

# Theory of Knowledge

for the IB Diploma



3<sup>rd</sup> Edition

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# Assessment – Exhibition

# 3

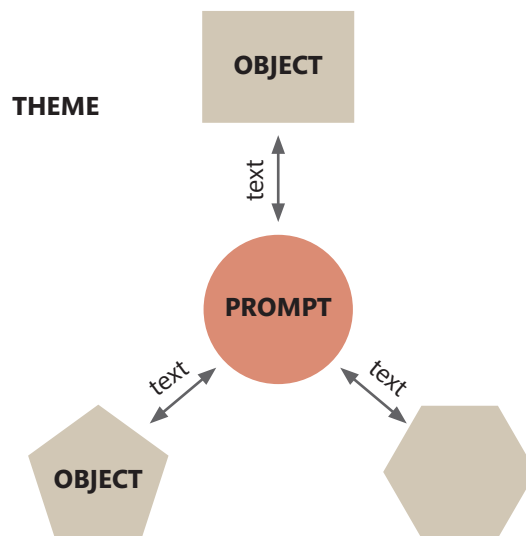
## Introduction

'Experience without theory is blind, but theory without experience is mere intellectual play.'  
(Immanuel Kant)

Much of the value of our engagement with the Theory of Knowledge course lies in an interplay between concepts and ideas on the one hand, and our everyday lived experiences on the other. The exhibition task is a great opportunity for you to explore and demonstrate the connections between what we call the 'TOK world' and the 'real world' around us. In a nutshell, the exhibition is about how TOK manifests in the world. It has been designed with the learner profile and IB mission in mind – as an attempt to foster a recognition of the range of TOK enquiry as it extends throughout and beyond academic study, and to show how TOK has practical importance.

The need to put together an exhibition is a powerful reason for keeping a **TOK journal** in which ideas and the nature of objects can be recorded as they emerge. Don't forget to include items that relate to your life beyond, as well as within, your academic study; an exhibit can benefit from a personal touch with one or more of your objects relating to your particular experiences.

## The components of your exhibition



**Figure 1** The components of your exhibition

As you contemplate the exhibition task, it is important to be aware of a number of components that need to be integrated. Your exhibition should have its roots in one of the *themes* that you have studied. This is a strong recommendation.

Much more strictly, your exhibition must be a response to one of the 35 internal assessment *prompts* found in the subject guide and replicated in this chapter on

pages 182–183. The IA prompts are all knowledge questions. It is essential that your exhibition consistently addresses the prompt that you have chosen.

You need to select three *objects* that illustrate something significant about the prompt that you have chosen. These objects can take a wide variety of forms, but they should be specific items or photographs of items as far as possible – not generic images of whole classes of object, or objects created specifically for the exhibition itself.

You need to explain in writing the TOK connection between each of the objects and the prompt, and provide a justification for their inclusion. Again, you need to ensure that each of the objects offers a different insight into the prompt. The limit for your three pieces of text altogether is 950 words.

## The construction of your exhibition

You might start with the selection of a theme that you found particularly interesting and find an object that says something within it. You might then look for a suitable prompt that can link to that interesting object. Alternatively, you might begin from a prompt that engages you within a theme and identify some possible answers to the prompt that can then be connected to objects that illustrate those answers. Then again, you might have an object that fascinates you. You would then link it to one of the prompts, and expand the exhibition into two other objects.

There are different ways into the exhibition so you might want to play with them to see what you think works best for you. Some approaches are shown below:

	1	2	3	4	5
<b>Theme first</b>	Select theme	Identify object	Search for suitable prompt	Write text	Add other objects and texts
<b>Prompt first</b>	Select prompt	Select theme	Find possible answers to prompt	Identify objects	Write texts
<b>Object first</b>	Select object	Link to prompt	Write text	Add other objects and texts	

An essential point is that your teacher is there as a support with the construction of your exhibition. But they can assist only in response to whatever you bring to the conversation, and there are limits to what is permitted. Talk to your teacher at an early stage, and then later on take advantage of your one allowed consultation once you have a well-advanced draft.

Stick rigidly to *one prompt* for your whole exhibition. Check that the points your objects make are *precise and about knowledge*. And make sure that your objects exhibit diversity in the points they trigger about the prompt.

Consider the advantages of choosing a theme that has been covered in class, and try to use your selected theme as a way of making your exhibition coherent. Remember that some leeway will be tolerated for the treatment of a prompt that transcends themes or draws on areas of knowledge, but do not make this an aim of your work.

Make sure that your explanation sets each object within its own context so that everyone understands what your objects are, what they do, and what they mean. Then make a clear link from each object to the selected prompt, and explain for each object what it has to say about the prompt and how it offers an explicit and precise perspective on it. Keep to the 950-word limit for all three texts together – aim for 300 words per object. Include references to support factual claims that you make about each object.

The assessment instrument is shown on page 184. Read it carefully and keep it in mind during the process of constructing your exhibition. In particular, aim to exemplify the characteristics described under the heading ‘Excellent’. Remember that your teacher will assess your work using what is called *global impression* marking; this means that they are looking for the description in the instrument that provides the best overall fit for the quality of your exhibition.

As with all other internally assessed tasks in the diploma programme, a sample of student work will be sent to examiners as a check against the standards applied by your teacher to the work of all TOK students in your year group.

### The IA prompts

You must select one prompt from the list below on which to base your exhibition.

