Arguments, Imposter Syndrome, and Conspiracy Theory

By: Mays Imad

Course Context – The following module is intended for introductory science courses (for major and nonmajor). It is supposed to be shared with students toward the beginning of the semester. The time allocated for the following module should be a minimum of two weeks.

Learning Objective – By completing the following assignment, students will be able to:

1. Define an argument and provide an example from everyday life.
2. Describe the different parts of an argument.
3. Distinguish between deductive and inductive arguments.
4. Define and give an example of imposter syndrome.
5. Reflect on the various factors that could lead to imposter syndrome.
6. Define a theory.
7. Identify the elements which make a theory conspiratorial.
8. Analyse the connections between imposter syndrome and conspiracy theories.

Assessment of Learning – Students' learning of the objectives stated above will be assessed using the following approaches:

1. Summative: Multiple choice quiz of different arguments where students will be asked to determine whether the argument is inductive or deductive.
2. Formative: Students will annotate an argument presented to them to show how they go about analyzing whether its conclusion is guaranteed from the evidence or merely supported.
3. Formative: Students will work in groups (3 students per group) to prepare a 5-min presentation on the relationship between imposter syndrome and conspiracy theories.

Learning Activities – The following activities will be used to engage students with the topic and help them learn the respective objectives.

1. Students will read descriptions and examples of deductive and inductive arguments. Students will also watch an animation and then work in groups to come up with their own examples of arguments for each type.
2. Students will read descriptions and examples of imposter syndrome and watch a video describing what causes imposter syndrome to emerge and what to do about it. Students will be asked to reflect on the type of argument one makes when they claim "I must be an imposter."
3. Students will read descriptions and examples of conspiracy theories and examine an infographic describing what causes conspiracy theories and what are common elements within all conspiracy theories.

References & resources used to create the following module:

1. Identifying conspiracy theories. (2020). European Commission. https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/fighting-disinformation/identifying-conspiracy-theories_en
2. Introduction to Philosophy and Arguments. (2021, March 9). Retrieved July 3, 2021, from https://human.libretexts.org/@go/page/29952
3. Deductive and Inductive Arguments. (2021, March 9). Retrieved July 3, 2021, from https://human.libretexts.org/@go/page/24316
4. Johnson, J. (2014). Global issues, local arguments : readings for writing. Pearson.
5. Villwock, J. A., Sobin, L. B., Koester, L. A., & Harris, T. M. (2016). Impostor syndrome and burnout among American medical students: a pilot study. *International Journal of Medical Education*, *7*, 364–369. https://doi.org/10.5116/ijme.5801.eac4
6. Paul, R., Elder, L., & Foundation For Critical Thinking. (2001). *A miniature guide for students on how to study & learn a discipline using critical concepts & tools*. Foundation For Critical Thinking.
7. Rothchild, I. (2006). Induction, Deduction, and the Scientific Method. In Society for the Study of Reproduction. https://higherlogicdownload.s3.amazonaws.com/SSR/fbd87d69-d53f-458a-8220-829febdf990b/UploadedImages/Documents/rothchild_scimethod.pdf

Credits for images used below:

Critical Thinking & Intellectual Standard

- https://www.shutterstock.com
- https://louisville.edu/ideastoaction/-/files/posters/i2a-poster-intellectual-standards.pdf

Inductive Versus Deductive Arguments

- https://www.youtube.com/watch?v=gQO7qhYSwvk
- https://www.javatpoint.com/difference-between-inductive-and-deductive-reasoning
- https://7esl.com/inductive-vs-deductive-reasoning/

Imposter Syndrome

- https://towardsai.net/p/data-science/impostor-syndrome-data-science
- https://willowtreeapps.com/ideas/imposter-syndrome-in-design-what-it-is-and-how-to-overcome-it

Conspiracy Theories

- https://medicine.wustl.edu/news/podcast-addressing-rumors-conspiracy-theories-related-to-coronavirus/

Arguments, Imposter Syndrome, and Conspiracy Theory

Introduction

Learning to identify and analyze another person's argument as well as construct our own is an essential part of developing and sharpening our **critical thinking** skills. Please make sure you review the notes on intellectual standards of critical thinking. The purpose of this assignment is to examine how we construct arguments and analyze arguments.

