Unit 2 The Critical Thinking Process

Learning Outcomes

By the end of this unit the learner will be able to:

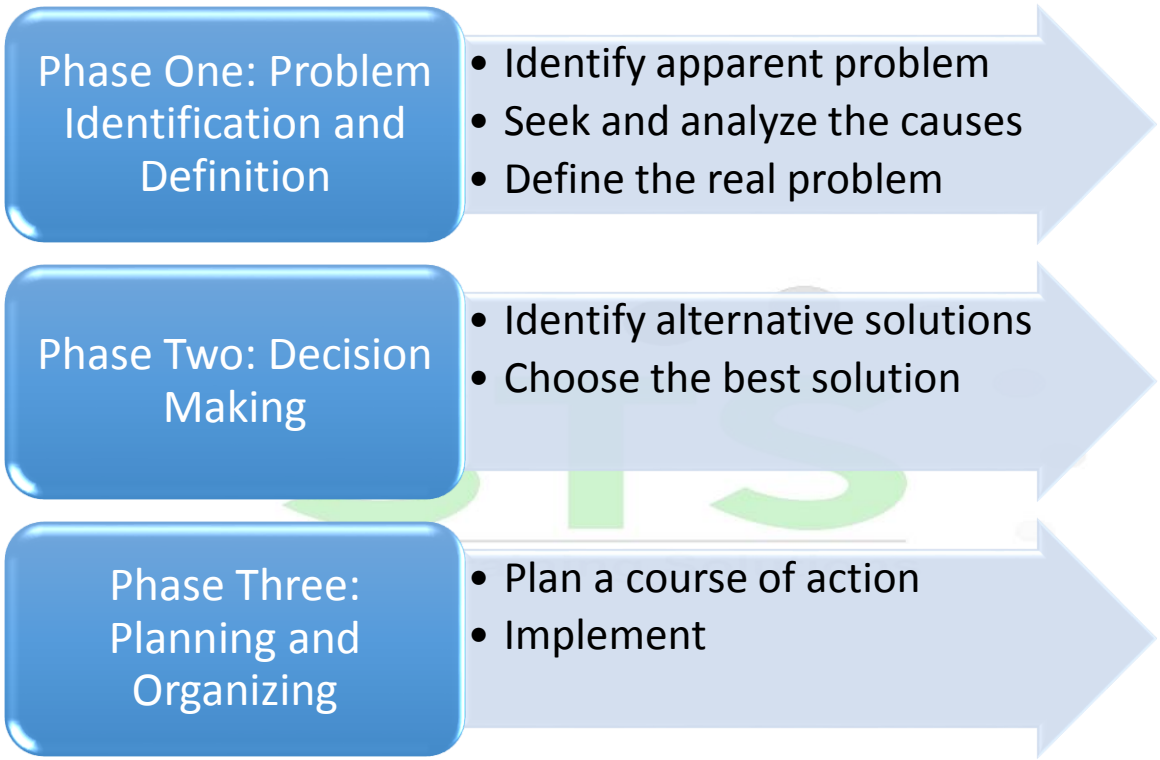
- ✓ Describe other thinking styles, including left/right brain thinking and whole-brain thinking
- ✓ Work through the critical thinking process to build or analyze arguments

