**Worksheet 7: Logic and Reasoning**

**Name:** ………………………………………

**Skimming the text**

Read the text’s title (headings and subheadings) and

Write some of the text’s keywords in the following blanks.

................. .................. ..................... ..................

Write the names of some important people and places given in the

reading passage.

.................. .................. ..................... .....................

Read the first sentences of each paragraph. What do you think the

reading is probably about?

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**5.1 Philosophical Methods for Discovering Truth**

(1) Logic is the study of reasoning and is a key tool for discovering truth in philosophy and other disciplines. Early philosophers used dialectics—reasoned debates with the goal of getting closer to the truth—to practice and develop reason. Dialectics usually start with a question. An interlocuter offers an answer to the question, which is then scrutinized by all participants. Early forms of arguments are evident in written dialogues. Arguments are reasons offered in support of a conclusion. We use logic to test hypotheses in philosophy and other domains. There are laws of logic—the law of noncontradiction and the law of the excluded middle. Laws of logic can be thought of as rules of thought. Logical laws are rules that underlie thinking itself. The rules or laws of logic are normative—they describe how we ought to reason.

**5.2 Logical Statements**

(2) Logical statements can be conditionals or universal affirmative statements. Both are important since they express the important logical relations (also called “conditions”) of necessity and sufficiency. If something is sufficient, it is always sufficient for something else. And if something is necessary, it is always necessary for something else. If you want to prove that a conditional or universal affirmative statement is false (which is to also prove that the necessary and sufficient conditions they express do not hold), then you must offer a counterexample.

**5.3 Arguments**

(3) An argument is a set of reasons offered in support of a conclusion. The reasons are called premises, and they are meant to logically support the conclusion. Identifying the premises involves critically identifying what is meant to be evidence for the conclusion. Both the premises and conclusion can be indicated by phrases and words. Evaluations of arguments take place on two levels: assessing truth and assessing logic. Logic and truth are separate features of arguments. Logical assessment involves determining whether the truth of the premises do support the conclusion. Logically good arguments contain inferences—a reasoning process that leads from one idea to another, through which we formulate conclusions—where the inference does support the conclusion.

**5.4 Types of Inferences**

(4) There are three different types of inferences: deductive, inductive, and abductive. Deductive inferences, when valid, guarantee the truth of their conclusions. Inductive inferences, when strong, offer probable support for the conclusion. And good abductive inferences offer probable support for their conclusions. Deductive inferences that cannot guarantee the truth of their conclusions are called invalid. A counterexample can be offered to prove that a deductive inference is invalid. Inductive inferences involve using observations based on experience to draw general conclusions about the world. Abductive inferences involve offering explanations for accepted evidence. Abduction is sometimes called “inference to the best explanation.”

**5.5 Informal Fallacies**

(5) A fallacy is a poor form of reasoning. Fallacies that cannot be reduced to the structure of an argument are called informal fallacies. There are many types of informal fallacies, which can be sorted into four general categories according to how the reasoning fails. These categories are fallacies of relevance, fallacies of weak induction, fallacies of unwarranted assumption, and fallacies of diversion. A fallacy of relevance occurs when the arguer presents evidence that is not relevant for logically establishing their conclusion. The fallacies of weak induction occur when the evidence used is relevant but is too weak to support the desired conclusion. The fallacies of unwarranted assumption occur when an argument assumes, as evidence, some reason that requires further justification. The fallacies of diversion occur when the arguer attempts to distract the attention of the audience from the argument at hand.

**Comprehension check**

*Read each statement and decide whether it is true or false. Write “T” before true statements and “F” before false ones.*

1. Dialectics usually start with a question. …

2. We use logic to test hypotheses in mathematics and other domains. …

3. The rules or laws of logic are not normative - they do not describe how we ought to reason. …

4. If something is sufficient Dcient, it is never sufficient for something else.

5. Logic and truth are separate features of arguments. …

6. Deductive inferences that can guarantee the truth of their conclusions are called invalid. …

7. A fallacy of relevance occurs when the arguer presents evidence that is not relevant for logically establishing their conclusion. …

**Multiple choice questions**

*Read the reading passage carefully and select the most appropriate answer for each of the following multiple-choice test items. There can be more than one answer correct.*

**Logic is a key tool for what?**

1. Discovering lies
2. Discovering truth
3. Discovering opinions

**What are the laws of logic?**

1. noncontradiction and excluded last
2. contradiction and excluded middle
3. noncontradiction and excluded middle

**What do you need to do if you want to prove that a conditional or universal affirmative statement is false?**

1. offer counterexample
2. offer antiexample
3. offer example

**What does a good argument contain?**

1. inference
2. Facts
3. Conclusion

**How is abduction called sometimes?**

1. inference to the best explanation
2. conclusion to the best explanation
3. Logic to the best explanation

