Building Claims from Evidence

Throughout your research you will be collecting and working with many different types of evidence. You will be using this evidence to make claims based on scientific arguments. A claim is a suggested answer to a scientific question. Evidence is the information we use to build claims. In our research, the team will use many different types of evidence to build claims concerning the parts of the problem question: How can we ensure health for all from mosquito-borne diseases?

Objective

In this task, we are going to learn how to use evidence to support claims. This will help the team explain how we know what we know.

1. Go to the Task 1-9 folder to get the Building Claims from Evidence activity.
2. Choose the Mosquito A or Mosquito B version from the task folder, or do both.
3. This task involves making a claim about a bite from an unknown animal.
4. The scientific question the team must consider is: What kind of animal bit me?
5. Follow the directions in the task to support the claims about this question.
6. Use the data sheet to document your results.
7. As a team, discuss the questions in the task.
8. Why is it important to always support your claims with evidence?
9. Why is it important to support decisions you make in your life with evidence?
10. Why is it important to listen to people, even when you do not agree?
11. Why is it important to respect people, even when you do not agree?

Remember, in your research, the team will use many different types of evidence to build claims concerning the parts of the problem question: How can we ensure health for all from mosquito-borne diseases?

Hooray! You completed Task 1-9. Check it off the task list. Go to Task 1-10!
Task 1-9 Making Claims from Evidence—Mosquito A

1. Break the team into smaller groups of three to five people.
2. Each group will be provided a set of Mosquito Card Sort Activity A Cards.
3. Read the scenario as a team.

   Natasha was asleep at night in her house when she suddenly felt something bite her hand. By the time she could get near a light to see what it was, the animal was gone. Therefore, she did not see what it was. The next morning she noticed a red, itchy, raised bump on her hand. She was concerned about what it might be and was wondering what kind of animal had bitten her.

4. One card has the problem question on it: What kind of animal bit Natasha?
5. Cut out all of the cards.
6. Put the claim card on the table underneath the question card. Claim: A mosquito bit Natasha.
7. There are three evidence support category cards.
   - Evidence you think supports the claim
   - Evidence you think does not support the claim
   - Evidence you think might support the claim, but are still not sure
8. Find these and lay them on the table under the claim card.
9. Cards A through H contain pieces of evidence.
10. In your group, place the pieces of evidence into one of the three evidence support categories where you think they belong.
    - Evidence you think supports the claim
    - Evidence you think does not support the claim
    - Evidence you think might support the claim, but are still not sure
11. When placing each card in a category, think of at least one reason why you placed into that category. You’ll use these reasons in the discussion.
12. Complete the activity sheet to document where you placed each piece of evidence and why.

Whole Team Discussion

1. Set expectations. Disagreement is normal during these types of discussions. Arguments and discussion help move science forward. This means not everyone will view the evidence in the same way.
2. Use the following sentence starters during the discussion
   a. I think this piece of evidence supports this claim because ....
   b. I do not think this piece of evidence supports this claim because ....
   c. I agree because ....
   d. I disagree because ....
   e. Why do you think that?
3. Discuss where each group placed each piece of evidence and why.
4. Discuss whether you think a certain type of evidence was more useful or persuasive when developing your reasons.
5. Do you find that some pieces of evidence are related to one another?
6. Do you find any pieces of evidence that are stronger when they are combined or closely related?
7. Based only on the evidence provided, do you think the claim is well supported?
8. Why is it important to support all claims with evidence?
### Task 1-9 Data Sheet A

**Problem Question:** What kind of animal bit Natasha?

**Claim:** A mosquito bit Natasha.

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Evidence support category (supports, does not support, might support the claim)</th>
<th>Reasons why the evidence supports, does not support, or might support the claim</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Natasha was inside her house when she was bitten by the animal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Natasha’s friend Ariel got a similar bite outside their house last week from a mosquito.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Spider bites typically leave red, itchy, and sometimes painful bumps on your skin.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Mosquito bites typically leave red, itchy, and sometimes painful bumps on your skin.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. All of the windows and doors to Natasha’s house have screens to try to keep the bugs out.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Natasha’s brother thinks it looks similar to when he was stung by a scorpion. But scorpions don’t typically live in the region around their house.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Some mosquitoes are known to prefer to bite humans specifically at night.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. Natasha has seen spiders inside her house in the past.</td>
<td></td>
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</tbody>
</table>
### Task 1-9 Mosquito A Cards

