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ARTICLE

Teaching Critical Thinking by Evaluating Pseudoscience Claims

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Teaching students how to think is a universal goal of educational institutions (Smith, 2003). Astleitner's (2002) defines critical thinking as a higher-order thinking skill, mainly consisting of evaluating arguments. It is a purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanations of the evidential, conceptual, methodological, or contextual considerations upon which the judgment is based. Snyder and Snyder (2008) describe critical thinking as a learned skill that requires instruction and practice. Critical thinking is fundamental skill that students can learn.

The Association to Advance Collegiate Schools of Business (AACSB, 2025), the world's largest, most prestigious nonprofit accrediting body for business schools, lists as a Standard for Curriculum:

4.3 Innovation, Experiential Learning, Lifelong Learning, and Societal Impact

• The school has an innovative approach to curriculum, whether related to content, pedagogy, or delivery method, that demonstrates currency, creativity, and a growth mindset.

• The school provides a portfolio of experiential learning opportunities that promote learner engagement between faculty and the community of business practitioners.

• The school promotes a lifelong learning mindset in learners, including creativity, intellectual curiosity, and critical and analytical thinking.

Critical thinking skills in business education can be improved by using instructional strategies that actively engage students in the learning process rather than relying on lecture and rote memorization; focusing instruction on the process of learning rather than solely on the content; and using assessment techniques that provide students with an intellectual challenge rather than memory recall. Students need practice engaging in the critical thinking process, and this practice should be deliberate and repeated (Holmes, Wieman, & Bonn, 2015).

Braun (2004) categorizes three approaches to teach critical thinking skills as: 1) Problem-

based learning (case studies, "live" or applied projects), 2) Course-content-embedded

learning (discussions, debates, guided questioning or scaffolding), and 3) An element underlying other pedagogies (critical theory, critical reflection, critical systems thinking). This paper focuses on a problem-based learning activity where students evaluate pseudoscience claims. It can be a useful tool for instructors to use for developing critical thinking skills in students, by having students practice doing critical thinking with an engaging topic.

This activity has been used in an undergraduate research methods course, with class sizes of 20 to 30 students. An instructor may also use this activity with larger class sizes where students work in groups. Instructors can use this activity to give students practice in using the critical thinking skills they have learned in class, similar to the practice problems a statistics professor might give students before assessing how well students have learned those skills with a quiz or test. It could be used in any class where instructors want students to learn-by-doing, rather than just lecture-and-test. This student activity could be used in a business problem solving course, at the undergraduate or MBA level, or in any course that has improving students' critical thinking as a learning objective.

Critical Thinking

Students engage in critical thinking when they investigate, appraise, interpret, or synthesize information and use creative thought to construct an argument, solve problems, or reach a conclusion (Raj, et al., 2022). A systematic review of the literature by Alsaleh (2020) concluded that critical thinking has been recognized as one of the most important thinking skills and one of the most important indicators of student learning quality. Abrami et al. (2008) asserted that critical thinking is widely recognized as an important, even essential skill.

Pseudoscience and Critical Thinking

Pseudoscience differs from science in that pseudoscience seeks to persuade, rather than to question. Science starts with a question, and searches for more questions. Pseudoscience starts with certainty, and doesn't generate any new questions (Bunge, 2006). Pseudoscience theories are an ideal way for students to practice their critical thinking skills.

Deciding what is science and what is pseudoscience is a difficult and on-going philosophical problem, called the demarcation problem (Pigliucci & Boudry, 2019). Some

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scientific theories started from no evidence to support them, and may have initially been labeled as pseudoscience. For example, in the early 1900's, scientists tried to explain the many geographical, geological, and biological continuities between continents. In 1912, the meteorologist Alfred Wegener described what he called "continental drift." According to this theory, the similar animals, plants, and rocks on either side of the Atlantic Ocean meant that the continents actually were once together, and over millions of years, the various land masses had drifted apart. But there was no known mechanism to make this happen. Over the next 50 years, evidence was found that the Earth's major features were not fixed, and mechanisms were discovered to explain how continents could move, creating the modern theory of plate tectonics, moving Wegner's theory from pseudoscience to science.

Some pseudosciences superficially look like science, but are not. For example, astrology uses data generated by observational astronomers to produce maps called "genitures" of the heavens at the client's birth, and uses them to make predictions. However, there is no plausible explanation for how the positions and movements of planets and stars could exert a physical or other influence on human personalities, events, or relationships. Astrological predictions are frequently vague and open to interpretations, and where there is a testable claim, no evidence has been found to support them.

