

1. Identify claim	2. Argument structure	3. Inferential Intent	4. Validity	4a. Hidden premises	5. Ambiguity	5a. Resolve ambiguity	5b. Conclusion changed	6. Check premises	Status of claim	Summary of fallacies
1: SCIENTIFIC CONSENSUS										
There is no empirical evidence that humans are causing global warming.	P1: There is no observed evidence for AGW. C: Humans are not causing global warming.	Deduction	INVALID Appeal to ignorance. Absence of evidence is not evidence of absence, so the premise doesn't lead to the conclusion.	P1: There is no observed evidence for AGW. P2: If there was evidence of AGW, we would have seen it by now. C: Humans are not causing global warming.	NONE	NA	NA	P1 is false: <i>stiffling induction</i> . Many lines of evidence support AGW. P2 is true.	FALSE The argument is invalid and a premise is false.	Stiffling induction: Ignores the many observed climate patterns consistent with greenhouse warming, all of which add to the evidence that humans are causing global warming.
31,000 dissenting scientists show there's no expert consensus on climate change.	P1: A large proportion of scientists dissent from AGW. P2: Scientists are experts in climate science. C: There is no expert consensus on AGW.	Deduction	VALID	NONE	NONE	NA	NA	P1 is false: <i>magnified minority</i> . 31,000 are 0.3% of the 10,000,000+ people with science degrees in the U.S. P2 is false: <i>fake experts</i> . The term "scientists" covers a range of disciplines, many of which don't include expertise in climate science. 99.9% of the signatories in the Global Warming Petition Project have no expertise in climate science.	FALSE Two of the premises are false.	False experts: 99.9% of the signatories in the Global Warming Petition Project have no expertise in climate science. Magnified minority: While 31,000 science graduates sounds like a lot, it is only 0.3% of the over 10 million people with science degrees in the United States.
CO2 is not a problem because it's a colorless, invisible gas.	P1: CO2 is invisible. C: CO2 is not a problem, invisible gas.	Deduction	INVALID Just because you can't see something doesn't mean it's not a problem.	P1: CO2 is invisible. P2: No invisible gases can cause problems. C: CO2 is not a problem.	NONE	NA	NA	P1 is true. P2 is false: <i>red herring</i> . Whether CO2 is visible or not is irrelevant to whether it affects climate change. People are also well aware that there are substances or phenomena that are invisible and yet harmful. E.g., carbon monoxide gas is poisonous, as is radiation from radioactive substances.	FALSE With the added hidden premise, the argument is made valid but contains a false premise.	Red herring: A substance's visibility is irrelevant to whether it can have an impact. Substances can be invisible and yet still harmful. E.g., carbon monoxide gas is poisonous, as is radiation from radioactive substances. In fact, CO2's invisibility is a key element to the greenhouse effect—it lets in sunlight but traps infrared heat, which causes a range of climate impacts.
Other scientific consensus have been wrong so we can't trust the consensus on climate change.	P1: Some scientific consensus have been wrong in the past. C: The scientific consensus on AGW is not trustworthy.	Deduction	INVALID Past consensus being wrong doesn't mean that every consensus is wrong.	P1: Some scientific consensus have been wrong in the past. P2: If other consensus proved <i>untrustworthy</i> , then the consensus on AGW <i>must be trustworthy</i> . C: The scientific consensus on AGW is not trustworthy.	NONE	NA	NA	P1 is true. P2 is false: <i>impossible expectation</i> . Not all scientific consensus are equal. While past scientific consensus have been wrong, they did not meet the three criteria of knowledge-based consensus. While no scientific process is perfect, if it meets the criteria of knowledge-based consensus, we can trust it is true.	FALSE With the added hidden premise, the argument is made valid but contains a false premise.	False equivalency: While some scientific consensus have been wrong in the past, they do not meet the three criteria of knowledge-based consensus: <i>consilience of evidence</i> , <i>social calibration</i> and <i>epistemic diversity</i> . Equating the consensus on climate change to past false consensus is an invalid comparison, as the scientific consensus on climate change meets the three criteria of knowledge-based consensus.
2: IT'S NOT HAPPENING										
Global warming stopped in 1998.	P1: 1998 was the hottest year on record. C: The planet is no longer warming.	Deduction	INVALID Comparing single years is not a valid way to make conclusions about long-term warming trends.	P1: 1998 was the hottest year on record since 1958. P2: If a future year isn't warmer than previous ones, then warming isn't happening. C: The planet is no longer warming.	NONE	NA	NA	P1 is false: <i>stiffling induction</i> . 2014, 2015 and 2016 were all hotter than 1998. P2 is false: <i>impossible expectations</i> . It's impossible to expect a temperature record to show a monotonic trend during a period of long-term warming.	FALSE Even with added premises to make the argument valid, the argument contains false premises.	Stiffling induction: Ignores the fact that 2014, 2015 and 2016 were all hotter than 1998. Impossible expectations: It's unreasonable to expect the surface temperature to monotonically increase during a period of long-term global warming, as surface temperature jumps up and down from year to year as the oceans exchange heat with the atmosphere.