**Problem Question:** What kind of animal bit Natasha?

**Claim:** A mosquito bit Natasha.

<table>
<thead>
<tr>
<th>Evidence you think <strong>supports</strong> the claim</th>
<th>Evidence you think <strong>does not</strong> support the claim</th>
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*Go back to Research Guide now*
Task 1-9 Making Claims from Evidence—Mosquito B

When scientists make claims based on evidence, they often end up with more than one possible claim to answer a question. Scientists also evaluate which claims are best supported by the evidence. They may also explain and discuss why the evidence supports one claim over another.

Round One

1. Break the team into smaller groups three to five people.
2. Each group will be provided a set of Mosquito Card Sort Activity B Cards.
3. Read the scenario as a team.
   
   Scenario:
   Natasha was asleep at night in her house when she suddenly felt something bite her hand. By the time she could get near a light to see what it was, the animal was gone. Therefore, she did not see what it was. The next morning she noticed it left a red, itchy, raised bump on her hand. She was concerned about what it might be and was wondering what kind of animal had bitten her.

4. Cut out all of the cards.
5. One card has the problem question on it: What kind of animal bit Natasha?
6. Find and put the three claim cards on the table underneath the question.
   c. Claim 3: Other—neither claim 1 nor 2 have enough support. She was bitten by something else (in that case, create your own claim).
7. You will be selecting one of these claims to support with evidence and reasoning. Place them under the problem question for now.
8. Cards A through E contain pieces of evidence.
9. In your group, your goal is to sort and discuss the evidence to determine which of the three competing claims is strongest.
10. Complete the Round One column on your data sheet.
    • Which claim is best supported?
    • What evidence best supports this claim?
    • Why does this evidence best support this claim?
11. Explain that groups may not come to a consensus about which claim is best supported. This is normal and to be expected. This is why there is the category Other Claim.
12. If you have questions or are unsure about both claims, select Other Claim and provide your reasons, using evidence for support.
13. Have the groups or the whole team share and discuss which claim they think is best supported by the existing evidence.

Use the following sentence starters during the discussion
   a. I think this claim is best supported because ....
   b. I do not think this claim is best supported because ....
   c. I agree because ....
   d. I disagree because ....
   e. Why do you think that?
Round Two

1. Discuss how scientists are constantly making observations and gathering data, which can become new evidence.
2. Provide each group with the round two evidence (F through J). Add this to the evidence from round one.
3. Use this new evidence, along with the evidence from round one, to determine which claim the team thinks is best supported by the existing evidence.
4. Complete the Round Two column in the data table.
5. Engage in team discussion. Have groups or the whole team share and discuss which claim they think is best supported by the existing evidence.
   • Use the following sentence starters during the discussion
     o I think this claim is best supported because ....
     o I do not think this claim is best supported because ....
     o I agree because ....
     o I disagree because ....
     o Why do you think that?
   • How were your discussions similar or different when you sorted the cards with multiple claims and when you sorted evidence cards for one claim?
   • What did you talk about when you were discussing the evidence?
   • Did your conversations about which claim is best supported change from round one when you received the new evidence cards in round two?
   • Remember:
     o Often scientists develop competing claims about a particular phenomenon. They use evidence to decide which claim is stronger.
     o As new evidence emerges, scientists must reevaluate the strength of their claims.

Round Three

1. Discuss how scientists are constantly making observations and gathering data, which can become new evidence.
2. Provide each group with the round three evidence (K through Q). Add this to the evidence from rounds one and two.
3. Use this new evidence, along with the evidence from previous rounds, to determine which claim your team thinks is best supported given the existing evidence.
4. Complete the Round Three column in the data table.
5. Engage in team discussion. Have groups or the whole team share and discuss which claim they think is best supported by the existing evidence.
   • Use the following sentence starters during the discussion
     o I think this claim is best supported because ....
     o I do not think this claim is best supported because ....
     o I agree because ....
     o I disagree because ....
     o Why do you think that?
How were your discussions similar or different when you sorted the cards with multiple claims and when you sorted evidence cards for one claim?