The **learning objectives** for this module will be:

1. Define an argument and provide an example from everyday life.
2. Describe the different parts of an argument.
3. Distinguish between deductive and inductive arguments.
4. Define and give an example of imposter syndrome.
5. Reflect on the various factors that could lead to imposter syndrome.
6. Define a theory.
7. Identify the elements which make a theory conspiratorial.
8. Analyse the connections between imposter syndrome and conspiracy theories.

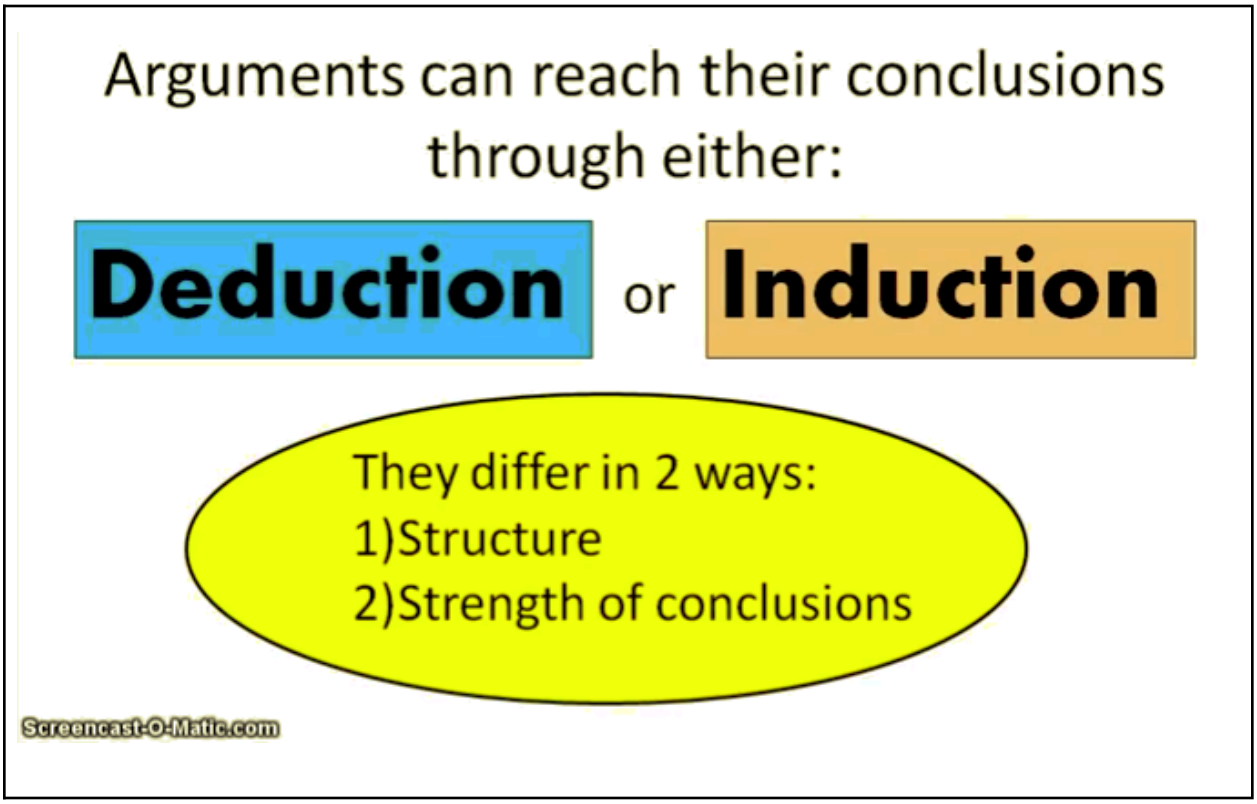
An **argument** is a series of statements used to persuade someone of something or to present reasons for accepting a conclusion. The general form of an argument in everyday language is that of premises (typically in the form of propositions, statements or sentences) in support of a claim: the conclusion. An argument has one or more premises but only one conclusion. Each premise and the conclusion are capable of being either true or false (but not both).