Unit 2

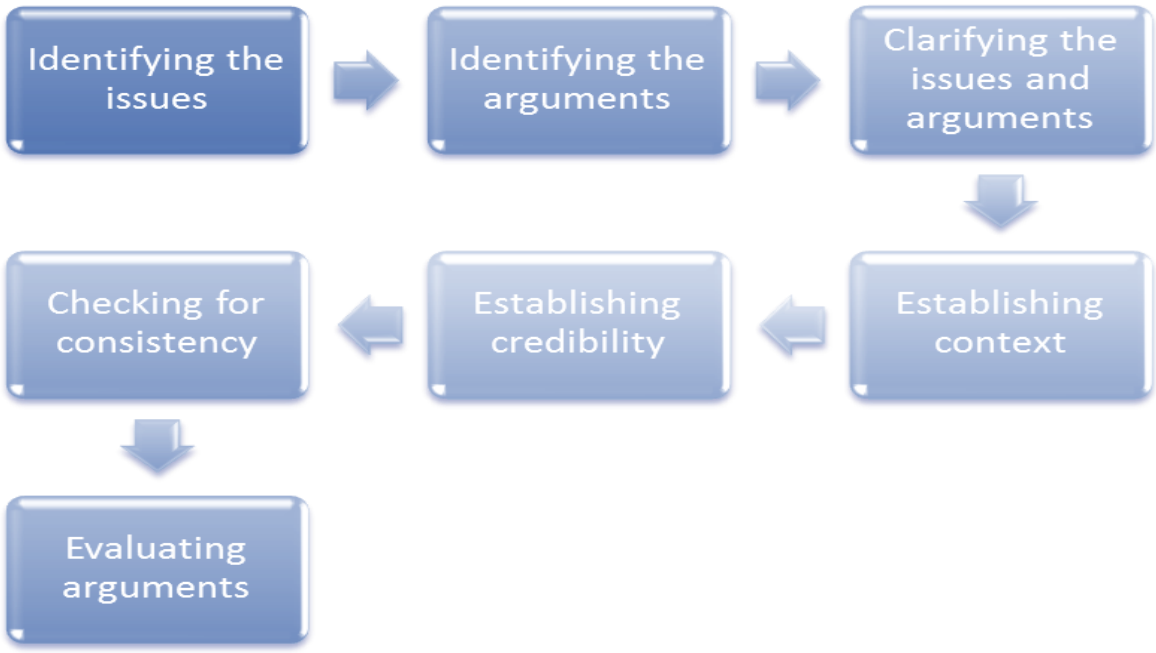
The Critical Thinking Process

The Critical Thinking Model

A typical problem-solving model has three phases:



A critical thinking model has the same basic structure, but focuses on the first two phases. Here is the overall model. We'll look at individual phases throughout the rest of the course.



The Standards of Critical Thinking

According to the Foundation for Critical Thinking (http://www.criticalthinking.org), there are seven standards that critical thinkers should have in their mindset.

Clarity

- Ask for illustrations and examples
- Get hard facts
- Ask the person to elaborate or express the idea in another way

Relevance and Significance

- How does that statement connect to the issue?
- What are the most important parts of the issue, argument, or evidence?

Logic

- Apply common sense
- Connect the dots between the points
- Ask for clarification when points clash with each other

Accuracy

- Look for supporting evidence
- Check and double-check the facts
- Get first-hand information whenever possible

Depth

- Make sure you are not over-simplifying the problem
- Are you covering all the issues?
- Are you covering the most significant issues?

Precision

- Ask for precise measurements (63% rather than "Over half the population")
- Watch out for vague words

Breadth

- Are you looking at all the points of view?
- How could you gain more perspective?
- Look at it through someone else's eyes (your children, your manager, etc.)

Keep these principles in mind as we work through the critical thinking model.

Identifying the Issues

Getting to the Root of the Problem

American inventor Charles Kettering once said, "A problem well stated is a problem half solved." You need to know what issue you need to evaluate before you start evaluating it!

The first step in the critical thinking process is to ask yourself, "What is the real issue?" This can be more complicated than it seems, but it is important to get it right. Remember, an issue can be a problem, a situation, a question, or just about anything else!

Here are some tips for identifying the issue.

- Try writing it as a question that can be answered yes or no.
- Be neutral and objective.
- Review the issue statement with others involved to make sure that you have gotten to the core of the problem.
- If there are one or more issues, separate them out so that you can focus on one thing at a time.

Let's look at an earlier example. A co-worker says, "Joe quit last week because of the changes in how we schedule vacation. I guess we need to overhaul the system."

You could state the issue as: Should we evaluate our vacation scheduling system?

Case Studies

Situation One

- **Situation:** At a meeting, someone says, "E-commerce is a thing of the past. We need to start focusing on Web 2.0 applications."
- **Issue:** _____

Situation Two

- **Situation:** There is an e-mail thread circulating with a customer complaint. This customer is unhappy with the new design of your best-selling widget. Someone replies to the thread with, "We need to re-think this product design or we're all going down the tubes."
- **Issue:** _____

Situation Three

- **Situation:** One of your employees privately says to you, "Our team's workspace is really disruptive and disorganized and it's affecting my productivity. I want it re-arranged right away."
- **Issue:** _____

Identifying the Arguments

Identifying Arguments

Our next task is to identify the arguments for and against an issue, and to identify the evidence supporting each argument. Ask yourself, "Why would a person take that position?" If a conclusion has already been reached, we will want to identify that as well.

Let's continue with our earlier example. A co-worker says, "Joe quit last week because of the changes in how we schedule vacation. I guess we need to overhaul the system."