Some pseudosciences began as pseudosciences and remain a pseudoscience. Among many examples, Gordon (2023) describes Lysenkoism. Lysenco claimed he could change the hereditary properties of plants by exposing them to environmental stressors, i.e., inheritance of acquired characteristics. He claimed that vernalization (subjecting seeds to periods of extreme cold before planting them), "shattered" the heredity of the plants, and environmental modifications could be passed on to future generations, but he provided limited data and statistical analysis on his trials. Classical genetics claimed that units of heredity (genes) were immutable to environmental modification. When the Academy of Sciences audited Lysenco's farm, mismanagement and fraud were found. Additionally, no data were found to support his claims (Gordin, 2023, p. 38).

Different from pseudoscience is pathological science, a term coined by Nobel laureate Irving Langmuir. While pseudoscience actively tries to imitate science in a superficial way, pathological science starts as normal science but is actually misleading due to wishful thinking, subjective biases, or flawed methods. Instead of trying to figure out why a surprising result might be wrong, a researcher tries to defend their result against all evidence that it is wrong (Perlmutter, MacCoun, & Campbell, 2024, p. 186). The key characteristics of pathological science are: (1) Barely Detectable Cause/Effect (the observed effect is very small, near the limits of measurement, and not clearly related to the cause); (2) Claims of Great Accuracy (proponents often boast of precise measurements, despite the data's uncertainty); (3) Fantastic Theories (the explanations proposed often contradict established scientific understanding); (4) Ad Hoc Excuses (criticisms are met with quick, made-up justifications); and (5) Support/Critic Ratio (the number of believers grows, then falls to oblivion, unlike normal science which strengthens over time). In short, pathological science is unintentional self-deception. Examples of pathological science are N-rays (a supposed form of radiation discovered in France, later shown to be a perceptual illusion), and Polywater (anomalous water forms that were extensively studied but later disproven) (Pathological science, 2025).

Some pseudoscience theories have seen a recent resurgence, despite a lack of evidence to support them, and critical thinking could be used to easily disprove the theory. For example, the Flat Earth theory claims that the Earth's shape is a plane or disk. A little critical thinking:

- There are thousands of images and videos from space agencies like NASA, the European Space Agency, and even private companies, as well as testimony from numerous astronauts, that directly show a spherical Earth.
- During a lunar eclipse, the Earth passes between the Sun and the Moon, casting a shadow on the Moon's surface. This shadow is always circular, and a sphere is the only shape that produces a consistently curved shadow regardless of its orientation.
- When observing a ship sailing into the distance, the bottom of the hull disappears before the top of the mast. On a flat Earth, the entire ship would simply appear smaller and smaller until it vanished, but the bottom-up disappearance is clear evidence of the Earth's curvature.
- Observers in the Northern Hemisphere see different constellations than those in the Southern Hemisphere. For example, the North Star is not visible in the Southern Hemisphere. This is only possible on a globe, because a flat Earth would have the same night sky visible from everywhere.
- People have successfully circumnavigated the globe, both by sea and air, by traveling in a relatively straight line in one direction and returning to their starting point. This is only possible on a sphere.

Several studies have focused on critical thinking and pseudoscience. Adam et al. (2014) measured the effectiveness of a classroom activity that was designed to improve students' critical thinking skills, using pseudoscience claims. Students read four flawed claims, indicated the extent of their agreement with claims, and evaluated the evidence presented in each. Using a pre-test and post-test design, after the classroom activity participants were

better able to correctly identify flaws in claims and were less likely to agree with flawed claims, both of which are important aspects of critical thinking. The authors claim that this suggests that even short interventions (such as their 75-minute activity) can increase students' critical thinking abilities as well as longer term interventions. McLean and Miller (2010) assessed changes in paranormal beliefs and general critical thinking skills among students enrolled in an experimental course designed to teach distinguishing science from pseudoscience and a comparison group of students in an advanced research methods course. They found that both courses were successful in reducing paranormal beliefs and increasing critical thinking skills.

