

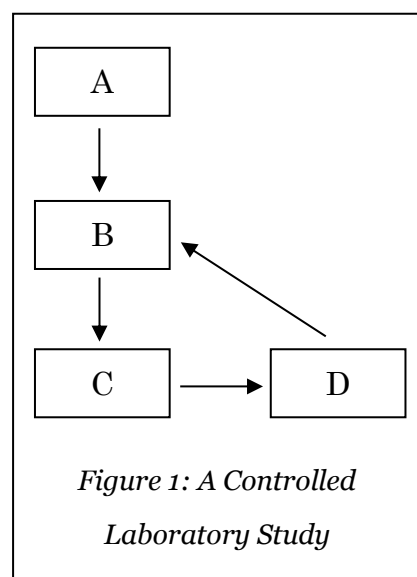
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次の文は, *The Process of Science* というタイトルで書かれた文章の一部です. よく読んで以下の設問に答えなさい.

Science helps human beings understand the natural world. Science aims to be objective rather than subjective, even though it is very difficult to make objective observations and to come to objective conclusions because we are often influenced by our own particular prejudices. Still, scientists strive for objective observations and conclusions. We also keep in mind that scientific conclusions are subject to change whenever new findings dictate so. Quite often in science, new studies, which might utilize new techniques and equipment, tell us when previous conclusions need to be modified or changed entirely.

The Scientific Method Has ⁽¹⁾Steps

Scientists, including biologists, employ an approach to gathering information known as the scientific method. The approach of individual scientists to their work is as varied as they themselves; still, for the sake of discussion, it is possible to speak of the scientific method as consisting of certain steps. After making initial observations, a scientist will most likely study any previous data, which are facts pertinent to the matter at hand. Imagination and creative thinking also help a scientist formulate a hypothesis that becomes the basis for more observations and/or experimentation. The new data help a scientist come to a conclusion that either supports or does not support the hypothesis. Because



hypotheses are always subject to modification, they can never be proven true; however, they can be proven untrue. When the hypothesis is not supported by the data, it must be rejected; therefore, some think of the body of science as what is left after alternative hypotheses have been rejected.

When scientists are doing a study, they often perform experiments in the laboratory where conditions can be kept constant. In (2)the experiment discussed next, physiologists are trying to determine if sweetener *S* is a safe food additive.

On the basis of available information, the physiologists formulate a hypothesis that sweetener *S* is a safe food additive even when 50% of the diet is sweetener *S*. If so, mice whose diet contains 50% sweetener *S* should suffer no ill effects.

HYPOTHESIS: Sweetener *S* is a safe food additive.

PREDICTION: If mice are fed a diet that contains 50% sweetener *S*,
there will be no effect on health.

In this study, the scientists decide on the following experimental design. They use a control group, which goes through all the steps of an experiment but lacks the factor being tested, in order to ensure that their results are due to this factor.

Test group: 50% of diet is sweetener *S*.

Control group: Diet contains no sweetener *S*.

To help ensure that conditions for the two groups are identical, the researchers place a certain number of randomly chosen genetically similar mice into the various groups, say, 100 mice per group. If any of the mice are different from the others, it is hoped that random selection has distributed them evenly among the groups. The researchers also make sure that all conditions, such as availability of water, cage set-up, and temperature of the

surroundings, are constant for both groups. The food for each group is exactly the same except for (3). After several weeks, both groups of mice are examined for bladder cancer. Let's suppose that one-third of the mice in the test group are found to have bladder cancer, while none in the control group have bladder cancer. The results of this experiment do not support the hypothesis that sweetener *S* is a safe food additive when 50% of the diet is sweetener *S*.

CONCLUSION: The hypothesis is not supported.

Sweetener *S* is not a safe food additive
when the diet is 50% sweetener *S*.

These results cause the scientists to believe that sweetener *S* may be less harmful if the diet contains less amount. So, they decide to do (4)another experiment.

(Mader 著 "Human Biology" より.)

設問 1. Figure 1 は下線(1)の内容を示します。A~D に当てはまる語句を文中から選んで書き入れなさい。

設問 2. 設問 1 の答にそって、下線(2)の内容を説明しなさい。(200 字以内)

設問 3. 文中の (3) に入る英語の語句を記しなさい。

設問 4. Control group が必要な理由を述べなさい。(200 字以内)

設問 5. 下線(4)の内容を考えなさい。(50 字以内)