Course notes

International Baccalaureate · IB Diploma · Theory of Knowledge

TOK: claims, evidence and objects

A claim needs a clear meaning

A **claim** 主张 is a statement that someone asks us to accept. “This map is accurate” is unclear until we know its purpose. A walking map may show safe paths well but leave out building heights. Ask: accurate for which decision?

Evidence 证据 supports a claim. Explain the connection rather than listing facts. A dated survey of paths can support a walking map. A popular review of the map may tell us about user opinion, but it does not show whether the paths still exist.

Compare explanations

A school says its new timetable improved attendance. Attendance rose after the change, but bus routes changed too. A **competing explanation** 另一种解释 is another cause that could account for the result. Compare suitable records before saying the timetable caused the improvement.

A useful conclusion states its limit: attendance rose during this period, but these records do not separate the effect of the timetable from the bus change. Uncertainty can make an argument more accurate.

An object has a particular context

An **object** 物件 can help us discuss knowledge when its real setting matters. Use the actual map your club used on a particular trip, rather than an unnamed image of any map. Record its date, maker, purpose and source.

A **context** 背景 explains where and how the object was used. Connect that setting to the exact school-approved exhibition prompt. Description alone does not explain a knowledge issue. Explain how the map’s selection of information affects what its users can know.

Check your explanation

Separate what the object shows from what you infer. Ask what evidence would weaken your explanation. Credit the source of an image and explain your own interpretation. Follow the current guide and your teacher’s instructions for assessed work; these notes teach introductory reasoning only.

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Areas of knowledge: evidence and justification

The TOK brief identifies five areas of knowledge. These original cases introduce all five, the core theme of knowledge and the knower, and two selected optional themes: knowledge and language, and knowledge and technology. They are a starting sequence, not a complete TOK course. The full guide, deeper discussion and current assessment-session requirements remain necessary.

History: what can the surviving records establish?

Two records tell different stories

- A school library closed early one afternoon. A later student account blames a staff meeting; a dated maintenance notice mentions a power repair. Which claim does each record actually support?
- A **source** 史料 preserves information from a particular setting. Separate a record of what happened from an explanation of why it happened.

Place each record in its setting

- Check who made the record, its date, intended readers and purpose. A notice may describe a planned repair without proving that the repair occurred.
- A remembered account can reveal what a student believed. Its value depends on the question; being a memory does not make every statement false.

Compare independent records

- Seek a repair log, opening-time record and meeting schedule. **Corroboration** 相互印证 compares relevant evidence from different sources. Two reports copied from one notice are not two independent checks.
- Explain agreement and disagreement. If the repair log records a power cut at the closing time, the repair explanation gains support; a meeting elsewhere does not establish its role.

Match certainty to the evidence

- An **inference** 推断 moves from evidence to a claim. A record that the library closed does not by itself establish the staff's intention. State which step requires another source.

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- Missing records limit what you can know. An archive may omit student complaints because nobody collected them, rather than because no complaints existed.

Ask a question about knowing the past

- Ask how source selection affects explanations of the past. Use the library case to explain which records survive, what each can establish and why a conclusion may change.
- Compare a supported alternative fairly. Do not claim that history has no standards because accounts differ; source context and independent checks provide reasons for a judgement.

■ Worked example

The dated notice announces a planned repair. A completed repair log records a power cut from 14:00, and the library log records closing at 14:05. Together they support a connection between the power cut and closing. The later memory suggests a staff meeting, but its date and place still need checking. The conclusion remains limited: the surviving records support the repair explanation more strongly for this closure; they do not reveal every staff member's intention.

■ Watch out

An official record is useful evidence, not an automatic guarantee of accuracy. Explain its purpose and the claim you infer from it.

■ Key idea

Judge a historical explanation by relevant records, their context, independent checks and the limits of the inference.

Human sciences: whose responses support the claim?