Global warming stopped in 1998.	ALTERNATE VERSION P1: The global temperature trend since 1998 is statistically insignificant. C: Global warming isn't happening.	Deduction	INVALID This argument is invalid if the technical version of the terms are considered. However, someone with a loose understanding of the term "statistically insignificant" might view it as valid.	NONE	Equivocation: the term "statistically insignificant" is taken to mean "isn't happening". What it actually means is either the time period is too short and/or the data is too noisy, making it difficult to detect a signal (like trying to understand a radio message with a lot of static). So it's perfectly possible for a real global warming signal to exist but not be detected at a statistically significant level in noisy data or over a short period.	P1: The global temperature trend since 1998 is statistically insignificant. P2: If a warming trend is statistically insignificant, then it means the warming isn't happening. C: Global warming isn't happening.	NO	P1 is false: <i>cherry picking</i> . Some records show statistically significant trends so this premise is based on selecting only datasets that are statistically insignificant. P2 is false: <i>impossible expectations</i> . This premise assumes that if a signal cannot be detected, then the signal does not exist.	FALSE The argument is now sound but the new premise is false (plus the original first premise was also false).	Impossible expectations: Just because it's difficult to detect a signal doesn't mean the signal doesn't exist (like a radio signal with a lot of static). The surface temperature record is a noisy signal because of interannual variability so you expect the trend to be statistically insignificant over short time periods. Cherry picking: Carefully selecting temperature records that show insignificant trends ignores other temperature records that do show a significant trend. For example, satellite datasets are noisier than thermometer datasets so ignoring satellites while ignoring thermometer data is cherry picking.
It's cold outside, so global warming isn't happening.	P1: Some areas of the world are experiencing record cold temperatures. C: The Earth is not warming.	Deduction	INVALID Global warming doesn't mean that cold will never happen anywhere.	P1: Some areas of the world are experiencing record cold temperatures. P2: If the Earth is warming, no area can experience colder weather than usual. C: The earth is not warming.	NONE	NA	NA	P1 is true. P2 is false: <i>impossible expectations</i> . The overall planet warming does not mean every part of the planet is warming - some areas can show cooling.	FALSE With the added hidden premise, the argument is made valid but contains a false premise.	Impossible expectations: Global warming doesn't mean that cold events never happen. Instead, it means cold events are less likely to happen over time. Global warming is like flipping the weather dice, making it more likely to get hot days.
Glaciers around the world are increasing, disproving global warming.	P1: Some glaciers are increasing. P2: Glaciers cannot increase in warming conditions. C: Global warming isn't happening.	Deduction	INVALID Premises refer to local warming conditions while the conclusion is about global warming, hence the premise does not lead to the conclusion.	P1: Some glaciers are increasing. P2: Glaciers cannot increase in warming conditions. P3: Global warming means warming everywhere. C: Global warming isn't happening.	NONE	NA	NA	P1 is true. P2 is false: <i>oversimplification</i> . Glacier changes is based on a number of factors such as temperature and precipitation. It is possible for local conditions to be such that increased precipitation causes glaciers to grow more than warming temperatures cause melt. P3 is false: <i>impossible expectations</i> . Some regions may experience cooling or no temperature change during global warming.	FALSE With the added hidden premise, the argument is made valid but contains two false premises.	Oversimplification: Glaciers are influenced by a number of factors, predominantly temperature and precipitation. While most glaciers will melt under warming conditions, some glaciers may even grow if precipitation and local conditions are favorable. Nevertheless, overall, glaciers across the globe are shrinking at an accelerating rate, threatening water supplies for millions of people. Impossible expectations: Global warming doesn't mean that every single location on the planet is warming.
The Greenland ice sheet is thickening in the middle thus disproving global warming.	P1: The Greenland ice sheet is thickening in the middle. P2: If warming was happening in Greenland, then the ice sheet would be getting thinner. C: Global warming isn't happening.	Deduction	INVALID Premises refer to local warming conditions while the conclusion is about global warming, hence the premise does not lead to the conclusion.	P1: The Greenland ice sheet is thickening in the middle. P2: If warming was happening in Greenland, then the ice sheet would be getting thinner. P3: Global warming means warming everywhere. C: Global warming isn't happening.	NONE	NA	NA	P1 is true. P2 is false: <i>oversimplification</i> . Changes in Greenland's ice sheet is based on a number of factors such as temperature and precipitation. Warming temperatures leads to more atmospheric moisture which increases precipitation, which can lead to more snowfall, thickening the ice sheet. P3 is false: <i>impossible expectations</i> . Some regions may experience cooling or no temperature change during global warming.	FALSE With the added hidden premise, the argument is made valid but contains two false premises.	Oversimplification: Greenland's ice sheet is influenced by a number of factors, including temperature and precipitation. Warming temperatures leads to more atmospheric moisture which increases precipitation, which can lead to more snowfall, thickening the ice sheet. Nevertheless, Greenland on the whole is losing ice, at a rate of over 2 Mount Everests worth of ice every year. Impossible expectations: Global warming doesn't mean that every single location on the planet is warming.
