

# Problems of Knowing And Linking Questions

## WAYS OF KNOWING

Because the Ways of Knowing are processes or activities so natural to students, their problematic aspects, worthy of reflection, do not come readily to conscious or critical attention. The senses, through perception, seemingly provide a window on the world as it really is, and the emotions have seldom been viewed as an integral aspect of human awareness and intelligence.

Additionally, the acquisition of a first language occurs so easily for most people, and communication with others is so effortless, that the influence of language in shaping thought is seldom noticed. Finally, the appeal of a well-constructed argument can be sensed even without any formal training in logic or other forms of reasoning.

The questions which follow are intended to stimulate and guide the reflection of students about these and related issues.

## Perception

He who has been bitten by a snake fears a piece of string. (Persian proverb)

Because perception is the active, selective and interpretative process of recording or becoming conscious of the external world through sense experience, this experience should be examined and critically evaluated. The following questions may help students become aware of the nature and power of perception, and how it relates to knowledge acquisition, knowledge claims, and making sense of the world.

## Nature of Perception

- In what ways does the biological constitution of a living organism determine, influence or limit its perception? If humans are sensitive only to certain ranges of stimuli, what consequences, including limitations, might this have for the acquisition of knowledge? How does technology extend and modify the capabilities of the senses?
- What are the implications of the following claim?  
'By its very nature every embodied spirit is doomed to suffer and enjoy in solitude. Sensations, feelings, insights, fancies – all these are private and, except through symbols and at second hand, incommunicable.'  
(Aldous Huxley)

## Limitations of Perception

- What is the role of culture and language in the perceptual process? Given the partially subjective nature of perception, how can different knowers ever agree on what is perceived? Do people with different cultural or linguistic backgrounds live, in some sense, in different worlds?

- How, and to what extent, might expectations, assumptions and beliefs affect perceptions? How, if at all, can factors which bias views of the world be recognized? Is all perception necessarily theory-laden? Do knowers have a moral duty to examine their own perceptual filters?
- It is often claimed that information and communication technologies are blurring the traditional distinctions between simulation and reality. If this is so, what might be the consequences?
- What can be meant by 'In the dream of the man who was dreaming, the dreamt man awoke'? (Jorge Luis Borges)

## Linking Questions

- What is the role of perception in the various Areas of Knowledge? How does it differ across the disciplines? Is it more important in relation to some disciplines than others? Is there any knowledge which is completely independent of perception?
- Does perception perform fundamentally distinct functions in the arts and the sciences? To what extent is it true that the artist makes an advantage out of the subjective nature of perception, while the scientist regards it as an obstacle to be overcome?
- What can be meant by 'Knowledge is the true organ of sight, not the eyes'? (Panchatantra)

## Language

Words are more powerful and treacherous than we think. (J-P Sartre)

Language is so much a part of human activity that it is easily taken for granted. The issues related to language and knowledge call for conscious scrutiny in order to recognize its influence on thought and behaviour.

## Nature of Language

- How have spoken sounds acquired meaning? What is the nature of the connection between the sounds and what they are taken to represent?
- Is it possible to think without language? How does language extend, direct, or even limit thinking?
- To what extent does language generalize individual experience, classifying it within the experience of the group? To what extent does a personal experience elude expression in language?
- Can language be compared with other human forms of symbolic representation, such as conventionalized gestures, sign language for the deaf, dance, painting, music or mathematics? What might language share with these other forms in the communication of what we know? In what ways might it be considered distinct?
- To what extent is knowledge implicit in language? For example, could it be said that 'Saturday is in bed' does not convey meaning, even though the sentence is syntactically correct, because of the prior knowledge that days of the week are not physical objects?

- How do computer languages compare with the conventional written and spoken languages of everyday discourse?

## Language and Knowledge

- How does the capacity to communicate personal experiences and thoughts through language affect knowledge? To what extent does knowledge actually depend on language: on the transmission of concepts from one person or generation to another, and on exposure of concepts or claims to public scrutiny?
- How does language come to be known? Is the capacity to acquire language innate?
- If knowledge is based on an internal representation of the world does this imply that language is a necessary component of knowledge?
- In most of the statements heard, spoken, read or written, facts are blended with values. How can an examination of language distinguish the subjective biases and values which factual reports may contain? Why might such an examination be desirable?
- How apt is Voltaire's view that 'Error flies from mouth to mouth, from pen to pen, and to destroy it takes ages'?

## Functions of Language

- What different functions does language perform? Which are most relevant in creating and communicating knowledge?
- What did Aldous Huxley mean when he observed that 'Words form the thread on which we string our experiences'?
- In what ways does written language differ from spoken language in its relationship to knowledge? Can control of written language create or reinforce power?
- Is it reasonable to argue for preservation of established forms of language? Is it reasonable to ask for one language common to the whole world?
- What is the role of language in creating and reinforcing social distinctions, such as class, ethnicity and gender?
- What is the role of language in sustaining relationships of authority? Do people speak the same way to inferiors and superiors in a hierarchy? Does the professional authority speak in the same way as the person seeking opinion or advice?
- What may have been meant by the comment 'How strangely do we diminish a thing as soon as we try to express it in words'? (Maurice Maeterlinck)

## Language and Culture

- If people speak more than one language, is what they know different in each language? Does each language provide a different framework for reality?
- How is the meaning of what is said affected by silences and omissions, pace, tone of voice and bodily movement? How might these factors be influenced in turn by the social or cultural context?
- What is lost in translation from one language to another? Why?
- To what degree might different languages shape in their speakers different concepts of themselves and the world? What are the implications of such differences for knowledge?

## Linking Questions

- In completing the sentence, 'I know that . . .', one is making a knowledge claim. Why is it useful or necessary to express knowledge claims? Are there Areas of Knowledge where it is expected or required? Are there Ways of Knowing where it is not?
- To what extent is it possible to overcome ambiguity and vagueness in language? In what contexts might ambiguity either impede knowledge or contribute to it? Does the balance between precision and ambiguity alter from one discipline to another?