An online vote seems decisive

- A school has 400 students. An optional online poll receives 100 responses, and 80 support later library hours. Does this show that 80% of all students support the change?
- A **sample** 样本 is the group from which evidence is collected. Here it contains the volunteers who answered, not all 400 students.

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Define the group and the claim

- The **population** 总体 is the group the question concerns. Decide whether the claim is about respondents, all enrolled students or only regular library users.
- The count establishes 80 out of 100 respondents supported the proposal. Extending that finding to everyone requires reasons why the respondents represent the wider group.

Check who entered the sample

- People who strongly want a change may be more likely to answer. Students without access to the poll may be absent. This is possible **selection bias** 选择偏差: entry into the sample changes the evidence.
- Ask how responses were invited, who could respond and whether relevant groups were missed. More responses through the same narrow channel do not automatically remove the problem.

Separate description from explanation

- A poll describes stated preferences under its wording and conditions. It does not establish that later hours improve learning or explain why each student selected an answer.
- For any follow-up involving people, use the school's approved process and collect only the information required. Clear wording and privacy safeguards are part of a defensible method.

Revise the conclusion before making a decision

- Report what is known: 80% of these respondents supported the wording they were shown. State the participation gap and consider an approved method reaching different student groups.
- Ask how a method shapes knowledge about a community. The issue is whether this evidence supports this claim, not whether every survey is reliable or unreliable.

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■ **Worked example**

All 100 respondents used an optional library-interest channel. Eighty supported later hours. The result accurately describes those recorded responses. Since students who rarely use the library may not read that channel, it does not establish the proportion among all 400 students. An approved follow-up could invite a defined range of students through several access routes, record participation and ask a neutrally worded question. Even then, stated support would not by itself measure improved learning.

■ **Watch out**

A precise percentage can still support a narrow claim. Check the group and question before treating precision as representativeness.

■ **Key idea**

Define the population, explain how the sample was selected and keep the conclusion within what the responses establish.

Natural sciences: when does a measurement support an explanation?

Two readings suggest a simple cause

- Two identical-looking metal cups stand under a lamp. One thermometer reads 28°C and the other 25°C. A student says the cup material alone caused the difference.
- A **measurement** 测量 links a reading to a method and conditions. Before explaining a difference, check what changed besides the material.

Make the comparison informative

- The cups may differ in distance from the lamp, surface finish, starting temperature or sensor position. Record these conditions and identify the factor the comparison is meant to test.
- A **control** 控制条件 keeps a relevant condition comparable. Matching distance and starting conditions helps separate a material explanation from these competing explanations.

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Check the instrument and uncertainty

- Compare the sensors in the same stable setting and use an appropriate reference check. **Calibration** 校准 connects an instrument's indications to known reference values under stated conditions.
- If one sensor consistently reads higher, switching sensors between cups can reveal that difference. Repeated readings help describe variation, but they do not automatically correct a biased instrument.

Distinguish a pattern from a complete model

- A stable difference under a controlled comparison may support a material-related explanation. It does not identify every mechanism or establish what happens for all cups and lamps.
- Explain the alternative your method addresses and the alternatives it leaves open. A scientific model earns support from tests and useful predictions; a neat story alone is insufficient.

Make the knowledge question explicit

- Ask how measurement methods affect confidence in a scientific explanation. Connect your answer to the control checks, instrument checks and the conclusion's scope.
- Avoid claiming that repeated measurements remove all uncertainty. Explain which uncertainty each check reduces and what further comparison would materially change the judgement.

■ Worked example

The 28°C cup is closer to the lamp, and its sensor reads 1°C higher in a shared reference setting. The original comparison cannot isolate material. The student first checks the sensors, matches the cups' position and initial conditions, then records repeated observations with sensors exchanged. A remaining pattern would support a more careful claim about this comparison. It would still need an account of the method's uncertainty and the range of conditions tested.

■ Watch out

Repeating a confounded comparison produces more records of the same problem. Improve the comparison as well as the number of readings.