1. What counts as knowledge?
2. Are some types of knowledge more useful than others?
3. What features of knowledge have an impact on its reliability?
4. On what grounds might we doubt a claim?
5. What counts as good evidence for a claim?
6. How does the way that we organise or classify knowledge affect what we know?
7. What are the implications of having, or not having, knowledge?
8. To what extent is certainty attainable?
9. Are some types of knowledge less open to interpretation than others?
10. What challenges are raised by the dissemination and/or communication of knowledge?
11. Can new knowledge change established values or beliefs?
12. Is bias inevitable in the production of knowledge?

13. How can we know that current knowledge is an improvement on past knowledge?
14. Does some knowledge belong only to particular communities of knowers?
15. What constraints are there on the pursuit of knowledge?
16. Should some knowledge not be sought on ethical grounds?
17. Why do we seek knowledge?
18. Are some things unknowable?
19. What counts as a good justification for a claim?
20. What is the relationship between personal experience and knowledge?
21. What is the relationship between knowledge and culture?
22. What role do experts play in influencing our consumption or acquisition of knowledge?
23. How important are material tools in the production or acquisition of knowledge?
24. How might the context in which knowledge is presented influence whether it is accepted or rejected?
25. How can we distinguish between knowledge, belief and opinion?
26. Does our knowledge depend on our interactions with other knowers?
27. Does all knowledge impose ethical obligations on those who know it?
28. To what extent is objectivity possible in the production or acquisition of knowledge?
29. Who owns knowledge?
30. What role does imagination play in producing knowledge about the world?
31. How can we judge when evidence is adequate?
32. What makes a good explanation?
33. How is current knowledge shaped by its historical development?
34. In what ways do our values affect our acquisition of knowledge?
35. In what ways do values affect the production of knowledge?

*The chosen IA prompt must be used exactly as given; it must not be altered in any way.*

### The exhibition assessment instrument

Your teacher will use the assessment instrument below to mark your exhibition.

Does the exhibition successfully show how TOK manifests in the world around us?					
Excellent 9–10	Good 7–8	Satisfactory 5–6	Basic 3–4	Rudimentary 1–2	0
<p>The exhibition clearly identifies three objects and their specific real-world contexts. Links between each of the three objects and the selected IA prompt are clearly made and well-explained.</p> <p>There is a strong justification of the particular contribution that each individual object makes to the exhibition. All, or nearly all, of the points are well-supported by appropriate evidence and explicit references to the selected IA prompt.</p>	<p>The exhibition identifies three objects and their real-world contexts. Links between each of the three objects and the selected IA prompt are explained, although this explanation may lack precision and clarity in parts.</p> <p>There is a justification of the contribution that each individual object makes to the exhibition. Many of the points are supported by appropriate evidence and references to the selected IA prompt.</p>	<p>The exhibition identifies three objects, although the real-world contexts of these objects may be vaguely or imprecisely stated. There is some explanation of the links between the three objects and the selected IA prompt.</p> <p>There is some justification for the inclusion of each object in the exhibition. Some of the points are supported by evidence and references to the selected IA prompt.</p>	<p>The exhibition identifies three objects, although the real-world contexts of the objects may be implied rather than explicitly stated. Basic links between the objects and the selected IA prompt are made, but the explanation of these links is unconvincing and/or unfocused.</p> <p>There is a superficial justification for the inclusion of each object in the exhibition. Reasons for the inclusion of the objects are offered, but these are not supported by appropriate evidence and/or lack relevance to the selected IA prompt. There may be significant repetition across the justifications of the different objects.</p>	<p>The exhibition presents three objects, but the real-world contexts of these objects are not stated, or the images presented may be highly generic images of types of object rather than being specific real-world objects. Links between the objects and the selected IA prompt are made, but these are minimal, tenuous, or it is not clear what the student is trying to convey.</p> <p>There is very little justification offered for the inclusion of each object in the exhibition. The commentary on the objects is highly descriptive or consists only of unsupported assertions.</p>	<p>The response does not reach the standard described by the other levels or does not use one of the IA prompts provided.</p>
Possible characteristics					
<p>Convincing Lucid Precise</p>	<p>Focused Relevant Coherent</p>	<p>Adequate Competent Acceptable</p>	<p>Simplistic Limited Underdeveloped</p>	<p>Ineffective Descriptive Incoherent</p>	

## Some exhibition exemplars

The following pages offer suggested examples of how exhibitions could be constructed in each of the themes of the TOK course. They are here to give you some guidance as well as to give you an opportunity to apply the assessment instrument in order to evaluate their quality. In general, they are intended to illustrate the top bands of the instrument, but they may have their flaws, which you are invited to identify in the light of the advice and assessment instrument provided above.

### Example A: Knowledge and the knower

*IA Prompt #14: Does some knowledge belong only to particular communities of knowers?*

#### Object 1: Bottle of Irn Bru

My first object is a bottle of Irn Bru from my native country of Scotland. This carbonated soft drink was first created as 'Iron Brew' by the company AG Barr in 1901 as an alternative refreshment to beer for steel workers constructing the central railway station in Glasgow. Changes in food labelling law in the 1940s prompted a change in name to 'Irn Bru', as the production process did not involve anything that could satisfy the definition of brewing. The drink has maintained an iconic presence in Scottish culture ever since, while production has remained in the hands of the Barr family. Although required to list ingredients, the company has kept the exact recipe a closely guarded secret – it is known only to the chairperson and one other individual, and also written down and kept in a bank vault somewhere in Scotland. Although there is now a range of products that include reduced sugar and extra ingredients, such as ginger, the picture displayed here is of a bottle of the original drink recently re-launched.



The student has used a personal touch.

