



ACTIVITY 9

Community Health Solutions

DATA ANALYSIS

ACTIVITY 9

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ACTIVITY SUMMARY

Students consider recommendations to help Southsand reduce the impacts of Southsand fever on the community. Students use the skills they've learned from the unit to evaluate comments from community members about the recommendations for fast thinking and cognitive bias. At the end of the activity, students decide which recommendation they think is most effective for the community.

ACTIVITY TYPE
DATA ANALYSIS

NUMBER OF
40-50 MINUTE
CLASS PERIODS
2-3

KEY CONCEPTS & PROCESS SKILLS

- 1 Slow thinking relies on careful reasoning and is useful for complex or higher-stakes situations. Slow thinking takes time and effort but is less prone to cognitive error when evaluating information and reaching conclusions.
- 2 There are many cognitive biases that shape the way people make conclusions, including confirmation bias, conflict of interest, conformity bias, and emotion bias. Recognizing these biases can lead to improved reasoning.
- 3 Cognitive shortcuts and cognitive biases can lead to cognitive errors that affect how one chooses and reasons about evidence related to a claim.
- 4 Confirmation bias is a common bias that leads to faulty reasoning. It is a result of the unintentional misuse of evidence to support an existing belief.
- 5 An actively open mindset helps reduce errors from cognitive biases and cognitive shortcuts by deliberately seeking out new ideas and information that could change one's mind.

CONCEPTUAL
TOOLS



NEXT GENERATION SCIENCE STANDARDS (NGSS) CONNECTIONS:

Evaluate competing design solutions based on jointly developed and agreed-upon design criteria, empirical evidence, and/or logical arguments regarding relevant factors (e.g., economic, societal, environmental, ethical considerations.) (*Science and Engineering Practice: Engaging in Argument From Evidence*)

Construct, use, and/or present an oral and written argument or counter-arguments based on data and evidence. (*Science and Engineering Practice: Engaging in Argument From Evidence*)

MATERIALS & ADVANCE PREPARATION

FOR THE TEACHER

- VISUAL AID 9.1
"Recommendations for Reducing Risks from Southsland Fever"
- VISUAL AID 9.2
"List of Cognitive Shortcuts and Cognitive Biases"
- VISUAL AID 9.3
"Scoring Guide: Engaging in Argument from Evidence (ARG)"
- ITEM-SPECIFIC SCORING GUIDE: Activity 9, Build Understanding Item 1

FOR EACH GROUP OF FOUR STUDENTS

- SET OF COMMUNITY MEMBER COMMENT CARDS (4 cards)
- SET OF HEALTH DEPARTMENT EVIDENCE CARDS (8 cards)

FOR EACH STUDENT

- STUDENT SHEET 9.1
"Evaluating Community Member Comments"
- STUDENT SHEET 9.2
"Writing Frame: Engaging in Argument from Evidence" (OPTIONAL)
- SCORING GUIDE: Engaging in Argument from Evidence (ARG) (OPTIONAL)

TEACHING NOTES

Suggestions for **discussion questions** are highlighted in gold.

Strategies for the **equitable inclusion of diverse students** are highlighted in light blue.

GETTING STARTED (10 MIN)

1 Review key points about Southsand fever from previous activities in the unit.

- Have students read the Introduction in the Student Book and review the map presented. Ask pairs to first discuss and then share with the class what they observe about the locations of fungal diseases around the world. Student responses may indicate that fungal diseases are more common around the world than they realized because almost every continent has some sort of widespread fungal disease caused by environmental disturbances.
- Remind students that Southsand fever is a fictional disease based on a real fungal disease called Valley fever that affects people mostly living in parts of the Southwestern United States. Although Southsand fever is fictional, it highlights a continuing problem that more communities around the world are experiencing as fungal diseases continue to expand their ranges. The recommendations presented in this activity are realistic recommendations for the model disease, Valley fever. The data provided on the Health Department Evidence cards is based on Valley fever but modified for the fictional Southsand fever.
- Make sure students understand that they will apply what they've learned in the unit to evaluate proposed recommendations for reducing risks from Southsand fever and community members' comments about those recommendations.
- Before students begin, review the facts of the Southsand fever disease as a class. Collectively make a list of key points about the disease. The following can guide your class review:

How does Southsand fever spread?

- breathe in fungal pathogen that lives in the soil
- not infectious (doesn't spread from person to person)

What are the environmental risk factors that might increase exposure risk?

- dry and dusty soil
- gusty winds that disturb the soil
- hot, dry weather
- activities that disrupt the soil: digging for construction, farming, research, landscaping projects, driving on dirt roads, hiking, etc.

Who is most at risk?