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■ **Key idea**

Connect a scientific claim to a controlled comparison, instrument checks, uncertainty and a stated range of conditions.

Mathematics: why does a proof establish more than examples?

A pattern seems to continue

- The first odd number is 1; the first two sum to 4; the first three sum to 9. A student claims the first n positive odd numbers always sum to n^2.
- A **conjecture** 猜想 is a proposed statement awaiting justification. Checking three cases suggests a pattern but leaves infinitely many positive integers unchecked.

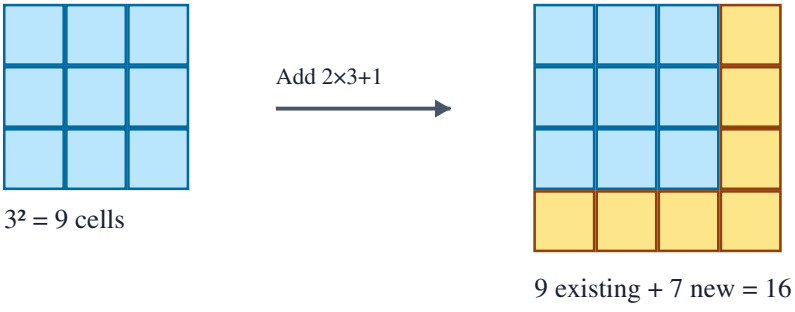
State the claim and its domain

- The claim concerns every positive integer n and the list 1, 3, 5, up to 2n−1. It does not concern any arbitrary collection of odd numbers.
- A **proof** 证明 gives a chain of valid reasons that covers the stated domain. One counterexample could defeat a universal claim, while many successful examples do not by themselves establish it.

Explain how the next case follows

- Suppose the first n positive odd numbers sum to n^2. The next odd number is 2n+1, so the next sum is $n^2+2n+1=(n+1)^2$. This step works for any positive integer n.
- The starting case is n=1, where the sum is $1=1^2$. Starting there and applying the general step establishes each successive positive integer case.

A finite picture explains the general step



For any positive integer n: $n^2 + (2n + 1) = (n + 1)^2$

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Check what the reasoning assumes

- This is **induction** 数学归纳法: a valid starting case plus a step from any case to the next. Both parts matter. A step alone does not establish that the chain begins.
- Ask whether the algebra, definition of the next term and domain are correct. A calculation error or a changed starting sequence can invalidate the argument.

Compare proof with observation fairly

- The reason for confidence is the general chain, rather than the number of tested examples. A diagram of a few squares can explain the idea, but the argument must show why the construction extends.
- Ask how mathematical justification differs from checking repeated observations. Do not infer that proofs settle claims outside their assumptions or that empirical testing has no value in its own field.

■ Worked example

For n=1, the sum is 1. Assume the sum through 2n−1 is n^2. Adding 2n+1 gives n^2+2n+1, which equals $(n+1)^2$. The base case and general transition establish the claim for all positive integers. The list 3,5,7 has sum 15, not 9, because it does not start at 1. That different list is outside the original claim, not a counterexample to it.

■ Watch out

Do not use a successful calculator check for n=100 as a substitute for the general transition. It checks one more case.

■ Key idea

State the domain, justify a starting case and establish a valid general step; explain exactly what the resulting proof covers.

Arts, optional themes and the knower

The optional themes selected for this website sequence are language and technology. Schools may select a different pair from the official choices; confirm the school programme before using these materials as a course plan.

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■ **The arts: how can an interpretation earn support?**

One photograph supports two readings

- A photograph shows a nearly empty school courtyard at sunrise. One viewer reads it as peaceful; another reads it as lonely. How can either interpretation give reasons instead of merely announcing a feeling?
- An **interpretation** 诠释 explains how features of a work support a reading. Identify the light, framing, empty space or other features that matter to your claim.

