Practice Being a Scientist

Q1: Name a living thing and a non-living thing.

Living Thing   Non-living Thing

Q2: Describe one way that living things often need non-living things to survive.

Q3: Name two essential parts of a living thing's life cycle.
(Hint: Two things that determine if the thing is a living thing.)

Q4: Describe one thing that a plant or animal can inherit from a parent, but that isn't always the same for the entire species.

Q5: Notice something about a living thing and record your observation by describing how that thing appears to be.

Q6: Explain why this trait might help the living thing to survive or to complete its life cycle.

Q7: Could your explanation be proven to be inaccurate?

Q8: What are two things that could be measured to test if our explanation is inaccurate?

Q9: What is an example of data that could be collected from your measurements that would convince you to change your mind and come up with a different possible explanation?

Q10: If the data does support your explanation, then what else would you be interested in testing about either your observation or explaination?

Created March 2020

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Be a Scientist - Evaluation Guidelines

This evaluation can be given to students in a written or verbal format.
The document may need to be edited if your student requires more space to write their answers. We encourage students to at least write answers for Q5-Q10 (possibly in a field journal) for their own reflection and to have a physical expression of their mastery of the skills and concepts practiced.

Q1: Name a living thing and a non-living thing.

Correct answers for a living thing include anything that is born, grows, reproduces and dies.

Examples: bateria, fungus, plants (including wood), fish, reptiles, mammals, insects, etc.

Correct answers for non-living things do not demonstrate this pattern of a life cycle.

Examples: rocks, air, water, and viruses as they do not demonstrate a full life-cycle

Standard

Idaho	Next Gen
LS1-K-1	

Use classification supported by evidence to differentiate between living and non-living items.

Q2: Describe one way that living things often need non-living things to survive.

Correct answers include a common phenomenon ranging from “plants need water or sunlight to grow” to “animals need to breath air to survive.” Simple answers are expected.

Idaho	Next Gen
LS1-K-1	K-LS1-1

Use observations to describe patterns of what plants and animals (including humans) need to survive.

Q3: Name two essential steps of any living thing’s life cycle.
(Hint: Two things that determine if the thing is a living thing.)

Correct answers include any two of these words or concepts; birth, growth, reproduction, death. Further expansion and evaluation of this standard could include demonstrating the skill of creating a model (drawn, written, or physical representation) of two different life cycles of living things. Highlight the shared milestones in their two life cycles and note the difference survival strategies that each uses as they complete their life cycles.

Idaho	Next Gen
LS1-1-3	3-LS1-1

Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

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Q4: Describe one thing that a plant or animal can inherit from a parent, but that isn't always the same for the entire species.

This concept was lightly touched on in the lesson as we discussed different color morphs of Gyrfalcons. Gray, black and white gyrfalcons are part of the same species but inherit their adult feather color from their parents. This example is an acceptable answer, but others may include different sizes and colors of other plants and animals within the same species. Differences between dogs and cats are great examples.

Idaho	Next Gen
LS2-3-1	3-LS3-1

Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

Q5-Q10 relate to the essential standard and how scientists test their arguments.

Idaho	Next Gen
LS1-4-1	4-LS1-1

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Q5: Notice something about a living thing and record your observation by describing how that thing appears to be.

Correct responses describe how the student sees the world. Answers that begin to explain the reason "why" need to be corrected to avoid attaching an explanation to the observation. Often an observation will describe a pattern, colors, size, or shape of external structures. This can be specific to an individual or as a comparison to other living things.

Examples: I notice that eagles have large feathers on their wings.
or I notice that eagles have larger feathers on their wings than hawks do.

Q6: Explain why this trait might help the living thing to survive or to complete its life cycle.

Correct responses explain how the described trait could improve the odds of survival, enhance an ability, or help complete parts of their life cycle. Commend explanations that include phrases similar to, "I think that... it is possible for this to... [black] could help the creature to…"

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Q7: Could your explanation be proven to be inaccurate?

The answer should be yes. This question should help the student rephrase their response to Q6 if they accurately answer Q7 with no.
Examples of an explanation that cannot be proven inaccurate are:
Flowers with pink petals are better. (Better at what? Better at… not wilting in the heat, perhaps?)
Sea shells are slippery because that is how they are made. (There is no explanation to test.)

Q8: What are two things that could be measured to test if your explanation is inaccurate?

Correct answers should include a measurement of the described trait and a measurement of the explained ability or rate of success of completing parts of the life cycle.

Some measurements can be qualitative such as measuring if different birds eyes are yellow or not yellow. Other measurements can be quantitative such as measuring how far away an owl can see an object.

Other measurements may need to be measured over time or measure a group of individuals. For example, if we're testing if the color of an egg helps it camouflage from predators you may need to measure how many of 10 white eggs are eaten before they hatch and compare to how many of 10 brown eggs are eaten before they hatch.

The key is to use reason to determine if the things measured can produce data that could provide evidence that the explanation is inaccurate.

Q9: What is an example of data that could be collected from your measurements that would convince you to change your mind and come up with a different possible explanation?

Correct answers can include evidence that the trait has the opposite effect than expected, indicate that there is no relationship between the trait and the explanation, or data mostly supporting the explanation but not as consistently as expected. This possible data could cause the student to slightly adjust or completely change their idea.

Q10: If the data does support your explanation, then what else would you be interested in testing about either your observation or explaination?

Correct responses can be as simple as asking a question about either their observation or explaination. Other responses may be as complicated as outlining their goals to create an entirely new experiment to refine their understanding of the subject they were observing. The desired response exhibits the understanding that a scientist doesn't stop testing their ideas and does not assume they've figured it all out once one set of data supports their idea.

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Final note: Student explanations and tests will likely only be theoretical for this evaluation. We encourage you to continue to use the skills and concepts of this lesson to work with students to observe the natural world around you, to test your explanations with resources on hand, and find exciting ways to document and share those discoveries with others. You are both scientists!