When approaching an argument, it is important to be able to identify these core elements which are the backbone of any argument:

- The **claim** is an arguable statement of conclusion (not matter of taste).
- The **reasons** supporting the claim (premises).
- **Assumptions** behind the reasons.
- **Evidence** used to support each reason.
- Summary of opposing views and the rebuttal.

Please watch the following video on how to spot and analyze an argument:
https://www.youtube.com/watch?v=MPgJCMd9a6k

There are several kinds of arguments, here we will consider two types, inductive and deductive arguments, and focus on their overall structure as well as the reliability of the conclusion.



In **deductive arguments**, the conclusion follows necessarily (with certainty) from the premises. For example, given premises that A=B and B=C, then the conclusion necessarily follows that A=C. With deduction we can provide absolute proof of our conclusions, given that the premises are true.

- A deductive argument is said to be **valid** or invalid. If one assumes the premises to be true, would the conclusion follow with certainty? If yes, the argument is valid. Otherwise,

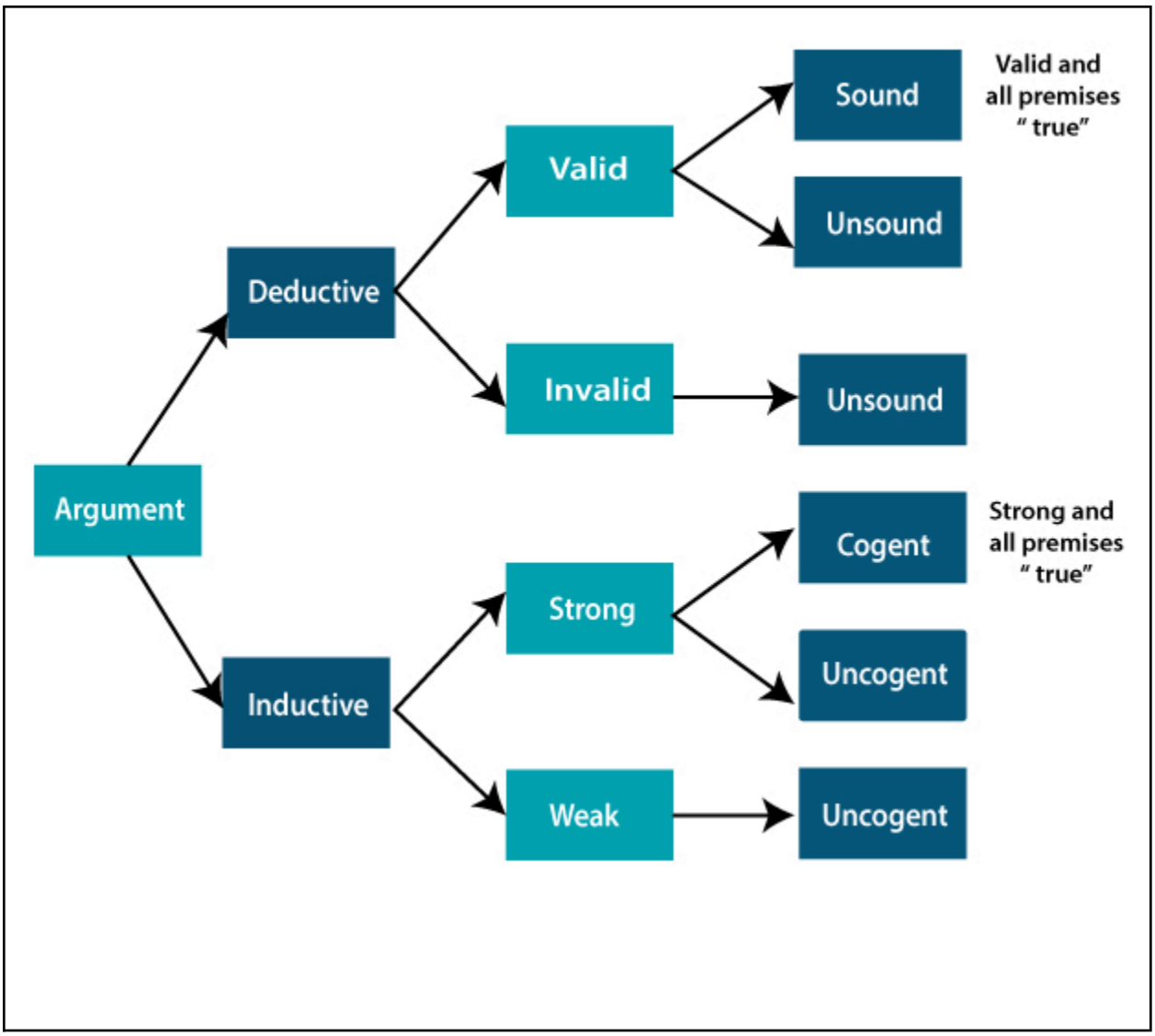
it is invalid. In determining validity, the structure of the argument is essential to the determination, not the actual truth values of the premises.