Antarctic sea ice is on the increase and casts doubt on global warming.	P1: Antarctic sea ice is increasing. P2: If Antarctic warming was happening, then Antarctic sea ice would be getting thinner. C: Global warming isn't happening.	Deduction	INVALID Premises refer to local warming conditions while the conclusion is about global warming, hence the premise does not lead to the conclusion.	P1: Antarctic sea ice is increasing. P2: If Antarctic warming was happening, then Antarctic sea ice would be getting thinner. P3: Global warming means warming everywhere. C: Global warming isn't happening.	NONE	NA	NA	P1 is true. P2 is false: <i>oversimplification</i> . Changes in Antarctic sea ice depends on a number of factors. For example, winds blowing from the Antarctic continent have been increasing, pushing sea ice away from the land. This creates more open water, making it easier for more sea ice to form. P3 is false: <i>impossible expectations</i> . Some regions may experience cooling or no temperature change during global warming.	FALSE With the added hidden premise, the argument is made valid but contains two false premises.	Oversimplification: It's an oversimplification to say that temperature is the only factor driving Antarctic sea ice. Changes in Antarctic sea ice depends on a number of factors. For example, winds blowing from the Antarctic continent have been increasing, creating open water that essentially acts as a sea ice factory. Impossible expectations: Global warming doesn't mean that every single location on the planet is warming.
Thermometer readings are uncertain so we don't know whether global warming is happening.	P1: Thermometer readings support the claim that the planet is warming. P2: Thermometer readings contain uncertainties. C: We cannot reliably say that the planet is warming.	Deduction	INVALID Conclusion doesn't follow from premises.	NONE	Exploits ambiguity between the words "reliable" and "uncertain". Measurement uncertainty doesn't mean the measurement is unreliable.	P1: Thermometer readings support the claim that the planet is warming. P2: Thermometer readings contain uncertainties. P3: The uncertainties in measurements are less than the observed warming. C: We can reliably say that the planet is warming.	YES. Now off the original point.	P1 is true. P2 is true.	FALSE The argument is now sound but the conclusion has changed.	Ambiguity: This argument exploits ambiguity in order to equate the words "reliable" and "uncertain". Just because a reading has some level of uncertainty doesn't mean it is unreliable. It's like saying that because a tape measure may only be accurate to a few millimetres, we can't meaningfully say that a person has grown over time because we used the tape measure to measure their height. There are a number of techniques used to determine reliability of temperature record. These have established that measurement errors are much smaller than the warming that we see.
Urban development is responsible for much of observed global warming over the last century.	P1: Urban areas are hotter than rural areas. P2: Thermometer measurements from urban areas are contaminated with urban heat. C: Global temperature record is contaminated by urban development.	Deduction	INVALID Just because urban heat might affect thermometer measurements doesn't mean it has a significant effect on the global record.	P1: Urban areas are hotter than rural areas. P2: Thermometer measurements from urban areas are contaminated with urban heat. P3: Urban contamination is not dealt with by scientists. C: Global temperature record is contaminated by urban development.	NONE	NA	NA	P1 is true. P2 is true. P3 is false: <i>misrepresentation</i> . Scientists have examined the impact of urban heat. They filter it out any contaminating influences by comparing urban measurements with nearby rural measurements.	FALSE With the added hidden premise, the argument is made valid but contains two false premises.	Misrepresentation: Assumes that scientists haven't examined the impact of urban heat. In reality, scientists filter out any contaminating influences by comparing urban measurements with nearby rural measurements. In fact, urban heat has had minimal effect on the climate record, with much warming happening where there is little urban development.

1. Identify claim	2. Argument structure	3. Inferential Intent	4. Validity	4a. Hidden premises	5. Ambiguity	5a. Resolve ambiguity	5b. Conclusion changed	6. Check premises	Status of claim	Summary of fallacies
They changed name from 'global warming' to 'climate change' because global warming isn't real.	P1: If AGW was real, then they wouldn't have needed to change the name from "global warming" to "climate change". P2: They did change the name. C: AGW isn't real.	Deduction	VALID	NONE	NONE	NA	NA	P1 is false: oversimplification. It is appropriate to use the term "climate change" when global warming is real, as global warming is a subset of climate change. P2 is false: misrepresentation. The term climate change has been used for decades. The IPCC, founded in 1988, stands for Intergovernmental Panel on Climate Change.	FALSE The argument is valid but contains two false premises.	Misrepresentation. The term "climate change" has been used for decades. The IPCC, founded in 1988, stands for Intergovernmental Panel on Climate Change. Incidentally, it was a contrarian Frank Luntz, looking to cast doubt on climate change, that first recommended switching from "global warming" to "climate change". Oversimplification. It is appropriate to use both the terms "climate change" and "global warming" during a period of global warming, as global warming is a subset of climate change.

3: IT'S NOT US

Human CO2 emissions are tiny compared to natural CO2 emissions so our influence is negligible.	P1: Human CO2 emissions are small compared to natural CO2 emissions. C: Nature has more influence on atmospheric CO2 levels than humans.	Deduction	VALID	NONE	Over-simplifies the carbon cycle and what is meant by natural CO2 emissions by considering only natural CO2 emissions and ignoring natural CO2 sinks. CO2 sinks roughly match CO2 emissions so net natural CO2 emissions is close to zero.	P1: Human CO2 emissions are small compared to natural CO2 emissions. P2: Net natural emissions are close to zero when natural absorptions are taken into account. C: Human CO2 emissions are the main influence on atmospheric CO2 levels.	YES. Now off the original point.	P1 is true. P2 is true.	FALSE The argument is now sound but the conclusion has changed.	Oversimplification. By considering only natural CO2 emissions and ignoring natural CO2 sinks, this argument oversimplifies the carbon cycle. CO2 sinks roughly match CO2 emissions so net natural CO2 emissions is close to zero. For thousands of years, our atmosphere has been in balance. Humans have upset the balance.