The knowledge required to produce Irn Bru is not available to the public, and the trademarked name means that this knowledge can be considered legally to belong to the AG Barr company. This is an example of knowledge restricted to certain people for commercial reasons, in order to prevent others from using it to their financial advantage. There are many other examples of brand-named and trademarked products that belong by law to individuals or companies – along with the knowledge needed to produce them. Such knowledge belongs to a particular community only because of its secret nature protected by law, and, in the absence of these safeguards, there would be no fundamental reason why it could not belong to others too.

Reference:

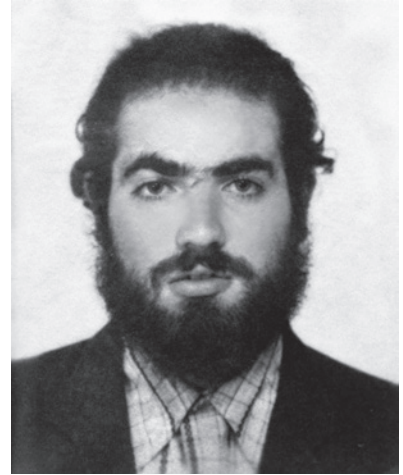
[www.agbarr.co.uk/our-brands/irn-bru/](http://www.agbarr.co.uk/our-brands/irn-bru/)

#### Object 2: Grigori Perelman

My second object is Grigori Perelman – a Russian mathematician mentioned in my Mathematics HL class who is famous for providing a proof for one of the seven 'millennium problems' identified by the Clay Foundation in 2000 as the most important open questions in mathematics. The foundation attached a prize of \$1m for a successful proof for each problem. The problem that Perelman disposed of was in the field of topology concerning the nature of surfaces – called the *Poincaré Conjecture*.



In the first years of the 20th century, the French mathematician and physicist Henri Poincaré first raised the conjecture, which remained unsolved until the work of Perelman was published and accepted by the mathematics community in 2006. With this acceptance came the awards: first the Fields Medal, the most prestigious prize in mathematics, and then the million-dollar prize sponsored by the Clay Foundation. Perelman immediately made headlines by rejecting both prizes – allegedly on the grounds that he did not value prizes but rather the mathematics itself.



Perelman's response to these awards suggests that he believes that mathematical knowledge belongs to a community rather than, in this case, being attributed to him personally. But what community? The number of people who understand his proof is very small when compared to the population as a whole, so perhaps we could claim that the proof of the Poincaré Conjecture belongs only to them. On the other hand, this community could include a wider range of people if more of them were to specialise in mathematics. However, the simple knowledge that the conjecture is true (rather than the proof of it) is something that could be considered to belong to humanity as a whole, as long as the mathematics community is trusted to maintain the standards required for mathematical proof. This case is concerned with knowledge that may belong to a particular community due to the unavoidable exclusion of others, as opposed to the deliberate decision to exclude them.

Reference:

[www.claymath.org/millennium-problems/poincar%C3%A9-conjecture](http://www.claymath.org/millennium-problems/poincar%C3%A9-conjecture)

### Object 3: Antiva medicine

My third and final object is a packet of the anti-viral drug Antiva, produced in Bangladesh and active against chronic hepatitis B infection. Like all anti-retrovirals, Antiva works by inhibiting the enzyme reverse transcriptase, which the virus needs in order to make copies of itself and hence proliferate. In Bangladesh, Antiva is manufactured by the company Square Pharmaceuticals. Bangladesh currently qualifies as one of the least developed countries (LDCs) in the world.



In 2015, the World Trade Organization (WTO) extended a waiver for patents and other intellectual property rights in relation to the 48 least developed countries in the world. This waiver will extend to 2033, when it will be discussed again. The waiver allows poor countries easier access to drugs and the opportunity to manufacture and

distribute them at much lower prices than those that would otherwise apply. One concern is that economic development in Bangladesh is such that by 2024 it may no longer count as an LDC, and hence no longer qualify for this WTO arrangement.

Here is a situation where knowledge would ordinarily belong to the manufacturer in a similar way, as is the case with AG Barr and Irn Bru. However, in this case knowledge has been deliberately shared with others on humanitarian grounds. Unlike the case with the Poincaré Conjecture, this knowledge is not limited by a general inability to understand it. One might claim that the knowledge does not really fully belong to the community of LDCs as the waiver is of limited duration. However, when knowledge is known it cannot usually be 'forgotten' again. Hence, if the waiver were cancelled, one could argue that it would be the permission to use the knowledge that would be withdrawn rather than the knowledge itself. It should also be mentioned that the importance of extending the community to which the knowledge belongs, in this case is dependent on the existence of the resources needed to exploit it.

Reference:

[www.un.org/ldcportal/wto-drugs-patent-waiver-for-ldcs-extended-until-2033/](http://www.un.org/ldcportal/wto-drugs-patent-waiver-for-ldcs-extended-until-2033/)

Word count = 940

## Example B: Knowledge and technology

*IA Prompt #33: How is current knowledge shaped by its historical development?*

### Object 1: Typewriter

My first object is a typewriter owned by my father. Although various forms of the typewriter have been invented since the 16th century, the versions that we most clearly recognise today were produced in the 1870s by Christopher Sholes and co-workers. Sholes eventually settled on an arrangement of keys that we still use in the design of keyboards today – this is known as the QWERTY layout, after the sequence of keys found at the top-left portion of the array. There are varying accounts of why Sholes arrived at the overall arrangement of letter keys. These

include the effort to locate keys such that common combinations of letters are located far apart in order to prevent jamming of the typewriter arms that swing and deliver the letter impressions to the paper; but there are anomalies here as some keys for common combinations of letters such as 'e' and 'r' are found next to each other. A contrasting claim states that the arrangement was made deliberately difficult for typists in order to slow them down and minimise errors, but touch typing was not a common skill at that time, so this explanation also seems unconvincing.

