Roadmap to Reason

CRITICAL THINKING

Critical Thinking Curriculum
for Life Orientation Grades 7-12










INDEX

“

One of the sure signs of maturity is the ability to rise to the point of self criticism.

MARTIN LUTHER KING

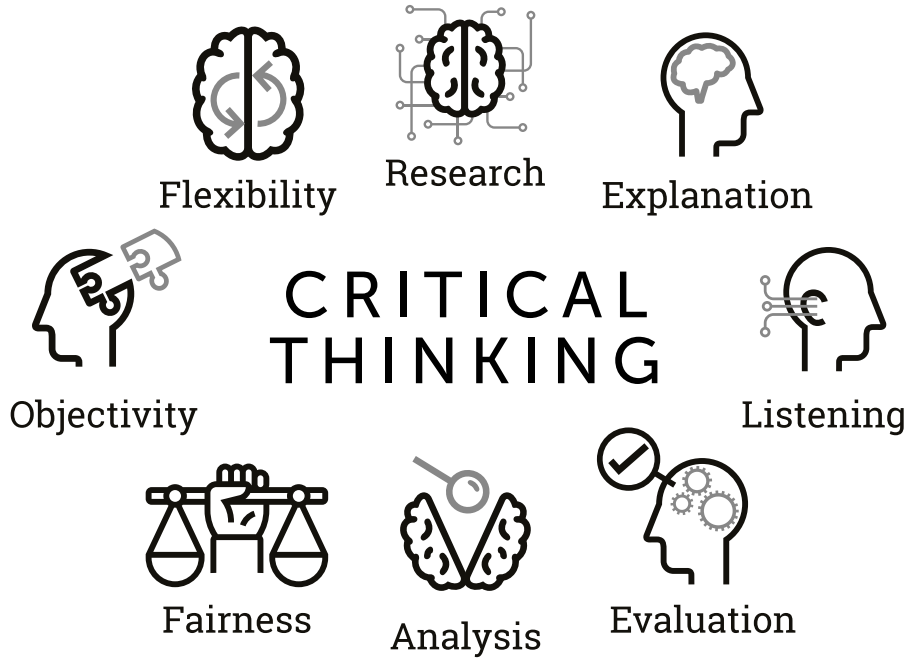
DOEN DO IT

Humanists
INTERNATIONAL

INTRODUCTION

What is Critical Thinking?

Critical thinking is identified as an essential skill in the Life Orientation curriculum. However, there are limited resources available for educators where critical thinking skills are taught explicitly. The purpose of this guide is to serve as a resource for educators to teach critical thinking as a well-defined set of skills that learners can apply at school, home and in particular when engaging with others on social media platforms.



There are many complicated definitions of critical thinking. Critical thinking is a field of study formally taught in Philosophy - a subject that in South Africa is taught only at tertiary level. Most South African textbooks do not teach Critical Thinking explicitly.

The CAPS curriculum states as one of its goals the teaching of Critical Thinking. Let's begin, then, by defining Critical Thinking.

One of the shortest definitions of critical thinking is: the ability to improve one's thinking through implementing self-evaluation.

Self-evaluation is not an activity we usually undertake, yet it is extremely important and, as seen in the definition above, it is at the core of critical thinking.

Critical thinking is usually taught as part of philosophy, and it can get complicated. However, it need not be. In fact, critical thinking can, and has, successfully been taught to children as young as six, especially if the focus is on teaching children the art of self-evaluation.

INTRODUCTION CONT.

> ***"Critical thinkers are clear as to the purpose at hand and the question at issue. They question information, conclusions and point of view. They strive to be clear, accurate, precise, and relevant. They seek to think beneath the surface, to be logical and fair. They apply these skills to their reading and writing as well as to their speaking and listening.***
>
> BELL HOOKS

Bell Hooks
Montikamoss / CC BY-SA

The word *"critical"* in *"critical thinking"*, sometimes carries a negative connotation. Therefore, let's explain by explaining what critical thinking is not, before trying to explain what it is, while also dispelling any negative connotations.

Critical thinking...

- is not being judgemental;
- is not being critical of others and what they think;
- is not being cynical.

Critical thinking is, much like science, a process, a mindset and a skillset.

Critical thinking is about having a mindset of openness; specifically openness to:

- new ideas,
- new people, and
- new knowledge.

Critical thinking can be a complex subject. Fortunately, this resource is not. This guide aims to be an introduction to three principles of critical thinking, based on the short definition given above.

Perception - self evaluation of our interaction with the physical world, through our physical senses, and an evaluation of our senses' input.

Meta-cognition - self evaluation of how we develop our thoughts.

Epistemology - self evaluation of how we get knowledge and how we apply it.

Each of these main topics is divided into lessons.
This guide provides you with:

- an indication of how many contact sessions could typically be spent on the lesson (contact sessions refer to the duration of a school period as on your timetable)
- the background knowledge necessary to teach the main topics;
- detailed content material to use in each lesson;
- instructions for each activity in lessons, and
- assessment materials.

The course has been designed in accordance with the curriculum statements for Life Orientation.

In many cases, the activities can be linked to the First Language curriculum. This can be done at the facilitator's discretion.

CONTACT SESSION

Baseline Activities

Learners and facilitators complete the questionnaire about general knowledge and beliefs about a variety of topics. Feedback will be given on an individual basis, later in the course when epistemology is discussed. The questionnaire can be completed online via link.

Find **Item 1** in Folder

CONTACT SESSION

Critical Thinking Assessment

Online activity or 1 Contact session: Critical Thinking Assessment Questionnaire.

Learners and facilitators complete the questionnaire about critical thinking skills. Feedback will be given in the consolidation phase.

Find **Item 2** in Folder

> ***"Intellectual" in that sense simply means those who are willing to reflect critically upon themselves as well as upon the larger society and to ascertain whether there is some possibility of amelioration and betterment.***

CORNEL RONALD WEST

CONTACT SESSION

Lesson 1: Seeing is NOT believing

Perceptions: How we experience the world

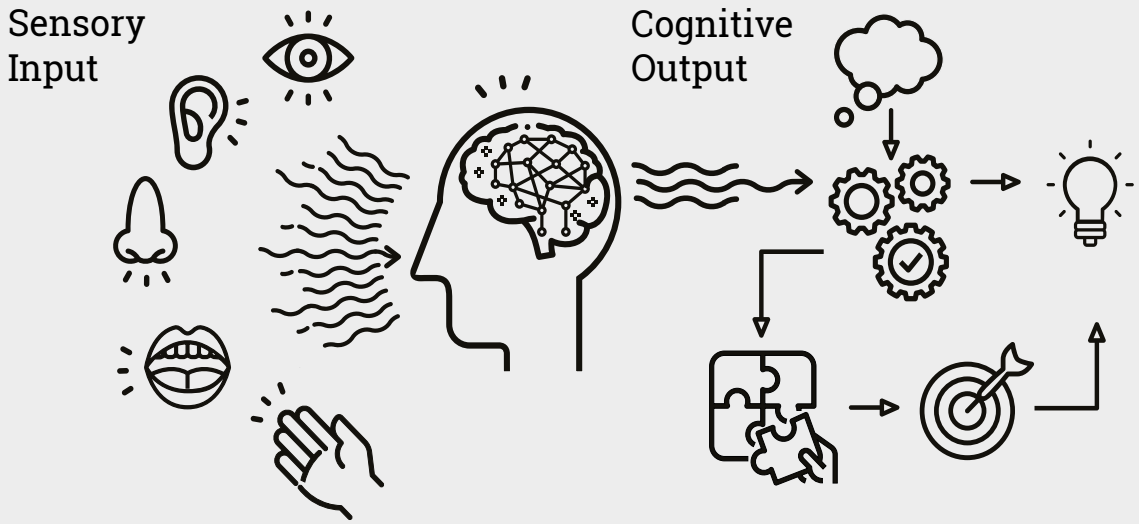
The story that follows captures the main objective of this lesson

My grandfather knew a man who was a braggart of note. He bragged about the beauty of his wife; he bragged about how smart he was; he bragged about how brave he was. Now, my grandfather was born in 1919, which means that he was a young working man in the 1930s. He worked on the railway at the time of this story, in Waterval Boven, in Mpumalanga. The town was the scene of heavy skirmishes during the South African war, and there were many war graves. At the time of this story, there was work being done on a new railway line. Some of the graves had to be moved.

The colleagues of the braggart decided to teach him a lesson. They made him a bet that he would not be brave enough to walk through the area of open graves at midnight. Of course he took them on. On the designated evening, he set off on his adventure. The deal was that he had to beat a stake into the ground at the far end of the gravesite to prove that he had indeed walked the entire distance. Mr Braggart set off. Suddenly, in the dark, familiar objects looked different. The wind sounded different. The movement of the branches of the trees was different. He walked faster. At the spot where he had to plant the stake, he knelt down, took out the hammer and knocked the stake in as quickly as he could. His heart beating, he got up to run back to the safety and warmth of light and heat and company. As he got up, he felt himself being held back. He pulled at the hem of his long coat – it was a very cold night – but whatever, whoever, had gotten hold of him wouldn't let go.