Volcanoes produce more CO2 than humans.	P1: Volcanoes emit more CO2 than humans. C: Volcanoes have a larger influence on climate change than humans.	Deduction	VALID	NONE	NONE	NA	NA	P1 is false: misrepresentation. Humans emit over 100 times more CO2 than volcanoes.	FALSE The argument is valid but contains a false premise.	Misrepresentation. It is false to say volcanoes emit more CO2 than humans, given that humans emit over 100 times more CO2 than volcanoes.
CO2 has a residence time of only 4 years so CO2 levels would fall quickly if we stopped emitting.	P1: CO2 only has a residence time of 4 years before its absorbed by nature. C: If we stopped emitting CO2, it would be absorbed by nature quickly.	Deduction	INVALID	P1: CO2 only has a residence time of 4 years before its absorbed by nature. P2: When a natural sink absorbs CO2 molecules, it sequesters it from the atmosphere permanently. C: If we stopped emitting CO2, it would be absorbed by nature quickly.	NONE	NA	NA	P1 is true. P2 is false: oversimplification. CO2 molecules cycle continuously through the atmosphere.	FALSE The argument is made valid with an extra premise but the premise is false.	Oversimplification. CO2 molecules cycle continuously through the atmosphere, so it is false to say that natural sinks sequester CO2 molecules permanently. How quickly a CO2 molecule moves around the climate system (i.e., residence time) is different to how long it takes CO2 levels to return back to normal. If we stopped emitting CO2, it would take thousands of years for the atmosphere to return to pre-industrial levels.
Greenhouse effect violates the 2nd law of thermodynamics.	P1: The atmosphere is cooler than the Earth's surface. P2: Thermodynamics says that heat can only flow from hot to cold. C: The greenhouse effect violates thermodynamics.	Deduction	INVALID	NONE	Ambiguous about what is meant by "heat flow". With the greenhouse effect, the net heat flow is still from the surface to the atmosphere. But the heat flow is less than it would've been without the greenhouse effect. So essentially, the greenhouse effect slows the cooling of the Earth to space.	P1: The atmosphere is cooler than the Earth's surface. P2: Thermodynamics says that heat can only flow from hot to cold. P3: With the greenhouse effect, the "net" flow of heat is from the Earth to the atmosphere. C: The greenhouse effect is consistent with thermodynamics.	YES. Now off the original point.	P1 is true. P2 is true. P3 is true.	FALSE The argument is now sound but the conclusion has changed.	Ambiguity. This argument is ambiguous about what is meant by "heat flow". With the greenhouse effect, the net heat flow is from the surface to the atmosphere, consistent with the 2nd law of thermodynamics. But greenhouse gases slow down the cooling of the Earth as it loses heat to space. The Earth still loses heat, but less than if there were no greenhouse gases.
The greenhouse effect is saturated so adding more CO2 won't affect it.	P1: Each CO2 molecule added contributes less greenhouse effect than the previous one. C: Adding more CO2 to the atmosphere won't add any additional warming.	Deduction	INVALID	NONE	Oversimplification: doesn't clarify that saturation applies to a single layer rather than the whole atmosphere. Need to add language to clarify the difference.	P1: Each CO2 molecule added to a single layer of air contributes less greenhouse effect than the previous one. P2: Layers high up in the atmosphere are less saturated than low layers. C: Adding more CO2 to the atmosphere means more heat trapped higher in the atmosphere.	YES. Now off the original point.	P1 is true. P2 is true.	FALSE The argument is now sound but the conclusion has changed.	Oversimplification. Arguing that the greenhouse effect is saturated in a single layer oversimplifies the fact that atmosphere which is made up of multiple layers. Layers higher up in the atmosphere are less saturated than lower layers. Consequently, emitting more CO2 means more heat is being trapped high up in the atmosphere where the air is thinner.
Atmospheric CO2 lagged behind temperature changes in the past, so rising CO2 can't be the cause of rising temperatures.	P1: If CO2 causes global warming, then CO2 variations should precede temperature variations. P2: CO2 lags temperature in the past. C: CO2 cannot be the cause of global warming.	Deduction	VALID	NONE	NONE	NA	NA	P1 is false: false dichotomy. While it is true that CO2 causes global warming, that doesn't mean global warming might not also lead to increased CO2 in the atmosphere. Moreover, increases in global temperatures can lead to the release of large amounts of CO2, which then exacerbates the process. The relationship between the two is therefore not so simple. P2 is false: sleightful induction. While it is true in the Antarctic ice core record that CO2 lags temperature, it is not the case in Greenland ice cores or tropical ocean sediment cores. Consequently, it's false to say that CO2 always lags temperature. It's a regional phenomena restricted to Antarctica.	FALSE The argument is valid but contains a false premise.	False dichotomy. While it is true that CO2 causes global warming, that doesn't mean global warming might not also lead to increased CO2 in the atmosphere. Just because a chicken comes from an egg doesn't mean eggs don't come from chickens—both are true. Similarly, CO2 causes warming and warming causes more CO2. The two combined comprise a reinforcing feedback. Sleightful induction. While CO2 lags temperature in the Antarctic ice core record, that is not the case in Greenland ice cores or tropical ocean sediment cores. Consequently, it's false to say that CO2 always lags temperature. It's a regional phenomena restricted to Antarctica.