What did you talk about when you were discussing the evidence?

Did your conversations about which claim is best supported change from rounds one and two when you received the new evidence cards in round three?

Remember:
- Often scientists develop competing claims about a particular phenomenon. They use evidence to decide which claim is stronger.
- As new evidence emerges, scientists must reevaluate the strength of their claims.

**Whole Team Discussion**

Remind the team that you will now engage in a discussion. When engaging in any type of meaningful discussion as a team, you must respect your team. Use these meaningful conversation starters in your discussion to respect your other team members.

- I agree with ___________ because...
- I disagree with ___________ because...
- I’d like to go back to what ___________ said about ...
- I’d like to add _______________
- I noticed that ...
- Another example is ...

Why is it important to support all claims with evidence?

Why is it important to reevaluate all claims when new evidence is collected?

Why is it important to engage in discussion when there are multiple claims for the same question?
**Task 1-9 Data Sheet B**

**Problem Question:** *What kind of animal bit Natasha?*

**Claim 1:** A mosquito bit Natasha.

**Claim 2:** A spider bit Natasha.

**Claim 3:** Other—neither claim 1 nor 2 have enough support. She was bitten by something else. (Create your own claim here.)

Which claim do you think is best supported by the available evidence? Document below the claim, evidence, and reasoning to support your decision.

<table>
<thead>
<tr>
<th></th>
<th>Round One</th>
<th>Round Two</th>
<th>Round Three</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Claim you think is best supported (1, 2, or 3)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Evidence that supports this claim</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reasons why the evidence supports the claim</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
**Task 1-9 Building Claims from Evidence Card Sort Activity B Cards**

Natasha created the following claim the next day when she woke up.

Claim 1: A mosquito bit me.

Claim 2: A spider bit me.

Claim 3: Something other than a mosquito or spider bit me. (Create your own claim here.)

**Question:** What kind of animal bit Natasha?

<table>
<thead>
<tr>
<th>Claim</th>
<th>Evidence you think supports the claim</th>
<th>Evidence you think does not support the claim</th>
<th>Evidence you think might support the claim, but you’re still not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claim 1: A mosquito bit me.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim 2: A spider bit me.</td>
<td></td>
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<tr>
<td>Claim 3: Neither Claim 1 or 2 have enough support. I was bitten by something else. (Create your own claim here.)</td>
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</tbody>
</table>

**Round One**

A. Natasha was inside her house when she was bitten by the animal.

B. Natasha’s friend Ariel got a similar bite outside their house last week from a mosquito.

C. Spider bites typically leave red, itchy, and sometimes painful bumps on your skin.

D. Mosquito bites typically leave red, itchy, and sometimes painful bumps on your skin.

E. All of the windows and doors to Natasha’s house have screens to try to keep the bugs out.

**Round Two**

F. Natasha has seen spiders inside her house in the past.
G. When mosquitoes bite humans, they make one hole in the skin. They inject saliva into the hole, so you don’t feel the bite as much as you might, while they drink the blood from under your skin using their proboscis.

H. Spiders typically only bite in self defense.

I. Some mosquitoes are known to prefer to bite humans specifically at night.

J. Some spiders are nocturnal hunters, meaning they search and hunt for food at night.

Round Three

K. Some spider bites can cause pain to spread from near the bite site into your abdomen, back, or chest.

L. Natasha has only noticed pain and itchiness at the bite site, although she noticed fluid coming out of the bite after she was scratching it a lot.

M. Mosquito and spider bites are generally dry, meaning fluid does not come out of them when you leave them undisturbed.

N. Natasha’s father said it does not look like the spider bite he had in the past.

O. Natasha’s brother thinks it looks kind of like when he was stung by a scorpion. But scorpions don’t typically live in the region around their house.

P. Spiders inject venom from one or two fangs when they bite humans.

Q. Some spider bites leave flat or sunken marks in the skin, rather than raised bumps.

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