We stated the issue as: Should we evaluate our vacation scheduling system?

One argument is yes, we should evaluate the current vacation scheduling system. Evidence for this could include facts like the number of complaints about the system from scheduling staff.

On the "no" side, you could have evidence about the phases of change, and point out that no one has had time to get comfortable with the system yet.

Case Studies

Situation One

- **Situation:** At a meeting, someone says, "E-commerce is a thing of the past. We need to start focusing on Web 2.0 applications."
- **Issue:** Should we change our online strategic focus to Web 2.0 applications?
- **For:** _____
- **Against:** _____

Situation Two

- **Situation:** There is an e-mail thread circulating with a customer complaint. This customer is unhappy with the new design of your best-selling widget. Someone replies to the thread with, "We need to re-think this product design or we're all going down the tubes."
- **Issue:** Should we evaluate the current widget design?
- **For:** _____
- **Against:** _____

Situation Three

- **Situation:** One of your employees privately says to you, "Our team's workspace is really disruptive and disorganized and it's affecting my productivity. I want it re-arranged right away."
- **Issue:** Is the current workspace configuration affecting team productivity?
- **For:** _____
- **Against:** _____

Clarifying the Issues and Arguments

Now, look at the issue, arguments, and evidence. Check for uncertainty and ambiguity. This can happen if:

- General words like lots, always, usually are used
- Words can have multiple meanings
- Words are in an incorrect order

Clarify the following statements.

Unclear Statement	Revised Statement
Lots of employees don't like that kind of coffee.	
All the big companies use the Acme 2000 printer.	

Our staff is poorly educated.	
There has been a big jump in customer complaints.	
Our carbon footprint has gotten bigger.	
These hamburgers have gotten smaller.	

Establishing Context

Now that we have a good grasp on the argument, evidence, and conclusions, let's look at the environmental factors around them.

First, let's explore the context of the argument. Questions you will want to ask include:

- What is the presenter's purpose?
- Does the presenter have a personal agenda?
- Does the presenter have a relationship with you that they are trying to change?
- Are they trying to get rid of a problem?
- How was the message conveyed?
- Were others meant to hear it?
- Were they trying to distance themselves from the message? (For example, sending an e-mail rather than speaking to you face-to-face.)
- Whose turf was the message delivered on?
- What other factors are present? (Person's status in the company, recent changes at home or work, etc.)

Let's continue with our earlier example. A co-worker says, "Joe quit last week because of the changes in how we schedule vacation. I guess we need to overhaul the system."

What contextual elements could affect this argument?

If you're having trouble identifying the context of a message, try imagining it coming from someone else or through a different medium.

Checking Credibility and Consistency

Credibility
The next thing that you must evaluate is the argument and evidence's credibility. In other words, can you believe this person or not?

Some things that you will want to find out are:

- How did the person find out the information – first hand, second hand, or beyond?
- What kind of background does the person have about the subject?
- How likely is their evidence?
- Is there other evidence, such as documents or witnesses?
- Does your background and observations support their statement?

Continuing with the example of Joe, you'd probably feel differently about your co-worker's statement depending on whether the co-worker had spoken to Joe themselves or overheard someone else talking about it in the lunchroom.

Consistency
Finally, look through the argument for consistency. This is particularly important for formal reports, long e-mails, or complex documents. You want to look for statements that contradict each other or that are true but not relevant.

Case Study: Changing Cafeteria Offerings
Circle the conflicting statements in the following argument.

I believe that we should change our cafeteria's caterer from McSpud to Fresh Go. Although 90% of our workers are generally healthy and in a good weight range, I feel that Fresh Go offers healthier options. I feel that a healthier workforce will increase productivity and morale. Fresh Go has been in operation since 1979 and offers dozens of different types of sandwiches and salads. They have helped over 50

other companies, and could certainly help the 25% of our workforce that is overweight. Fresh Go is also cheaper and meals can be made faster.

Evaluating Arguments

Finally, we have gathered enough information to evaluate the argument and decide on its strength. The five key questions you will need to ask are:

- Is the evidence straightforward and precise?
- How does the context affect the argument?
- Are all pieces of evidence consistent with each other?
- Is the evidence credible?
- Do all the pieces of the evidence support the conclusion?

Case Study

Background

Congratulations, you have just won 70 million dollars! Now you need to decide what to do with it all. Below you will find a proposal asking for funds. Use your critical thinking skills to evaluate the argument.