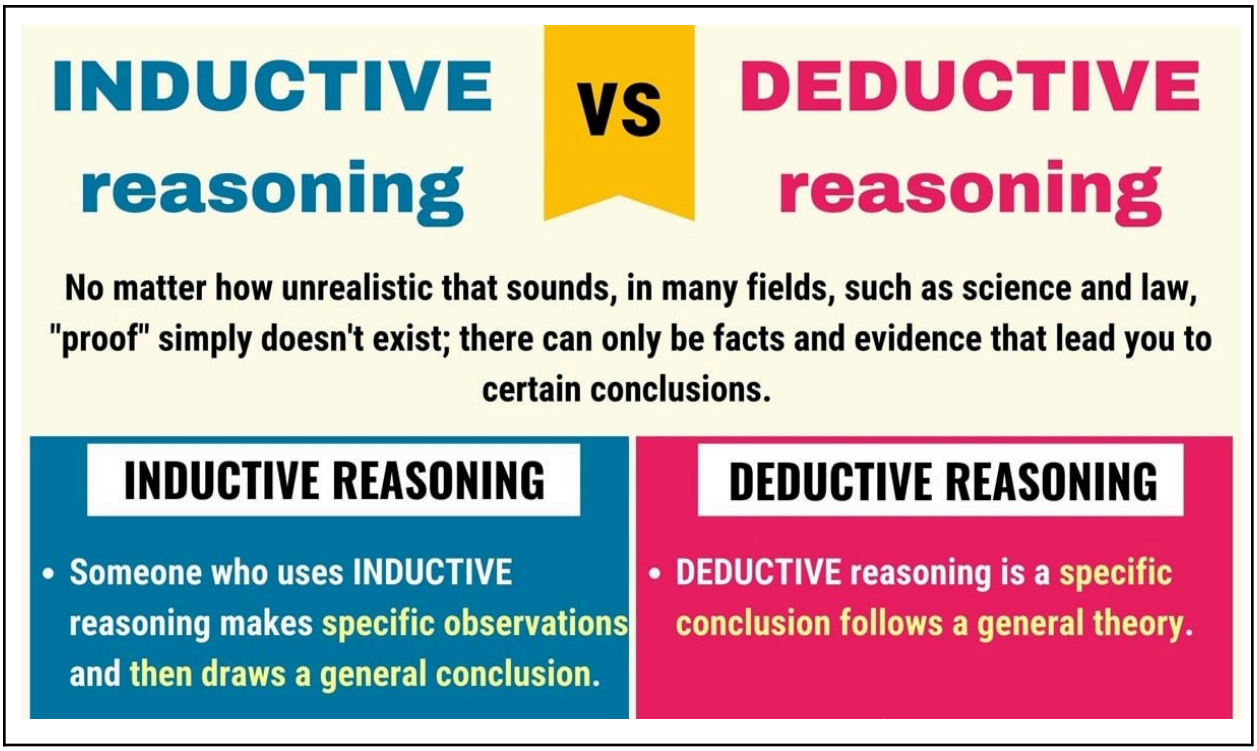
- Next, if a deductive argument is valid, check to see if its premises are all true. If the premises are true, the argument is valid and **sound**. In other words, a sound argument is a valid argument whose conclusion follows from its premise(s), and the premise(s) of which is/are true.
- For example, consider the argument: “Because bats can fly, and all flying creatures are birds, therefore bats are birds.” Let’s break it down:
    - Premise 1: Bats can fly
    - Premise 2: All flying creatures are birds
    - Conclusion: Bats are birds
        - If we assume the premises above are true, the conclusion follows necessarily, and thus it is a valid argument.
        - However, when we examine the truth of each premise we see that premise 1 is true while premise 2 is false (not all flying creatures are birds). As a result, the argument “bats are birds” is valid but **unsound**.
- In deductive reasoning, if something is true of a class, or group, of things in general, it is also true for all members of that class. That means that deductive logic goes from general to specific.