Fortunately the man's colleagues went to look for him when he didn't return, or he would have frozen to death out in the veld. When they found him, he lay, fainted, next to an open grave. The stake was hammered through the hem of his coat, deeply into the soft ground.

Most ghost sightings and encounters with aliens are easily explained in the light of day. Our senses are easily fooled. That is why the first step to developing critical thinking skills involves examining how easy it is to fool our sensory systems, and thereby come to incorrect conclusions about the nature of reality.



Background

In his book “Why we believe strange things”, Michael Shermer explains how all experience happens through our brains.

No brain = no experience = no thinking

When our sensory organs (eyes, nose, skin, tongue, ears) receive stimuli from the environment, our brains process this information through our nervous system. That processing is not foolproof.

How we perceive the world

Blind spot
We have a visual blind spot that our brains “complete”.

Pattern seeing
Our brains are extremely good at seeing patterns – even when there is no pattern. We are especially good at finding patterns that remind us of human faces. It seems that we are born with the ability to recognise human faces. Even new-born babies respond to pictures of human faces - probably because responding positively to human faces is essential to their survival. The human tendency to see “faces” in inanimate objects is so common that it has been given a name — pareidolia.

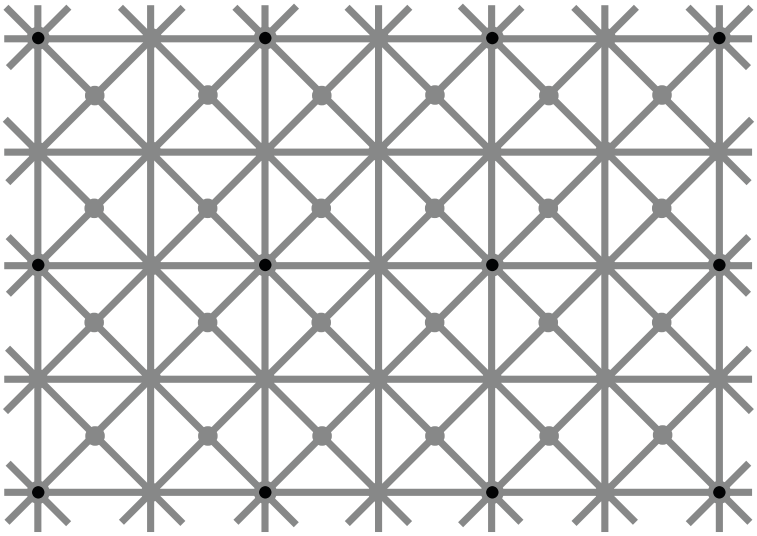
Video reference
https://www.livescience.com/39578-why-some-hate-broccoli.html

Taste and smell
The ability to taste and smell certain molecules is genetically determined. What we experience as taste is a complex chemical interaction. There are people who do not have receptors to react to certain chemical compounds. This means that when someone likes or dislikes a certain smell or taste, they experience it differently from those who do have the required chemical receptors. There are people with a greater sensitivity to the chemicals in broccoli, for example. To people with these chemical receptors broccoli has a bitter taste.

Individualised experience
We can only experience the world through our individual sensory system, and that is determined by physical aspects such as our biology, biochemistry and many non-physical aspects such as personality, previous experience, cultural background and age.

Video
http://www.theinvisiblegorilla.com/gorilla_experiment.html

Limited attention
When your focus is on one corner of a room, you are only aware of what is happening in the other corners vaguely, if at all. We cannot multi-task as far as our attention is concerned. That is why it is dangerous to text while driving.



The trick presents a series of crisscrossed lines with black dots at the corners. However, your brain doesn't allow you to see all of the 12 dots at the same time

Activities with learners

Activity 1
Goal: what we experience may be "real", but how we interpret it, may be incorrect.

1. Begin the lesson by sharing the story with learners.
2. Point out what the man experienced with his senses: cold wind; strange shapes; being "held" back.
3. Contrast what he experienced with what actually happened. Be sure to point out that his experience was changed by his beliefs about ghosts.

Activity 2
Goal: to illustrate our difficulty with perceiving accurately because we can only focus on one thing at a time.

1. Prepare for this lesson by wearing noticeable accessories, like a hat or jewellery.
2. Begin the lesson by greeting learners. Then draw learners' attention to something outside the classroom. While their attention is diverted, change something fairly conspicuous about your appearance, like removing an accessory.

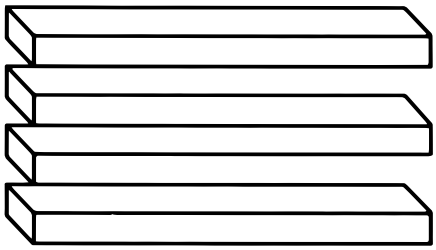
3. Continue as though nothing had happened until a few minutes have passed, then ask learners if they notice something different about you.
4. Discuss how many learners noticed the change, and how many didn't.
5. Give the example of inaccurate witness testimony as described by Prof Elizabeth Loftus. Show how this is relevant in court.

Videos
https://www.youtube.com/watch?v=VkrrVozZR2c

https://www.psychologicalscience.org/teaching/myth-eyewitness-testimony-is-the-best-kind-of-evidence.html

Activity 3
Goal: Shifts in focus cause shifts in behaviour.

1. Take the learners outside. Ask each of them, in turn, to walk at a certain pace from point A to B, that has been marked out with beacons. The distance should be at least 15m. Indicate a fairly fast pace by clapping your hands. Time them with your watch or phone stopwatch app.
2. The first time a learner covers the distance they just walk at the required pace.
3. The next time they cover the distance, they have to calculate the sum of two double digit numbers, while walking at the required pace.
4. Notice if they walk more slowly once they start working on the calculation. (For younger learners, this activity may be used to do Maths drills to enhance their Maths skills).



Activity 4
Goal: Nobody has perfect awareness, therefore we cannot trust our ability to recollect events 100%.

1. Divide learners into three groups: players, umpires and observers. Depending on the number of learners in your class, there should be one umpire for every two teams of players, and at least 3 observers for every umpire.
2. The players play a game of their choice (soccer or netball works best). The umpire has to act as fair referee. The observers have to make notes of how many mistakes the umpire does not respond to.
3. After a few minutes, swap roles.
4. Discuss:
   i. what it felt like to be umpire
   ii. was it easier or more difficult to be an observer or an umpire
   iii. how players interpreted instances where the umpire did not see mistakes.

“

Knowledge rooted in experience shapes what we value and as a consequence how we know what we know as well as how we use what we know.

BELL HOOKS

Integration with Curriculum Statements

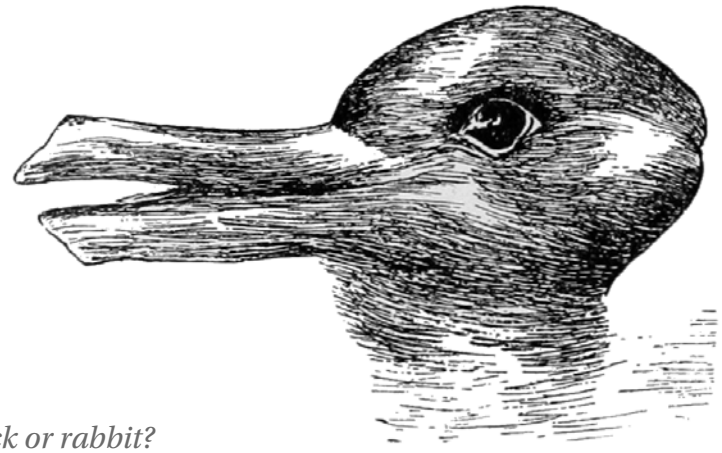
Stress, and how to handle stress, is dealt with in the Curriculum Statements. Learners should know that stress influences our ability to observe and remember what we observe. Our physical systems, including recall or memory of observations are influenced by stress. Critical thinking helps one to deal with a variety of stressors by bringing some objectivity into consideration.