Using Pseudoscience to Teach Critical Thinking

Consider the following from Halpern (1998): Approximately 78% of women and 70% of men read their horoscopes, with many believing that these horoscopes are so often correct that they were written especially for them (Lister, 1992); they phone their personal psychics, at a cost that many cannot afford, for advice on matters that range from how to invest their money to whether a loved one should be disconnected from life support systems; they spend huge sums of money on a variety of remedies for which there is no evidence that they work or are even safe to take--sometimes with disastrous results. In a survey of college students, more than 99% expressed their belief in at least one of the following: channeling, clairvoyance, precognition, telepathy, psychic surgery, psychic healing, healing crystals, psychokinesis, astral travel, levitation, the Bermuda triangle mystery, extraterrestrials in UFOs (also called Unidentified Anomalous Phenomena), plant consciousness, auras, or ghosts, and more than 65% reported that they personally experienced at least one of these phenomena (Messer & Griggs, 1989). These facts suggest relevancy, interest, and perhaps the importance, in applying critical thinking to the underlying assumptions of a pseudoscience.

One way to develop critical thinking is to first ask students to list the assumptions that are made for a claim, then examine whether the assumptions hold up under examination. For example, the claim that the pyramids in Egypt were built by extraterrestrials (i.e., ancient aliens) makes these assumptions:

1. There are advanced civilizations on other planets,
2. These advanced civilizations are able to travel light years (only recently have the space probes Voyager 1 and Voyager 2 reached interstellar space),
3. At some time in pre-history extraterrestrials traveled multiple light years to come to Earth,
4. When they got here, these extraterrestrials built the pyramids, because to build the pyramids would require heavy machinery, and the ancient Egyptians did not have any.

The first assumption has a long history of debate. The Drake Equation (2025), formulated in 1961, is used to estimate the number of active, communicative extraterrestrial civilizations in the Milky Way Galaxy, based the number of civilizations in the Milky Way galaxy with which communication might be possible, the average rate of star formation in our galaxy, the fraction of those stars that have planets, the average number of planets that can potentially support life per star that has planets, the fraction of planets that could support life that actually develop life at some point, the fraction of planets with life that go on to develop intelligent life (civilizations), the fraction of civilizations that develop a technology that releases detectable signs of their existence into space, and the length of time for which such civilizations release detectable signals into space. Even using generous estimates of the parts of the equation, the probability of other advanced civilizations in the galaxy is small, and the chances that they would choose to visit the earth is even smaller. (On the other hand, the Fermi Paradox says that if extraterrestrial life is common, it would be implausible for it not to have been detected.) The chance is not zero, but no evidence has been found that there are advanced civilizations out there, perhaps because they are out there and chose not to visit the earth, or travel to other solar systems light years away is very difficult, or maybe they are not interested in us.

The second assumption is based on the idea that traveling between solar systems is similar to travel between places on Earth. The longest commercial flight is the route from New York (JFK) to Singapore (SIN), which is approximately 9,537 miles (15,348 kilometers) and takes around 18-19 hours. To travel near the speed of light from the nearest potentially habitable exoplanet (orbiting Proxima Centauri b) to Earth, would take approximately 4.2 years. The technological and logistical challenges in making this journey are formidable.

The third assumption is based on the idea that humans are somehow special enough that an advanced civilization would want to visit us. Bill Watterson (creator of the comic strip Calvin and Hobbes), speaking though Calvin quipped, "Sometimes I think the surest sign that intelligent life exists elsewhere in the universe is that none of it has tried to contact us."

The fourth assumption has been thoroughly refuted by archeological evidence that the Egyptians built the pyramids, including workers' cemeteries and settlements that indicate that there was a large, organized workforce that worked on the pyramids. Excavations have uncovered tools used by ancient Egyptians, such as chisels, hammers, and saws, as well as evidence of quarrying, stone transport, and construction techniques. Papyri and inscriptions found at the pyramid sites detail the organization of workers, the transport of materials, and the progress of construction. Even tombs of pyramid builders have been

found, providing direct evidence of the people who were involved in the construction process.

The Activity

This assignment asks students to make a list of arguments against a pseudoscience claim or list the assumptions of a claim. Although other types of claims could be used, such as product claims in advertisements, the advantage of pseudoscience claims is that they are likely to engage student interest, and engaged students tend to be more effective learners. There may be students who object to a pseudoscience claim as being labeled pseudoscience, because they believe that there are shape-shifting reptilian aliens who manipulate human societies, or that Crop Circles are created by extraterrestrials. This is a teaching moment. Students can believe anything they want to believe, however, what the student needs to do for this assignment is make a list of arguments against the claim or assumption made by the claim. There are arguments against any pseudoscience claim, and there are assumptions made by any pseudoscience claim, the student just has to list them, it does not matter whether they think that the claims are true or false. There may be a secondary benefit for students who believe one of these pseudoscience claims. In making their list of arguments against or assumptions made in the claim, students may reassess their belief in the pseudoscience claim.