## Reason

A chain of reasoning is no stronger than its weakest link. (Anon)

It is often the case that when disputes arise over knowledge claims, what is at issue is not only the substance or facts of the matter, but also the logic or reasons given for acceptance of the facts, and the procedures used in reaching a conclusion. The questions in this section probe the nature, value and limits of reason, and the techniques associated with the logical rigour that many suppose is a shared standard of evaluation.

## Nature of Reason

- What constitutes 'good reason' and 'good arguments'? What is the value of learning to distinguish between valid and invalid arguments?
- What constitutes a 'good reason' for belief? Is a persuasive reason necessarily grounded in truth?
- How accurate is the definition of logic as the study of form in argument, irrespective of the subject matter. Is this form/content distinction found in other Ways of Knowing or Areas of Knowledge?
- Does the nature of reason vary across cultures?

## Reason and Knowledge

- Does knowledge always require some kind of rational basis?
- If knowledge claims cannot be rationally defended, or can be shown to be irrational, should they be renounced?
- What may be meant by Nietzsche's comment that 'Rational thought is interpretation according to a scheme which we cannot escape'?

## Strengths and Weaknesses of Reason

- Why are informal fallacies often plausible and convincing? When, where, and how can they be formulated?
- How do beliefs affect the capacity to reason logically and the capacity to recognize valid arguments? How do they affect the capacity to recognize fallacies and rationalization?
- What, if any, are the advantages of expressing arguments in symbolic terms (for example,  $p \rightarrow q$ )? Are the ambiguity and vagueness of conventional language eliminated by this formulation?

- If logic puzzles are formulated in highly contrived terms, such as ‘liars’ and ‘truth-tellers’, do such formulations diminish or emphasize the relevance and role of logic as a useful tool to demonstrate a point?
- In what ways can the person presenting an argument and the context in which it is made influence its acceptance or rejection?
- In everyday discourse, the ‘rational’ choice is usually equated with the ‘best’ choice. Does this conjunction hold in all social contexts?
- What did Pascal mean by the comment that ‘The last function of reason is to recognize that there are an infinity of things which surpass it’? To what things does he refer?
- What are the implications of Patrick Shawe’s claim that ‘When ... disagreements occur

...

[where] competing claims cannot be easily and obviously tested, attention is bound to turn to the route by which a controversial conclusion was reached. We are forced to become self-conscious about the reasoning process. How far reasoning will take us remains to be seen, but so far as it leads we must be sure that it is sound’?

## Linking Questions

- What may be meant by André Gide’s comment that ‘What eludes logic is the most precious element in us, and one can draw nothing from a syllogism that the mind has not put there in advance’?
- What role does formal logic play in arriving at, and justifying knowledge? How does this role compare with the roles of the other Ways of Knowing? Does the role of formal logic affect the degree of certainty in, or the social status of, the various Areas of Knowledge?
- Is it correct to think that what constitutes a good reason varies from discipline to discipline and from culture to culture? What are the implications of the answer to this question when disputes arise among practitioners and between cultures?
- Attempts have been made to identify universal, self-evident and incontrovertible ‘laws of logic’. The ‘law of identity’ (for example, ‘an apple is an apple’) or the ‘law of non-contradiction’ (for example, ‘nothing can be an apple and also a non-apple’). Are these actually ‘laws’ in the scientific sense of the term, or are they ‘axioms’? How do they compare with axioms in mathematics, and with foundational, underlying beliefs we take for granted in other Areas of Knowledge?

## Emotion

[Emotion] has the advantage of being open to all, the weak and the lowly, the illiterate and the scholar. It is seen to be as efficacious as any other method and is sometimes said to be stronger than the others, since it is its own fruition, while other methods are means to some other ends. (Bhagavad Gita)

Although many have felt the power of emotions in shaping thoughts and influencing behaviour, there are those who believe that emotions are an obstacle in the pursuit of knowledge. While emotions may be a key to self-understanding and to understanding the world, the extent to

## Nature of Emotion

- Can feelings have a rational basis? Would it be better or worse if emotions could be justified? Are emotions and feelings essential? Is 'emotional intelligence' an oxymoron?
- Can there be 'correct' or 'appropriate' emotional responses? Is it 'correct' to be horrified by accounts of torture?
- Is it possible to experience an emotion, a feeling, an attitude or sensibility that cannot be expressed in language? Can an emotion, such as love or grief, have its origins in, or be shaped by, language?
- Is the knowledge gained from emotional responses influenced by culture? Are concepts such as patriotism and racism examples of collective emotions? What does it mean to be responsible for our emotions? Can emotions be classified as 'good' or 'bad'? Do emotional responses emanate from cultural influences?

## Emotion and Knowledge

- Does emotion reside in the realm of private knowledge in the sense that it cannot be verified by others? Is all private knowledge necessarily some form of emotion? Is physical pain or hunger an emotion? Can people be wrong about their own emotions? Do people have, in some sense, exclusive access to their emotions or can others lead them to recognize previously unknown emotions?
- Is there any kind of knowledge which can be attained solely through emotion? Is the answer to the question dependent on factors such as gender, age, culture, and/or socioeconomic group?
- Is emotion an essential ingredient of scientific or artistic knowledge? Can there be creativity without emotion?

## Linking Questions

- What part does emotion play in the acquisition of knowledge? Does the role of emotion vary across the different Areas of Knowledge? Should emotion play such a role in the evaluation of knowledge claims?
- Is an action morally justifiable if it feels right? What part do, or should, emotions play in the formation of moral judgements or political judgements? Do people act their way into feeling or feel their way into action? In other words, are the motives for involvement emotionally prompted? At what point, if any, may the motives for involvement in the Creativity, Action, Service programme be emotionally prompted?
- Is faith purely emotional or is it possible to provide a rational justification for religious belief? Is emotion a source of spiritual knowledge? If so, how can we justify discussing spiritual matters in public?

## The Areas of Knowledge,

which are situated within the perimeter of the TOK diagram, are subject areas or disciplines into which knowledge is frequently classified. They may be seen as an application of Ways of Knowing, perhaps shaped by methodology, to particular subject matter. The questions which follow in this section deal with both the rationale for such classification and the interdisciplinary comparisons which clarify or challenge the division of knowledge into areas.