Video
http://www.theinvisiblegorilla.com/gorilla_experiment.html

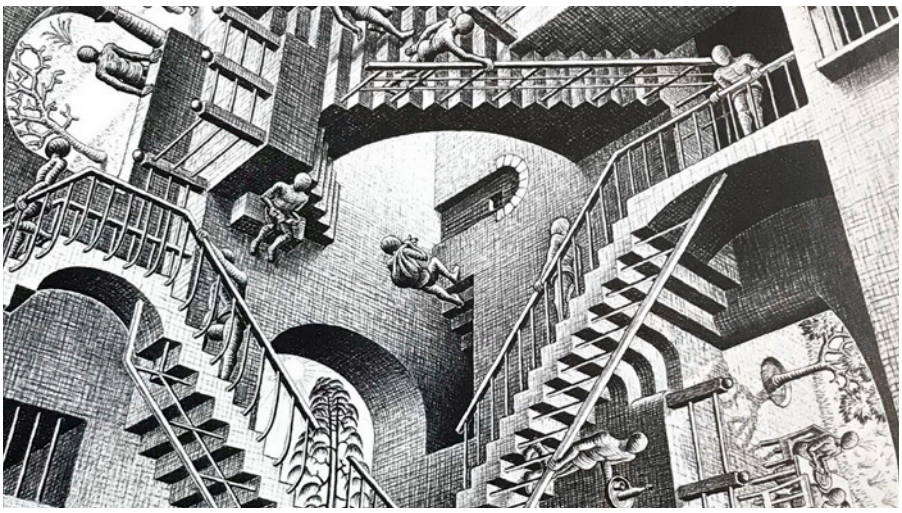
For more sophisticated/older learners

Discuss the blind spot in our visual system and how it impacts on driving. This link provides insight into the dangers of texting and driving. Discuss this information with learners in grades 10-12.

An important aspect to point out to learners is that we can disagree with someone about the accuracy and/or quality of their experiences, but not about whether or not they have experienced something in a particular way. The experience that each person has is real to that individual, but it might not be an accurate reflection of the reality outside of us.



Duck or rabbit?



Which way is up? (M.C. Escher's "Relativity" lithocut)

Images source
http://creativity103.com are licensed under a Creative Commons Attribution 3.0 License.

Lesson objectives

At the end of this lesson learners must be aware of the following:

1. Our sensory system is imperfect;
2. When interacting with people, remember that what you experience is not always exactly what the other person experienced;
3. Acknowledge the other person's experience as valid for that person, even though it might not be accurate.

CONTACT SESSION

Lesson 2: Perceptions And Point Of View

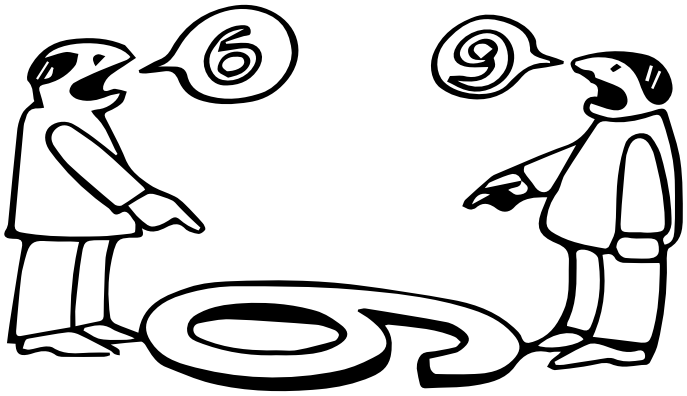


Image source: *pixy.org Copyright: CC0*

Background

In the previous lesson we focused on how we process the outside world. This lesson will focus on the interactions between people who have different responses to the same stimuli.

When two people talk about taste, and smell, and what they see in a picture, it is easy to acknowledge that each has a different perception.

The purpose of this lesson is to:

- illustrate with visual illusions how different people see different things in the same image
- illustrate with visual illusions how our own perceptions shift – we can sometimes see more than one image, at other times, only one.
- use the visual illusions as a metaphor for human situations and interactions. (Integration: the term metaphor is used in Language of Learning and Teaching (LOLT) (English). For younger learners it might be necessary to explain it again if they have not yet covered it in English. If it is the first time learners are taught the word, point out that when they cover this content in EFAL or English Home Language, it will not be unfamiliar).

CONTACT SESSION

> ***In any situation there are three points of view: yours, mine and the truth.***
>
> ANONYMOUS

Activity for Lesson 2

1. Make copies of the images as provided.
2. Each group of learners is given an image to work with.
3. The members of the group discuss what each individual sees.
4. Each group gives feedback on what they saw – whether they all saw the same image, different images etc.
5. Finally, if possible, show the class the video with the illusion
6. and discuss, with the class as a whole, what is seen in each image.

Remember

- *in general no-one can be 100% certain that they have access to the truth;*
- *in conflict situations, it sometimes helps to remove ourselves from a situation to get a better perspective; and*
- *don't take debates too personally - what the other person says or believes might be different from what you believe. That's alright; it does not make the other person a bad person, or even wrong. You might be wrong.*

The only way to decide a debate is by agreeing on how you decide it. Usually the best way is to turn to the scientific method: measure, experiment or test, measure again. We all have eyes and ears, but they can be deceived; that is why in science we use measuring tools like rulers, protractors, thermometers, stopwatches, etc.

Conversation guidelines

Ask learners to give examples of situations where two or more people "see" the same situation from different points of view. This activity can be done for any age group. The examples of situations that they give will differ. This activity is useful to facilitate discussion on conflict resolution as outlined in the curriculum statements.

Make sure that learners understand that this is a "visual" skill that can be employed in subjects such as Art and Mathematics (Geometry for example), but also a thinking skill, because it requires practice to change one's view of a situation.

Talk about the point of view, and how to tell which point of view is more, or less, justified.

Grading

For older learners, discuss the terms "objectivity" and "subjectivity". This can be linked to Language by using examples of different narrators and narrative points of view.

Integration with Curriculum Statements

This is applicable to conflict management; personal relationships; making decisions and adapting to change.

Links & resources

Vox, Aug 5, 2015, Why you're seeing a face in this purse
https://www.youtube.com/watch?v=E1dMloUfN1o

CONTACT SESSION

Lesson 3: Meta-cognition

Background

In the simplest possible terms, meta-cognition can be defined as thinking about one's thinking. Studies have shown that after taking into account all other variables, a learner's meta-cognitive ability is the most important factor that determines academic progress.

A learner that functions at a high meta-cognitive level will:

- be aware of what he knows and/or understands,
- be aware of what he doesn't know and/or understand, and
- be able to take appropriate action if he realises that his knowledge is insufficient, and/or he has trouble understanding learning material.

For example, he will realise when his attention begins to wander during a lesson, which will enable him to adapt his learning behaviour.

On an interpersonal level, people with high meta-cognitive skills are able to act with greater understanding in a variety of situations.

For example, the person that is meta-cognitively capable, will realise that she is feeling irritable because she is hungry, or has a headache, and won't immediately attribute her feelings to the person with whom she is interacting. Such an individual is able to recognise when she has negative feelings about any individual, is able to determine what the cause for such feelings, and has greater success managing such feelings. It is clear that persons with these skills are an asset in any situation because they are able to defuse conflict.

The main objective of this lesson is to introduce learners to the terminology.

Begin by explaining that 'meta' is a prefix, and that it is used to mean "about/concerning" (but literally in Greek means "past/after").

For younger learners it might be necessary to revise terminology such as 'prefix'. This content can be integrated with the language curriculum.

Next, explain the meaning of the word 'cognition'. The word cognitive means "connected with thinking or conscious mental processes".

Integration with Curriculum Statements

This integrates with content about stress management; planning for one's future; study skills; and making healthy life choices.

CONTACT SESSION

Activity 1 for Lesson 3

Main objective: To make learners aware of their thought processes:

1. Set a timer for 30 seconds, and give learners the following instruction: “For the following 30 seconds, think about anything except ice cream.”
2. Allow learners to discuss how successful they were at the task.
3. Set a timer for one minute, and give learners the following instruction:
4. “Think about only about ice cream for one minute”.
5. Allow learners to discuss how successful they were at the task.
6. Suggest to learners that they start a “diary” in which they write down their thoughts, and trace how they came to think the thought that they wrote down. The same can be done with conversations – it is entertaining to note what a group of people ends up talking about, and tracing the topics back. So for example, one can begin to talk about the weather and end up talking about cars.

CONTACT SESSION

Activity 2 for Lesson 3

Give learners the set of instructions below. This activity works best if learners have to copy the instructions.

Instructions on how to brew the perfect cup of coffee from freshly ground beans.

Step 1 Prepare your ingredients and appliances you will need
Step 2 Grind one ton of coffee beans
Step 3 Fill the bathtub and set alight
Step 4 Add coffee grounds to the vinegar
Step 5 Get the correct temperature of the vinegar
Step 6 Blooming is where you wait for the flavours to mix
Step 7 Begin your brew pour by slowly moving the water from the bathtub into your cup
Step 8 End your brew pour by wiping the spoon with a towel
Step 9 Remove the coffee grinds
Step 10 Serve and enjoy

Ask learners:

- if they feel confident that they can follow the instructions, or if they feel lost
- if they were aware at which point – let them give the exact number in the process when they began to feel lost. They should have realised that something was off at step 2 - one ton of coffee beans for a cup of coffee?
- to indicate if they know WHY they began to feel lost.

The goal is for learners to become aware of what happened in their minds while they were busy with the task. You also want to make them aware of the exact point at which they became lost, which in this case will be the point in the instruction where you inserted the nonsense information. You want learners to realise the moment when they encountered the nonsense information.

