

Safety and Scientific Processes Note-taking Guide - Answer Key

Scientific Investigation

solar system, experimental, controlled, organized, hypothesis, observe, investigations, animal, observational, conclusions

Scientific investigation is an <u>organized</u> process scientists follow to find answers to all sorts of different questions.

There are two main types of scientific investigation: <u>experimental</u> investigation, and <u>observational</u> investigation.

Some problems cannot be answered by setting up a <u>controlled</u> experiment to test a <u>hypothesis</u>. For these problems, scientists must watch, or <u>observe</u>, and then make <u>conclusions</u> based on these observations.

Questions involving <u>animal</u> behavior in the wild, or movement of objects in the <u>solar system</u>, can only be investigated through careful observation. These scientific investigations are called observational <u>investigations</u>.

Safety

tasted, safety glasses, equipment, smelled, flammable, harmful, lab, washed, gloves

Whenever you are handling any dangerous or <u>flammable</u> chemicals, <u>safety</u> <u>glasses</u> and <u>gloves</u> always need to be worn.

Equipment should only be used for the purpose it is intended for!



Food and drink are never allowed in a lab.

Lab substances should never be <u>tasted</u>, touched, or <u>smelled</u> without permission. This is because unknown substances are potentially <u>harmful</u>.

Hands should always be <u>washed</u> after working with certain materials.

Scientific Method

design, research, conclusion, scientific method, observe, materials, testable, hypothesis, data, identify

Scientific investigation always follows an organized plan or process called the scientific method.

The steps commonly followed in the scientific method are:

Identify the problem Research the problem

Write the problem as a testable question

Propose a hypothesis

Collect materials

Design the experiment

Observe and collect data

Draw a conclusion



Experiment

constant, prove, data, patterns, independent, documented, observation, conclusion, repeat, vary

Each step of the experimental procedure needs to be carefully <u>documented</u> so that others can <u>repeat</u> the experiment and <u>prove</u> the results to be true.

In a scientific investigation, only the one factor that is being tested is allowed to change, or <u>"vary</u>", during an experiment. This factor is called the <u>independent</u> variable.

All other conditions must remain the same or remain <u>constant</u> during the experiment.

Before beginning her experiment, Tess draws up an <u>observation</u> table to record her <u>data</u>. This table will help Tess spot <u>patterns</u> that can help her form a <u>conclusion</u> later.

Observational Investigation

sunlight, data, climates, experimental, conclusions, hypothesized, observations, problem, changes, variables, patterns, observational, controlled, supported

A climatologist is a scientist who investigates questions about <u>climates</u>.

The <u>problem</u> the climatologists are working on is whether the ash cloud from a volcano will affect the climate and life around the volcano.

The climatologist's have <u>hypothesized</u> that temperatures will decrease because the ash cloud will most likely block the <u>sunlight</u> for several days.

Variables such as the erupting volcano or the movement of the ash cloud cannot be controlled.



This makes it difficult to conduct an <u>experimental</u> investigation.

Instead of setting up an experiment to collect data, they will conduct an <u>observational</u> investigation. This investigation is mainly based on gathering <u>data</u> from <u>observations</u>.

Then, they will look for <u>patterns</u> and <u>changes</u> in patterns to see whether their hypothesis is <u>supported</u> by the data.

Finally, they will draw <u>conclusions</u> based on this observational data.