**Reference to the Linking Questions may also be useful.**

The students' own experience as knowers would ideally base many of the questions on their studies for the IB Diploma. Teachers may find it necessary to supplement the students' educational experience with additional concepts, but they should be guided always by the aim of stimulating students' personal reflection on knowledge. The question 'How do I know?', which is asked in the Ways of Knowing section, interacts in this section with another question, 'What do I know?', or, more specifically, 'How do I know that a given assertion is true, or a given judgement is well grounded?'

## Mathematics

All is number. (Pythagoras)

There is little doubt that mathematics has influenced our understanding of the natural world. It has been said that the world is mathematical at its deepest level. Whether mathematical knowledge comes to us as a result of some connection to natural phenomena is another matter.

Many have likened mathematics to a logical game invented by humans. Others consider mathematics to be a unique aesthetic experience, while still others consider it a 'special language tool'. The following questions offer an opportunity to reflect on the nature of mathematical knowledge, which Diploma programme students encounter in their Group 5 subject(s).

### Definition of Mathematics

- What does calling mathematics a 'language' mean? Does mathematics function in the same way as our daily written and spoken language?
- Do mathematical symbols have meaning, in the same sense as words have meaning?
- Why is it that some claim that mathematics is no more than a 'logical game', such as chess, for example, devoid of particular meaning? If this were the case, how do we account for the fact that it seems to apply so well to the world around us?
- What could Carl Sandburg have meant by the following?  
'Arithmetic is where the answer is right and everything is nice and you can look out of the window and see the blue sky – or the answer is

wrong and you have to start all over and try again and see how it comes out this time.'

## Mathematics and Reality

- Is it reasonable to claim that mathematics is effective in accounting for the workings of the physical world?
- Could it be argued that mathematics is simply the application of logic to questions of quantity and space?
- What did Einstein mean by asking: 'How can it be that mathematics, being after all a product of human thought which is independent of experience, is so admirably appropriate to the objects of reality?'
- What are the differences between the **formal** school of thought which regards mathematics as similar to an activity governed by rules, limited only by the rules of logic and the creativity of the mathematician, and the **realist** school of thought which regards mathematics as referring to the way the world actually works?
- What is the foundation on which mathematical knowledge rests? Is it discovered or invented? What is meant by this distinction? Can it be applied usefully in other areas?
- What is the origin of the axioms of mathematics? Are axioms necessarily self-evident to all people? How is an axiomatic system of knowledge different from, or similar to, other systems of knowledge?
- Do different geometries (Euclidean and non-Euclidean) refer to or describe different worlds?

## Mathematics and Knowledge Claims

- What is the significance of proof in mathematical thought? Is a mathematical statement true only if it has been proved? Is the meaning of a mathematical statement dependent on its proof? Are there such things as true but unprovable statements in mathematics?
- Mathematics has been described as a form of knowledge which requires internal validity or coherence. Does this make it self-correcting? What would this mean?
- How is a mathematical proof or demonstration different from, or similar to, justifications accepted in other Areas of Knowledge?
- Is mathematical knowledge certain knowledge? Can we claim that ' $1 + 1 = 2$ ' is true in mathematics? Does ' $1 + 1 = 2$ ' hold true in the natural world?
- Does truth exist in mathematical knowledge? Could one argue that mathematical truth corresponds to phenomena that we perceive in nature or that it coheres, that is, logically connects, to a designed structure of definitions and axioms?
- Fermat's 'Last Theorem' remained unproved for 358 years, until 1995. Is mathematical knowledge progressive? Has mathematical knowledge always grown? In this respect, how does mathematics compare with other Areas of Knowledge (for example, history, the natural sciences, ethics and the arts)? Could there ever be an 'end' to mathematics? In other words, could we reach a point where everything important in a mathematical sense is known? If so, what might be the consequences of this?
- Has technology, for example, powerful computers and electronic calculators, influenced the knowledge claims made in mathematics? Is any technological influence simply a matter of speed and the quantity of data which can be processed?
- What impact have major mathematical discoveries and inventions had on conceptions of the world?

## Mathematics and Values

- Why do many mathematicians consider their work to be an art form? Does mathematics exhibit an aesthetic quality?
- What could be meant by G H Hardy's claim that: 'The mathematician's patterns, like the painter's or poet's, must be beautiful; the ideas, like the colours or the words, must fit together in a harmonious way. Beauty is the first test. There is no permanent place in the world for ugly mathematics'?
- What relationships, if any, exist between mathematics and various types of art (for example, music, painting, and dance)? How can concepts such as proportion, pattern, iteration, rhythm, harmony and coherence apply both in the arts and in mathematics?
- Is the formation of mathematical knowledge independent of cultural influence? Is it independent of the influence of politics, religion or gender?
- What is meant by S Ramanujan's comment that 'Every time you write your student number you are writing Arabic'?
- If mathematics did not exist, what difference would it make?

## Natural Sciences

A theory is a fantasy constrained by fact. (S Bastian)

The influences of the natural sciences, such as the subjects in Group 4 of the Diploma programme, permeate much of modern life. This prominence has led to a wide variety of attitudes towards the nature, scope and value of science in general. Critical analysis of the nature of science, the value, power and limits of its methodology, and the context in which scientific work takes place, should raise strong issues.

## Definition of the Natural Sciences

- Can the word 'science' mean somewhat different things in different languages? What subjects or disciplines could the term 'natural sciences' include?
- Should the natural sciences be regarded more as a method or more as a body of knowledge?

## Natural Sciences: Methods of Gaining Knowledge

- What is meant by 'the scientific method'? What are the roles of various kinds of reasoning in science? To what extent is there one method which is appropriate for, and actually followed in, all of the natural sciences?
- What are the implications of the following claim?  
'One aim of the physical sciences has been to give an exact picture of the material world. One achievement of physics in the twentieth century has been to prove that this aim is unattainable.'  
(Jacob Bronowski)
- In the Diploma programme, Group 4 subjects are designated 'Experimental Sciences'. What counts as an experiment? Can experiments be undertaken in other subjects? Are

there some necessary conditions for an activity to be an experiment, for example, hypotheses, data, manipulation of variables, observations, generalizations and expectations of outcomes?