Integration with Curriculum Statements

This is applicable to dealing with change; making positive life choices; effective communication.

Find **Item 3** in Folder

CONTACT SESSION

Lesson 4: Stereotypes & Assumptions

Background

The word stereotype has two parts – stereo and type. The origin of "stereo" is the Greek word stereos, meaning solid. Therefore the word stereotype can be described as meaning "solid type". This gives a clear idea of what we do when we stereotype people – we cast them into a type in such a way that our idea of them becomes fixed – like a solid block of ice. It is unfair to the person who has been stereotyped as well, because you are not giving them the option to act "out of type". In effect you treat them in a way that you expect a stereotyped person to behave, and they will probably respond with the expected stereotyped behaviour.

Ask learners to give examples of times when they were right about their solid idea of someone.

Discuss with learners a time when their solid idea of someone was wrong.

Stereotyping literally means that you cast people in a fixed mould. This is never fair. People are multi-faceted individuals with complex stories to tell. When you fix a person into a solid mould, you are unfair to that person. You are also unfair to yourself. You are unfair to yourself because you are losing out on the chance to get to know a complex, interesting individual.

If you allow your response to people to be determined by your fixed idea of who and what they are, you run the risk of acting inappropriately towards them, and you miss an opportunity to expand your own horizons. The following activities are provided will explore the risks of stereotyping.

Breaking free from stereotypes

CONTACT SESSION

Activity for Lesson 4

Use images to show learners stereotypical ideas of people. The images will make them aware that we stereotype people almost automatically. We cannot prevent this tendency if we are not aware of it. This activity can be done verbally or on a digital platform. This is a risky exercise that would need to be handled with care. Steer clear of presenting race and gender stereotypes. There is a big risk that this will exacerbate stereotypes. Rather a suggestion here would be to take, for example, photographs of people in adverts in a newspaper, and ask what message each picture is saying about each person. Adverts often make references to stereotypes in an attempt at humour.

Lesson objectives

Stereotypes create solid pictures. Solid ideas of people cause problems in a fluid and flexible world. Stereotyping prevents us from adapting and growing in how we evaluate and respond to people and refuses those people the opportunity to be fluid and flexible.

> ***Human nature is not simple and any classification that roughly divides men into good and bad, superior and inferior, slave and free, is and must be ludicrously untrue and universally dangerous as a permanent exhaustive classification.***
>
> WEB DU BOIS

CONTACT SESSION

Lesson 5: Biases

Background

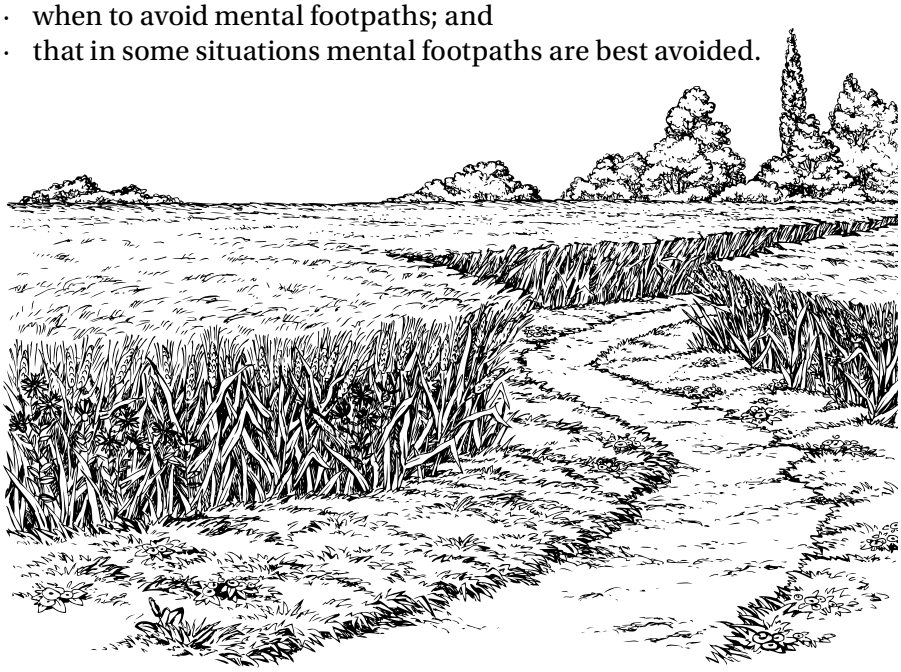
In the previous section, we dealt with stereotypes. Stereotypes lead us to be prejudiced in various ways. “Prejudice” simply means to judge prematurely, to prejudge. It means to think we know the answers before we ask.

The world is a complex place, and we often have to take shortcuts when making decisions. Most of the time, this is necessary and time-saving. One can think of bias as a footpath of thinking. A lot of the time it works out fine.

Imagine that you live in an area where there is open veld, and a shop. There is a footpath over the veld. When you buy one can of baked beans, it will be easy to use the footpath. But sometimes not. Because if you are pushing a shopping trolley full of groceries, it will be much easier and faster to use the longer route, along the pavement. Even though that route is longer, you will probably be home sooner.

The main objective of this lesson is to teach learners:

- where their mental footpaths are;
- when to avoid mental footpaths; and
- that in some situations mental footpaths are best avoided.



Bias causes trouble because it is a premature judgement. That means that you make the judgement before you have all the relevant and/or correct information. When choosing what to wear, bias might not have major consequences. When choosing who to marry, or whether to change jobs, who to vote for, or what to believe about vaccines, bias might have disastrous negative results.

Biases are so much part of the way we think and interact with the world, that we are often not aware they exist. If one always follows the same footpath, one might forget that there is a pavement , in other words.

Another analogy would be to imagine that you were born with a pair of glasses that tints everything green, fixed to your face. You are so used to having the glasses on your face that you don't realize they are there. You are so used to seeing the world through those glasses, that to you, that is "just the way things look." If you grew up in a world where everybody had green tinted glasses fixed to their faces, you wouldn't be aware that there are people who don't have green glasses on their faces, or that the world looks different without them.

We all wear these metaphorical glasses.

No human being can ever be completely free of bias. The best we can do is to learn how to spot our biases. We can do this when we learn that the "glasses on our faces" are there, and that they can be removed – they are not permanent. Realizing that we have tinted glasses stuck to our faces, and learning how to remove them, is an important part of developing critical thinking skills, and is a form of metacognition.

Psychologists, cognitive scientists and philosophers have identified numerous types of "cognitive" biases. These are biases (prejudgements) based on false, incomplete or incorrect information, that come into effect when we apply our minds to situations that require thinking.

In this course we will neither list, nor begin to study in depth, the many cognitive biases. We will look at only three, and give practical examples of how they manifest.

- Confirmation bias;
- Barnum effect– as a demonstration of confirmation bias; and
- Optimism bias.

Facilitators and learners who want to learn more can research the following common biases:

- Anchoring bias
- Availability bias
- Commitment bias
- Representative thinking
- Congruence bias
- Actor/Observer bias and
- Effort bias.

External reference
www.yourbias.is

Confirmation bias

Consider this statement:

Men believe that they always put down the toilet seat.

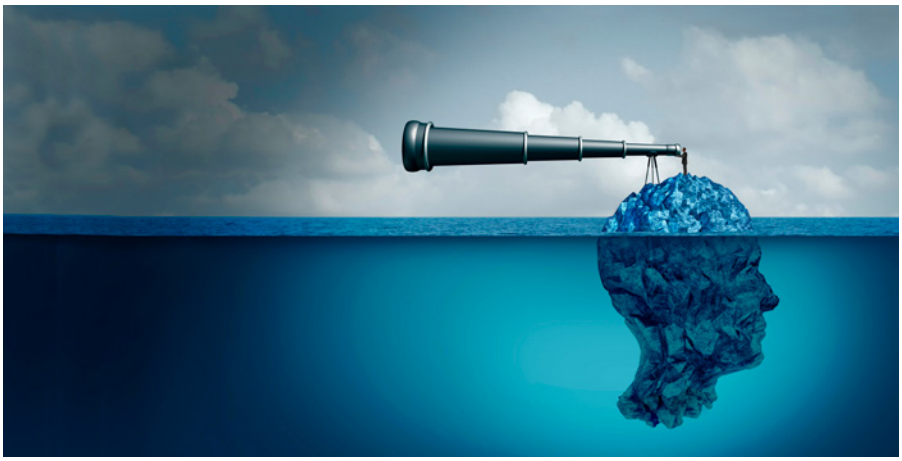
Now consider this statement.

Women believe that men never put down the toilet seat.

Both are right. And both are wrong. Men remember the times they DO put the seat down. Women remember the times the seat wasn't put down.

How many arguments happen in households because of confirmation bias?

This type of bias is extremely common. It means that we notice events that support what we believe, and disregard, or do not notice, events that do not confirm what we believe.