Whatever the origins of the key layout, it became standard when Sholes's invention became mass-produced by the company Remington and Sons; 150 years later, the



The student has linked the objects but this is not strictly required by the assessment instrument. However, it does emphasise that the objects make different points about the prompt – which is required.

QWERTY keyboard is still the default today. Typists obviously need to learn to use it, so we can see that current technology in the form of computer keyboards, and the procedural knowledge needed in order to use them, has been shaped by the historical development of earlier technology. Furthermore, this arrangement has become 'locked in' to our knowledge as any major re-structuring of the keyboard layout would result in inefficiency, with significant difficulties in adjustment resulting in reduced typing speeds.

Reference:

[www.forbes.com/sites/quora/2019/01/10/why-was-the-qwerty-keyboard-layout-invented/#64409f4957ae](http://www.forbes.com/sites/quora/2019/01/10/why-was-the-qwerty-keyboard-layout-invented/#64409f4957ae)

### Object 2: Mesosomes

Many biology textbooks refer to the appearance of structures within prokaryotic cells, such as bacteria, that are known as *mesosomes*. These mesosomes are my second object. In older texts, these structures are assigned rather speculative roles in cellular respiration or cell division.

This is the case in one of the textbooks

I am using for my studies. However, more recent research has demonstrated to the satisfaction of most biologists that mesosomes are artifacts; that is, they are features of cells caused by the processes used in order to prepare the specimens for observation using the electron microscope, rather than real structures in the cells. These processes include the application of heavy metals and freezing in order to fracture the cells and membranes in ways that make viewing easier.

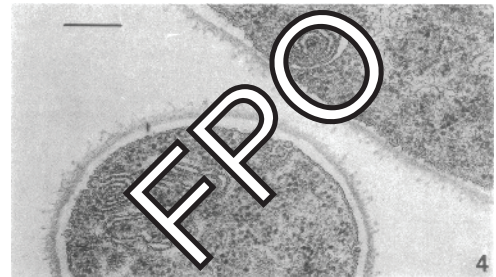
We commonly think of technology as the product of science, and this is clearly the case with the invention of the electron microscope. However, technology is also needed in order to advance science, as is the case here. This object reminds us that we must also be aware of the possibility that the application of technology itself may influence what we observe and what we think we have discovered. Such concerns are particularly important in science, where so many objects and events are observable only with the aid of scientific equipment. Furthermore, misinterpretations of observations may persist long after the observations have been explained more accurately – as appears to be the case here with instructional texts in biology sometimes still accrediting mesosomes with the cellular functions mentioned above.

Reference:

[www.sciencedirect.com/topics/medicine-and-dentistry/mesosome](http://www.sciencedirect.com/topics/medicine-and-dentistry/mesosome)

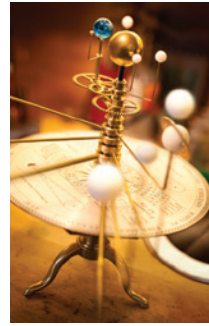
### Object 3: Orrery

The last object in my exhibition is an orrery. An orrery is a mechanical representation of the solar system driven by a clockwork mechanism. The first orrery was created by the clockmakers George Graham and Thomas Tompion in about 1710, who presented it to Charles Boyle, the Earl of Orrery – hence the name. The mechanisms that drove the movements in orreries were ingenious and needed to be complex in order to replicate the simultaneous observed movements of a substantial set of astronomical bodies, including planets and the Earth's moon.



It might have been more striking if the student had used a page from their biology textbook as the object, rather than the mesosomes themselves.

Perhaps more interestingly for TOK, the use of clockwork in these models seemed to chime with some more philosophical views – popular at the time – about the nature and functioning of the universe. In particular, some scientists (such as Isaac Newton) adopted an interpretation in which God set up the universe and then ‘retired’ to leave the laws of physics (such as Newton’s law of universal gravitation) to run their course. This is analogous to a clockwork mechanism, which is cranked up and then left to unwind without further intervention. This philosophical view is known as *deism*, and was attractive not least because it suggested that, at least in principle, the behaviour of the universe is entirely predictable.



This object illustrates how technological inventions can extend their influence well beyond the job that they are originally intended to perform. Another example would be the modern tendency to regard the mind as if it were a collection of software. Unlike the case of the mesosome, where it is false empirical claims that persist in our knowledge about something specific, the notion of a clockwork universe is an example of a powerful metaphor that burrows into thinking and can shape knowledge in a wider field – often below the threshold of conscious thought.

Reference:

[www.universetoday.com/44671/what-is-an-orrery/](http://www.universetoday.com/44671/what-is-an-orrery/)

Word count = 852

### Example C: knowledge and politics

*IA Prompt #11: Can new knowledge change established values or beliefs?*

#### Object 1: Portrait of Aung San Suu Kyi

The first object in my exhibition is a portrait of Aung San Suu Kyi, who was placed under house arrest for most of the two decades from 1990 to 2010 in Myanmar. During this time, she was a focus of opposition to the military government after the annulment of elections which her party had won. Her refusal to leave Myanmar during these years, despite having permission to do so on condition of not returning, coupled with her determined resistance against the regime, won her many plaudits and awards. These included the Nobel peace prize in 1991 and an honorary doctorate from her *alma mater* – Oxford University – in 2012. In 2015, when her party achieved a landslide victory, she was made state counsellor (the equivalent of prime minister) but her international reputation subsequently suffered because of her perceived indifference to the plight of the Muslim minority Rohingya people, who were oppressed in Myanmar and displaced into neighbouring Bangladesh. In 2017, St Hugh’s College in Oxford decided to remove her portrait from public display, although the honorary doctorate was not revoked, in contrast to many other awards that were being withdrawn from her at this time.