Distinguish different questions

- A reading of the work's effect differs from a claim about the photographer's intention. The composition can support an account of its effect, while a claim about intention may also need contextual evidence.
- A claim that the school is always empty is different again. One framed moment cannot establish the courtyard's use throughout the day.

Compare reasons for competing readings

- The peaceful reading may cite soft light and open space. The lonely reading may cite the small isolated figure and absence of other people. Explain the connection between feature and reading.
- An **ambiguity** 多义性 permits more than one reasonable reading. It does not make every reading equally supported: a claim about a crowded noisy scene conflicts with the visible features.

Check the role of context and values

- Knowing that the work was made for a quiet-study exhibition may change a reading without making the visible composition disappear. Ask which judgement depends on that added context.
- Different **criteria** 判断标准 answer different questions. Documentary accuracy, emotional effect and imaginative expression cannot be exchanged without explaining the purpose of the judgement.

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Explain what disagreement teaches

- Ask how evidence can support a reading when viewers disagree. Compare the reasons, identify what each reading explains and state the uncertainty in claims about intention.
- Avoid treating personal response as either a complete proof or worthless evidence. Explain its role alongside features, context and the question being asked.

Worked example

Both peaceful and lonely readings can cite specific features of the sunrise photograph. The first explains the soft light and open space; the second explains the isolated figure. A dated exhibition statement supports a quiet-study context, but does not by itself prove what every viewer experiences. The stronger discussion identifies the question, compares the features and distinguishes an interpretation of effect from a factual claim about the whole school day.

Watch out

A disagreement does not remove the need for reasons. Explain how the work and its context support or limit each reading.

Key idea

Connect an artistic interpretation to specific features, relevant context and an explicit criterion; distinguish effect, intention and documentary claims.

Knowledge and language: what changed in the translation?

A small word changes the message

- An original school notice says students may use the library after class. A translated version says students must use it. The place and time are the same, but the instruction has changed.
- A **translation** 翻译 should preserve the relevant meaning, including whether an action is permitted, required or uncertain. Similar topic words do not guarantee an equivalent claim.

Compare the exact wording and setting

- Check the source sentence, intended readers and purpose. In this notice, may expresses permission; must expresses a requirement. The surrounding rules help confirm that use.

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- Do not assume one word has the same role in every sentence. In another setting, may can express a possibility; context determines which meaning is being conveyed.

Notice what a label leaves out

- Calling a source reliable compresses several judgements: its method, evidence, context and relevance. State which property the label is meant to describe before using it as a reason.
- A **category** 范畴 groups things under a label. Categories can make comparison useful, but a broad label can hide differences that matter to the current question.

Preserve the strength of the claim

- A report saying a change may help does not say it will help. **Modality** 情态 expresses possibility, permission, necessity or other strength in a statement. Check it when comparing versions.
- Qualifiers such as some, under these conditions and according to this source can carry important limits. Removing them can make a cautious claim appear universal.

Use language to make reasoning inspectable

- Ask how wording affects what readers believe they know. Show the original claim, the changed wording and the inference each version invites.
- Clarify the meaning and return to the evidence. Clear language helps a claim be checked, but a clear sentence alone does not establish that the claim is true.

■ Worked example

The source notice permits after-class library use. The translation requires it. A reader following the translation could infer a school obligation that the original does not establish. The correction restores permission and checks the surrounding conditions. Similarly, changing some students may benefit to all students will benefit removes both a population limit and uncertainty. The issue is the strength of the resulting knowledge claim, not merely whether the vocabulary sounds fluent.

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■ **Watch out**

Do not replace a qualification with a stronger word because the stronger sentence sounds smoother. Preserve the claim's limits.

■ **Key idea**

Compare wording in context, preserve modality and qualifiers, and explain how a language choice changes the inference.

■ **Knowledge and technology: are the top results independent evidence?**

Three headlines seem to agree

- A fictional search tool displays three top results saying a school club doubled its membership. All three repeat one press release. Does seeing three results independently confirm the increase?
- **Provenance** 来源追溯 records where information came from and how it reached the reader. Trace the reports before counting them as separate evidence.