We are blind to our own biases...

CONTACT SESSION

Activity 1 for Lesson 5

Do the activity before you give the class any information about the topic.

Other examples of statements that can be used include:

> *"The All Blacks rugby team plays dirty."*

For older learners use statements like:

> *"Older people don't understand social media."*
>
> *"A degree acquired at a major university is essential to building a successful career."*

Identify the people that support the statement. Ask them to give examples, that support their belief. Then ask those who oppose the statement to give examples that support their (opposing) belief.

Integration with Curriculum Statements

This integrates with the goals of adapting to diversity; democracy and human rights; traditional practices of diverse communities.

"

Once you change your philosophy, you change your thought pattern. Once you change your thought pattern, you change your attitude. Once you change your attitude, it changes your behavior pattern and then you go on into some action.

MALCOLM X

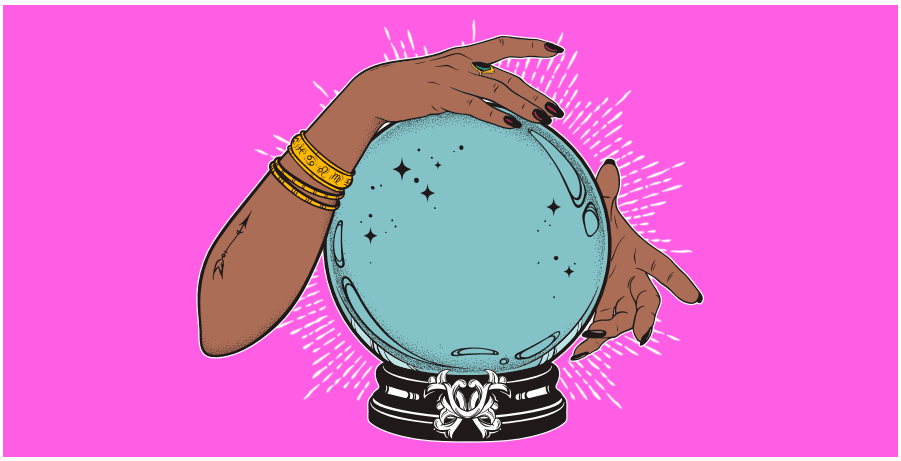
CONTACT SESSION

Activity 2 for Lesson 5 - Barnum Effect

External reference
https://www.britannica.com/science/Barnum-Effect

The Barnum Effect is an example of confirmation bias. Do the following activity to illustrate this to the learners.

- Learners are given a "personality test". (This will be provided by the course facilitators/authors.)
- Once they've done the test, pretend to "calculate" their results.
- Each learner is given what they believe to be an individual "result".
- Get learners to evaluate the accuracy of the results of their tests. They should record their accuracy rating in their workbooks - or electronically if possible.
- Once their evaluation has been recorded, ask learners to pass their results sheet to the person behind them.



Fortune tellers, astrologers & psychics are masters at the Barnum effect

They should soon see that everybody's results are the same - yet everybody probably rated their results as mostly accurate. The reason for this is that the results are general enough to allow for every person to see something accurate in them. This is how astrology, for example, works. We do this because we "remember the hits and forget the misses."

As an additional activity, let learners bring examples of astrological predictions from popular newspapers to class. Point out that these "predictions" are so vague that they can apply to anybody.

For older learners, let them do research about the origin of a famous personality test like the Myers-Briggs. They should find that even a test like this one, that is used by organisations all over the world, is to a great extent based on confirmation bias.

Find **Item 4** in Folder

Dog

Cat

Motorbike

Person with tattoos

CONTACT SESSION

Activity 3 for Lesson 5

Thinking about your beliefs, so that you can reflect on your cognitive biases.

Learners write down their beliefs about:

- Dogs
- cats
- bikers
- snakes
- people who have tattoos

(It is often fun if the facilitator also writes down his/her beliefs and shares them with the learners)

After this session of lessons learners must know:

- what biases are,
- how they skew thinking, and
- how biases influence our responses and behaviour.

Instruct learners to begin each belief statement with: "I believe that dogs….. (Learners don't have to put their name on the page with their belief statements.)

Once each learner (and the facilitator) has written their belief statements, the facilitator lets learners swap statements. It is preferable that the swapping is done randomly so that friends do not read one another's belief statements. The facilitator should also emphasise that no beliefs are to be criticized or ridiculed.

Images: *Creative commons from pexels.com*

Optimism bias (Wishful thinking)

Begin the lesson, or this part of the lesson if it is in the same contact session, by asking learners what the odds are of any individual winning the lottery.

When the lottery payout is very big, the number of people that play increases dramatically. This reduces the chances of any individual to win but, because of our optimism bias, we still buy that ticket. The more we want to win, or need that money, the harder it is for us to follow reason, and remember that our chances of winning are minuscule. That is optimism bias. We hold the belief that wishing it so, or having "lucky numbers" (!) will make it so.

External reference
https://www.smartluck.com/free-lottery-tips/southafrica-lotto-652.html

About South African Lotto Game

The Republic of South Africa Lotto started on March 11, 2000 (as a 6/49 game) and in August 2017, the game added more numbers to become a 6/52 lottery.

- **HOW TO PLAY THE GAME**: To play South African Lotto, choose **six** numbers from **1 to 52**.
- **COST**: Each lotto game board costs **R5.00**. For additional costs, a player can also play South Africa Lotto Plus #1 and #2, extensions of the South Africa Lotto game.
- **DRAWINGS**: The drawings are held twice a week on **Wednesday and Saturday**.
- **TO WIN THE GAME**: The South Africa Lotto draws the **6** winning numbers plus a **bonus** number which provides more ways to win if a lotto player misses 1, 2, or 3 of the main numbers and gets the bonus number.
- **ODDS**: The odds of winning the first prize RSA Lotto jackpot are **one in 20,358,520**.
- **JACKPOT PRIZE**: The jackpot is **$10,000,000**.

CONTACT SESSION

External link
https://businesstech.co.za/news/wealth/257031/why-playing-to-win-the-r61-million-powerball-is-the-worst-bet-you-can-make/

Activity 4 for Lesson 5 - Saving for Lotto

Based on the odds of winning the Lotto, let learners calculate how much money they will have if they put R10 in a jar each Friday, compared to how much they will have if they buy a Lotto ticket each Friday.

Discuss the content of the article with learners from Grades 10-12.

Find **Item 5** in Folder

Integration with Curriculum Statements

This integrates with the role of the media; democracy - recognising fallacies in our own reasoning and that of others contributes to having constructive conversations about difficult topics.

CONTACT SESSION

Lesson 6: Fallacies / Part 1

Background

Fallacies are different from biases because they are not errors in perceptions or memories, but errors in logical thinking. Fallacies are also different from biases in that they are almost always involved when we make arguments.

Fallacies are studied in logic, a sub-section of philosophy.

There are formal and informal fallacies, and there are probably hundreds of identified fallacies. For the purposes of this course, we will give a brief introduction to the most common fallacies. Note that some fallacies have Latin names. In this course we will use the Latin names because they are used in other languages in their Latin forms.

If time allows, facilitators can teach this section to learners from Grades 9 to 12. It will help learners to expand their vocabulary. Facilitators can also just read this for their own information if there is not enough time to teach it to learners.

Latin was the language spoken in ancient Rome, which colonised most of Europe around 2000 years ago Many English and Afrikaans words we use commonly today have their origins in Latin, as a result. Unfortunately the history of African languages has to a large extent been lost during colonial times. Many prefixes in English, such as the following, come from Latin.

pre - before
post - after
anti – against
ambi – both
ab - apart, away from
ad - towards
tri - three

Learners can learn these prefixes and their meanings. This will help them to figure out the meaning of some new words they encounter in texts.

This list of English words that have their origin in Latin will help learners to understand words they encounter in subjects such as Maths and Life Sciences, and why we say some words in English come from Latin. Here are some words from Latin:

aqua - aquatic *(found in water)*
fama – fame
figura – figure
herba – herb
pirata – pirate
schola – school
radius - ray
femina – feminine *(like a woman)*
trans – over
port – carry
salis – salt
gemma - jewel
luna – moon *(lunar phases)*
inter - between
scientia – knowledge *(science)*
medicus – doctor *(medical, medicine)*
minor – small *(minus in Maths)*
difficilis – difficult
expirare – expire
plus – more
urbs – urban *(of a city)*
plumbeus – lead
pipes were made of lead, therefore a plumber is someone who works with lead pipes
post – after
extra – outside
mural – of a wall

To return now to fallacies with Latin names, the fallacies we shall discuss are:

1. *"tu quoque"* (sounds like */too kwo kway/*) – means "you too"
2. *"post hoc ergo propter hoc"* – "after this, therefore because of this"
3. *"ad hominem"* – "at the man" (attacking personally)
4. false dilemmas

Before one can discuss fallacies, learners have to know what an argument is.