Proposal

Dear Lotto Recipient:

I saw that you recently came into a large fortune and would like to propose an endeavor that you might find worthwhile to support. My name is Dr. Annik Bailey. I am a veterinarian and have been with the Foundation for Endangered Animals for almost a year. I have primarily been working in Central Africa, where the bluefin whale is endangered. Many whales are killed each year, primarily due to incurable diseases. A whale disease research center would not only save this precious species, but it would also provide much-needed jobs for the uneducated population in the area.

Thank you for your consideration. I look forward to speaking with you soon.

Yours sincerely,

Annik Bailey

Critical Thinking Worksheet

Issue:
Conclusion:
Evidence:
Analysis: Is the evidence straightforward and precise? How does the context affect the argument? Are all pieces of evidence consistent with each other? Is the evidence credible? Do all the pieces of the evidence support the conclusion?

A Critical Thinker's Skill Set

Asking Questions

Open Questions

These are broad, general questions that require your conversation partner to provide more than just a "yes" or "no" answer. They also permit the other person to decide how much information to give. Open questions typically start with one of the five W's (who, what, where, when, and why) or ask "How?"

Open questions can do the following:

- Give us more information
- Encourage your conversation partner to speak openly
- Encourage people to share opinions and ideas
- Help us determine if people have interpreted what we say accurately

Closed Questions

Closed questions can be answered with a single word or two, such as a simple yes or no. They can begin the closing process in a conversation, or provide confirmation of a detail, but they don't usually lead to a richer conversation or gathering more information. The advantage of closed questions is that they give you control over the questions and the type of answers you receive. Closed questions are easy to interpret and more questions can be answered in less time.

However, closed questions don't allow for detailed explanations or for the other person to share how they feel about a particular circumstance. If you want to dig deeper and get more information, use open questions.

Probing Techniques

When we do not get enough information by using open-ended questions, we can use probes to expand the conversation.

Verbal and Nonverbal Probes

A probe will encourage your conversation partner to add to their previous response. Verbal probes are often a single word or short phrase. Some examples are:

- "Tell me more about that."
- "That's interesting. Tell me more."
- "Really?"
- "Why?"
- "Can you give me a specific example of what you mean?"

Nonverbal probes rely on your body language and gestures to get the same results as a verbal probe. Some examples are:

- Raising the eyebrows as if you are surprised
- Nodding
- Frowning
- Pursing the lips

Probing Techniques

There are many ways that you can use probing in your conversations. We've provided some techniques for you below.

Ask an open question.

Some good questions include:

- "Can you describe that more clearly?"
- "Would you give me a specific example of what you mean?"
- "What do you think we should do?"

You'll soon recognize that if you ask too many of these questions, your conversation partner will feel like they are under interrogation, so use them carefully.

Pause.

Many of us feel uncomfortable when silence overtakes a conversation, and we will fill the silence by expanding on what was said previously.

Use reflective or mirroring questions.

For example, if someone says "Susan quit because she felt underappreciated," you may respond by just reflecting back to them, "Underappreciated?" Then pause. Usually, the other person will provide you with an expanded answer without you asking more questions or interrogating. These kinds of statements also serve to focus or clarify and summarize without interrupting the flow of the conversation. They demonstrate your intent to understand the speaker's thoughts and feelings.

Paraphrase.

Reflect what has just been said in your own words. "So if I understand you correctly, you…" This technique shows that you want to understand your conversation partner and that you want to be accurate. It also allows the sender to hear back what they have said from someone else's point of view.

Use summary questions.

Summary questions are a helpful way of probing and winding up the conversation at the same time. "In summary, you have found that 90% of employees have not received a pay increase in the past 18 months and that 95% of employees have not received a performance review in the past 24 months. Your

research has also shown that 68% of employees would describe themselves as disengaged. Is that correct?"

Summary statements or paraphrases sum up what has been said, and will show that you have listened and absorbed what's being said. Don't use them to take over the dialogue.

The summary is the stronger cue that the conversation is winding down on that topic. However, if necessary or appropriate, you can follow this up with a fact-finding question (usually a closed question), such as, "Did you want to say more about the issue?", or, "Do you have any other suggestions?"

Pushing My Buttons
List of Statements

- I think this city is too hot.
- I really dislike cooking.
- You're not very good at your job.
- I think the report you wrote is terrible.
- Your new hair cut isn't flattering.
- I wish I didn't have to go to that meeting tomorrow.

