

9-12

Because computers can store, retrieve, and process large amounts of data, they can rapidly perform a long series of logic steps. They are therefore being used increasingly to help experts solve complex problems that would otherwise be very

Use and correctly interpret relational terms such as if... then... and, or, sufficient, necessary, some, every, not, correlates with, and causes.

A sound argument should have both true statements and valid connections among them. Formal logic is mostly about connections among statements, not about whether they are true. People sometimes use logic that begins with untrue statements, and

Once a person believes a generalization, he or she may be more likely to notice cases that agree with it and to overlook cases that don't.

A failure to find an exception to a generalization after reviewing a large number of instances increases the confidence in the accuracy of the generalization.

Logic requires a clear distinction between those conditions that are necessary to get a result and those that are sufficient to get the result. Some conditions may be both necessary and sufficient.

In using logic in real-world situations, one often has to deal with probabilities rather than certainties.

6-8

People are using incorrect logic when they assume that a statement such as "If A is true, then B is true" implies that "If A isn't true, then B must not be true either."

Notice and criticize the reasoning in arguments in which the claims are not consistent with the evidence given.

In formal logic, a single example can never prove that a generalization is always true, but sometimes a single example can prove that a generalization is not always true. Proving a generalization to be false is easier than proving it to be true.

Be skeptical of claims based only on analogies.

If people have generalizations that always hold, and good information about a particular situation, then logic can help them to figure out what is true about it. This kind of formal logic requires care in the use of key words such as if, then,

Sometimes people invent a generalization to summarize a set of observations. But sometimes people overgeneralize, imagining generalizations on the basis of too few observations.

Reasoning by similarities can suggest ideas to consider but can't prove them one way or the other.

3-5

Seek reasons for believing something rather than just claiming "Everybody knows that..." or "I just know" and discount such claims when made by others.

One way to think about something is to compare it to something more familiar.

Offer reasons for claims and consider reasons suggested by others.

The claims people make are sometimes based on how they feel about something rather than on what they observe.

An analogy has some likenesses to but also some differences from the real thing.

K-2

Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask the same question.