Most of us use the word argument to indicate that there is fighting over something. This is the colloquial (common) meaning of the word. In the critical thinking context, however, the word argument has a positive meaning. An argument means using facts to build a case for or against; like you see lawyers making a case to argue to a judge. Critical thinkers are people who are able to build a case, and express their reasons for their opinions clearly, even to people who might potentially disagree with them. An important feature of a true critical thinker is to be able to make a case and an argument without becoming emotional about it, and without getting angry with someone who does not agree.

CONTACT SESSION

Activity 1 for Lesson 6

Video
https://www.youtube.com/watch?v=xpAvcGcEc0k

For older learners (Gr 10-12)
Watch the video *"The Argument Clinic"*.

After watching the video, let learners define in their own words what an argument is.

This can be a written exercise that can be used as assessment.

For younger learners:

Individually, pairs or groups, let them build an argument to support one of the following cases:

1. School uniforms should be scrapped.
2. Breaks should be longer and more often.
3. Homework should be scrapped.

Their "case" – their argument — should include at least three points: a premise, a supporting premise, and a conclusion. If possible, let them collect evidence to support their case.

An example of an argument is as follows:

Bob is a man	*Premise 1*
All men are mortal	*Premise 2*
Therefore	
Bob is mortal	*Conclusion*

This is is an example of what we call a "formal" argument.

Find **Item 6** in Folder

"

My father used to say, "Don't raise your voice to improve your argument."

DESMOND TUTU

CONTACT SESSION

Lesson 7: Fallacies / Part 2

Background

The fallacies to be explained are:

1. *"tu quoque"* (sounds" like /too kwo kway/) – means "you too"
2. *"post hoc ergo propter hoc"* – "after this, therefore because of this"
3. *"ad hominem"* – "at the man" (attacking personally)
4. false dilemma

Tu Quoque example

This is an example that might take place in any household:

A mother asks her oldest son to help her do the dishes. He ignores his mother, and she ends up doing the dishes alone. Later that day, the older brother asks the younger to bring him some toilet paper. The younger brother ignores him. After getting up to refill the toilet paper, he gives his younger brother a shove, and they start fighting. The mother intervenes and while they talk about the fighting, she asks the younger brother:

"Why didn't you just do your brother the favour?"

"Well, he didn't do the dishes after you asked him," he answers.

Though this might be the truth, it is not a good argument. In fact, it is not an argument at all. This is fallacious reasoning. Just because someone does something, does not automatically license anyone else to do it.

CONTACT SESSION

Activity 1 for Lesson 7

For older learners:

Find examples of clips from interviews on radio or television, or Twitter and Facebook conversations. Let learners listen to the interviews and read the posts to find examples of the tu quoque fallacy.

Background | ad hominem

This fallacy has different names. In South Africa it can be defined in sports terminology as "playing the man, not the ball."

We all fall victim to this fallacy because we often have strong likes or dislikes when it comes to people. The ad hominem fallacy is often what lies behind conflict between people with opposing views and their supporters. This is because we tend to place more emphasis on the person than on what he or she is saying. If you like someone, it is difficult for you to acknowledge that they might not have good arguments to support their views. If you dislike someone, it is as difficult to see that they might have good ideas.

The following is an example of an insult on Facebook.

I mean rock-hard stupid. Dehydrated rock-hard stupid.

Stupid so stupid that it goes way beyond the stupid we know into a whole different dimension of stupid.

You are trans stupid stupid. Meta stupid.

Stupid collapsed on itself so far that even neutrons have collapsed. Stupid gotten so dense that no intellect can escape.

Singularity stupid.

Blazing hot mid-day sun on Mercury stupid. You emit more stupid in one nanosecond than our entire galaxy emit in a year.

Quasar stupid.

Like Reply 3h

Terminology

Cause – an event, without which, a later event would not occur. A cause and the later event (effect) always go together.

Correlation – when two events happen in sequence but are not causally related. For example, the margarine consumption rates in parts of USA correlate with divorce rates, but it's fairly obvious that margarine doesn't cause divorce.

Post hoc ergo propter hoc – or, post hoc for short – involves mistaking correlation for causation. For example, say you had chocolate at lunch time, and two hours later, you have a headache. You blame the headache on having eaten that chocolate. This is an example of the post hoc fallacy. You might be correct in your presumption that the chocolate caused the headache, but you have no way of knowing whether this is true until you have done further investigation.

That is how we discovered the need to use science experiments. So in this case, if you want to find out whether the chocolate actually caused your headache, eat chocolate every other day and keep a diary of headaches, to see if the chocolate correlates with the headaches. If the correlation is 100% then you can say the chocolate causes the headache. If you find less than 100% correlation, the chocolate might partially cause or contribute to headaches but not be the exclusive cause. You would have to rule out other factors like stress, inadequate hydration, etc.

B. F. Skinner
Wiki Commons /Attribution - Share Alike 4.0 International

Skinner was a psychologist in the early 20th century. He proposed a model to explain choices, called Behaviourism. He did experiments with pigeons. He trained pigeons to respond to lights and other stimuli like buttons. He trained them to do certain actions like twirl around or peck buttons to get food. He found that pigeons fall for the post hoc fallacy. By rewarding them with food when they did a certain actions, pigeons behaved as if they believed that their actions caused the food to appear, e.g. by turning around. He called this "superstitious" behaviour. Hence, superstition is when you mistake correlation (spinning around) for causation (getting fed). Another example of a superstition is the well-known black cat superstition. It no doubt started by someone having bad luck every time they saw a black cat. The cat didn't cause the bad luck. It was just correlation.

It is also worth mentioning that post hoc was first diagnosed by David Hume in the 1700s. Just because A follows B, doesn't mean B causes A. For example, lots of shopping happens before Christmas. Does that mean Christmas is caused by shopping? No, it is the other way around; Christmas causes shopping.

CONTACT SESSION

Activity 2 for Lesson 7

1. Let learners to do research about the superstitions of sports people, such as having a lucky sock, or always getting changed in a particular order. Let them see how these beliefs are often based on post hoc fallacies.
2. Let learners think about examples from their own lives where they have fallen victim to this fallacy, and how it can lead to them making decisions based on incorrect information.

CONTACT SESSION

Activity 3 for Lesson 7

Challenge learners to think of a movie character, sports or entertainment personality that they dislike. Let them identify views held by that character. Once they have identified the views held by that person, let them find something about the views that has merit.

Grading

For younger learners it might be necessary to give more guidance and give them options of fictional characters to choose from.

Older learners might be given examples of people in politics or historical characters.

Background | false dilemma

False dilemma is a fallacy that can have major effects when we have to make decisions. It is also a powerful tool that people who want to influence us in one or other direction often use language difficulty.

False dilemma is when a situation is presented in such a way that only two options are given, while there might be more than two. False dilemma is sometimes presented as “black or white thinking.”

A statement such as *“you are either with us, or against us”* as a response to criticism is a common example. When people say things like *“If you don’t like X country, get out”,* they are also presenting a false dilemma.

Most situations in life are more complicated than we think, or would like them to be. Whenever you are presented with only two options, ask yourself whether there may be other options that are not being presented. Avoiding this fallacy is especially important when having to make decisions.

Activity 4 for Lesson 7

For older learners:

Find examples of online debates where people present the false dilemma.

Integration with Curriculum Statements

This integrates with study methods; the media; democracy.

CONTACT SESSION

Lesson 8: Epistemology

Background

Epistemology is about thinking about knowledge. Epistemology (/ee-pis-ti-mo-lodji) is thinking about, or whether, what we know, and how we know what we know.

Like meta-cognition, epistemology is another word of Greek origin. Any word that ends in the prefix -logy refers to the study of something.

The Greek word "episteme" means knowledge. In philosophy and psychology, epistemology is the study of:

- what knowledge is - the nature of knowledge;
- how we know - the method of knowing;
- validating (judging) what we know;
- distinguishing fact from opinion; and
- trying to find out what we need in order to say that we really know.

How does the study of knowing affect critical thinking skills?

The more we know, the greater our set of thinking tools. Think of a cellphone screen - The more glowing dots (pixels) a screen has, the clearer the picture. Each pixel (dot) represents an item of knowledge - more pixels = clearer picture. Knowledge is to thinking, what pixels are to clear pictures. On a 1 megapixel camera, pictures are worse than pictures on a 10 megapixel camera (mega = million, pixel = dot). More knowledge thus leads to clearer thinking.

In the first lessons, we discussed how our senses can fool us. If we know the world through our senses, and we know that our senses can give misleading information, how can we be sure that what we know is correct? This is an age-old problem that ancient Greeks explored as far back as 500 BC. It is from this question that the study of knowledge, epistemology, developed.

