1. A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

_____

_____

The variable

_____

_____

The hypothesis

_____

_____

The data collected

_____

_____

The conclusion

_____

_____

Scoring Guide

Score & Description
Complete Student response demonstrates a firm grasp of the steps of a scientific investigation by identifying 5 factors.
Essential Student response demonstrates understanding of the process of scientific investigation by identifying 4 of the factors.
Adequate Student response demonstrates understanding of the process of scientific investigation by identifying 3 of the factors.
Partial Student response demonstrates some understanding of the of the process of scientific investigation by identifying 1 or 2 of the factors.
Unsatisfactory/Incorrect Student response does not demonstrate a grasp of the nature of scientific investigation, or defines the terms but does not relate them to the paragraph.

Complete - Student Response

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

river salmon

The variable

hatchery salmon

The hypothesis

hatchery fish have lost fear of predators

The data collected

she timed the amount of time it took for the salmon to move away from predator

The conclusion

hatchery fish has less fear of predators than river fish

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

15 river salmon

The variable

15 hatchery salmon

The hypothesis

Fish raised in captivity had lost their fear of predators

The data collected

Time it takes for each fish to move to back of tank

The conclusion

Hatchery fish have less fear of predators

Scorer Comments:
Both responses correctly identify five factors.

Essential - Student Response

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

the river salmon

The variable

the hatchery salmon

The hypothesis

that the hatchery salmon will not have developed a fear of predators.

The data collected

the time it took for the hatchery fish to move away

The conclusion

hatchery fish have less fear of predators than river fish do

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

Cod

The variable

hatchery Salmon

The hypothesis

fish raised in captivity lost fear of predators

The data collected

Amount of time it took young salmon to move to back of tank

The conclusion

hatchery fish have less fear of predators than river fish

Scorer Comments:
Both responses correctly identify four factors. The first response includes an incorrect identification of the data collected; the time should be measured for both groups of salmon. The second response incorrectly identifies the control.

Adequate - Student Response

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.
The control

river fish

The variable

hatchery fish

The hypothesis

hatchery fish were not as able to survive in a wild environment

The data collected

time for the smaller fish to hide from the predator

The conclusion

hatchery are less able to survive in the wild due to their lost fear of predators.

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

the tanks, and the cod

The variable

hatchery fish, River fish

The hypothesis

fish raised in captivity had lost their fear of predators

The data collected

times that it took both sets of fish to move to the back of the tank

The conclusion

That hatchery fish have less fear of predators than do river fish.

Scorer Comments:

Both responses correctly identify three factors. The first response over generalizes in forming the hypothesis and conclusion, resulting in incorrect responses for these factors. The second response incorrectly identifies the control and the variable.

Partial - Student Response

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

the 15 river Salmon

The variable

15 hatchery Salmon

The hypothesis

what going to happen when the hatchery S. see the cod?

The data collected

hatchery S. are slower than the rivers to move away from cod.

The conclusion

Don't put hatchery Salmon is a river full of preitors.

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

putting the fish in tanks.

The variable

the fish

The hypothesis

the fish would hesitate from running away from predators

The data collected

the moved back aftera while

The conclusion

hatchery fish don't fear predators as much

Scorer Comments:
The first response correctly identifies two factors: the control and the variable. The second response correctly identifies only the conclusion.

Unsatisfactory/Incorrect - Student Response

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.
The control

15 river salmon, 15 hatchery salmon, all the same age.

The variable

the fish

The hypothesis

finding out which fish was scared of preditors

The data collected

placed a plexiglas in between them.

The conclusion

that cod where not as scared of preditors

1 A research project is described below.

A fishery scientist questioned the ability of fish raised in a hatchery to survive in a wild environment. She believed the fish raised in captivity had lost their fear of predators. To test her idea, she placed 15 hatchery salmon and 15 river salmon of the same age into two separate but identical tanks. She then placed a clear piece of Plexiglas into each tank. In each tank, she placed the salmon on one side of the Plexiglas and a large predatory fish, the cod, on the other side of the Plexiglas. She then recorded the amount of time it took the young salmon to move to the back of the tank away from the cod. She found that the hatchery fish were much slower in moving away. This led her to believe the hatchery fish have less fear of predators than do river fish.

Identify each of the following using a sentence or a phrase.

The control

the two types of fish

The variable

the plexiglass

The hypothesis

to see how much time it took for the fish to be scared.

The data collected

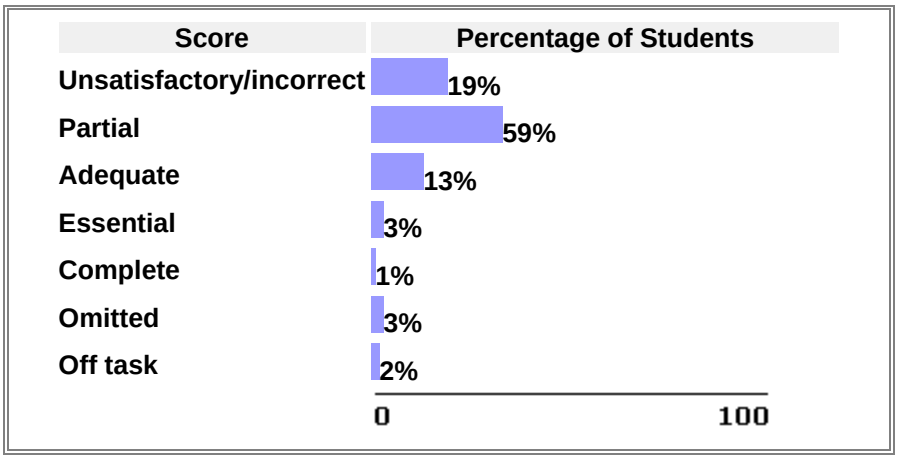
they moved slow.

The conclusion

as long as they know they aren't in danger they move slower

Scorer Comments:
Both responses incorrectly identify all five factors.

2005 National Performance Results



Note:

- These results are for public and nonpublic school students.
- Percentages may not add to 100 due to rounding.

The Fields of Science: *Life Sciences* (Sub content classification: *Ecology*)
Knowing and Doing Science : *Scientific Investigation*

The Fields of Science

Life Sciences

This question measures basic knowledge and understanding of the following:

Knowing and Doing Science

Scientific Investigation

Scientific investigation probes students' abilities to use the tools of science, including both cognitive and laboratory tools. Students should be able to acquire new information, plan appropriate investigations, use a variety of scientific tools, and communicate the results of their investigations.