My Statement

My Probes

Critical Thinking Questions
From the probing exercise, develop a list of useful critical thinking questions.

Active Listening Skills

Active listening means that we try to understand things from the speaker's point of view. It includes letting the speaker know that we are listening and that we have understood what was said. This is not the same as **hearing**, which is a physical process, where sound enters the eardrum and messages are passed to the brain. Active listening can be described as an attitude that leads to listening for shared understanding.

When we make a decision to listen for total meaning, we listen for the content of what is being said as well as the attitude behind what is being said. Is the speaker happy, angry, excited, sad…or something else entirely?

Responding to Feelings

The content (the words spoken) is one thing, but the way that people feel really gives full value to the message. Responding to the speaker's feelings adds an extra dimension of listening. Are they disgusted and angry or in love and excited? Perhaps they are ambivalent! These are all feelings that you can reply to in your part of the conversation.

Reading Cues

Really listening means that we are also very conscious of the non-verbal aspects of the conversation.

- What are the speaker's facial expressions, hand gestures, and posture telling us?
- Is their voice loud or shaky?
- Are they stressing certain points?
- Are they mumbling or having difficulty finding the words they want to say?

Demonstration Cues

When you are listening to someone, these techniques will show a speaker that you are paying attention, providing you are genuine in using them.

Physical indicators include making eye contact, nodding your head from time to time, and leaning into the conversation.

You can also give **verbal cues** or use phrases such as “Uh-huh,” “Go on,” “Really!” and, “Then what?”

You can use **questions** for clarification or **summarizing statements**. Examples:

- “Do you mean they were charging $4.00 for just a cup of coffee?”
- “So after you got a cab, got to the store, and found the right sales clerk, what happened then?”

Tips for Becoming a Better Listener

- **Make a decision to listen.** Close your mind to clutter and noise and look at the person speaking with you. Give them your undivided attention.
- **Don’t interrupt** people. Make it a habit to let them finish what they are saying. Respect that they have thoughts they are processing and speaking about, and wait to ask questions or make comments until they have finished.
- Keep your **eyes** focused on the speaker and your **ears** tuned to their voice. Don’t let your eyes wander around the room, just in case your attention does too.
- Carry a **notebook** or start a conversation file on your computer. Write down all the discussions that you have in a day. Capture the subject, who spoke more (were you listening or doing a lot of the talking?), what you learned in the discussion, as well as the who, what, when, where, why, and how aspects of it. Once you have conducted this exercise 8-10 times, you will be able to see what level your listening skills are currently at.
- Ask a few **questions** throughout the conversation. When you ask, people will know that you are listening to then, and that you are interested in what they have to say. Your ability to summarize and paraphrase will also demonstrate that you heard them.
- When you demonstrate good listening skills, they tend to be **infectious**. If you want people to communicate well at work, you have to set a high example.

Creating Explanations

Defining Explanations

Explanations and Arguments

Another important part of critical thinking is being able to clearly explain why something is a particular way. Instead of trying to persuade someone to a particular point of view, explanations allow you to understand why something happened. Or, you may use the explanation framework to evaluate an argument. Explanations focus on causes, where arguments focus on evidence.

Arguments can be identified by the presence of evidence, such as hard facts or specific events. Explanations can be identified if they appear as an answer to a question. They often appear in the form of opinions, with phrases like “I think,” or, “My guess is…” or, “In my view.” Explanations can, however, be an excellent starting point for arguments.

Mini Case Study

Consider the following **issue**: Attendance has recently been down during quarterly meetings.

- An **argument** could be: A survey of 200 employees shows that attendance is down because the meetings have been moved to Fridays, which is the day that status reports are due.
- An **explanation** could be: I think attendance is down because the meetings have become more boring.