It is best not to introduce another example – use the available word count to develop the effectiveness of the selected object.

Here, the portrait is more effective as an object than the person because it creates a tighter focus.

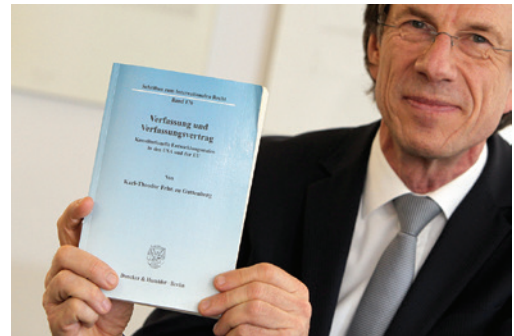
This object illustrates how new knowledge can change beliefs about a prominent person active in the field of politics. In this case, the new knowledge about Suu Kyi was inconsistent with what was previously assumed to be the case, and her more recent apparent inaction in the face of injustice was generally deemed more significant than her earlier resilience in captivity. It is worth noting that the change in beliefs about Suu Kyi's character has probably not been accompanied by any change in values among those who have observed her; rather it is her perceived failure to live up to those enduring values, such as those that underlie the expression of human rights by the United Nations, that has led to the change in beliefs.

Reference:

[www.theguardian.com/world/2017/sep/29/oxford-college-removes-painting-of-aung-san-suu-kyi-from-display](http://www.theguardian.com/world/2017/sep/29/oxford-college-removes-painting-of-aung-san-suu-kyi-from-display)

### Object 2: Dissertation of Karl-Theodor zu Guttenberg

My second object is the PhD dissertation of Karl-Theodor zu Guttenberg, who served as German defence minister from 2009 to 2011. During this period, queries were raised as to the authenticity of his submission in support of his doctorate. The University of Bayreuth eventually identified 23 violations of copyright in the work, and ruled that this was a case



of intentional deception as evidenced by numerous modifications of original texts in an attempt to prevent discovery of their origins. Zu Guttenberg simplified the task of the university to revoke the award of the doctorate by making a request for the withdrawal himself. Subsequently he tendered his resignation as government minister. Although this was initially not accepted by Angela Merkel as German chancellor, further enquiries into the work prompted zu Guttenberg to offer resignation again and this time it was accepted.

Cases like these invite further scrutiny of past behaviour on the part of the individuals involved, and zu Guttenberg was not spared in this respect. While plagiarism has long been considered academic malpractice, the tools available for research and for detection of the traces of unreferenced work have vastly expanded in recent years with the advent of digital searching and online publication. This has sparked a more general debate as to the ownership of ideas and whether established expectations for attribution of the work of others are sustainable in a highly interconnected world. The question here is about how the high value that we assign to originality and respect for the work of others should be protected. Nevertheless, beliefs about the integrity of zu Guttenberg as an academic were certainly brought into question by this series of events.

Reference:

[www.spiegel.de/international/germany/the-guttenberg-plagiarism-scandal-german-society-is-applying-a-double-standard-a-748090.html](http://www.spiegel.de/international/germany/the-guttenberg-plagiarism-scandal-german-society-is-applying-a-double-standard-a-748090.html)

### Object 3: Bill Clinton's announcement concerning Monica Lewinsky

Finally, my third object is the announcement made by former US President Bill Clinton concerning his relationship with White House intern Monica Lewinsky. Clinton became embroiled in a scandal in 1998 while US president when accused of conducting this affair. In the briefing Clinton first denied having sexual relations with Lewinsky, but eventually had to concede that the truth was otherwise. The result was that Clinton became only the second US president in history to be impeached by the senate – for perjury and obstruction of justice.



A still from the video of this event is acceptable as an object.

Clinton's approval ratings reached their highest point of his eight-year incumbency at 73 per cent immediately after impeachment proceedings were concluded and he was acquitted of the charges, despite the fact that he had not told the truth to the US public. According to Gallup polling, his final rating after stepping down was 65 per cent – higher than any other US president since the early 1950s – and, in a further poll in 2007, Clinton came fourth in the list of the greatest US presidents in history.

In this case, the allegations levelled against a prominent politician seemed to have little effect on some of the beliefs of observers. I have presented in this exhibition three cases where new knowledge comes into contact with established beliefs. There is an opportunity to examine how the nature of this knowledge might produce differing effects on beliefs – ranging from a realisation of indifference to injustice, to a lack of respect for the protocols of knowledge ownership, to the private behaviour of a public figure. There is a further chance to reflect on how the reactions to new knowledge about prominent individuals might be influenced by their particular characters, or be shaped by variations between cultures as a result of differences in values.

The temptation is strong to make explicit comparisons between the points made by each object, but consider how the words might be effectively used to develop the point of each example, while leaving the examiner to appreciate the differences.