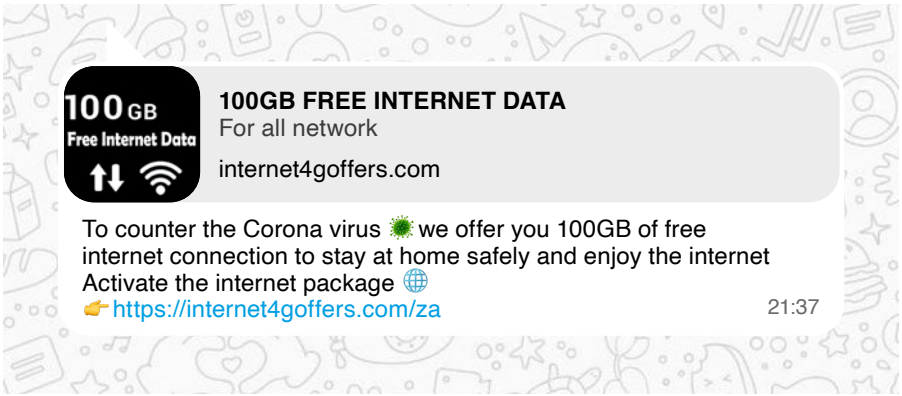
It is extremely important to know HOW we know. Anybody can make almost any claim. In this day and age, anybody can make any claim and post it on the internet for everybody to see. That is why knowing HOW we know things is more important than ever before. Knowledge that was not acquired responsibly is misinformation. Spreading misinformation is harmful.

Here are some examples of misinformation on social media...

So sad, these posts had me fooled.

NATIONALGEOGRAPHIC.COM

Fake animal news abounds on social media as coronavirus upends life



CONTACT SESSION

Activity 1 for Lesson 8

What do you know?

Refer to the results of the knowledge base test the learners did in the first contact session. Discuss their results, and allow them to discuss the answers to the questions.

Ask learners how they know when their birthday is. How do they know their parents didn't change the date of their birth on their certificate to change the date that they went to school? For example, a child born on the 28th of December, might be registered as having been born on 2 January, to enable them to go to school a year later.

Take away

At the end of this session learners must know the word epistemology, and what it means. They should also have spent some time thinking about what they know, and how they know what they know.

CONTACT SESSION

Activity 2 for Lesson 8

Do the activity as on a spreadsheet. See the example below. Encourage learners to use their textbooks for the different subjects as a guide. Older learners can be guided to distinguish between knowledge and skills. For example, knowing what fractions are, and how to do calculations with fractions is not the same thing.

The facilitator should guide learners to break the information into chunks, perhaps according to themes. The goal is not the completeness of the list, but to prompt learners to think about what they know.

HL	**Maths**	**History**
Parts of speech	Prime Numbers	Trans-Atlantic slave trade
Concord	Factors	
The alphabet	What fractions are	
Tenses	Characteristics of different shapes	
Spelling rules		
Sounds		

Background

The definition of *Knowledge*

Knowing begins with learning something, but *knowing* is not the same as *learning*. (Memorizing information is neither learning nor knowing).

The formal definition of knowledge is as follows:

> Knowledge is a justified true belief that is not based on coincidence.

This is why

Why *justified*?
: Because, if you can't explain (justify) why something is true, you do not understand it, and therefore cannot know it.

Why *true*?
: Because you cannot know something if it is false.

Why *belief*?
: Because you cannot know something if you don't believe it.

Why *uncoincidental*?
: Because sometimes you just happen to have heard or seen something, but you don't know if it's true. For example, a stopped watch is correct once a day. If you happen to see it at the correct time, it doesn't mean that you know the time.

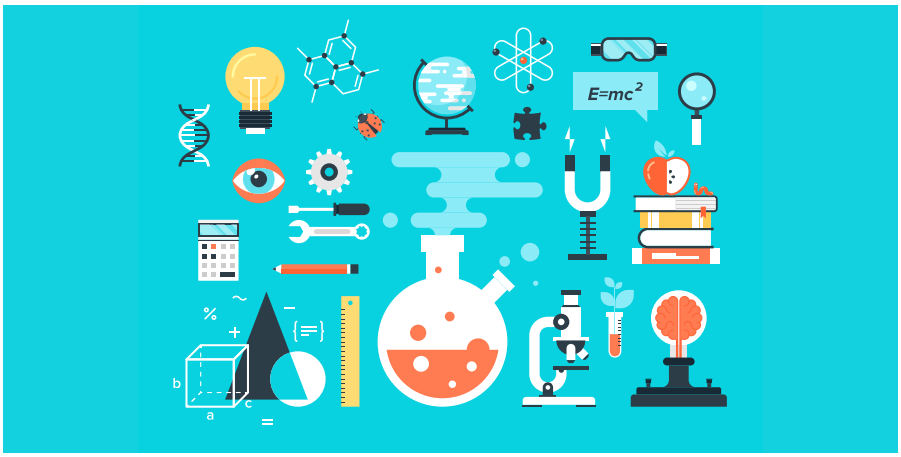
Importantly, you cannot get knowledge from a person simply telling you that something is so. You can only know something if it is a *belief* that is *justified*, *true*, and *uncoincidental*. A teacher, for example, tells you that Majorca is in Spain. Once you have memorised what a teacher told you, you do not know it. You have just memorised a belief. To know it you must understand why it is true (*the justification*), that

> ***Sometimes people hold a core belief that is very strong. When they are presented with evidence that works against that belief, the new evidence cannot be accepted. It would create a feeling that is extremely uncomfortable, called cognitive dissonance. And because it is so important to protect the core belief, they will rationalize, ignore and even deny anything that doesn't fit in with the core belief.***
>
> FRANZ FANON

it is true (e.g. because all scientists agree or all mathematicians agree or all geography teachers agree), and it must not be a coincidence that you are told this.

So for example, if you were living 1000 years ago, you would be taught that demons caused sickness, not germs. This means you would *believe* that demons caused sickness, but not *know* it, because you would not be able to escape the coincidence that you were born 1000 years ago.

Similarly, if your teacher says 2 x 2 is 4, you do not know that until you test it with, say, Lego blocks. Take a Lego block with two studs on it. That is a TWO. Now take another block. You now have two TWOS. Count the studs: there are 4. So, you have justified the belief that 2 x 2 is 4. All mathematicians agree on it, you can see it. It is true. It is also not a coincidence, because every time you see 2 objects with 2 dots, there are a total of 4 dots, regardless of the century or time or date or country you are in. So, 2 x 2 = 4, is knowledge.



CONTACT SESSION

Activity 3a

Get the learners to come up with some examples of things that they cannot ever know (practically, not "in theory"). Ask them why they cannot know these things; which of the four criteria of knowledge, fail. Some examples:

- What is inside a black hole
  [can't justify, because you can never reach one or escape it]
- What "*good*" means
  [can't justify it or be true, because no-one agrees on the basic definition, examples are contradictory, etc]
- What "*beautiful*" means
  [same as above]
- If you make a universal solvent, what kind of container will you keep it in?

Bloom's Taxonomy

There are levels of knowing. American educational psychologist Benjamin Bloom and his collaborators devised Bloom's taxonomy in the 1940s. This is a type of classification of knowing and learning.

“

A person who never made a mistake never tried anything new.

ALBERT EINSTEIN

Let’s use the example of a cake to illustrate Bloom’s taxonomy:

- I know what a cake is.
- I know there are different types of cakes.
- I know the basic ingredients of a cake.
- I know how to bake a basic cake.
- I know a cake needs a raising agent, and I know there are two types of raising agents, but I don’t know the chemistry behind raising agents.
- I know a cake needs heat to bake, but I don’t know the chemistry of what happens inside the cake while it is in the oven.
- I don’t know the exact ratios of the different ingredients, therefore I cannot create my own cake recipes.

Activity 3b

- Ask learners to do a taxonomy for something with which they are familiar.
- For older learners, Grades 10 - 12, use the term taxonomy.
- For younger learners, use the image of the ocean. One can look at a picture of the sea and know that that is the sea. Then one can visit the beach and hear the waves, and feel the sand and the wind. Another step would be to stand in the shallow water. The next step would be to actually swim IN the sea. Swimming in the sea is very different from looking at a picture of the sea. If you swim in the ocean, you will feel the power of the waves, you will taste the salt, you might even be a little bit frightened by the power of the water. It can be taken even further - swimming in the sea is not the same as diving in scuba gear. You can swim in the sea without seeing what happens underneath.
- Epistemology is about the difference between looking at a picture of the ocean and swimming in the waves.
- Another example: you can know that that is a bicycle but not know how to ride it. So you know what one looks like but do not know other things about bicycles, like what it feels like to ride one.

Use a spreadsheet to encourage learners to identify things

- they know, and
- things they don’t know

It will be helpful to do this thematically. Here are some suggestions for themes, or topics.

What do you know about:

- cooking
- birds
- cars

What do you know that you don’t know about these things.

Finally, point out to them that there are also things that they don’t know that they don’t know. Repeat this sentence a few times. For example, how many quarks are there in a proton? – they don’t know that they don’t know that, because they don’t even know about protons, never mind that they’re made of quarks.

