking multiple photos of one object from 25 different micro angles.
Andy Vocal exercises to improve singing
Anjali
Christie: Have students try teaching the newly learned topic to others.
Christina
Curtis scrimmage. Perhaps some sort of game/competition
David Judo: practice a technique 100 times. Then trying them on their sparring partners with different sizes and weights while we correct them
Donna: drills where you isolate one 'part' of a movement (like arms-only or kick-only in swimming): could be applied to programming as write the first line of how to define a function (e.g., repeat many times, just that first line, for different imaginary functions)
Emerson Moving around a pencil in your right hand to practice violin bow grip
Franklin start with simple drills then increase complexity: baseball
Grace: explain the code you have to someone who doesn't know coding/ practice explaning complex topics in simple term (e.g., to your younger siblings)
Guinsly
Jess - peer review/evaluation
Julie: annotating poor examples and creating a corrected one
Kara isolation one part of a movement ie. swimming, leg propulsion
Kashish write down everything you know about a specific topic on a blank piece of paper to test how much you really know in 5-10 minutes
Kelly-MarieHave students exaplin the concepts to a partner and the partner explain it to them. Maybe come up wit their own concept maps together?
Kirsta - sticky note clustering (Responses are recorded on sticky notes, and then organized by participants). This can be done online with Jamboard.
Margot
Meaghan
Michael: spontaneous improvisation - 5 minute debate speech on any topic, everyone must bombard the speaker with points of interest that they must accept
Nelly
Pam Giving a short project to pairs of students, then having them present their solution to the class the next day so that everyone can see the different apporaches (Grade 10 science class)
Rachel group discussion true/false exercises
Sarah role play to experience difficulty of taking sustainability decisions
Solar
SoniaExplaining a concept using the game telephone. Done with little kids (under 6) learning the rules to soccer. Mad minute where in one minute you rapid fire answers to very basic questions. Was done in elementary school to learn multiplication and division.
Vicki pros & cons (usually in paper discussions)

Prepare to Cut

- Keep breaks on time
- Watch out for dependencies
- Leave time to wrap up your workshop
- Do not speed up
- Communicate with your team
- Communicate with your learners

Review the Instructor Notes

Review Prior Feedback

- Repetition vs Reflective Practice

Connect With Your Team

-- -- *Exercise: Minute Cards Revisited* -- --
Follow your Trainers' instructions to share feedback your event.

Keypoints:

- To teach effectively, you have to know *who* you are teaching.
- Good learning objectives identify specific events that can be evaluated through formative assessment.
- A good exercise informs Learners and Instructors when an objective is achieved.

LUNCH (1h)

Let us know when you're back by sharing one goal you have for live coding this afternoon:
Amareena define defintions
Andy Add more context to why I'm doing the things I'm doing
Anjali
ChristieDescribing code better (e.g., why I used certain functions and arguments), continuing to speak at a good pace.
Christina Learn to use the chat option on Zoom in order to be interactive, and to give students extra resources for "filling in the gaps." Also how to identify if I am speaking too quickly or not.
Curtis
David
Donna be more succinct
Emerson Better manage the multitasking between live coding and teaching

Franklin make new lines instead of erasing previous ones and providing enough detail to students can understand
Grace: Speak slower and be ready to adapt if any error/lag happens to fill up any deadspace
Guinsly
Jess - not trail off
Julie: manage my pacing and make sure to check in to see if learners are following. also identify for learners why this skill is useful
KaraSteadier pacing, less stop and go
Kashish
Kelly-MarieBeing more confident.
Kirsta: Speak more slowly and clearly, and use the correct terms on the command line
Margot
Meaghan
Michael
Nelly
Pam Stumble over my words less
Rachel more organized and confident
Sarah
Solar
SoniaBe more intentional with why I'm teaching the thing I'm teaching.
Vicki avoid "um" and "like" lol or maybe not?

More Practice Live Coding

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

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

Objectives:

- Use feedback to improve your teaching.

-- -- *Exercise: Round Two* -- --

- Before splitting into groups, read the rubric that is given to Instructor Trainers as a suggested framework for evaluating the online teaching demonstration sessions that are part of Instructor checkout.

https://carpentries.github.io/instructor-training/demos_rubric/ . (Note: demos are not scored, so this rubric is for advisory purposes only.) What questions do you have?