Reference:

[www.bbc.com/news/world-us-canada-50813276](http://www.bbc.com/news/world-us-canada-50813276)

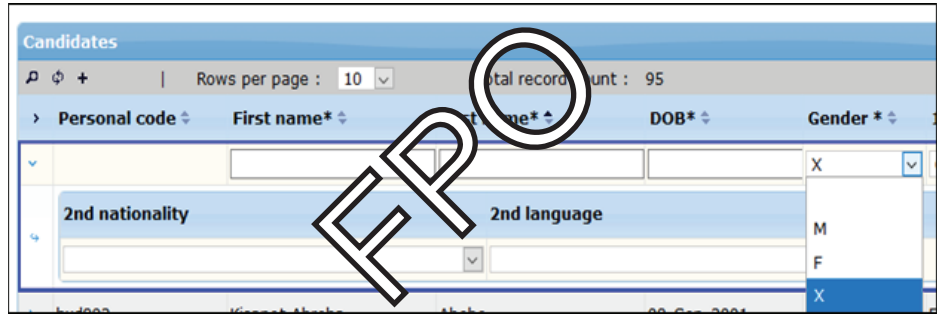
Word count = 894

### Example D: Knowledge and language

*IA Prompt #6: How does the way that we organise or classify knowledge affect what we know?*

#### Object 1: IBIS registrations – gender options

My first object is a screenshot from the IBIS examination registration website. A recent amendment to this page now permits candidate registration under three gender options: M for male, F for female, and now X as well. This change raises important issues about classification. We human beings tend to like classifications, as they are a way to organise what we know. This particular example questions some of our most basic traditional assumptions about gender. Although classification in



some areas of knowledge is less directly connected to the human experience, we are still comforted in some way by being able to ‘organise’ our knowledge. Think of the classification of Pluto as a dwarf planet, for instance. Elsewhere, artistic movements are a great way to make sense of art history and, while they are sometimes determined in hindsight, they often come about when a group of artists decides to classify themselves (surrealism, Dadaism, and so on). That kind of classification also helps us to have an identity.

By catering for all gender identities, the IB registration options highlight the performative function of language. I have heard of people who have undergone surgical procedures in order to fit in with traditional established gender options, but the widespread recognition of gender X and the power to choose pronouns to reflect perceptions of identity may render the need for such people to alter their biology unnecessary or incidental. More generally, I have heard of people in therapy who are comforted to hear that they are autistic or have ADHD, because the diagnosis helps them to put a label on their own experiences.

Reference:

[www.themandarin.com.au/83991-what-is-gender-x/](http://www.themandarin.com.au/83991-what-is-gender-x/)

### Object 2: Capybara

My second object is the capybara, the largest rodent in the world. Native to South America, capybaras can reach a length of 1.2 metres and a weight of more than 45 kilograms. Their diet is herbivorous and they spend much of their time in the semi-aquatic environment of marshes and swamps. They are strong swimmers, have partially webbed feet, and protect themselves from predators by hiding underwater.



In Venezuela, capybara meat is considered a delicacy. When 17th-century Spanish missionaries arrived in this area, they set about enforcing the dietary restrictions of their religion among the converted – including the prohibition on meat consumption during Lent. But they also realised the importance of the capybara in providing required nutrition to local indigenous groups, and so they appealed to the Vatican to allow their converts to continue to eat the animals. The descriptions provided by the missionaries of the appearance and habits of capybaras were insufficient for clear communication so the Vatican authorities, having never seen capybaras themselves,

ruled that the capybara was a kind of fish. It is a matter of debate whether, had they known of the true nature of the animal, they would have made the same decision given that there is explicit prohibition in the Bible of rodent consumption.

While the way in which the Vatican authorities classified the capybara can be considered to be a reflection of their knowledge, for the missionaries and the indigenous people of Venezuela the categorisation of the animal was an indication of pragmatic realities. It is unlikely that thinking of the capybara as a fish made any difference to those directly involved in consuming them. Indeed, there are reports that capybara meat tastes like a combination of pork and sardines, with the fishy notes presumably a consequence of their lifestyle as described above.

Reference:

[www.cogwriter.com/news/religious-news/did-a-pope-conclude-a-rodent-was-a-fish-for-lent/](http://www.cogwriter.com/news/religious-news/did-a-pope-conclude-a-rodent-was-a-fish-for-lent/)

### Object 3: Swastika in Ghana

The third object in my exhibition is a symbol displayed on a commercial building in Ghana close to my school. This is a swastika. Variations on this symbol are quite common in Africa and in diverse locations across the world. They are sometimes found on weights used by the Akan people of Ghana and Côte d'Ivoire in order to measure gold dust, which is present in copious amounts in these countries. In this context, the symbol references gold as a currency and, by extension, the concepts of power and wealth. Also, the swastika can be described as a stylisation of the adinkra symbol of two conjoined crocodiles representing the values of democracy and cooperation, and futility of greed.



Use of an object from the local environment can enhance authenticity and stimulate discussion in the audience for the exhibition. Some sort of audience is a requirement, whether class sharing or major school event.

Symbols act as a convenient way of representing concepts important for social knowledge – adinkra symbols are ideographs that function well in a pre-literate culture. The meanings of such symbols are easily communicated and understood, but they are more strictly tied to the culture in which they originated than is the case with full written language, which means that there is a greater need to acquire knowledge of the context. The swastika has a long and varied history across many cultures around the world, but the many meanings that it transmits have been overshadowed by its usage by the national socialists in Nazi Germany in the 1930s and 1940s, and hence with the crimes and atrocities that they committed. Such an overpowering connection of a symbol to a particular set of circumstances can interfere with the message it was originally intended to convey, and hence disturb the organisation of knowledge in a different cultural context.