This is the beginning of knowledge – knowing that you don’t know.

“

Ignorance more frequently begets confidence than does knowledge.

CHARLES DARWIN
The Descent of Man

Activity for learners in Grades 10-12

Learners have to choose one of the following options:

Option 1
You get R100 000 to spend over a period of thirty days.

Option 2
Over a period of 30 days you get the following:

Day 1: R0.01
Day 2: R0.02
Day 3: R0.04
Day 4: R0.08
Day 5: R0.16
Day 6: R0.32
The amount doubles each day.

Learners have to motivate why they chose the option they chose.

The purpose of this activity is to show learners that we “know” the idea of exponential growth, but that we don’t have a feeling for its implications till we have done some work. All knowledge is like this - to fully know anything, we have to do some work; ie. we must justify it.

If you had one million Rand, and you spent R100 a day, it would take how many years to spend the money? Think about the meaning of large numbers.

At this point, refer back to the previous section on meta-cognition. Show learners how important meta-cognition is because, without meta-cognition, it is not possible to gauge one’s knowledge. Encourage learners to apply this knowledge practically when they prepare for tests and exams. This is a vital study tool that learners can use at school every day to improve their learning.

It is also important to encourage learners to become “active learners” who focus on deep knowledge and not only superficial memorisation.

Grading

Video
https://www.youtube.com/watch?v=pOLmD_WVY-E

For older or more sophisticated learners: discuss the Dunning-Kruger effect and its implications.

The Dunning Kruger effect is described for the first time in “Unskilled and Unaware of It: How Difficulties in Recognizing One’s Own Incompetence Lead to Inflated Self-Assessments” (Dunning, D., and Kruger, J. (1999). Journal of Personality and Social Psychology. Vol 77. No 6.).

Find **Item 7** in Folder

CONTACT SESSION

Activity 4

How do we know?

1. Present learners with fake news that includes items such as the following:
    i. Chinese troops invaded South Africa in May 2020.
    ii. Vaccines cause autism.
    iii. The moon landing never took place.
    iv. Hair grows faster when the ends are cut often.
    vi. The earth is flat.
    x. Coronavirus was caused by cellphone towers.

2. Learners write the statements down.
3. Without giving any additional information about any of the topics, learners evaluate each statement for truth by indicating with a 1 (false) to 5 (true), how true they believe each statement to be.
4. Each statement HAS to be rated.
5. Facilitator collects learners' responses.
6. Where a learner gave an item 4 or 5 points, ask them WHY they gave the rating they did.
7. Return learners' notes, and allow them to adjust their original rating with I don't know (IDK), next to their original rating, if upon consideration, they realize that they don't have enough knowledge of that statement to rate how true it is accurately.

CONTACT SESSION

Activity 5

- Each learner writes a statement.
- They then swap with a classmate. The classmate rates the accuracy of the information in front of them on a scale of 1-10. (1 for false, and 10 for accurate).
- Once the statement has been rated, a reason has to be given for the rating. This prompts learners to think about HOW we know; why Chinese troops did not invade; etc.

The question of HOW we know, leads to exploring the scientific method.

The most accurate way we have so far devised of knowing about the world, is the scientific method.

The scientific method can be used in all subjects, and in all situations. Many learners don't take Science as subject and are never introduced to the scientific method as a reliable method of knowing about the world.

Grading

For younger learners the following activity can be done to facilitate their thinking about HOW we know:

Present learners with a map and images of an island in the Pacific. They should pretend that they are stranded on the island, and have to survive.

> *How will they know whether the water is safe to drink?*
> *How will they know which fruits are edible?*
> *How will they know if, and which, insects are dangerous?*

Guide them to words such as observation, testing, trying and noticing things.

Our body of knowledge not only grows, it also changes. Ironically the first step to knowing, is saying "I don't know." Not knowing something is not a thing to be embarrassed about or ashamed of. If you are ever shamed by anybody for not knowing something, remind yourself that the person shaming you knows even less than you do, because anybody who shames someone for not knowing something has neither knowledge, nor wisdom. Everybody, at some stage, knew nothing. When it comes to knowledge we are all standing on the shoulders of our predecessors.

Knowledge begins with curiosity. We start to investigate when we wonder about things. Here are some things to wonder about:

> *How did people begin to eat pineapples? They don't look at all inviting, with all those thorny bits on the outside.*
>
> *How did people figure out crafts such as crochet and knitting?*
>
> *Dogs are related to wolves. We have dogs because people thousands of years ago tamed wolves. How did people first tame wild wolves?*
>
> *Who invented zero? What IS zero?*

Background

One of the most neglected aspects of critical thinking is the need for a sound knowledge basis. What can be regarded as "trivial" information is a crucial part of critical thinking.

Consider a learner's ability to think critically about a claim on, for example, a pimple treatment product. For a learner to make a sensible critical judgement regarding whether or not to buy the product, he has to know:

- what causes pimples
- that having pimples is not the same as acne
- that not all pimples can be treated in the same way
- that more expensive products often contain exactly the same active ingredients as less expensive products but, owing to packaging and branding, prices can differ dramatically

- what an “active ingredient” is
- why an “active ingredient” works.

In this example, without a sound basic knowledge of basic human physiology, pharmacology and the aims and effects of marketing, it is almost impossible to be a critical thinker.

Knowledge often begins with curiosity. One of the underlying aims of this course is to instil curiosity in learners. Curiosity is an attribute of a critical thinker.

At this point, we have introduced three aspects of critical thinking:

- The importance of perceptions and the dangers of bias: thinking about how we experience the world, and how that shapes the way we think
- How meta-cognition helps us overcome bias: thinking about thinking
- How we know what we know: thinking about knowing.

CONTACT SESSION

Activity 6

Discuss the results of the knowledge questionnaire with learners. Give them your results too. This emphasises that knowledge acquisition is a collaborative process. Everybody has a different set of knowledge that they can share with others. Our role as facilitator is to show learners that YOU learn as much from THEM as they can learn from you.

Discuss things with learners that they know, that you do not know. This reversal of the roles of “learner” and “educator” empowers learners to see that they know more than they think they do. It also shows them that there are different types of knowledge, and that all knowledge is useful.

CONTACT SESSION

Lesson 9: Summary

Emphasise that there is a difference between knowing **how**, knowing **who**, and knowing **that**.

Sometimes it is more powerful to know *how* to do something rather than knowing *that* it can be done; and sometimes it is more useful to know *who* to speak to rather than to know that something needs to be done. Similarly, just because you know that something works in such-and-such a way, doesn't mean you can do it. For example, anyone can see how a bicycle works, but not everyone can ride one. Hence, sometimes merely theoretical knowledge is not enough.

As stated in the introduction, this course was not intended to be a detailed resource about critical thinking. This course is a fun introduction that aims to place learners (and facilitators) on the road to becoming critical thinkers.

CONTACT SESSION 23

Activity 1

Learners and facilitators do the questionnaire about thinking skills again. Give them the results of both times they did the questionnaire.

Refer back to the definition of critical thinking discussed in the introduction, and show learners how they have progressed since the start of the course.

Recap the main points:

1. Our perceptions are based on our senses and how we interact with stimuli, and are therefore are not 100% trustworthy.
2. The only way to improve our interactions with the world is to be conscious of our "blind spots", biases and faulty perceptions. This is how meta-cognition helps us. In an era of information overload, critical thinking is a more important skill than ever before. We must we cautious of our biases when encountering exciting or scary ideas. Many false ideas ("fake news") spread because they are exciting or confirm our biases or fears.
3. We need to know many things to make good decisions and not be fooled by our own perceptions and fallacies of reasoning. This is where epistemology helps us, because it makes us question what we know and how we know it. It leads us on the path to knowing as many true things as possible. In an era where we are confronted by more options about more things than ever before, it is increasingly important that we know how to access accurate information when making decisions, and that we understand HOW we make decisions.

> ***"Philosophy, in understanding human society, call for an analysis of facts and events, and an attempt to see how they fit into human life, and so how they make up human experience. In this way, philosophy, like history, can come to enrich, indeed to define, the experience of man.***
>
> KWAME NKRUMAH

“

Education must enable one to sift and weigh evidence, to discern the true from the false, the real from the unreal and the facts from the fiction. The function of eductaion, therefore, is to teach each one to think intensively and to think critically.

MARTIN LUTHER KING JR.

Critical thinking enables us to get to know ourselves as irrational beings that CAN, and sometimes do, act rationally.

This guide, and the manner in which it integrates with the curriculum statements for Life Orientation while explicitly teaching aspects of critical thinking as a skills set. This will have set learners on the path to becoming critical thinkers. This is only the first step. Encourage learners to keep applying the ideas they were introduced to, in everyday life at home and at school. Remind them to ask questions about

- everything they encounter on social media
- their interactions with people in daily life
- their thought processes about how they learn, what they learn and why they learn.

Remember, we never arrive as critical thinkers –
it remains a life-long process.