Two examples of arguments against or assumptions of a pseudoscience claim (Bermuda Triangle and Ghost Hunting) that have been given by students are provided in Appendix A. There are other arguments or assumptions that students might give, the list is not exhaustive.

The purpose of the activity is help students develop their critical thinking skills using a context that will be interesting and engaging for students. It is not enough just to show students what critical thinking is, and tell them what skills they need to develop. Students need practice engaging in the critical thinking process, and this activity gives them a chance to learn critical thinking by doing it themselves, and see others do it.

The Activity – Student Handout

Background

There are many different problem-solving frameworks, but they all begin with clearly defining the problem. Once you get a clear idea of what the problem is, you are on your way to forming a solution.

A skill that is (critically) important in problem solving is critical thinking. Critical thinking is the analysis of available facts, evidence, observations, and arguments to form a judgment by the application of rational, skeptical, and unbiased analyses and evaluation. Critical thinking is used by people in all kinds of jobs, and in everyday life. For example, a triage doctor or nurse at a MASH (Mobile Army Surgical Hospital) unit analyzes the cases at hand and decides the order in which the patients should be treated. Some cases can wait, some will survive if treated quickly, and some are unlikely to survive, so it is important to use always limited resources where they will have the greatest effect. An attorney reviews evidence, then devises a strategy to win a case or to decide to settle out of court. The attorney has to critically evaluate the case, and when a case would require much effort and there is little chance of winning, may decide that settling out-of-court is a better option.

A useful way to develop your critical thinking skills is to apply critical thinking to pseudoscience claims. They are useful problems to work with because every pseudoscience claim has arguments for and against it, and every pseudoscience claim is based on assumptions which may or may not be true.

To Do

Apply critical thinking to the Pseudoscience Claim assigned to you by the last digit of your Student Number. Make a list of five (5) arguments against the claim or five assumptions made by the claim.

For example, if you were given the pseudoscience of Astrology (a number of belief systems that hold that there is a relationship between astronomical phenomena and events or descriptions of personality in the human world; several systems of divination are based on the relative positions and movement of various real and construed celestial bodies) you would start with its two key assumptions: (1) Celestial Influence: Planets and stars exert subtle, non-physical influences on Earth and its inhabitants; and (2) Birth Chart Significance: A natal chart, mapping planets at birth, reveals personality, potential, and life path.

Five arguments against Astrology or assumptions made by Astrology:

1. The stars and planets are assumed to have an effect on people when they are born. Stars and planets are large but very far away, the gravitational effect of the doctors and nurses aiding the birth have a larger gravitational pull.
2. Astrology assumes that the positions of the stars and planets at the time of birth rather than the time of conception, determines someone's personality, but the time of birth could be affected by C-Section or the use of drugs to induce labor.
3. Astrology assumes that people born under the same sign will have the same personality. Twins are born at the same time, so they should have same personality. All the babies born on the same day in a hospital should grow up to have the same personality. Every time you meet someone who is the same sign (or birthdate) as you, they should have the same personality as you.
4. There should be only 12 different personalities in the world, to match the 12 signs of the zodiac. There should not many personalities, only 12.
5. Astrological profiles are typically so vague they could apply to anyone (called the *Barnum Effect*).

Student Number ending in:

0: *Bermuda Triangle*: a region of the Atlantic Ocean that lies between Bermuda, Puerto Rico, and (in its most popular version) Florida. Ship and aircraft disasters and disappearances perceived as frequent in this area have led to the circulation of stories of unusual natural phenomena, paranormal encounters, and interactions with extraterrestrials.

1: *Ghost hunting*: the process of investigating locations that are reported to be haunted by ghosts, to find ghosts.

2: *Water-Fueled Cars*: a variety of perpetual motion machines. Such devices are claimed to use water as fuel or produce fuel from water on board with no other energy input.

3: *Technical Analysis*: a security analysis method for forecasting the direction of stock prices through the study of past market data, primarily price and volume.

4: *Animal Magnetism or Mesmerism*: belief that an invisible natural force is possessed by all living things, including humans, animals, and vegetables, and that the force has physical effects, including healing.

5: *Myers–Briggs Type Indicator (MBTI):* a personality test composed of four categories of two types, and each person is said to have one quality from each category, producing 16 unique personality types.