Follow the information chain

- Open the named sources and compare dates, authors and cited records. If every report derives from one release, agreement may reflect copying rather than independent checks.
- Seek the membership records appropriate to the claim. Distinguish registered members, active participants and visits; doubling one measure does not establish doubling another.

Ask what the ranking measures

- The tool may rank results by relevance, popularity or another stated signal. Being first does not itself establish that a report has verified membership data.
- A **proxy** 代理指标 is a stand-in measure. Click count might indicate attention, but attention differs from accuracy; explain the connection before treating one as evidence for the other.

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Check what the tool omits

- A ranking can make some sources easy to see and others hard to find. Change the question carefully, inspect the source range and note when the claimed underlying records are unavailable.
- An **algorithm** 算法 uses specified steps to process information. Evaluating its output requires the task, inputs and relevant checks, not a general assumption that automation is either perfect or useless.

Make a claim about this result, not all technology

- Ask how a tool's selection affects confidence in a knowledge claim. Explain the copied-source chain, the ranking signal and the independent evidence still needed.
- The justified conclusion is limited: the three displayed reports share one origin. This does not by itself prove the press release false; it explains why apparent repetition adds little independent support.

■ Worked example

The three top reports link to the same club release, which counts registrations. A separately dated attendance record counts participation. These sources answer different questions. The reports' agreement does not independently verify the registrations, and neither measure automatically establishes how often members attended. The reader traces the origin, states the measure and seeks records that directly support the chosen claim.

■ Watch out

Repetition, ranking and a confident summary are different from independent verification. Trace the evidence each result actually uses.

■ Key idea

Follow provenance, identify the measured quantity and evaluate the tool's selection before deciding what a displayed result establishes.

■ Knowledge and the knower: what would change your judgement?

Two students describe the same library

- One student calls the library quiet after morning visits. Another calls it noisy after afternoon group work. Their experiences can both be accurate while supporting different claims.

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- A **perspective** 视角 reflects a knower's position, experiences and assumptions. Identify the settings of the observations before treating disagreement as a contradiction.

State the question and the criterion

- Quiet at 09:00 differs from quiet throughout the day. A good library for silent study may also differ from a good library for collaboration. State the claim you are evaluating.
- A **value** 价值取向 affects what people judge worth pursuing. Preferring silence can guide a decision without establishing that every observed sound level is low.

Identify a blind spot in the evidence

- Morning visitors may not observe afternoon use; regular users may not know which barriers keep others away. A **blind spot** 认知盲点 is a relevant part of a question that the current viewpoint misses.
- Compare observations across the periods or groups that the claim covers. Including another perspective helps when it supplies relevant missing evidence, not merely because it adds another opinion.

Name what would revise the claim

- A student claiming silence all day should be ready to revise that claim after reliable afternoon observations. Specify a relevant check before seeing whether it supports your preference.
- Disagreement can reveal a difference in evidence, meaning or values. Decide which kind matters here instead of assuming every disagreement is solved by collecting more numbers.

Reflect on responsibility as a knower

- Ask how your position affects what you notice and trust. Explain the initial judgement, the evidence it lacked and the revision supported by another setting.
- Being open to revision does not mean accepting every claim. Use clear criteria and relevant checks, acknowledge uncertainty and explain why some reasons deserve more weight.

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■ Worked example

The morning student reports quiet visits and initially generalizes to the whole day. The afternoon student supplies dated observations of group discussion. The first student revises the claim to quiet during the observed mornings. They then separate a factual question about use across times from a value question about balancing silence and collaboration. Their disagreement becomes clearer without pretending that one purpose must matter equally to every student.

■ Watch out

Adding both sides is not sufficient reflection. Explain how the second perspective changes the claim, its meaning or the evidence required.

■ Key idea

Locate your perspective, distinguish evidence from values, identify what is missing and state which relevant check would justify revision.

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