- What are the similarities and differences in methods in the natural sciences and the human sciences? To what extent do their fields of study overlap? To what extent would it be true to say that the human sciences appear less 'scientific' because their subject matter is more complex?
- Is the scientific method a product unique to western culture, or is it universal?
- What is the role of creativity in the sciences? To what extent is the creation of a hypothesis or a research method comparable to the creation of a work of art?
- What knowledge, if any, will always remain beyond the capabilities of science to investigate or verify? If there is, or can be, such knowledge, why will it always elude effective scientific treatment?
- What can be meant by Poincaré's comment that 'It is through science that we prove, but through intuition that we discover'?

## Natural Sciences and Knowledge Claims

- Is science about establishing cause and effect relationships? If so, how is this achieved?
- What may Poincaré have meant by 'Science is built of facts the way a house is built of bricks: but an accumulation of facts is no more science than a pile of bricks is a house'?
- How different are the knowledge claims of those disciplines that are primarily historical, such as evolutionary biology, cosmology, geology and palaeontology, from those which are primarily experimental, such as physics and chemistry?
- What kinds of explanations do scientists offer, and how do these explanations compare with those offered in other Areas of Knowledge? What are the differences between theories and myths as forms of explanation?
- To what extent can all the natural sciences be understood through the study of just one science, for example, physics? If biology relies on chemistry, and chemistry relies on physics, can it be said that all natural sciences are reducible to physics? If so, what would be the implications of this position?
- Is scientific knowledge progressive? Has scientific knowledge always grown? In this respect, how do the natural sciences compare with other Areas of Knowledge, for example, history, the human sciences, ethics and the arts? Could there ever be an 'end' to science? In other words, could we reach a point where everything important in a scientific sense is known? If so, what might be the consequences of this?
- Is it accurate to say that much of science investigates entities and concepts beyond everyday experience of the world, such as the nature and behaviour of electromagnetic fields, subatomic particles, or the space-time continuum? To what extent do these entities actually exist? What consequences might questions about the reality of these entities have for the public perception and understanding of science?

## Natural Sciences and Values

- How does the social context of scientific work affect the methods and findings of science?
- What values and assumptions about knowledge underpin science? What findings might emerge from a consideration, for example, of whether or not scientific knowledge is amenable to public scrutiny, whether or not it is intrinsically worthwhile, and whether or

not it will continue to be valid in the future?

- What could be meant by ‘I have been steeped in science all my life, now I am ready to pray’? (Stephen Hawking)

## Natural Sciences and Technology

- Is scientific knowledge valued more for its own sake or more for the technology which it makes possible? Is there any science which can be pursued without the use of technology?
- Should scientists be held morally responsible for the applications of their discoveries? To what extent would it be true to say that technological advances drive changes in values and morality? Is there any area of scientific knowledge which is morally unacceptable?

## Natural Sciences: Metaphor and Reality

- If natural sciences are defined as investigating the natural world, what is meant by ‘natural’ or ‘nature’ in this context? What difference might it make to scientific work if nature were to be regarded as a machine (for example, as a clockwork mechanism) or as an organism (such as some recent interpretations of the Gaia Hypothesis)? How useful are these metaphors?
- Does scientific language and vocabulary have primarily a descriptive or an interpretative function? Consider here expressions such as ‘selfish gene’, ‘artificial intelligence’, ‘electric current’, ‘natural selection’ and ‘concentration gradient’.
- Are the models and theories which scientists create accurate descriptions of the natural world, or are they primarily useful interpretations for prediction, explanation and control of the natural world?

## Human Sciences

Under the most rigorously controlled conditions of pressure, temperature, humidity, and other variables, the organism will do exactly as it pleases. (Anon)

The human sciences, such as most of those subjects in Group 3 of the Diploma programme, seek to explain or to understand human behaviour. Some practitioners in this field apply the same methods and standards as the natural sciences, while others argue that we cannot properly understand conscious behaviour without examining motives, or the meaning of an action, for the people involved.

## Definition of the Human Sciences

- What kinds of knowledge are usually included in the category of ‘human science’? Does it matter whether this Area of Knowledge is called ‘human science’ or ‘social science’? What is the relationship between these terms and the designation of Group 3 in the Diploma programme as ‘Individuals and Societies’?

- To what extent does the human subject matter of this Area of Knowledge affect a scientific approach? Is it reasonable to think that human behaviour can be studied scientifically?

## Human Sciences: Methods of Gaining Knowledge

- Are the human sciences, as a whole, fundamentally different from the natural sciences? What might be the outcome of comparing and contrasting, for example, the role of models and theories, methods for collecting data, the nature of facts, the role of observation and experimentation, the impact of the observer on the observed phenomena, quantification, falsifiability, precise prediction, identification of constants, and the degree of complexity of the phenomena studied?
- In what ways might the human sciences have advantages over the natural sciences in Ways of Knowing and access to different forms of justification? Does language play a different role? To what extent can empathy, intuition and feeling be legitimate Ways of Knowing in the human sciences?
- How might the language used in polls, questionnaires and other information-gathering devices of this sort influence the conclusions reached? If there is an influence, does it, or a similar one, occur in natural science research? Does the extent of the influence relate to the degree of certainty attributed to the natural sciences and the human sciences respectively, or to the social status or value associated with each?
- What are the main difficulties human scientists confront when trying to provide explanations of human behaviour? What methods have been invented to circumvent these difficulties and to minimize their influence on the results that are obtained?
- What are the implications of Mario Puzo's claim that 'If our brains were simple, we would be too simple to understand them'?
- Are the human sciences an improvement on what can be known about human behaviour by studying literature and poetry? In what ways are these types of knowledge similar or different?