- Return to your groups and repeat the previous live coding exercise, re-teaching the same content as before. This time, the presenter should incorporate changes based on feedback received, and everyone should try to ‘level up’ their feedback using the rubric for teaching demos.
- 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 10 minutes for rubric discussion, 30 minutes for teaching, and 10 minutes for de-brief.
Amareena

Andy Ask for feedback, ask audience if the text size is ok, explain the commands, otherwise good pace and delivery
Anjali
Christie
Christina
Curtis feel like didn't have a plan, tried to improve roadmap, missed the checking to see if everyone can see the screen, good pace and delivery, maybe only import ggplot and not tidyverse, like that you didn't get through too much because it's complex
David Speak fast and need to slow down and work through the code with the students
Donna
+: Good pacing and flow, great engagement and explanation
-: Could be more concise for topics that might have been explained earlier in the session
Emerson: (lesson on Lists)
+s: good body language/gestures to accompany talking; polished feel (good!);
~s: VSCode might not be ideal teaching environment (visual distraction/auto-complete); maybe slightly too fast-paced;
Franklin Good explanation of terms, ask the level that people are already familiar with before starting
Grace
Guinsly
Jess
Julie
Kara+ good introduction, referenced previous lessons, very approachable tone and body language
- Some things were overexplained / audience seemed mixed and needed better definition
Kashish
Kelly-MarieUse simpilar xpressions to ease complications, kept introduction with reivew of past material to ease in audience. Can continue tot work on confidence in delivery.
Kirsta
Margot
Meaghan
Michael
Nelly
Pam
Rachel despite teaching from beginner perspective, try engage with any prior knowledge to allow students to make connections
Sarah
Solar
Sonia tried to add too much in, a bit side tracked, show only content used in lesson, good signposting, explains purpose well, good pace, good examples
Vicki

Keypoints:

- (Reflective) Practice makes perfect.

What is one question we still haven't addressed?

- What will we know about learners?
    - From your pre-workshop survey you have some info (you can view questions here: https://carpentries.github.io/instructor-training/06-feedback/index.html)
    - Given the context you may also know more (i.e. one workplace)
- New term: "False beginner" someone who may have learned in the past but forgot (relearning), vs. learning for the first time. Similarly if someone knows another programming language but is learning a new language. False beginners have mental models, but they don't have the details. They have different goals and will learn at different speeds than "true learners"
    - pair programming, self-paced work, breakouts can all be ways of handling multiple skill levels
- Other orgs
    - https://programminghistorian.org/
- Amareena
- Andy Is the carpentries open to adding more programming languages/skills to its "syllabus"?
    - You bet! The core lessons don't change much, but new lessons and mixing and matching is critical to the vitality of community https://carpentries.org/community-lessons/
    - contributing to others before contributing your own builds momentum faster, gets used to the rhythm
    - different roles in the carpentries include instructors, trainers, and maintainers (who maintain the lessons and implement the changes that others suggest)
- Anjali What ways/methods have past Carpentries instructors used to keep themselves upto date about topics that they teach? With evolving technology, one challenge is how to keep up with new topics in the field you teach. Also, what is DC - Genomics in UofT recent instructors?
    - using in day job, review lesson
    - keep in touch with other orgs (like pyladies, rladies, code4lib, etc.)
- Christie: Seconding Emerson. What best practices for material prep for workshops is. I find that's quite the struggle (obvs made easier w/ carpentries workshops having their own content)
- Christina - quick overview of good lesson planning? how to use carpentries website to create a lesson plan?
    - 1. learner persona (reuse these if context is similar)
    - 2. concept map (what is the big idea for course and lesson)
    - 3. what does "done" look like. what is the final assessment that sums up the content and brings everything together
    - 4. develop formative assessments to support people having the skills to complete the final assessment
    - 5. order the content (payoff early, but lay foundation)
- Curtis Is there additional formal teaching feedback built into carpentries? Or something you could ask for from co-inructor/others. e.g. someone sitting in on your lesson
    - community discussions, asking for feedback on teaching
    - in past we considered more formal assessment, but didn't want it to be intimidating
- David How do we know we haven't lost the students somewhere along the way? (quizzes and formative questions are one. Polls and reactions are other. What else?)
    - see if learners are completing the exercises, ask for learners to give parts of the code in a live example in front of the screen
- Donna most frequent first-timer mistake? // is there Carpentries continuing ed for instructors? // are we all going to meet up afterwards for virtual beers: maybe on the slack in a few weeks... :) //
    - over-preparing content and under-preparing delivery
    - informal continuing ed is attending community discussions
    - also, virtual beers / social in a couple weeks would be delightful ! In the past we have also

