Exercise walk-through

1.4
Areas of knowledge: history, the arts and mathematics

International Baccalaureate · IB Diploma · Theory of Knowledge

The essay on a prescribed title

- Unpack: an expert is a person with training who is trusted by a community; "important" can mean useful, or necessary.
- Natural sciences: peer review by experts catches mistakes before results are accepted.
- **Counterclaim**: experts rejected Marshall's evidence for years; in the end the evidence, not the experts' opinion, decided.

Sources for this lesson

- International Baccalaureate, *__Theory of Knowledge__ guide* (first assessment 2022), including the specimen prescribed titles and the 35 __exhibition__ prompts.
- International Astronomical Union, Resolution B5, "Definition of a Planet in the Solar System" (24 August 2006).
- B. Marshall and J. R. Warren, "Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration", *The Lancet* (16 June 1984), and the Nobel Prize in Physiology or Medicine 2005.

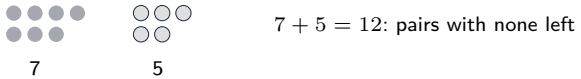
Key terms

- **Knowledge question**: an open, general question about knowledge itself, not about the subject matter.
- **Perspective**: the point of view, shaped by language, culture, education and interests, from which a knower sees.
- **Confirmation bias**: noticing evidence that supports what we already believe and ignoring the rest.

Exercises 2.1·2.2

2.1 Explain why **hindsight** can be both a help and a problem for historians. [2]

2.2 Prove that the sum of two **odd** numbers is even, and explain why this proof is more certain than a scientific law. [3]



$7 + 5 = 12$: pairs with none left

Exercises 2.1·2.2

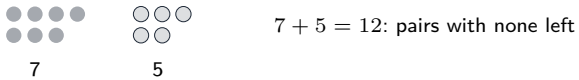
2.1 Explain why **hindsight** can be both a help and a problem for historians. [2]

2.1

help: historians know what happened next, so they can see long-term causes and results; problem: they may see events as inevitable and judge people by what those people could not know

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2.2 Prove that the sum of two **odd** numbers is even, and explain why this proof is more certain than a scientific law. [3]



2.2

$(2a+1)+(2b+1) = 2a+2b+2 = 2(a+b+1)$, which is even; it follows by deduction from definitions, so it holds for all cases; a scientific law rests on finite observations and could be revised

Exercises 2.3·2.4

2.3 Explain **two** reasons why two historians can disagree about the same event. [4]

2.4 Evaluate the claim that the arts give us **knowledge**, not just feelings. Use **one** work of art. [6]

Exercises 2.3·2.4

2.3 Explain **two** reasons why two historians can disagree about the same event. [4]

2.3

any two, explained: different sources or new sources found; different perspectives, e.g. national, political, class; different questions and focus, e.g. economic vs political causes; different times of writing: each generation asks new questions

2.4 Evaluate the claim that the arts give us **knowledge**, not just feelings. Use **one** work of art. [6]

2.4

a named work in context, e.g. Guernica (1937) after the bombing of Guernica; for: it shows what violence against civilians means, knowledge by acquaintance; it shapes how people understand events; against: it does not give facts or testable claims; interpretations differ; a reasoned judgement about kinds of knowledge

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Exercise 3.1

3.1 *(Essay-style.)* “Mathematics gives certainty; history gives only interpretation.” Discuss. [10]

axioms → proof

sources → interpretation

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axioms → proof | sources → interpretation

3.1

Mark with the TOK markbands (out of 10): [9-10] excellent: clear, focused, convincing links, well-chosen examples, implications explored; [7-8] good: focused, mostly clear links, relevant examples; [5-6] satisfactory: some focus, links partly explained; [3-4] basic: limited links, description more than analysis; [1-2] rudimentary. Points that may be included: understanding of certainty and interpretation; mathematics: proof from axioms gives certainty within a system; limits: choice of axioms; Gödel's incompleteness; history: interpretation of sources; perspectives; history also has well-established facts and methods of checking; a balanced conclusion

Exercise 3.2

3.2 Explain why the discovery of **non-Euclidean geometry** raises a knowledge question about mathematics. [5]

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Euclid's parallel postulate was assumed to be obviously true; mathematicians replaced it and built consistent new geometries; so axioms are chosen, not simply given by reality; non-Euclidean geometry later described space in general relativity; knowledge question, e.g. "Is mathematics discovered or invented?"