Reference:

[africa.si.edu/collections/view/objects/asitem/Objects@632/26/displayDate-asc?t:state:flow=8b789e5f-e870-41da-ba2d-2d7a629fa493](http://africa.si.edu/collections/view/objects/asitem/Objects@632/26/displayDate-asc?t:state:flow=8b789e5f-e870-41da-ba2d-2d7a629fa493)

Word count = 839



### Example E: Knowledge and religion

#### IA Prompt #8: To what extent is certainty attainable?

##### Object 1: Grandmother's Bible

The first object in my exhibition is my grandmother's Bible. Sunday visits to church were common during my early childhood, and by the time I was 15 there were lessons from the minister leading up to confirmation. Throughout all of this, I was more confused than convinced. The stakes seemed high. I needed to know. I confided my doubts to my grandmother who led me to her Bible and placed her hands on the book, a very large book, and said, 'See. These words are a light unto my path. It says so right here.' I didn't see. How was her certainty possible? I read the book over the summer. I still was not certain. 'But grandmother,' I said, 'bad things happen.' She just looked at me.



Questions arose: what must it feel like to be certain? How and why does this condition elude others? How does one dimension of certainty, say, in religion, attach to a disposition to believe claims from elsewhere? What other high-stakes claims are impossible to believe except through an act of uncritical belief? Is there an afterlife? Am I a good person? Who/what created the universe? Is there a meaning to life? Why does it matter? What would count as evidence? Maybe it's all around me and I don't see it. That's what my grandmother said.

This object and the circumstances described above concern the pursuit or attainment of psychological certainty in which one is completely sure of something. An important feature of this kind of certainty is that it can be held even if the person who is certain is actually wrong.

Reference:

[centerforinquiry.org/blog/religious\\_certainty\\_is\\_a\\_dangerous\\_weapon/](http://centerforinquiry.org/blog/religious_certainty_is_a_dangerous_weapon/)

##### Object 2: Gödel's ontological proof of God

My second object is an ontological proof for the existence of God offered by the Austrian mathematician, Kurt Gödel. An ontological proof is one in which the conclusion is reached from starting premises arrived at by rational thought rather than empirical observation. These premises may be thought of as axioms in a similar fashion to those found in mathematics. Gödel claimed that his proof was motivated by his desire to construct a watertight argument rather than support any personal religious conviction that he may have harboured. The details of Gödel's argument are too complex and difficult to discuss in detail here, but it involved

Ax. 1.  $(P(\varphi) \wedge \Box \forall x(\varphi(x) \Rightarrow \psi(x))) \Rightarrow P(\psi)$

Ax. 2.  $P(\neg\varphi) \Leftrightarrow \neg P(\varphi)$

Th. 1.  $P(\varphi) \Rightarrow \Diamond \exists x \varphi(x)$

Df. 1.  $G(x) \Leftrightarrow \forall \varphi(P(\varphi) \Rightarrow \varphi(x))$

Ax. 3.  $P(G)$

Th. 2.  $\Diamond \exists x G(x)$

Df. 2.  $\varphi \text{ ess } x \Leftrightarrow \varphi(x) \wedge \forall \psi(\psi(x) \Rightarrow \Box \forall y(\varphi(y) \Rightarrow \varphi(y)))$

Ax. 4.  $P(\varphi) \Rightarrow \Box P(\varphi)$

Th. 3.  $G(x) \Rightarrow G \text{ ess } x$

Df. 3.  $E(x) \Leftrightarrow \forall \varphi(\varphi \text{ ess } x \Rightarrow \Box \exists x \varphi(y))$

Ax. 5.  $P(E)$

Th. 4.  $\Box \exists x G(x)$

The student has demonstrated a strong personal input, but needs to develop further the link between scripture, religion, and psychological certainty.

what is known as *modal logic*, the distinction between necessary and contingent truths, and the concepts of properties and essences. As with ontological arguments in general, criticisms of Gödel's argument understandably focus on the legitimacy of the axioms he used. If the starting points of an argument can be called into question, then the truth of the conclusions can be too.

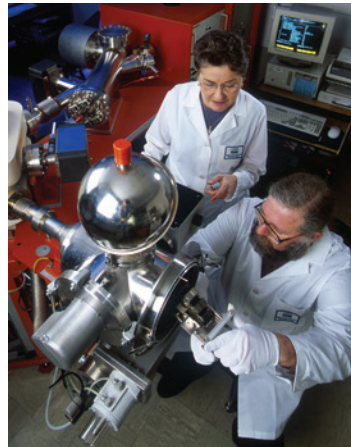
This object is concerned with epistemic certainty – the attempt to arrive at knowledge that is demonstrably true whatever the feelings or allegiance may be to it of individuals. There have been numerous attempts to achieve this kind of certainty, often inspired by the apparent power of logical thought as applied in other fields of knowledge. The philosopher Bertrand Russell commented that our uneasiness with such arguments when applied to religion is often undermined by our difficulty in identifying exactly what is wrong with them. The implied question is whether logic is an appropriate vehicle for trying to support or reject claims in the field of religion.

Reference:

[plato.stanford.edu/entries/ontological-arguments/](http://plato.stanford.edu/entries/ontological-arguments/)

### Object 3: Isotope-ratio mass spectrometer

The final object in this exhibition is an isotope-ratio mass spectrometer (IRMS). This device is used to determine the ratio of different isotopes in a sample. If the heavier isotope is radioactive, and the rate of its decay into the lighter isotope is known, then an estimate of the age of the sample can be made. For example, uranium-238 decays into lead-206 with a half-life of 4.47 billion years, meaning that half of the uranium will have converted into lead over that period. The age of a sample of zircon mineral, for example, which we know contains no lead at formation, can be estimated in this way. An isotope like uranium-238 with such a long half-life is useful for dating very old samples, such as those formed shortly after the formation of the Earth and solar system. It is true that the older the sample the greater the opportunity for error, as the proportion of remaining uranium diminishes and approaches zero. However, modern methods reduce this error to a maximum of around 1 per cent in terms of time.