done checkout support sessions, and I'm happy to run those if there's interest

- Emerson How to efficiently prep for the material to teach a Carpentries workshop
    - read entire lesson, prepare to cut
    - practice run with timing
    - wipe software and re-install everything to start from scratch
    - check out AV if in person in advance if possible to ensure that projector is working, etc.
    - ensure that accesssibility and washrooms are accessible and unlocked, also that campus security is aware you're there
- Franklin Is there a template I should follow for an introductory undergrad course or should I make my own?
    - workshop for undergrads learning how to teach workshops - can reach out to Greg
- Grace: How closely should we follow the Carpentry course scripts? Do we need to touch on all the written definitions/show all the incorprated graphs, etc.?
    - stick closely the first time, then you'll know where to make changes
    - be prepared to make changes
- Guinsly
- Jess - is there a list somewhere I add my name to as an available instructor? Related, can I just join the slack? ooh there's a slack? I would like to join that too (Kirsta)
    - Instructors will be made public as you complete your checkout process, you can indicate if you don't want your name on the list: https://carpentries.org/instructors/
    - Slack is the best! Here is the full set of Carpentries contacts https://carpentries.org/connect/ (big bonus, there's an Ontario specific channel that you should all join if you're interested <3
    - and a local UofT listserv - https://onesearch.library.utoronto.ca/ic-faq/39898
        - carpentries-l@listserv.utoronto.ca
- Julie: if you are co-instructing or helping another instructor, how do you recommend advocating for incorporating accessibility practices (e.g., for a course, providing lecture recordings) if the other instructor is reluctant (this is also for non-Carpentries contexts)? Will we have time to review how to use GitHub?
    - This is one of the groups - students for barrier free access https://uoftsba.wordpress.com/
- Kara(seconding comments above) Best practices for prepping for workshops - good overview available?
- Kashish

- Is there a proficiency test/clearance check we, as instructors we must pass, in the coding area we want to teach in, before leading our first workshop?

- "Start where you are, use what you have, help who you can."
- Jordan - I started with a novice level for sure. In fact, I found it easier to prepare when I was a definite novice, because I was so new to learning the skills.
- One workshop every-other month is our sustainable pace (with UofT organized, UofT coders, and other combinations of non-UofT and UofT members)

- How frequent are Carpentries workshops happening at U of T right now?

- Kelly-MarieDo you need our Github ID? The instructions for certification says you do.
- Kirsta How can I join the Carpentries listserv at U of T? Will there be U of T specific community calls I can join to fulfill this part of the check-out proces?
    - https://onesearch.library.utoronto.ca/ic-faq/39898
    - carpentries-l@listserv.utoronto.ca
- Margot

- Meaghan
- Michael
- Nelly
- Pam How to create projects for adult learners with little extra time.
- Rachel how do we find partners to teach a lesson with?
    - At UofT recent instructors: https://utoronto-my.sharepoint.com/:x:/g/personal/jordan_pedersen_utoronto_ca/EWfVTAO7mL9Lvm43XFRolecB6REeq-a1guaUH74wVylyjA?e=yg60cg
    - Internationally once you complete instructor certification you'll get a regular (weekly?) email that looks like this: [instructors] Upcoming Online Carpentries teaching Opportunities in multiple regions, Instructors needed
    - Hi Carpentries Instructors, We uploaded new online teaching opportunities in the **US** this week. Please take a moment to review the upcoming workshops and be sure to add your name if you are interested. Remember to sign-up with the email that you use as your primary contact in AMY. If you need to change this information please let us know and we will get you updated! Here is the signup link for your convenience: https://docs.google.com/spreadsheets/d/1YhTAzEalDqKUowgej7aRa7E1K0XcB6ZezoVUt6VN2qY/edit#gid=0
- Sarah
- Solar
- SoniaIs there a place where all the feedback on course excersies, particularly as students provide their input on how they felt about the resource package they recieved (thinking about the Data Carpentries data set)?
    - There are usually instructor notes (which you can see at the top of the page of a workshop under extras)
    - https://datacarpentry.org/OpenRefine-ecology-lesson/guide/index.html
- Vicki what are the most important qualities that instructors should have when teaching technical skills?
    - https://teachtogether.tech/en/index.html#the-rules
    - Good listening!