**What are categories of informal fallacies?**

1. fallacies of relevance, fallacies of strong induction, fallacies of unwarranted assumption, and fallacies of diversion
2. fallacies of relevance, fallacies of weak induction, fallacies of unwarranted assumption, and fallacies of universe
3. fallacies of relevance, fallacies of weak induction, fallacies of unwarranted assumption, and fallacies of diversion

**Synonym finding**

*Find a single word in the passage which means:*

1. Debates (para. 1)………………

2. Ready (para. 1)………………

3. Technique (para. 1)………………

4. Intervals (para. 1)………………

5. Customary (para. 2)………………

6. Roles (para. 2)………………

7. Domain (para. 2)………………

8. Field (para. 3)………………

9. Rulers (para. 3)………………

10. Stress (para. 3)………………

11. Root (para. 3)………………

**Matching**

*Match the terms with their definitions.*

1. Abductive …

2. Argument …

3. Conclusion …

4. Conditional …

5. Counterexample …

6. Deductive …

7. Fallacy …

8. Fallacy of diversion …

9. Fallacy of relevance …

10. Fallacy of weak …

11. Hypothesis …

12. Inductive …

13. Inference …

14. Invalidity …

15. Law of noncontradiction …

16. Law of the excluded middle …

17. Logical analysis …

18. Necessary condition …

19. Strawman …

1. a poor form of reasoning.
2. induction a general category of informal fallacies in which an arguer’s evidence or reasons are too weak to firmly establish their conclusion.
3. a logical statement that expresses a necessary and a sufficient condition. Conditionals are usually formulated as if–then statements.
4. X is a necessary condition for Y if and only if X must be true given the truth of Y. If X is necessary for Y, then X is guaranteed by Y—without the truth of X, Y cannot be true.
5. an example that proves that either a statement is false or an argument is invalid.
6. a general category of informal fallacies in which an arguer relies on reasons that are not relevant for establishing a conclusion.
7. a logical law that states that for any statement, either that statement or its negation is true.
8. the result of an argument. A conclusion is that which is meant to be proved by the reasoning and premises used in an argument.
9. fallacy of diversion that utilizes a weaker version of the position being argued against in order to make the position easier to defeat.
10. a general category of informal fallacies in which an arguer presents evidence that functions to divert the attention of the audience from the current subject of argument.
11. a set of reasons offered in support of a conclusion.
12. a logical law that states that contradictory statements/propositions can never be true in the same sense at the same time.
13. a proposed explanation for an observed process or phenomenon.
14. having to do with deduction/deductive reasoning. Deduction is a form of inference that can guarantee the truth of its conclusions, given the truth of the premises.
15. having to do with abduction/abductive reasoning. Abduction is probabilistic form of inference in which an explanation is offered to justify and explain evidence.
16. a property of bad deductive inferences. An invalid inference/argument is one in which the truth of the premises does not guarantee the truth of the conclusion.
17. having to do with induction/inductive reasoning. Induction is a probabilistic form of inference in which observation or experience is used to draw conclusions about the world.
18. the process of determining whether the logical inferences made in an argument are good. A logical analysis determines whether the premises in an argument logically support the conclusion.
19. a reasoning process that moves from one idea to another, resulting in conclusions.

**Cloze test**

*There are some missing words in the following text. Find the best choice for each blank*

**Red herring**

A red herring fallacy is like a strawman, except the arguer completely ignores their opponent’s position and simply changes the (1)………. . The arguer diverts the attention of the audience to a new subject. A red herring is a smelly smoked fish that was used to train hunting dogs to track smells by dragging this fish along a path as practice. So the fallacy gets its name because it means to trick people into (2)……….a different path of reasoning than the one at hand. You may wonder how a person can get away with simply changing the subject. Successful use of the red herring usually involves shifting the subject to something tangentially (3)………. . Here is an example:

*My daughter wants me to exercise more. She said she is worried about my health. She showed me research about cardiovascular fitness and its impact on quality of life for people my age and older. She suggested I start biking with her. But bicycles are expensive. And it is dangerous to ride bicycles on a (4) ………* *road. Furthermore, I do not have a place to store a bicycle.*

This argument first summarizes the daughter’s position that they ought to exercise more. But then they take the suggestion of bicycling and veer off topic (getting more exercise) to the feasibility of cycling instead. The comments on bicycling in no way address the daughter’s general (5)……….that the arguer needs to exercise more. Because the argument changes the subject, it is a (6)…………….**.**

1 A) theme B) topic C) subject D) conversation

2 A) following B) walking C) running D) staying

3 A) related B) unrelated C) same D) diffrent

4 A) empty B) bussy C) full D) iced

5 A) deduction B) subject C) topic D) conclusion

6 A) strong argument B)valid conclusion C) red herring D) strawman fallacy

**Source:**

Smith, N. (2022). *Introduction to Philosophy*. Houstom, Texas: OpenStax.