One fingerprint of human-caused global warming is the tropospheric hot spot which hasn't been observed, thus disproving human-caused global warming.	P1: Climate models predict human-caused global warming should cause a tropospheric hot spot. P2: A hot spot hasn't been observed. C: Humans aren't causing global warming.	Deduction	VALID	NONE	This argument contains a verbal trick - a hot spot should appear for any type of surface warming so is not linked uniquely to greenhouse warming.	P1: Climate models predict global warming should cause a tropospheric hot spot. P2: Surface warming has been observed. P3: Satellite/radiosonde measurements have had trouble finding a tropospheric hot spot. C: Either model predictions or measurements are uncertain.	YES. Now off the original point and no longer relevant to the question of human-caused global warming.	P1 is true. P2 is true. P3 is true.	FALSE The argument is now sound but the conclusion has changed.	Ambiguity. Contains a verbal trick by conflating "global warming" with "human-caused global warming" in order to cast doubt on humanity's role in causing global warming. A hot spot should appear for any type of surface warming so is not linked uniquely to greenhouse warming.
CO2 is a trace gas so its warming effect is minimal.	P1: Carbon dioxide is a trace gas. C: The presence of carbon dioxide in "trace" amounts in the atmosphere is not responsible for warming the earth. * Trace amounts in analytical chemistry are those less than 100 ppm. While CO2 levels are higher than this, we can use the term more colloquially for the purposes of this exercise.	Deduction	INVALID	P1: Carbon dioxide is a trace gas. P2: Trace amounts of a substance can have no effect. C: The presence of carbon dioxide in trace amounts in the atmosphere is not responsible for warming the earth.	NONE [It is possible to analyse this argument by claiming that the word "trace" is used with equivocation, but the treatment given here is sufficient to overcome that issue]	NA	NA	P1 is true (noting the earlier caveat). P2 is false: red herring. The "trace" aspect of CO2 is irrelevant to whether it can impact climate. Lethal doses of hydrogen cyanide are of slightly lower ppm than atmospheric CO2.	FALSE The argument is made valid with an extra premise but the premise is false.	Red herring. The fact that CO2 is a trace gas is irrelevant to whether it can impact climate. Trace amounts of substances can have a strong effect. Lethal doses of hydrogen cyanide are of lower dosage than atmospheric CO2. We know CO2 causes warming because satellites measure its warming effect—the increased greenhouse effect is an observed reality.
The sun is causing currently observed climate change on Earth.	P1: The Sun is the main source of energy in our climate. P2: If the Sun radiates more energy, the Earth warms. P3: Solar activity is increasing. C: The Sun is causing global warming.	Deduction	VALID	NONE	NONE	NA	NA	P1 is true. P2 is true. P3 is false: sleightful induction. The Sun has been getting colder for the last 30 years as the Earth has been warming.	FALSE The argument is valid but contains a false premise.	Sleightful induction. Ignores the fact that the Sun has been getting colder for the last 30 years as the Earth has been warming. Sun and climate are moving in opposite directions. Further confirming our understanding is the fact that changing patterns in the yearly and daily cycle confirm human-caused global warming, while ruling out the sun.

4: PAST & FUTURE CLIMATE CHANGE

The Earth's climate has changed before, so humans are not responsible for current climate change.	P1: The climate can change through natural processes. P2: The climate is currently changing. C: The climate is currently changing through natural processes.	Deduction	INVALID	P1: The climate can change through natural processes. P2: The climate is currently changing. P3: Human activity cannot cause climate change in the past. C: The climate is currently changing through natural processes.	NONE	NA	NA	P1 is true. P2 is true. P3 is false: single cause. Assumes only natural causes drive climate change.	FALSE The argument is made valid with an extra premise but the premise is false.	Single cause. Assumes only natural processes cause climate change. Just because nature drove climate change in the past doesn't mean it must always be the driver. We are confident that human activity is driving current climate change because human fingerprints are observed all over our climate system.
Human activity is not necessary to explain climate change.	P1: Climate can change through natural processes. P2: Human activity can cause climate change. P3: The climate is currently changing. C: Human activity is not necessary to explain current climate change.	Deduction	VALID	NONE	Equivocation: the term "climate change" is used here to cover a variety of meanings. The change referred to in P1 and P3 do not have the same meaning, since the rate of change is different in each. This syntax makes the argument seem valid, but it is not.	P1: Climate can change through natural processes. P2: Human activity can cause climate change. P3: The climate is currently changing at a much more rapid rate than in the past. P4: Natural processes occurring at the moment cannot explain the current rate of climate change. C: The Earth is not warming through natural processes.	YES. Now off the original point.	P1 is true. P2 is true. P3 is true. P4 is true.	FALSE The argument is now sound but the conclusion has changed.	Equivocation. The term "climate change" is used here to represent both slow climate change in the past and rapid modern climate change. The rate of modern climate change is unprecedented, being much faster than natural climate change in the Earth's past. Therefore equating the two is misleading.