In **inductive arguments**, the truth of the conclusion is supported to some degree of probability by the premises. Whereas deductive arguments aim to give premises that guarantee/necessitate the conclusion, inductive arguments are more modest: they aim merely to provide premises that make the conclusion more probable than it otherwise would be; they aim to support the conclusion. For example, 100% of biological life forms that we know of depend on water to exist (true premise). If we discover a new biological life form it will likely depend on water to exist (claim/conclusion). The premise makes a strong case for the conclusion but doesn’t necessitate it. Arguments that involve predictions are inductive because the future is uncertain.

- An inductive argument is said to be **strong** or weak. If the premises of an inductive argument are *assumed* true, is it probable the conclusion is also true? If so, the argument is strong. Otherwise, it is weak.
- A strong argument is said to be **cogent** if it has all true premises. Otherwise, the argument is uncogent.
- Here’s an example of an inductive argument: “Thimerosal is an antimicrobial molecule which contains ethylmercury which is a neurotoxin. When the MMR vaccine was first developed, one of the ingredients it contained was thimerosal. The increase in cases of children who took MMR vaccine and were later diagnosed with autism is therefore due to the neurotoxicity caused by ethylmercury.” Now, let’s break it down:
    - Premise 1 = Thimerosal is an antimicrobial molecule (true premise)
    - Premise 2 = Thimerosal contains ethylmercury (true premise)
    - Premise 3 = Ethylmercury is a neurotoxin (true premise)
    - Premise 4 = MMR vaccines contains thimerosal (false premise)
    - Conclusion = MMR vaccine will lead to neurotoxicity (uncogent conclusion)

- Note 1, in the above example there is a hidden **assumption** that The concentration of thimerosal in MMR vaccine is strong enough to cause neurotoxicity. Also, the reason premise 4 is false is because thimerosal has not been an ingredient of MMR vaccines since the early 90's. And, when the vaccine did contain thimerosal prior to the 90's, the concentration used was not high enough to cause neurotoxicity.
- Note 2, look for **logical fallacies** which are holes in the logic. They are often easy to miss and therefore, deceptive. In the above example, even if we were to assume that all premises and assumptions are true, the conclusion commits a **causal fallacy**, assuming that MMR causes autism just because autism cases were reported after MMR vaccines were administered.