## Human Sciences and Knowledge Claims

- How does the use of numbers, statistics, graphs and other quantitative instruments affect perceptions of the validity of knowledge claims in the human sciences?
- Is it reasonable to attempt to explain human behaviour independently of what people claim are their intentions?
- How different are the knowledge claims of those disciplines which are primarily historical, such as archaeology, and those which can be experimental, such as psychology? Can this distinction be drawn in most human sciences?
- What kinds of explanations do human sciences offer, and how do the explanations compare with those in other Areas of Knowledge? To what extent do the human sciences offer any of the following: scientific laws, recognition of general patterns and tendencies, prediction of the future? To what extent do they offer insight or understanding?

## Human Sciences and Values

- Can human behaviour be usefully classified and categorized? Can it be classified within a culture? Across cultures? Can patterns of behaviour be identified as human behaviour?

Within a culture? Across cultures? What beliefs or prejudices might be involved in our answer to these questions?

- In what ways might the beliefs and interests of human scientists influence their conclusions?  
Are the conclusions of natural scientists affected by their beliefs and interests? Might the beliefs and interests of mathematicians influence their conclusions?
- In what ways might social, political, cultural and religious factors affect the types of human science research that is financed and undertaken, or rejected? Is human science research for the sake of knowledge a realistic possibility, because it is intrinsically worthwhile, or is there always a covert, utilitarian purpose behind such research?

## History

That men do not learn very much from the lessons of history is the most important of all the lessons that history has to teach. (Aldous Huxley)

History is different from the other human sciences, or indeed other sciences in general, in that knowers cannot directly observe the past. Historiography, that is, a study of the writings of history, is not a study of all of the past, but rather a study of those traces that have been deemed relevant and meaningful by historians. The availability of those traces, and their relevance and meaning, may be influenced in many ways, by factors such as ideology, perspective or purpose. As knowers seek to clarify the past, and to determine whether or not what is claimed is true, they will face problems of reliability and attitudes, and may consider the purpose of historical analysis and the issue of the nature of historical truth. The opportunities for distinctions and interpretations which are culturally driven abound, and invite analysis.

## Definition of History

- What is history? Is it the study of the past or the study of records of the past?
- To what extent is the very nature of this Area of Knowledge affected by being about the past? In what ways do other Areas of Knowledge also concern themselves with the past? Is all knowledge, in a sense, historical knowledge?
- Which of the following is the most persuasive description of history: an account of great individuals, an account of a decline from the greatness of the past, or an account of progress towards the future, or a cycle of recurring events? What other descriptions might be appropriate? Is it possible to portray different visions of history in a diagrammatic form?
- What are the implications of Henry Miller's claim that 'The history of the world is the history of a privileged few'?
- What might George Orwell have meant when he wrote that 'Who controls the past controls the future. Who controls the present controls the past'?

## History: Methods for Gaining Knowledge

- Can one talk meaningfully of a historical fact? How far can we speak with certainty about anything in the past?
- In what ways has technology affected the study of history? How have the methods of

gaining evidence and the means of communicating historical interpretation, for example, been affected by technological development? Can we now observe the past more directly?

- What are the implications of the following claim?  
'It is impossible to write ancient history because we lack source materials, and impossible to write modern history because we have far too many.'  
(Charles Peguy)
- Which is the more important attribute of the historian, the ability to analyse evidence scientifically (and so risk reducing it to its dry fundamentals), or the ability to expand it with creative imagination (and bring the past to life)?
- What is the role of the historian? Does the historian record history, or create it? Can the historian be free of bias in the selection and interpretation of material? Could it be reasonably argued that the personal understanding of historians, despite their possible bias, is necessary or even desirable in the interpretation and recording of history? Is the power of persuasion a characteristic of a good historian?
- What might be the influence on historical interpretation of the context within which historians write? To what extent might the position of historians within their own epoch and culture undermine the value of the interpretation, and to what extent might it increase its value in making it relevant to a contemporary audience?
- What is a historical explanation? How are causal connections between events established in history? According to what criteria can such explanations be critically evaluated?

## History and Knowledge Claims

- Why study history? Is it possible to know who we are without a knowledge of the past? Is there any other way of describing and assessing the process of change in human societies?
- Can history provide a guide to understanding contemporary affairs? Can it provide a guide to the future? What might be 'the lessons of history' for future generations?
- If truth is difficult to prove in history, does it follow that all versions are equally acceptable?
- What knowledge of history might be gained by focusing attention on each of the following: the historian, the historical documents and written history, the readership, and the social, cultural and historical context?

## History and Values

- About whom is history written? Are the lives of some groups of people more historically significant than the lives of others? Why do selected past events appear in books as historically important while others are ignored? To what extent is history dependent on who kept or preserved a written record? To what extent is history about those who held power, and to what extent is it about ordinary people?
- Are value judgements a fault in the writing of history? Should value-laden terms such as 'atrocious', 'regime', 'hero' or 'freedom' always be avoided, or does exclusion of value judgements deprive history of meaning?
- To what extent can distinctions be made between factual report, biased interpretation and calculated distortion? Can history be used for propaganda? If so, how?

# The Arts

Art is a lie that makes us realize the truth. (Pablo Picasso)

Although what is meant by ‘the arts’ may itself be a topic of discussion, the field considered here includes, at the least, a broad field of literature, such as is encountered by the IB student in Group 1 of the Diploma programme, and the visual arts, music and theatre encountered in Group 6. The arts are diverse: their content, forms and methods are often dissimilar, and the understanding and appreciation of them may possibly be more subjective than objective. The following questions invite discussion of the ways in which the arts may affect individuals or groups, and the ways in which they embody and communicate knowledge.

## Definition of the Arts

- What is the origin and nature of a sense of beauty? Is this sense specific to the individual or to the culture, or is it universal?
- Some languages have no generic word for ‘the arts’. To what extent might the concept be a culturally relative one? To what extent, even within those languages which have a generic term, is the term ‘the arts’ elastic in definition?
- Do all the arts have features in common? What might these be?
- What roles do the arts play in people’s lives? Are these roles unique to the arts?
- Are the arts a kind of knowledge, or are they a means of expressing knowledge? If the latter, what knowledge might they express?
- What are the implications of the following claim?