Working With Your Team (if needed, may have been covered in preparing to teach)

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

- What are the challenges of managing a heterogeneous classroom?
- What should we do if there is a Code of Conduct violation?
- What does it mean to be a co-Instructor?
- How does an instructional team prepare for a workshop?

Objectives:

- Identify potential challenges of teaching learners with very different backgrounds and skill levels.
- Locate resources to direct your response if someone at your workshop violates the Code of Conduct.
- Identify workshop roles and responsibilities for your team.
- Use The Carpentries workshop website template instructions to start creating a website.

Never Teach Alone

The Instructional Team

- A *Host* who organizes the workshop logistics
- Two or more *Instructors* who plan and execute workshop instruction
- *Helpers* who support learners during the workshop

Hosting
https://docs.carpentries.org/topic_folders/hosts_instructors/hosts_instructors_checklist.html#host-checklist

Helpers

- help learners with setup and installation
- answer questions during exercises
- monitor the room to spot people who may need help (indicated by a sticky note or otherwise)
- monitor the shared notes and either answer questions there or remind the Instructor to do so during breaks

https://docs.carpentries.org/topic_folders/hosts_instructors/hosts_instructors_checklist.html#helper-checklist

Carpentries Classroom Practices

- Starting with the Code of Conduct
- Participatory Instruction & Hands-off Help
    - Learners Use Their Own Machines
- Sticky Notes
    - Accessibility of Sticky Notes
- Formative Assessment
- Breaks (ideally with snacks)
- Feedback

Co-Teaching Models

- Team teaching: Both teachers deliver a single stream of content in tandem, taking turns the way that musicians taking solos would.
- Teach and assist: Teacher A teaches while Teacher B moves around the classroom to help learners.

Sticky Situations 1: Learners at Many Levels

-- -- *Exercise: What Are the Challenges?* -- --
What are some of the challenges you might expect when teaching learners with a broad range of expertise? Add your thoughts in the Etherpad.

This discussion should take about 5 minutes.

- workshop advertising
- exercises
- partnering
- managing the conversation
- helper vigilance

Sticky Situations 2: Code of Conduct Violations

A critical function of the Code of Conduct is to ensure that our community does not tolerate or encourage the persistence of harmful behaviors. In order for the code to work well, incidents must be reported. Note that it is not the responsibility of the reporter to determine whether a Code of Conduct violation has occurred; when in doubt, it is best to report an incident and allow the Code of Conduct Committee to make that determination.

-- -- *Exercise: Know Your Resources* -- --
1) Take 5 minutes to read through the Code of Conduct Incident Response Guidelines: https://docs.carpentries.org/topic_folders/policies/incident-response.html

2) Discuss what you have read in small groups. As questions arise, you may wish to refer to our complete Code of Conduct section in The Carpentries Handbook: https://docs.carpentries.org/topic_folders/policies/index_coc.html or to the Transparency Reports released by The Carpentries Code of Conduct Committee: https://github.com/carpentries/executive-council-info/tree/master/code-of-conduct-transparency-reports

- What kinds of things could your instructional team agree upon in advance of your workshop?
- What questions do you have about CoC enforcement?

3) Write some notes in the Etherpad.

This discussion should take about 10 minutes.

Know your Local Laws and Policies

Planning Together

-- -- *Exercise: Teaching Together - Nuts and Bolts* -- --
With a partner, imagine that you are planning a workshop together. For this exercise, you may assume

that your workshop has a separate, designated Host.

- How would you prepare to teach a workshop together?
- How would you coordinate with other members of your instructional team (e.g. Host, Helpers)?
- What kinds of things will you do to support each other during the workshop? What won't you do?