To review, watch the following video on how to differentiate between different types of arguments. Then, working with your group, come up with an example for each kind of argument: https://www.youtube.com/watch?v=BwtCScUoL_w

Evaluating Premises is important because the conclusion cannot be true unless the premise is true. One of the tasks involved in assessing an argument is to identify the premises and decide if they are reasonable and true. Keep in mind that some arguments will have explicit premises (ones which are stated openly) while others will contain implicit premises (ones which are not stated openly but are implied). Recall that a premise is an assumption one makes and uses to construct their argument. Thus, when evaluating the strength or cogency of an argument, it's critical to determine what those assumptions (especially those which are implicit) are and evaluate them.

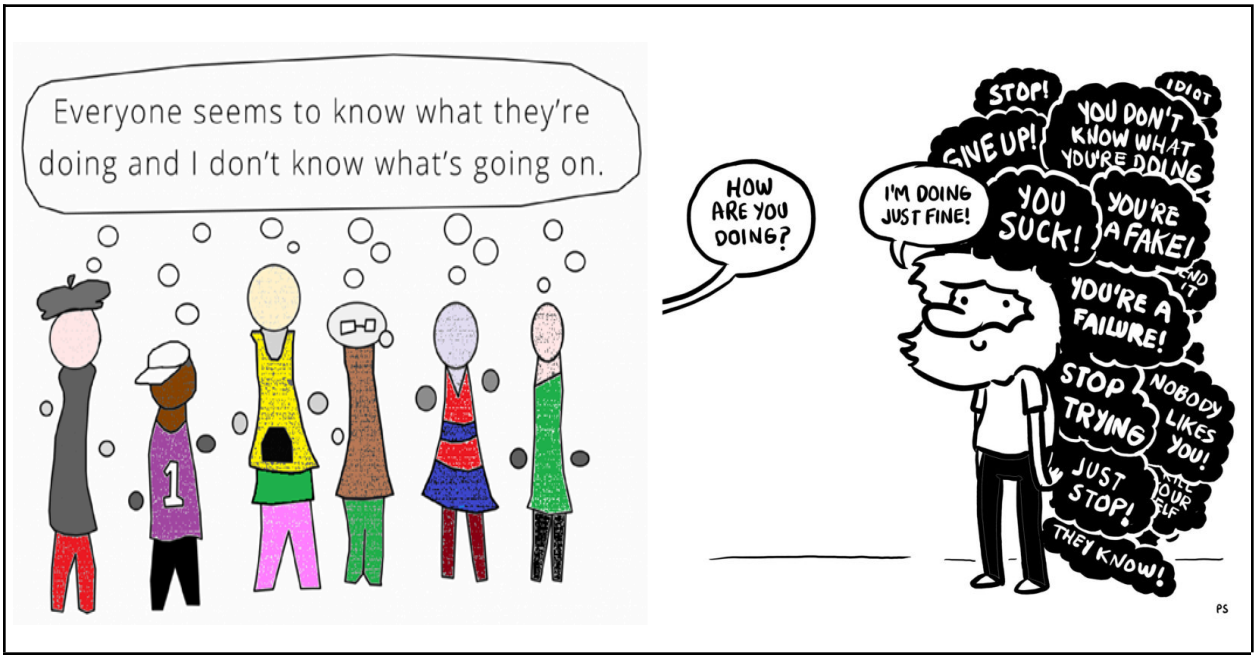
Finally, watch the following video on how to evaluate premises:
https://www.youtube.com/watch?v=OpNoCmNtP5c&t=179s

Now, we are going to take a look at two examples where arguments are made and assess those arguments. First, we will examine the notion of imposter syndrome followed by conspiracy theories. For each, pay close attention to what the argument is and whether it is inductive or deductive. We will construct each argument and analyze it closely.

Imposter Syndrome

Do you ever feel like a fraud–Like you've misled others about your abilities and talents and that you don't deserve to be here? Do you catch yourself not trying to contribute to group work because you feel that you have nothing intelligent to offer? Are you surprised when you get a good grade on an exam and wonder if the instructor made a mistake?