‘Life is very nice but it lacks form. It’s the aim of art to give it some.’ (Jean Anouilh)

## The Arts: Methods of Gaining Knowledge

- To what extent and in what ways might the arts be regarded as a representation of reality? What kinds of art might be seen as ‘realistic’?
- What is the proper function of the arts: to capture a perception of reality, to teach or uplift the mind, to express emotion, to create beauty, to bind a community together or to praise a spiritual power? Are there functions omitted here? Do the various arts have the same functions?
- Is originality essential in the arts? Is the relationship between the individual artist and tradition similar in all cultures and times?
- In what ways does technology influence the arts? What, for example, might be lost or gained aesthetically by recycling visual images, or by composing music by computer?

## The Arts and Knowledge Claims

- Does familiarity with an art form itself provide knowledge and, if so, of what kind? Knowledge of facts? Of the creator of the art form? Of the conventions of form? Of psychology or cultural history?
- Does art, or can art, tell the truth? If so, is artistic truth the same as truth in the context of the natural sciences, the human sciences, or history? How might the truth claims of art be verified or falsified?
- What are the implications of the following claims?  
'Far from being engaged in opposing or incompatible activities, scientists and artists are both trying to extend our understanding of experience by the use of creative imagination subjected to critical control, and so both are using irrational as well as rational faculties. Both are explaining the unknown and trying to articulate the search and its findings. Both are seekers after truth who make indispensable use of intuition.'  
(Karl Popper)
- Is explanation a goal of the arts? How do the arts compare in this regard with other Areas of Knowledge?
- What did Frank Zappa mean when he claimed that 'Talking about music is like dancing about architecture'?

## The Arts and Values

- How are value judgements in the arts justified? How is 'good art' recognized or decided on?
- What are the justifications and implications of claiming that there are absolute standards for good art, or that the only standard for good art is individual taste?
- Does the artist carry any moral or ethical responsibility? Is it possible for an artwork to be immoral? Should art be judged on its ability to shock?
- What is the role of education in creating art, and in appreciating it? Is an art form legitimate if it can be enjoyed only by those trained in its appreciation through having had relevant education or through having become familiar with it in their own cultural context? Is a critical assessment of an art form legitimate if it is made by someone with no relevant education or cultural familiarity?
- What relationships exist between the arts, on the one hand, and power over the public mind, on the other? Should art be politically subversive? Conversely, should it serve the interests of the community or the state? Why would governments, corporations, advertisers, and ideologically based groups of many kinds concern themselves with visual artists, musicians and writers?
- To what extent can one reasonably separate values in the arts from the definitions of the field, its methodologies and its knowledge claims?

## The Arts and Knowledge Perspectives

- What knowledge of art can be gained by focusing attention on the **artist**? Can artists' intentions, and the creative process itself, be understood through observing artists or knowing something of their lives? Is the creative process as important as the final product, even though it cannot be observed directly? Are an artist's intentions relevant to

assessing the work? Can a work of art contain or convey meaning of which the artist is oblivious?

- What knowledge of art can be gained by focusing attention solely on the **work** itself, in isolation from the artist or the social context? Can technical virtuosity in itself, a skilled mastery of the medium, be enough to distinguish a work of art? Are certain compositions, ways of structuring sounds or shapes, inherently more pleasing than others? Can a work be judged primarily by the harmony of form and content, the way in which structure and style work effectively to create or support the subject matter? Is the form of a work its true meaning?
- What knowledge of art can be gained by focusing on the reader or audience's **response**? Can it be plausibly argued that art is brought into being only in the response of the audience, that a work is created anew each time it is viewed, heard or read? What is the role of the critic in judgement of the worth of art? Are any of the following sufficient indicators of the value of a work: its popularity, its commercial value in the market, its universality in its appeal beyond its cultural boundaries, and/or its longevity?
- What knowledge of art can be gained by focusing attention on its social, cultural or historical **context**? To what extent do power relationships determine what art or whose art is valued? Is all art essentially a product of a particular place and time in terms of its subject matter and conventions of expression? Is art best seen as anthropological or historical documentation, bringing to life a remote society or era, but understood esoterically, only with independent knowledge of that remote life? Does art become obsolete? Is art understood more fully by emphasizing what all cultures have in common rather than by stressing what is unique to each?

## Ethics

To avoid any evil, to seek the good, to keep the mind pure: this is the essence of the Buddha's teaching. (The Way of Practice)

For the student, few areas of the TOK programme are concerned with such immediate and personal matters as ethics, perhaps because of the immediate consequences in everyday life. Ethics involves a discussion of the distinctions between right and wrong, the justification of moral judgements, the implications of moral actions for the individual and the group, and the relationship between concepts in ethics and politics. While the framework for discussion should be epistemological questions and what the bases are for values, the teacher is encouraged to apply theoretical questions to practical examples of interest to students, thus combining abstract argument and personal experience, and providing a structure for student reflection on possible links between ethics and responsible action.

### Definition of Ethics

- What characterizes a moral judgement? In what ways might a moral judgement differ from other judgements?
- Does morality necessarily involve action, or can it involve thoughts and attitudes alone, and be solely meditative?
- What is the difference between 'morality' and 'ethics'? Is ethics concerned primarily with **what is** or what **ought to be**?

## Ethics: Methods of Gaining Knowledge and Knowledge Claims

- What is the source of the sense of ‘right’ and ‘wrong’? For moral beliefs, can one distinguish between the source and the justification, or are the two the same?
- What are the justifications for, and implications of, claiming that there are absolute standards for morality, or that the standards of morality can be set only by society, or that the standards of morality can be set only by the individual? Are the three positions mutually exclusive?
- How does the method of ethics compare with the methods in other Areas of Knowledge? Is the method in ethics closer to the axioms and reasoning of mathematics, or is it closer to the evidence and theory of the sciences? To what extent is argument a method?
- How, if at all, is it possible to know who is right in judging ethical issues? If moral decisions are not clear, or if moral issues are controversial, does it follow that there is no such justifiable concept as right or wrong? How much ambiguity is tolerable in ethics for it still to be called ‘knowledge’? How might this question also be applicable to other Areas of Knowledge?