Radiometric dating provides a scientific basis on which claims about the age of the Earth can be evaluated. As with all scientific work, there has to be not only an acceptance of error but an attempt to quantify it. Science does not seek epistemic or psychological certainty as described above, but rather an approximation to certainty on the basis of available empirical evidence. By quantifying uncertainty, science can arrive with confidence at conclusions that rule out other claims that are well beyond credibility. This includes claims made by some religious adherents (inferred from scripture) that the Earth is only a few thousand years old. We all need to adjust to a world in which a degree of uncertainty is tolerated.

Reference:

[www.tulane.edu/~sanelson/eens212/radiometric\\_dating.htm](http://www.tulane.edu/~sanelson/eens212/radiometric_dating.htm)

Word count = 838

## Example F: Knowledge and indigenous societies

## IA Prompt #29: Who owns knowledge?

## Object 1: Hoodia plant



*Hoodia gordonii* is a type of flowering cactus that grows in Southern Africa. It has been used widely by the San and other people in the region as a natural appetite suppressant. In keeping with cultural practices, the San shared the knowledge of the effects of the plant when consumed with outsiders, including an anthropologist in the 1930s who noted its use. This reference came to light in the 1960s and the South African Council for Scientific and Industrial Research (CSIR) commenced research into what might be the active ingredient – eventually isolating a molecule known as P57. The commercial potential for an anti-obesity product was quickly appreciated, but the San people were not initially recognised as the original holders of the knowledge about the plant, with the CSIR claiming that it was impossible to identify who first became aware of its effects. Eventually an agreement was reached that provided the San with 6 per cent royalties on any sales of anti-obesity products containing the active ingredient. However, heavy marketing by pharmaceutical companies has led to a level of demand such that the plant is now listed as an endangered species. Moreover, some producers have now been accused of selling *Hoodia* products that do not contain any *Hoodia* extract at all.

This object illustrates what can happen when the concept of knowledge ownership and the means of legally establishing it (such as intellectual property law) are familiar to one group and not the other. Furthermore, the sharing of knowledge with outsiders in this case has led to the depletion of a natural resource for an indigenous society. While the San were eventually recognised for their role in supplying the knowledge, questions arise as to the degree to which the CSIR can lay claim to knowledge as a result of their success in isolating the active ingredient – something beyond the capacities (or desires?) of the San themselves.

Reference:

[www.wipo.int/ipadvantage/en/details.jsp?id=2594](http://www.wipo.int/ipadvantage/en/details.jsp?id=2594)

## Object 2: Indonesian batik

My second object is a batik shirt design from Indonesia. The batik technique involves the selective application of wax to cloth, such that subsequent dyeing will be restricted to the areas without the wax. The wax can then be removed with hot water and more wax applied in a different pattern, followed by the application of a different coloured dye, and so on as required. The technique allows for much creativity in the production of new patterns, but there are thousands of designs with traditional meanings that have long histories and are deeply embedded in local culture. The use of these designs has in the past been agreed between the batik-producing community as a whole. However, batik is popular beyond Indonesia and production occurs elsewhere, leading to concerns in the batik artist community as to the appropriation of the knowledge of the designs for profit, and without the corresponding knowledge of their meanings.



In recent years, an Indonesian government-sponsored patent programme has been set up that assigns ownership to particular families or groups, and requires all other producers to acquire permission for those particular designs to be used. Both the assigning of ownership of a design and the use of it by others is accompanied by the payment of a fee. This has been an intensive process because of the many designs in existence and the demand for their use. This object is linked to the problems that can arise when ownership of knowledge carries a financial obligation. Some designers struggle to pay the fee needed to guarantee their status as owners, and small-scale producers face similar financial hurdles. Overall, the pattern of ownership and use of batik has been recast by a well-intended intervention.

Reference:

[web.law.duke.edu/cspd/itkpaper/](http://web.law.duke.edu/cspd/itkpaper/)

## Object 3: Genographic Project map



My third object is a map of human migration patterns produced by the Genographic Project – an initiative in human genetics sponsored by the National Geographic Society. These patterns and pathways are investigated through genetic profiling, using

a genetic testing kit that targets DNA particularly concerned with markers for ancestry. Cheek swabs can be provided by individual citizens and analysed in order to contribute to the overall database.

However, different countries operate on the basis of different laws concerning the ownership and use of genetic data. At one point, the National Congress of American Indians called for a halt to the project until procedures are clarified on an international basis. Some indigenous people refused to participate, concerned about possible undermining of traditional beliefs about their origins. There were worries about indigenous people being treated as curiosities, objects of study, rather than as equal partners; possible discoveries that the science might assert that the ancestors of the indigenous are not original inhabitants. There was unease that traditional land rights might be challenged, and that policies aimed at compensation for earlier injustices might be weakened. At the same time, other indigenous people saw the project as an opportunity to reaffirm their status. Some were reassured by the nature of the project as non-profit and affiliated with the support of various conservation initiatives.

Reference:

[web.law.duke.edu/cspd/itkpaper/](http://web.law.duke.edu/cspd/itkpaper/)

Word count = 819

The word count here is 136 short of the permitted maximum. How could these extra words be used to improve the exhibition?