You're not alone. Many students, *and* professors, question whether they are prepared to do the work they do or whether they even belong here in higher education. This phenomenon is called Imposter Syndrome–feelings of self-doubt and intellectual fraud and can lead to failure. Individuals with the Imposter Syndrome experience intense feelings that their achievements are undeserved and worry that they are likely to be exposed as being fake.



Let's try to understand what this syndrome is all about, how it affects our learning and careers, and what we can do about it. Watch this video to learn more about imposter syndrome: https://www.youtube.com/watch?v=eqhUHyVpAwE

Conspiracy Theory

We are going to examine another example of an argument. Recall that a theory is an idea used to explain a situation or justify a course of action. For example, the theory of gravitation, for instance, explains why apples fall from trees and astronauts float in space. A theory not only explains known facts; it also allows scientists to make predictions of what they should observe if a theory is true. Scientific theories are testable. New evidence should be compatible with a theory. If it isn't, the theory is refined or rejected. A conspiracy theory is an explanation for an event or situation that deliberately ignores the more probable explanations and resorts to a more sinister explanation, often involving political and influential organizations.

Let's look closer at what conspiracy theories are, what elements are common to all conspiracy theories, why do they arise, and how to spot them: https://ec.europa.eu/info/sites/default/files/live_work_travel_in_the_eu/unesco-conspiracy-english-0.jpg

Assignment

1. Online discussion question. Does scientific inquiry use inductive or deductive reasoning or both?
2. Construct an argument that would arrive at the conclusion: "I must be an imposter." Is your argument inductive or deductive? What assumptions/premises? Determine whether the argument is valid/strong or sound/cogent. You will turn in individual work for this part to receive feedback from me.
3. Working with your group, build an argument to support the following conclusion: "Imposter Syndrome is a form of conspiracy theory." You will turn in group work for this part to receive feedback from me. You will also prepare a five-minute presentation of your group work to share with other groups for peer feedback. Make sure you:
    a. Show all the premises/assumptions (those which are implicit and explicit).
    b. State whether the argument is inductive or deductive.
    c. Determine whether the argument is valid/strong or sound/cogent.

When answering the questions above, remember to refer to the intellectual standard for critical thinking (see next page for summary).

The **intellectual standard** for thinking allows us to assess the quality of our thinking using a universal metric of good thinking. When applying intellectual standards, it helps us become more sophisticated, reliable thinkers. The intellectual standards are:

INTELLECTUAL STANDARDS:

THINKING ABOUT MY THINKING

Clarity	To what extent is my point easily understood by myself and others?
Accuracy	To what extent is my information at hand true or correct without distortion?
Precision	To what extent is my information exact and specific to the necessary level of detail?
Relevance	To what extent does my information and input relate to the issue at hand?
Depth	To what extent am I engaging with the complexities of the issue?
Breadth	To what extent am I considering the issue at hand within the necessary contexts and relationships?
Logic	To what extent do my conclusions follow from the evidence?
Significance	To what extent can I identify and focus on the most important aspects of the issue at hand?
Fairness	To what extent am I able to avoid privileging my own biases?

Let's examine each closely with examples:

Clarity: means that my thinking can be explained well enough so it is easy to understand and follow. In other words, my goal when I communicate my thinking is to be less confusing and more smooth.

> *For example, when I think about and come up with a case study for my students involving an ethical dilemma with its many dimensions, I am trying to communicate and explain to my students the case so they can understand it and begin to interrogate it.*

To make thinking more clear, I can ask:

- How could I elaborate further on that case? Could I express the details in other words. What would it look like if I were to spell it out?
- How could I further illustrate that with diagrams, pictures, or analogies?
- Could I give a real life concrete example that my students can relate to? Could I describe a particular person, in a particular situation, and with a particular context?

When working with science students, I often ask them to spell things out using non-jargon language and invite them to: "Explain it like you would to your non-scientist grandmother" or

"Explain it like you would to a 10-year old." Similarly, I often ask my students for feedback at the end of each assignment and specifically inquire: “How could I make the instructions more clear?”