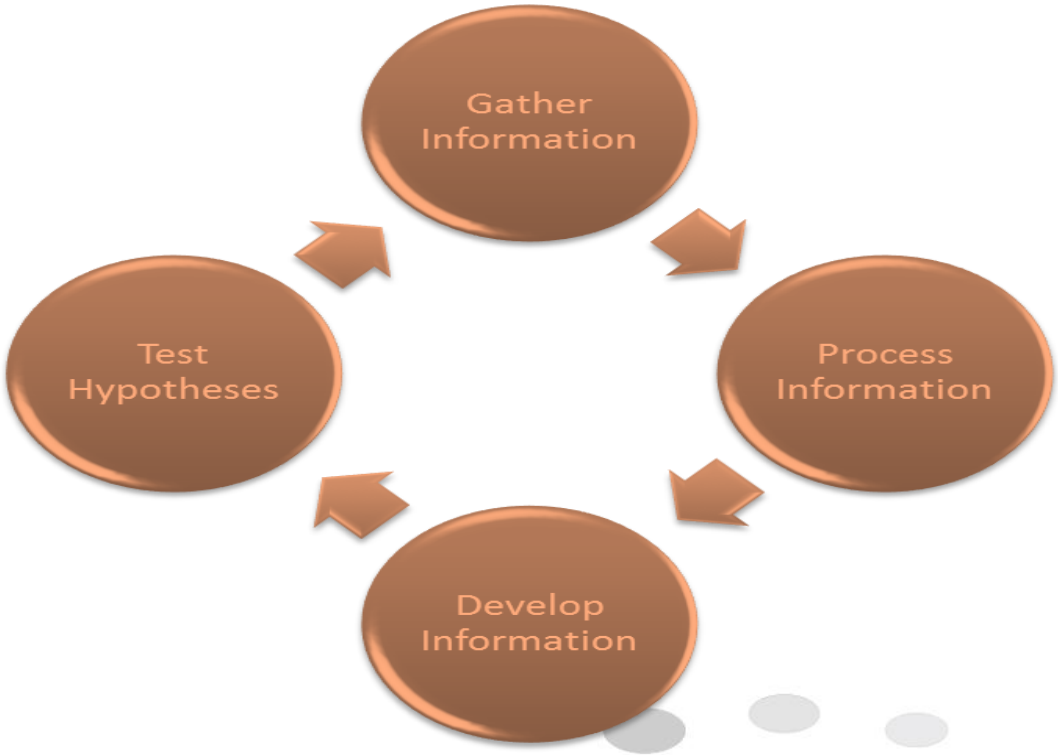
Test your Knowledge

Determine if each statement is an explanation or argument.

Statement	Explanation	Argument
Website traffic has been up 200% since the new feedback system was installed.		
I think the new product hasn’t been successful because of the ugly package.		
My guess is that more people visit our store because we’re in a better location.		
Recent surveys show that 65% of new parents invest in a college fund.		

Steps to Building an Explanation

There is a four-step cycle that you can use to build an explanation.



Gathering Information

To start, gather as much information as possible from as many different sources as possible. Be open-minded and make sure not to discard anything right away.

What kind of resources might be useful in this stage?

Processing Information

Once information is gathered, it must be processed. This means categorizing the information, assessing its reliability and credibility, and comparing and contrasting similar pieces of information. Your goal is to make sense of what is in front of you.

Developing Hypotheses

Now it's time to synthesize the information that you have gathered and process it into some possible explanations. Typically, three to five tentative hypotheses is a good number to aim for: not too few to restrict yourself, but not too many to overwhelm you.

If you're having trouble developing hypotheses, try asking yourself these questions:

- How might someone else explain this?
- Step back from the data and look at the big picture. What does it tell you?

We'll look at some more ways to generate ideas a little later in this course.

Testing Hypotheses

Finally, it's time to test and evaluate your hypotheses. Ask yourself:

- Does this hypothesis account for all the evidence?
- Does the hypothesis make sense? Is it believable?
- Why is it better than the other alternatives?

Based on the results, you may need to return to a previous phase in the cycle.

Test your Knowledge

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Questions

What kind of information might you want to gather?

Where would you look?

How would you process the information?

What kinds of hypotheses might you develop?

How would you evaluate those hypotheses?

Dealing with Assumptions

An assumption is something that you presume to be true. Assumptions help us get through our everyday lives. You wouldn't get very far in your day if you didn't assume that gravity was still present and you kept testing it!

However, when thinking critically, you need to be very careful of assumptions that you and others make. Carefully evaluate assumptions and evaluate whether the person can reasonably make that assumption.

Is it reasonable to anticipate that your ideas (or someone else's) can bear up to the scrutiny of others? That they are actually true?

Common Sense

If it takes ten men four days to dig two holes, and five men three days to dig one hole, how many men and how long would it take to dig half a hole?

Consider this argument:

- All cats have purple fur.
- Shadow is a cat.
- Therefore Shadow has purple fur.

Does the logic follow? Is the argument correct?