## Ethics and Values

- Does living a moral life matter?
- In what ways might justifications for moral beliefs be influenced by views on human nature – whether humans are by nature good, evil, or amoral?
- Can one reasonably separate values in ethics from the definition of the discipline, its methods and its knowledge claims? How does it compare in this regard with other Areas of Knowledge?
- What may be meant by ‘If you travel with fraud you reach your destination, but are unable to return’? (Ghanaian proverb)
- What may be meant by ‘He who wears his morality as a robe is better off naked’? (Kahlil Gibran)

## Ethics and Technology

- What is the purpose of the Ethical and Fair Use policies related to the Internet, that are commonly adopted by schools and other institutions?
- What ethical issues are raised by highly skilled Internet users breaking into private and public computer systems?

## Ethics and Knowledge Perspectives

- To what extent does the state of a person’s knowledge play a part in deciding whether an act is right or wrong? Under what conditions would it be legitimate for a person to plead ignorance? Are people responsible for finding out the relevant facts as much as possible?
- What knowledge of morality may be gained by focusing attention on the **individual** making moral judgements? Is freedom of choice a necessary condition for making moral judgements? Should the person’s intentions be the criterion for deciding whether an action is right or wrong? Are people always aware of their real intentions or motives?

- What knowledge of morality may be gained by focusing attention on the features of the **moral judgement** or **act** itself? Are some thoughts or actions intrinsically ‘right’ or ‘wrong’, independent of circumstances? Is it possible to establish firm principles to determine moral action? If so, on what basis? On the basis of reason? Divine revelation? Is it possible to rank principles in order of importance? What are ‘human rights’ and on what basis do they rest?
- What knowledge of morality may be gained by focusing attention on the **consequences** of the thoughts or actions? Is an effect on others a necessary condition for a judgement to be a moral judgement? To what extent can consequences be predicted and judged as to which consequences are better and which are worse? Can consequences be quantified or weighed scientifically? Which matters more, the consequences for individuals or the consequences for the group? Are there spiritual consequences to be taken into account?
- What knowledge of morality may be gained by focusing attention on the social, cultural or historical **context** of the moral judgement? Is a shared moral code a necessity for a harmonious society? To what extent can acceptance of dissent be a feature of a shared moral code? To what extent do moral values differ, depending on the society or the historical time? For example, can a practice such as slavery be right in one era or region and wrong in another? Can the practices of one society be judged with any validity by applying the values of another generation or another culture? Do some values seem to be universal, or nearly so?
- How may moral dilemmas arise? Is it possible for an individual to act in a morally justifiable way within a context of restricted choice, oppression, or corruption? To what extent may the circumstances of people’s lives excuse actions which might be condemned by society’s moral principles? Can respect for a culture, in harmony with principles of tolerance and openness, be reconciled with a condemnation of specific practices within that culture, on the basis of other principles?
- Is there a relationship between ethics and the Creativity, Action, Service programme within the Diploma programme? Is service to others, in whatever form, a moral obligation? If so, on what might the obligation be based? If not, why not?
- Are there ethical obligations for humanity to treat the natural environment in a certain way? Are there constraints? If so, are the obligations and constraints based solely on a concern for the indirect effects on humanity, or are there other issues and principles involved?
- Do established values change in the face of new knowledge?
- Should scientific research be subject to ethical principles, or is the pursuit of scientific knowledge intrinsically worthwhile?
- Does the possession of knowledge carry an ethical responsibility?
- Is there knowledge which a person or a society has a responsibility to acquire, or not to acquire?
- When confronted by an unjust situation, is a person obliged to act? If the unjust situation is in the context of friendship or family, would this make a difference? Should this make a difference? Are there ethical constraints on the actions which a person should take to ‘right a wrong’?

## Ethics and Politics

- Is politics primarily concerned with **what is** or **what ought to be**? Is it a study of the workings of power, with possible attendant corruption, or is it a study of ethical concepts

- of how people ought to live together in a society?
- Are the following ideas political, ethical, or both: justice, rights, social responsibility, equality, and freedom? Is the concept of property an ethical idea? Is the concept of society an ethical idea?
  - To what extent are political systems such as autocracy, democracy, theocracy and communism, in their ideal forms, allied with ethical ideas of the right way for people to live in a society? To what extent might each system embody different concepts of justice and social responsibility?
  - Does politics affect the ethics of a society?
  - Is there an obligation on an individual to be politically aware, or even politically active? Conversely, is there an obligation on an individual to refrain from political action? Can one avoid being affected by politics?
  - How should the language of political debate be analysed and judged? Is there a greater need for analysis in politics than in other Areas of Knowledge?
  - What is the influence of politics on other Areas of Knowledge, such as the natural and human sciences, history, and the arts? What, conversely, might be the influence of these other Areas of Knowledge on politics?
  - When the moral codes of individual nations conflict, can criteria be developed for an international morality which transcends them? What are the justifications for, and functions of, such ethical and political documents as the Geneva Conventions for warfare or the United Nations Declaration of Human Rights?

## LINKING QUESTIONS

I have gathered a garland of other men's flowers, and nothing is mine but the ribbon which binds them. Connections between the elements of the TOK diagram can also be explored through the further Linking Questions such as those offered below, which raise issues and concepts central to the course.

## Belief

Under all that we think, lives all we believe, like the ultimate veil of our spirits.  
(Antonio Machado)

- What may be meant by Ugo Betti's comment that 'When you want to believe in something you also have to believe in everything that's necessary for believing in it'?
- How do beliefs about the world, and beliefs about what is valuable, influence the pursuit of knowledge?
- To what extent can beliefs be justified on the basis of Ways of Knowing? To what extent should they be justified this way?
- Does some degree of unjustified belief exist within each element of the TOK diagram?
- What may be meant by the following comment?  
'First there is a time when we believe everything without reasons, then for a little while we believe with discrimination, then we believe nothing whatever, and then we believe everything again – and, moreover, give reasons why we believe everything.'  
(Georg Christoph Lichtenberg)

## Certainty

Only when we know little can we be certain; doubt grows with greater learning. (Goethe)

- What may be meant by Martin Luther King's claim that 'Nothing is more dangerous than sincere ignorance and conscientious stupidity', or the following lines by W B Yeats?  
'The best lack all conviction, while the worst  
Are full of passionate intensity.'
- To what extent is certainty attainable within each of the Ways of Knowing or within each of the Areas of Knowledge?
- In the absence of evidence, is certainty possible? Can there be certainty about a claim that is false?