6: *Crop Circles*: geometric designs of crushed or knocked-over crops created in a field, caused by extraterrestrials in UFOs.

7: *Lizard People*: the idea of shape-shifting reptilian aliens who control Earth by taking on human form and gaining political power to manipulate human societies.

8: *Subliminal Advertising*: visual or auditory information discerned below the threshold of conscious awareness, which is claimed to have a powerful enduring effect on consuming habits.

9: *Hollow Earth*: a proposal that Earth is either entirely hollow or consists of hollow sections beneath the crust, and suggesting the existence of subterranean life.

Variations in The Activity

Pseudoscience Topics

An instructor may wish to use other pseudoscience topics than the ones listed in the Student Handout, or different topics for different sections or different semesters. There are many pseudosciences to choose from, an extensive list can be found on the Wikipedia page "List of topics characterized as pseudoscience." (2025, July 18). Some topics work better than others. Examples of topics that students tend to struggle with include: (1) Ancient Astronauts, which is often presented as a "documentary" on the History Channel and a topic of many movies and TV shows, students often want to argue that it isn't pseudoscience, it is actually true, rather than do critical thinking about the claim; (2) Feng Shui, the ancient Chinese system of mysticism and aesthetics based on astronomy, geography and the putative flow of qi, which students may think is more about interior design than science; (3) Minimum Parking Requirements, a system for assigning an optimal number of parking spaces to a given land use, students tend to focus on the university not having enough (close) parking rather than the pseudoscience claims; (4) Crystal Healing, the belief that crystals have healing properties, students often get bogged down discussing which crystals heal what illness (or prevent illness) rather than looking for evidence that various crystals have the stated effect; (5) Hypnosis, state of extreme relaxation and inner focus in which a person is unusually responsive to suggestions made by the hypnotist, students have seen too many magic shows and movies where it appeared that the hypnotist was in complete control of the person's behavior; and (6) Creation Science, which claims to offer scientific arguments for certain literalist and inerrantist interpretations of the Bible, using religious beliefs to reinterpret scientific results.

In-Class Exercise

The activity is described as an Assignment, where each student develops their own list of arguments against a pseudoscience claim or assumptions made in the claim, and submits their list independently. To modify the assignment to make it into an experiential exercise, instructors may want to use an in-class discussion, and have the class make a list of arguments against or assumptions of the pseudoscience claim, and list them on a white board. The instructor may put students into teams and have students work together to develop their lists. Or, instead of generating their lists, the instructor may have students make a class presentation, so that students can see the processes of identifying arguments against and listing assumptions of a claim multiple times with different claims. This variation has the additional benefit of learning from the ideas of other students as they develop their lists for different pseudoscience claims; there may be ideas that they had not thought of. An example of a list of Assumptions of a Pseudoscience Claim (Crop Circles and Subliminal Advertising) is given in Appendix B.

In-Class Debate Exercise

The instructor may use a debate format, where (depending on the size of the class) students or student teams take sides, one side listing arguments for the claim, the other side listing arguments against the claim. An example of the lists the two sides may develop for a pseudoscience claim (Hollow Earth) is shown in Appendix C. The advantage of this variation is that students can see both sides of the argument at once, and get practice doing critical thinking about arguments for and against a claim.

Online Forum

In an online course, a Forum can be set up to engage students in a discussion of one or more pseudosciences. There are many ways this can be achieved. For example, multiple threads, each containing a pseudoscience, could

be set up by the instructor. Initially, each student can be assigned the task of posting to one of the threads a list of assumptions of the pseudoscience claim or arguments dispelling it. Following this, students would respond to peer posts in at least two other threads.

For each post, student responses should focus on the strength of the arguments made or create a unique argument against the peer's assumption that hasn't already been mentioned in the thread's discussion. A final part of the assignment may include having students write a short paper summarizing what they learned from the exercise. Some questions for the instructor to consider are whether engagement with others and reading the threads strengthened or weakened a student's belief regarding the pseudoscience, or if the process of reading and engaging in the various threads changed their view of the importance of critical thinking.

Reflection/Discussion Questions

These questions can be modified to fit the variation of the assignment used.

1. What if you were assigned a pseudoscience that you had an a priori personal belief in, or were open to believing? If so, would you find it more difficult to create a list of assumptions or beliefs that go against your core belief? Why?

2. In the assignment you were asked to list assumptions for or against a pseudoscience belief, without expressing your own belief. Is this distinction important in the context of critical thinking? Why?