1. Identify claim	2. Argument structure	3. Inferential Intent	4. Validity	4a. Hidden premises	5. Ambiguity	5a. Resolve ambiguity	5b. Conclusion changed	6. Check premises	Status of claim	Summary of fallacies
Current warming is just the continuation of natural recovery from the Little Ice Age.	P1: It warmed naturally from the Little Ice Age to the start of the industrial period. P2: It's warmed over the industrial period. C: Warming over the industrial period is natural.	Deduction	INVALID Conclusion doesn't follow from premise - just because nature caused climate change in the past doesn't mean it has to be causing it now.	P1: It warmed naturally from the Little Ice Age to the start of the industrial period. P2: It's warmed over the industrial period. P3: Human activity cannot cause climate change C: Warming over the industrial period is natural.	NONE	NA	NA	P1 is true. P2 is true. P3 is false.	FALSE The argument is made valid with an extra premise but the premise is false.	Single cause: Assumes only natural processes cause climate change. Just because nature caused the end of the Little Ice Age doesn't mean it must always be the driver. Natural processes that ended the Little Ice Age have been wiped by recent human activity.
CO2 was higher in the past but the world didn't boil away so the greenhouse effect is weak.	P1: CO2 was higher in the Earth's deep past. P2: The Earth didn't experience runaway greenhouse warming during these periods. C: The greenhouse effect is weak.	Deduction	INVALID At the same time that CO2 was very high, solar activity was much lower. In fact, the two roughly balance each other out. So the conclusion doesn't follow from the premises because its missing an important premise.	P1: CO2 was higher in the Earth's deep past. P2: No other climate driver offset the stronger greenhouse warming. P3: The Earth didn't experience runaway greenhouse warming during these periods. C: The greenhouse effect is weak.	NONE	NA	NA	P1 is true. P2 is false: single cause, slothful induction. The sun was cooler when CO2 was higher. P3 is true.	FALSE The argument is made valid with an extra premise but the premise is false.	Single cause: Assumes that if CO2 was a climate driver, then no other climate driver would offset CO2's warming influence. In the past when CO2 was much higher, the sun was much cooler. The two roughly balanced each other. We are now raising CO2 levels with a warmer sun. Slothful induction: Overlooks the fact that the sun was cooler in the Earth's deep past when CO2 was higher.
The Medieval Warm Period was warmer than current conditions. This implies recent warming is not unusual and must be natural.	P1: The Medieval Warm Period was as warm or warmer than now. P2: Climate change during Medieval times was natural. P3: It's warm now. C: The climate is currently changing through natural processes.	Deduction	INVALID Conclusion doesn't follow from premises - just because nature caused climate change in Medieval times doesn't mean it has to be causing it now.	P1: The Medieval Warm Period was warm. P2: Climate change during Medieval times was natural. P3: It's warm now. P4: Human activity cannot cause climate change. C: The climate is currently changing through natural processes.	NONE	NA	NA	P1 is false. Slothful induction, ignores full body of evidence that finds that while some regions were comparatively warm to now, many other regions were cooler and overall, the globe was cooler than current conditions. P2 is true P3 is true P4 is false. Single cause: Assumes only natural processes cause climate change. Just because nature influenced climate in medieval times doesn't mean it must always be the driver.	FALSE The argument is made valid with an extra premise but the premise is false.	Slothful induction: Ignores full body of evidence that finds that while some regions were warmly comparable to now, many other regions were cooler and overall, the globe was cooler than current conditions. Single cause: Assumes only natural processes cause climate change. Just because nature influenced climate in medieval times doesn't mean it must always be the driver.
Models are imperfect and therefore unreliable.	P1: Models are not perfect representations of climate. C: Models are unreliable.	Deduction	INVALID Non sequitur: mistakes made have no bearing on the broader results from models which are based on fundamental physics. In addition our understanding is based on empirical evidence also.	P1: Models are not perfect representations of climate. P2: Models should be perfect if we're relying on the broader results from models which are based on fundamental physics. C: Models are unreliable.	NONE	NA	NA	P1 is true, although there is a hint of slothful induction in that it ignores all the correct interpretations that models have made. P2 is false. Impossible expectations, no model is perfect but they are useful tools that can reproduce the past and provide insights into the future.	FALSE The argument is made valid with an extra premise but the premise is false.	Impossible expectations: By definition, no model is perfect as they are simplified representations of reality. Therefore, expecting models to be perfect are an impossible expectation that can never be met. Models are useful tools based on fundamental physical principles that can reproduce the past and provide insights into the future.
Models predictions have failed, making them unreliable.	P1: Model predictions have been wrong. C: Models are unreliable.	Deduction	INVALID Just because something isn't perfect doesn't mean it's not reliable.	P1: Model predictions have been wrong. P2: Models should be perfect to be reliable. C: Models are unreliable.	NONE	NA	NA	P1 is true. P2 is false. Impossible expectations: climate models have had great success at predicting long-term effects like greenhouse warming.	FALSE The argument is made valid with an extra premise but the premise is false.	Impossible expectations: No model can ever make completely perfect predictions. Nevertheless, climate models have had great success at predicting long-term effects such as greenhouse warming.
Scientists can't even predict weather.	P1: Weathercasters get weather predictions wrong. C: Climate predictions are unreliable.	Deduction	INVALID Weather and climate are different things so one doesn't lead to the other.	NONE	Ambiguity. This claim conflates weather and climate, which is weather averaged over time and space.	P1: Weathercasters get weather predictions wrong. P2: Weather is chaotic and hard to predict. P3: Climate, which is weather over time, is more stable and predictable. C: The success of weather predictions has no bearing on the reliability of climate predictions.	YES. Now off the original point.	P1 is true. P2 is true. P3 is true.	FALSE The argument is now sound but the conclusion has changed.	Ambiguity: This claim conflates weather and climate, which is weather averaged over time and space. The success of short-term predictions have little relevance to long-term climate predictions.