## Culture

Just because we aren't all the same doesn't mean we have nothing in common. (Kirk Kerekes)

- What beliefs or knowledge, if any, are independent of culture?
- How do cultures differ with respect to the Ways of Knowing and Areas of Knowledge which they value above others? How would one justify valuing one way, or one area, more than another?
- If one looks at most Western compilations of quotations, it seems that most are attributed to dead, white, European males. Why might this be so? To what extent does the identity of the author of a quotation influence how its content is interpreted and how seriously its ideas are taken? What does the choice of quotations in this guide signify?

## Evidence

Tell a man there are 300 billion stars in the universe and he'll believe you. Tell him a bench has wet paint on it and he'll have to touch to be sure.

(A)

- What constitutes 'good evidence' within the different Ways of Knowing and Areas of Knowledge?
- Do perception, reason, and emotion have the same weight in providing 'good evidence' for claims within the different Areas of Knowledge? Must evidence always be expressed in words?
- What could be meant by 'A mind all logic is like a knife all blade. It makes the hand bleed that uses it'? (Tagore)
- Is technology, in the form of the information processed by computers, authoritative in the same way that humans, authors of texts and lecturers are?
- Which, if either, is the more definitive: facts from books, or facts from databases?
- Can a fact exist without a context?
- What does Luigi Pirandello mean by his comment that 'My opinion is a view I hold until  
– well – until I find out something that changes it'?  
–

# Explanation

The reverse side also has a reverse side. (Japanese proverb)

- What characteristics must an explanation possess to be considered 'good' within the different Ways of Knowing and Areas of Knowledge?
- Must all 'good explanations' make predictions with the same degree of success?
- Where would explanations about each Area of Knowledge rate, in a continuum from 'stories' through 'models' to 'reality'? What is 'reality'?
- What may be meant by Eugène Ionesco's statement: 'Explanation separates us from astonishment, which is the only gateway to the incomprehensible'?

# Interpretation

- To what extent do the classification systems (labels and categories) adopted in the pursuit of knowledge affect the knowledge we obtain?
- How does interpretation occur within the Areas of Knowledge? Within the Ways of Knowing? Are some Ways of Knowing less open to interpretation than others?

# Intuition

Intuition will tell the thinking mind where to look next. (Jonas Salk)

- In attempting to understand what is commonly called 'intuition', is it best to think of it as a rapid cognitive process or perhaps, as some say, an irrational or unmediated awareness of phenomena?
- Germaine Greer once commented that 'The frequently celebrated female intuition . . . is after all only a facility for observing tiny insignificant aspects of behaviour and forming an empirical conclusion which cannot be syllogistically examined.' Does 'feminine intuition' exist? Do men's Ways of Knowing differ from those of women?
- To what extent is intuition to be taken seriously in the different Areas of Knowledge?

# Technology

Before you become too entranced with gorgeous gadgets and mesmerizing video displays, let me remind you that information is not knowledge, knowledge is not wisdom, and wisdom is not foresight. Each grows out of the other and we need them all.  
(Arthur C. Clarke)

Although technology is certainly not new, rapid and accelerating advances in the fields of information and communication technology are commonly recognized as having profound effects on what we do and can know. Technology offers a means of communication that, more than any other, crosses cultures.

- In what ways has technology expanded knowledge? In what ways has it affected how much we value the different Ways of Knowing and Areas of Knowledge? What fields of

- study have been founded on technological developments?
- Does information technology, like deduction, simply allow the knower to arrange existing knowledge in a different way, without adding anything, or is this arrangement itself knowledge in some sense?
  - To what extent do information and communication technologies influence the way we think about the world? To what extent do these technologies determine what we regard as valuable or important? Could it be argued that the increasing global dominance of a particular form of information technology gives rise to an increasing uniformity of thinking?
  - Can it be said that every new technology affects the beliefs of individuals and societies, in both positive and negative ways? How can the impact of new technologies be predicted? How reliable are these predictions?
  - What is the difference between data, information, knowledge and wisdom? Are there technologies specifically designed to impart data, information, knowledge and wisdom?
  - In what ways do information and communication technologies influence the accessibility of information, and the reasons for believing such information to be true? Who controls such technologies, and what are the effects of such control?
  - What did Sydney Harris mean when he said that ‘The real danger is not that computers will begin to think like men, but that men will begin to think like computers’?
  - What is meant by Akio Morita’s claim that ‘You can be totally rational with a machine. But if you work with people, sometimes logic has to take a back seat to understanding’?

## Truth

They who know the Truth are not equal to those who love it, and they who love it are not equal to those who delight in it.  
(Confucius)

- How useful are the truth tests of coherence, correspondence and pragmatism in arriving at knowledge?
- Is there such a thing as ‘false knowledge’?
- What is the difference between ‘justified true belief’ and ‘true belief’?
- What is meant by the following statement?

‘As the wise test gold by burning, cutting and rubbing it . . . so are you to accept my words after examining them and not merely out of regard for me.’  
(Buddha)

- To what extent does the truth of a sentence depend on the language used to express it?

## Values

To live is, in itself, a value judgement. To breathe is to judge. (Albert Camus)

- How do values underlie the pursuit of truth in the different Areas of Knowledge? How, if at all, do they influence methodology?
- To what extent do the different Ways of Knowing and Areas of Knowledge influence the values adopted by individuals and societies?

- In what ways do values affect our representations of the world, for example, in language, maps, visual images, or statistics? When might a persuasive representation be praised as ‘effective’, or, in contrast, condemned as ‘manipulative’?

At the end of nine or ten nights he realized, with a certain bitterness, that he could expect nothing from those students who accepted his teaching passively, but he could of those who sometimes risked a reasonable contradiction.

(Jorge Luis Borges)