3. If you chose to list assumptions that are contrary to your belief about the assigned pseudoscience, did that result in a change in your belief about the pseudoscience assigned?

4. Think about the pseudoscience topic you were assigned. Did you find any of the arguments or assumptions you listed to be particularly compelling or hard to refute?

Appendix A

Examples of Student Answers: Arguments Against a Pseudoscience Claim

Bermuda Triangle:

1. Statistics from organizations like the U.S. Coast Guard show that the number of disappearances in the Bermuda Triangle is not statistically higher than in any other equally-traveled, storm-prone region of the ocean.
2. Many of the supposed "mysterious" disappearances were later explained by logical causes like severe weather, human error, or mechanical failure.
3. The boundaries of the Bermuda Triangle are not officially recognized and vary between different stories, making it impossible to define a specific area of unusual activity.
4. There is no scientific evidence of unique electromagnetic anomalies or other physical phenomena in the region that could explain the disappearances.
5. Many of the popular stories are heavily embellished, and some, like the famous "Flight 19" incident, are based on inaccurate or fabricated details.

Ghost Hunting:

1. Electronic Voice Phenomena (EVP) can be easily explained by natural phenomena such as radio interference, background noise, pareidolia (the mind perceiving patterns in random data), or digital artifacts.
2. Cold spots are often caused by drafts, poor insulation, or the normal convection of air.
3. Orbs in photographs and videos are almost always explained by dust, moisture, insects, or lens flare reflecting the camera's flash.
4. Electromagnetic Field (EMF) meters detect electromagnetic fields from common household electronics like wiring, cell phones, or appliances, and a non-corporeal object has no way to create an EMF.
5. Personal experiences and eyewitness accounts are subjective and can be influenced by confirmation bias, fear, psychological states, or suggestibility.

Appendix B

Examples of Student Answers: Assumptions of a Pseudoscience Claim

Crop Circles

1. Crop circles are geometric designs that are so complex that they could not be made by humans with simple tools, extraterrestrial intelligence and technology are required.
2. The stalks of the plants in crop circles are bent (not broken) by an unknown force, not by simple mechanical pressure.
3. Crop circle designs are intricate and complex, and made very quickly, beyond human capability.
4. Crop circles are found in random locations, not in areas with good road access or near popular tourist locations.
5. If an extraterrestrial civilization was able to travel light years to earth, they would choose to communicate with humans by making patterns in crops.

Subliminal Advertising

1. The subconscious mind processes information that the conscious mind ignores or fails to detect.
2. Repeated, brief exposure to stimuli (e.g., logos, colors) creates associations that guide future choices, such as increased trust or preference for a brand.
3. Subliminal messages can nudge behavior, particularly in reinforcing existing brand perceptions rather than creating entirely new desires.
4. Subliminal cues are retained over time and can influence delayed decisions.
5. Hidden visual elements in media (like in films or TV) are perceived and interpreted by the brain, despite not being consciously recognized.

Appendix C

Pseudoscience Claims—Debate Format

Pseudoscience Claim: *Hollow Earth*: a proposal that Earth is either entirely hollow or consists of hollow sections beneath the crust, and suggesting the existence of subterranean life.

Arguments for…	**Arguments against…**
1. Ancient legends and myths from various cultures, such as the Greek myth of Hades or the Buddhist concept of Shambhala, describe a subterranean world.	1. Gravitational measurements and seismic data, particularly from earthquakes, conclusively prove that the Earth is a solid sphere with a dense core.
2. Admiral Richard Byrd's diary entries and other anecdotal accounts from polar explorers allegedly describe finding entrances to the inner earth at the North and South Poles.	2. The diary entries and claims of Admiral Byrd and others are either fabricated or were later revealed to be fiction.
3. There is a secret conspiracy among governments and scientists to hide the existence of the inner world and its inhabitants.	3. The laws of physics, specifically gravity and geology, make a hollow Earth impossible; if it were hollow, its gravitational pull would be significantly different and its crust would collapse.
4. The entrances to the hollow Earth are protected by a thick cloud cover at the poles, making them difficult for modern satellites to photograph.	4. High-resolution satellite imagery and polar exploration have thoroughly mapped the Earth's surface and confirmed the existence of landmasses and ice caps at the poles, with no signs of giant openings.
5. The Earth's gravity could be explained by a different physical law, not by a solid core, and earthquakes could be a result of the movements of the inner world.	5. There is no scientific evidence to support the existence of a subterranean world or life inside the Earth, and the theory is rejected by the entire scientific community.

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