In the 1970s, climate scientists were predicting an ice age.	P1: Climate scientists erroneously predicted an ice age in the 1970s. C: Current climate science is unreliable.	Deduction	INVALID The state of science in the 1970s does not necessarily have implications for the state of science now.	P1: Climate scientists erroneously predicted an ice age in the 1970s. P2: Climate science needs to be perfect in the 1970s in order for us to trust it now. C: Current climate science is unreliable.	NONE	NA	NA	P1 is false: misrepresentation. P2 is false: impossible expectations. P3 is false.	FALSE The argument is made valid with an extra premise but the premise is false.	Misrepresentation: This argument overstates the state of scientific understanding of climate in the 1970s. Scientific papers overwhelmingly concluded that warming due to increasing greenhouse gases was imminent. Impossible expectations: Demanding that science in the 1970s has to be perfect in order for us to trust science now is an impossible expectation.
We're heading into another ice age because of the cooling sun.	P1: Solar activity is near Maunder Minimum levels. P2: During the Maunder Minimum, there was a little ice age. C: We're heading into another ice age.	Deduction	INVALID Assumes there are no other forcings that would prevent ice age.	P1: Solar activity is near Maunder Minimum levels. P2: During the Maunder Minimum, there was a little ice age. P3: Greenhouse gases don't have much warming effect. C: We're heading into another ice age.	NONE	NA	NA	P1 is true. P2 is true. P3 is false: single cause.	FALSE The argument is made valid with an extra premise but the premise is false.	Single cause: Assumes solar variations are the driver of climate change and that greenhouse warming is negligible in comparison. In reality, the influence of solar variations is tiny compared to the strong warming effect from rising greenhouse gases. Even if the sun fell to Maunder Minimum levels, it would only delay global warming by a decade.
The IPCC is alarmist.	P1: There are examples where the IPCC has overestimated climate impacts. C: The IPCC is alarmist.	Deduction	INVALID Ignores the greater number of cases where IPCC underestimates climate impacts.	P1: There are examples where the IPCC has overestimated climate impacts. P2: The IPCC overestimates more than underestimates climate impacts. C: The IPCC is alarmist.	NONE	NA	NA	P1 is true. P2 is false: cherry picking. Selectively focuses on a few examples where the IPCC overestimated climate change, ignoring the much larger number of examples of underestimation.	FALSE The argument is made valid with an extra premise but the premise is false.	Cherry picking: Selectively looks at a few examples where the IPCC overestimated climate change, ignoring the much larger number of examples where the IPCC underestimate climate impacts. Ignoring the much larger number of examples of underestimation.
5: IT'S NOT BAD										
Water vapor is the strongest greenhouse gas.	P1: Water vapor contributes more greenhouse warming than CO2. C: Water vapor is a stronger driver of climate change than CO2.	Deduction	INVALID While water vapor has a stronger greenhouse effect, it doesn't drive climate - rather climate drives it. The amount of water vapor in the air depends on temperature. Warming causes water vapor to rise, which causes further warming - a reinforcing feedback.	P1: Water vapor contributes more greenhouse warming than CO2. P2: Water vapor is a driver of climate change rather than a feedback. C: Water vapor is a stronger driver of climate change than CO2.	NONE	NA	NA	P1 is true. P2 is false: misrepresentation. Water vapor doesn't drive climate change: climate change drives water vapor. The amount of vapor in the air depends on air temperature.	FALSE The argument is made valid with an extra premise but the premise is false.	Misrepresentation: This argument misrepresents the behavior of water vapor in the atmosphere. Water vapor doesn't drive climate change: climate change drives water vapor. The amount of vapor in the air depends on air temperature. Warming causes water vapor to rise, which causes further warming - a reinforcing feedback. The fact that water vapor is a strong greenhouse gas means it amplifies the warming from greenhouse gases.
Clouds provide negative feedback.	P1: Warming leads to more water vapor. P2: More water vapor leads to more clouds. P3: Clouds have a cooling effect. C: Clouds provide negative feedback.	Deduction	VALID	NONE	NONE	NA	NA	P1 is true. P2 is true. P3 is false. Oversimplification: acting as if clouds only have a cooling effect ignores that they can also warm.	FALSE The argument is valid but contains a false premise.	Oversimplification: Arguing that clouds only cool is an oversimplification as different types of clouds behave differently. High-level clouds warm while low-level clouds cool. Consequently, any reinforcing feedback from clouds isn't strong and they play a minor role in climate sensitivity.
Species can adapt to climate change.	P1: Species have adaptive abilities. C: Species can adapt to climate change.	Deduction	INVALID Just because species can adapt to some climate change doesn't mean they can adjust to the rapid climate change happening now.	P1: Species have adaptive abilities. P2: Climate change is gradual enough that species have time to adapt. C: Species can adapt to climate change.	NONE	NA	NA	P1 is true. P2 is false: misrepresentation. Mass extinctions happen when climate changes too fast for species to adapt. Currently species are going extinct at similar rates to past mass extinctions.	FALSE The argument is made valid with an extra premise but the premise is false.	Misrepresentation: Assumes that climate change is gradual when it is actually changing much faster than usual natural climate change, and faster than species can adapt to. Mass extinctions happen when climate changes too fast for species to adapt. Currently species are going extinct at similar rates to past mass extinctions.