Accuracy: means that the data or facts are correct and free of errors. In other words, I don’t present misinformation but rather that what I present is reliable–that I can check to verify the statement to be true from reputable, credentialed sources.

> *For example, when I write a grant proposal to request for funding for faculty members to engage the community and recruit students to join our college, I will state that our college enrollment has declined over the past year.*

Precision: means that I am careful to offer specificity–in addition to clarity and accuracy. I can achieve specificity by including more specific information that can further help understand the situation at hand. In other words, specificity ensures that every detail is exact and appropriate qualifiers are used.

> *For example, I will include in my above mentioned proposal that the college enrollment dropped by 19.27% between Spring 2019 and Fall 2021.*

It is important to note that precision doesn’t necessarily mean accuracy. I remind my students that sometimes statistics are thrown at us to distract us and make the conclusion convincing. We could have a precise statement that is backed by lots of statistics, but that statement is not true. It’s important to be mindful of numbers and statistics and what they mean or try to do. Richard Paul says: “Numbers can mystify.”

Relevance: means that everything I include in the argument has a purpose and will make a difference. In other words, if I omit something that is relevant, it will make my thinking erroneous. So, I will present information that relates or impacts the question and not any extraneous information even if it’s true.

> *For example, when I give my students a medical case study about a patient who has liver inflammation, I ask them: “What relevant information do you need to be able to diagnose and offer treatment options?” In this case blood work, especially that which is related to the liver, will be critical, whereas information about the patient’s favorite vacation place will not.*

Why? Because relevant information will help me investigate the relationships between ideas and help me ask further questions such as: “How does that information help me with the issue at hand?” which will ultimately help me answer a question or solve a problem.

Depth: means that my argument is not superficial and aims to acknowledge and investigate the complexity of the issue. In other words, having depth means that I understand the

multidimensionality of a problem and the variables that impact it and thus, I examine the inter-relationships of those variables.

> *For example, if I ask my bioethics students: "Why is there a climate crisis?" and they answer: "Because we use too much plastic these days," that answer might have some truth but it's superficial and doesn't address the multidimensions of the situation.*

Depth can sometimes be related to the intellectual standard of precision - by leaving out depth, the information one presents could be misleading, even if strictly accurate.

Breadth: means that I am able to take all sides and all perspectives related to the issue at hand. In other words, I will consider what different points of views are relevant to the issue at hand and ask further questions. Having breadth means having the ability to think outside the box and allows me to consider the question: "What relevant points have I ignored?"

> *For example, when I present the ethical dilemmas surrounding the topic of abortion, it's important for me to present all perspectives–including those who oppose, support, or are ambivalent about its ethics or legality.*

Logical: means that the argument is reasonable and consistent and the conclusion follows from the evidence. In other words, my argument is logical when everything within it makes sense step by step.

> *For example, my sister asks me to have dinner with her next week and I say yes as long as it's not on a night when I'm teaching. When she asks me to have dinner with her on Wednesday and I say I can't because I teach Wednesday night, my conclusion follows from the premise that I can as long as I am available and not teaching.*

Significance: means that I don't leave out essential facts or significant information within my argument. In other words, I will be intentional to include everything that is indispensable to making my case.

> *For example, when I go through my annual teaching evaluation, I write a self-reflection which includes concrete examples of things I engaged in to help improve my teaching and how I know that those activities have helped improve my pedagogy. When I prepare my reflection, I ask myself: "How is that piece of information crucial in this context?" And, "from all the information I can include, what are the most supportive ones to my case?"*

Fairness: means that I strive toward impartiality and even-handed towards other positions. In other words, I reflect on whether my thinking is balanced and free from implicit or explicit biases. This includes asking questions such as: "Do I have a vested interest in the issue?" Or, "Are my emotions getting in the way of thinking clearly and logically about the issue such that I am not representing other views?"

For example, when I present an argument in favor of including philosophy of science as part of the science curriculum, I will also include the opposing view and why they don't support my conclusion.