Record some notes, and share your thoughts with the group. This exercise should take about 10 minutes.

Setting up a Workshop Website

-- -- *Exercise: Practice With The Carpentries Infrastructure* -- --
For this activity, your Trainer will put you in groups, but you may choose whether to work together or independently. If you work independently, you can still use your group as a resource to ask questions as they emerge.
Go to the workshop template repository: https://github.com/carpentries/workshop-template

- If you have a GitHub account (or don't mind creating one) and are comfortable doing so, follow the directions to begin creating a workshop website using your local location and today's date.
- Alternatively, have a look at the video tutorial linked on the instructions page. With any time remaining, check out the websites for upcoming Carpentries workshops on our website: https://carpentries.org/upcoming_workshops/
- Add your questions and thoughts on this process to the Etherpad. If you created a workshop website, add the link there as well.

This exercise should take about 15 minutes.

Note: Sometimes web browsers will cache the workshop webpage, so when you make changes in GitHub, they do not show up on the workshop webpage immediately. Two ways to avoid this are to use a "private" or "incognito" mode in your web browser or by following these instructions to bypass your browser cache: https://en.wikipedia.org/wiki/Wikipedia:Bypass_your_cache

Setting up an Etherpad

Keypoints:

- Team work takes work, but allows you to share the load and build connections.
- Working with a broad range of learners can be challenging, but there are many ways to keep a classroom happy and motivated.
- The instructional team decides how to respond to Code-of-Conduct incidents during a workshop; all violations should be reported to The Carpentries Code of Conduct committee for follow-up.

BREAK (15 min)

Discussion of how to teach during traumatic times:

- flexible deadlines
- cancelling and post-poning is ok
- sign off for the day
- as an instructor take care of yourself - take the time, feel free to disclose (or not) as you see fit
- don't allow for in-class debate, wrong place and not trained for heated and personal debate will get out of hand
- don't pretend it's not happening

Launches and Landings

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

- How do you actually start a workshop?

Objectives:

- Connect goals of an introduction with options for content and delivery.
- Practice a short introduction.
- Identify worthwhile elements of a workshop conclusion.

Launching your Workshop: The Introduction

"primacy effect": a tendency to remember things presented at the beginning of a list or event

-- -- *Optional Exercise: What is in an Introduction?* -- --
Get into small groups (3-4 people) and discuss the questions below. Take notes on your answers in the Etherpad.

- 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?

Learning Objectives For your Introduction

After the introduction learners should:

- be able to predict the type of instruction

- know what will be taught
- understand what will be required of them
- believe that they can learn from the workshop

The instructional team should:

- know of who is participating in the workshop and what their expectations are
- have an initial impression of how learners respond to participation prompts and what will be needed to encourage them to engage

Setting the Stage

- physical environment
- time before class
- introducing yourself
    - introductions for everyone
- doubts
- seeding a classroom community
    - icebreakers

Teaching Your Trajectory: Workshop 101

- Describe the prerequisites (if any).
- Share the schedule and logistics
- Communicate the workshop structure
- Communicate your expectations for learners, including:
    - how to follow the Code of Conduct
    - ways to ask for help
    - ways to give feedback to the instructional team
- Collect and share baseline data on learners
- Share some advice for success
- Whet learners' appetites for workshop content

-- -- *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 a few 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, briefly share feedback, reserving extensive discussion for after all have had a turn to present.

This exercise will take about 15 minutes.

The Art of a Smooth Landing

-- -- *Exercise: Brainstorm: Making the Last Moments Count* -- --
You have made it to the end of your workshop! Everyone is exhausted and their brains are full. You could cover more content… or you could use the last few minutes in another way.

In the Etherpad, write down one thing you could do at the end of a workshop. What is the value of spending time on that thing? If you have time after writing down your idea, read through the others in the etherpad. If you have another idea that has not been written down yet, add it to the list.

This exercise will take about 5 minutes.

Keypoints:
A planned introduction is key to creating a functional workshop environment.

- Conclusions support reflective practice and set the stage for continued learning.

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* -- --
Based on the content we've discussed throughout this workshop, add at least one item to each category below:

- Concepts/Theories
- Tools/Practices

This exercise can be done as a class and should take about 5 minutes.