Polar bear numbers have increased so they're in no danger from global warming.	P1: Some polar bear populations have increased in number. C: Polar bears are not threatened by global warming.	Deduction	INVALID Just because some populations have increased doesn't mean they're not threatened by climate change.	P1: Some polar bear populations have increased in number. P2: If global warming threatened polar bears, all populations would decrease. C: Polar bears are not threatened by global warming.	NONE	NA	NA	P1 is true. P2 is false and an oversimplification. There are a variety of factors influencing polar bear populations. One threat (hunting) has been removed but replaced with an increasing threat (melting sea ice).	FALSE The argument is made valid with an extra premise but the premise is false.	Oversimplification: There are a variety of factors influencing polar bear populations. One threat (hunting) has been removed but replaced with an increasing threat (melting sea ice). Polar bears need sea ice to hunt so the shrinking of Arctic sea ice is endangering their populations.
Ocean acidification isn't serious.	P1: Oceans are not acidic. C: Ocean acidification is not serious.	Deduction	INVALID Seriousness of acidification is not the absolute value of the ocean's acidity but the change from the current level that species have evolved with to a different level.	P1: Oceans are not acidic. P2: Ocean conditions are not harmful to organisms so long as the pH level is greater than neutral. C: Ocean acidification is not serious.	NONE	NA	NA	P1 is true. P2 is false and a red herring. Ocean acidity has increased 30% and poses serious threats to coral reefs that are also threatened by warming oceans and bleaching. What's important is not whether pH is above 7 or not, it's that species have evolved under conditions of pH around 8.1 and changing pH changes the conditions required for carbonate lifeforms to calcify.	FALSE The argument is made valid with an extra premise but the premise is false.	Red herring: Focusing on whether pH is above 7 or not is a distraction. Ocean acidity has increased 30% and poses serious threats to coral reefs that are also threatened by warming oceans and bleaching. Species have evolved under conditions of pH around 8.1 and changing pH changes the conditions required for carbonate lifeforms to calcify.
Global warming is good.	P1: Some regions will benefit from global warming. C: Global warming is good.	Deduction	INVALID Just because there are a few cases where global warming is good doesn't mean that it's overall good.	P1: Some regions will benefit from global warming. P2: When you add up all negatives and positives, the net effect of global warming is good. C: Global warming is good.	NONE	NA	NA	{1 is true. P2 is false and cherry picking: this focuses on a few good impacts of global warming and ignoring the overwhelming number of bad impacts.	FALSE The argument is made valid with an extra premise but the premise is false.	Cherry picking: Focuses on a few good impacts of global warming and ignoring the overwhelming number of bad impacts. Climate change is having negative impacts on all parts of society.
CO2 is not a pollutant.	P1: CO2 is a naturally occurring substance. P2: Natural substances cannot be a pollutant. C: CO2 is not a pollutant.	Deduction	VALID	NONE	This is a red herring: quibbling over technical definitions of pollutant is a distraction from the realities of the negative impacts of global warming.	P1: CO2 is a naturally occurring substance. P2: A pollutant is any substance that disrupts the environment. P3: Greenhouse warming disrupts the climate. C: CO2 is a pollutant.	NA	P1 is true. P2 is true. P3 is true.	FALSE The argument is now sound but the conclusion has changed).	Red herring: Quibbling over technical definitions of pollutant is a distraction from the realities of the negative impacts of global warming. CO2 is a substance that disrupts the environment - CO2 does that by trapping heat.

1. Identify claim	2. Argument structure	3. Inferential intent	4. Validity	4a. Hidden premises	5. Ambiguity	5a. Resolve ambiguity	5b. Conclusion changed	6. Check premises	Status of claim	Summary of fallacies
CO2 is plant food.	P1: Plants need CO2 to grow. C: CO2 is good for plants.	Deduction	INVALID Fails to take into account negative impacts of global warming on plant growth.	P1: Plants need CO2 to grow. P2: Greenhouse warming has no negative impacts on plants. C: CO2 is good for plants.	NONE	NA	NA	P1 is true. P2 is false and slothful induction. CO2 fertilisation is just one factor affecting plant growth. Climate change impacts agriculture through increased heat stress and flooding. The full picture shows that negative impacts outweigh benefits.	FALSE The argument is made valid with an extra premise but the premise is false.	Slothful induction: Ignores the ways that climate change impacts agriculture through increased heat stress and flooding. CO2 fertilisation is just one factor affecting plant growth. The full picture shows that negative impacts outweigh benefits.
Extreme weather not linked to global warming.	P1: Extreme weather happened before recent global warming. P2: Extreme weather is happening now. C: Current extreme weather is not driven by global warming.	Deduction	INVALID Just because extreme weather was natural in the past doesn't mean it has to be now.	P1: Extreme weather happened before recent global warming. P2: Extreme weather is happening now. P3: Global warming cannot affect extreme weather. C: Current extreme weather is not driven by global warming.	NONE	NA	NA	P1 is true. P2 is true. P3 is false: misrepresentation.	FALSE The argument is made valid with an extra premise but the premise is false.	Misrepresentation: Assumes that global warming cannot affect extreme weather when in reality, the risk from extreme weather is increasing, with some forms of extreme weather more confidently linked to global warming than others.