-- -- *Exercise: Organize Your Knowledge* -- --
Use a concept map or other visual organiser of your choice to connect some of the concepts above. You don't have to use them all! How are the terms you have chosen to include related to each other?
Work on this on your own. There is no "right answer" – this is about you building up a mental model, moving from "novice" to "competent practitioner".
If you feel you have finished organizing your thoughts, try the next exercise.

This exercise should take about 5 minutes.

-- -- *Exercise: Parting Thoughts (optional)* -- --
If you did not think about these issues when organizing your topics in the previous exercise, now consider:

- How would you describe 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.

Ask and Offer

Beside your name please write something you need help with and some kind of help you could offer someone else (even if you don't know who).

- Amareena I can offer help learning pandas, I need help with
- Andrew I can help with Git, I need help with R
- Anjali Need help with Neural networks in R; can help with R package development - yes ask Rohan Alexander! He taught me neural networks in R very thoroughly! - Christina Thank you
- Christie: I could use help with being accessible in my instruction. While I'm no statistician, I'm quite experienced with latent variable modeling (structural equation modeling, finite mixture modeling, item response theory)
- Christina: Don't know how to make my lessons more accessible, have little training. I can help people use TSpace , and also lots of literary analysis if that's your jam. Also am not opposed to a good Praise and Worship music jam just for fun.
- Curtis: I need help with all languages other than R (well just R less so). Also need help with AI and prediction models. I can help with basic biostatistics.
- David I need help learning a great solution for engaging the audience during an online session. I can help navigating finding a community partner for your course or finding software engineers
- Donna Need help with causal inference // Can offer coaching any level of running/fencing/swimming :)
- Emerson Need help with project management. Can offer help with software engineering interviews
    - https://codebender.org/
- Franklin
- Grace: need help with time management. Can offer help with R/maybe Git
- Guinsly
- Jess
- Jordan: I don't understand how to use surveys in research very well, would love some advice /// I can offer help with finding electronic resources at UofT, I'm also a pretty good baker and gardener
- Julie: Need help with learning how to use Git and knowing when and how to say no :) // can help with editing and proofreading things.

- KaraCan offer help with getting strarted with GIS Data & Systems (ArcGIS, QGIS). Currently starting to learn R, and would love help as I get going Kara I can help with some beginner R! - Pam
- Kashish I need help and want to practice my French conversational skills with someone. I am great at efficient cooking and meal preparation techniques!-I can help you practice your French :) Meal prep techniques could be a great help to me! I'd love to pair up! Who is this? - Kashish
- Kelly-Marie I need help with making healthier eating choices. Knows scientific programming with Python.
- Kirsta
- Margot
- Meaghan
- Michael Need help with making lessons more interesting. Can help with using LaTeX.
- Nelly
- Pamela I need help learning how to memorize and not hate every second of it. I can help someone to learn the basics of genetics. I can also tell you where to get authentic tacos downtown.
- RachelNeed help with giving better, applicable feedback. I can help someone manage their time
- Sarah Need help with creating the formative assessements during the lesson, I can help with any resources to teach management or IS concepts
- Solar
- SoniaI need to dedicate more time to ensure I can work through the certification process; I would like to be better at more of the software heavy carpentries; I can provide feedback on dry runs at teaching.
- Vicki I need help with Git - I always have to Google stuff. I can offer lots of help in data manipulation and visualization (basically anything in `tidyverse`)

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 course.
- Articulate constructive feedback.

-- -- *Exercise: One Up, One Down* -- --
Provide one up, one down feedback on the entire Instructor Training course. Remember:

- Say only one thing, and try not to duplicate. This gets harder for those who come later!
- Trainers should try not to respond, only record responses (e.g. in the Etherpad). This is also hard, but important!

This exercise should take about 10 minutes.

-- -- *Exercise: Minute Cards (optional alternative)* -- --
Please use your minute cards (sticky notes or virtual) to give your Trainers anonymous feedback directly.
This exercise should take 5 minutes.

-- -- *Exercise: Post Workshop Surveys* -- --
Assessment is very important to us! Please take the remaining time to complete this ~5 minute post-workshop survey.

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://carpentries.typeform.com/to/cjJ9UP#slug=2022-02-23-utoronto