- people who are outside a lot
- older people

PROCEDURE SUPPORT (40-50 MIN)

2 Support students as they analyze community members' comments and evidence about Southsand fever recommendations.

- Read the fictional scenario and recommendations in Procedure Steps 1 and 2 as a class. Clarify any questions students have at this point.
- In Procedure Step 3, hand out one set of Community Member Comment cards to each group and have each group member work with one of the cards. The comments on the cards represent fictional community members and their reactions to the recommendations for reducing Southsand fever.
- For groups with students that require additional support with argument and evidence analysis, consider assigning Community Member Comment cards by Erykah or Jimena, which have more straightforward claims and evidence.
- In Procedure Step 4, hand out Student Sheet 9.1, "Evaluating Community Member Comments," to each student and have them complete columns 2 and 3 of the table. A sample student response for this student sheet is found at the end of this activity.
- Students may need support identifying the main claim for their comment. They may also need support looking for potential cognitive shortcuts and cognitive biases in the comment. Use Visual Aid 9.2, "List of Cognitive Shortcuts and Cognitive Biases," to review the features of the cognitive shortcuts and cognitive biases that students have learned about throughout the unit.
- Before groups move on to Procedure Step 5, consider having a class discussion related to the cognitive shortcuts and cognitive biases they found in their community members' comments. Ask, **Should the presence of a cognitive shortcut or cognitive bias automatically mean that the argument the community member made should not be considered?** Most students will empathize with community members and advocate for considering their views. Follow up with a more important question. Ask, **If a community member did not agree with the recommendation, does that mean that the recommendation is not a good solution?** Student responses may be mixed. Bring up the following points if no one mentions them:
 - Some arguments for or against the recommendations may be biased because they were written by community members who wanted to protect their interests. This doesn't necessarily mean that the points being made are not valid.
 - Cognitive biases shouldn't rule out a solution, but it's important to be aware of them so you can think carefully about which solutions might be best for the community.

3 Students use evidence about Southsand fever to evaluate community members' claims.

- In Procedure Steps 5 and 6, distribute a set of Health Department Evidence cards to each group and support group members as they analyze the data. While students look for evidence both for and against the claims made by community members, remind students that there may be more than one piece of evidence that relates to the recommendation.

4 Group members share their analysis of community member comments.

- In Procedure Step 7, individual students choose a community member's comment and considers whether they agree or disagree with the claim. In Step 8, you may want to assign a community member to each group to make sure all community members are represented. It is not necessary for students to agree with their group members on their positions.
- In Procedure Step 9, groups discuss the most effective solution to reduce the number and severity of Southsand fever cases and the priority for funding.

5 Facilitate a class discussion about the recommendations by using a Walking Debate.

- In Procedure Step 10, groups switch focus from community member comments back to the recommendations. As needed, revisit the scenario from Procedure Step 1 and review the city leaders' goals: *They've set aside some special funding and would like to emphasize recommendations that reduce the number and severity of Southsand fever cases in the community.*
- Use the literacy strategy of a Walking Debate to encourage students to discuss their opinions for the funding priority for Southsand City. See [Appendix 1: Literacy Strategies](#) at the end of the Teacher's Edition for more guidance and information on using the Walking Debate with your students.

SYNTHESIS OF IDEAS (20 MIN)

6 Build Understanding item 1 can be used as an assessment opportunity.

- Remind students of the Engaging in Argument from Evidence Scoring Guide. You may wish to project Visual Aid 9.3 "Scoring Guide: Engaging in Argument from Evidence (ARG)," for your students to review each level and clarify your expectations.
- Do not share the item-specific version of the Scoring Guide (Item-Specific Scoring Guide: Activity 9, Build Understanding Item 1) with students as it provides specific information on how to respond to the item prompt.
- Remind students that you expect to see them demonstrate growth in their development of evidence-based arguments, and they may want to review their responses to the previous

assessment in Activity 3 (Build Understanding item 4), and/or Activity 6 (Build Understanding item 1). Note that this is the last opportunity in the unit to formally assess students using the Engaging in Argument from Evidence (ARG) Scoring Guide.

- Sample responses for Levels 1–4 are provided in the Build Understanding section that follows. Review these responses to get an idea of what is expected for each level alongside the item-specific Scoring Guide. See [Appendix 2, Assessment Resource](#), at the end of the Teacher’s Edition for more guidance and information on using the Scoring Guides and assessment system with your students.
- Depending on your students, you may want to have them provide feedback on one another’s work for revision prior to turning in the work to you for scoring. Alternatively, consider having students turn in a rough draft to you for feedback and revision.
- The formal assessment opportunity can be completed by a variety of alternative options other than a written argument, including a presentation, the creation of a graphic, a poster or video, or through a debate format. Consider whether any changes to the scoring guide or prompt will be necessary for students to complete an alternative assessment format.

7 Review Build Understanding item 2 as a follow-up to the assessment in Build Understanding item 1.

- Build Understanding item 2 gives students an opportunity to reflect on their own thinking as they construct their arguments. Students may be hesitant to discuss their own cognitive shortcuts or cognitive biases with other students at first. They may need help identifying what types of ideas or experiences they have that might lead them to be influenced by cognitive biases. Potential scaffolding questions to help students as they work include:
 - Do you know anyone who is a medical worker, a construction worker, or other outdoor worker?
 - Have you ever been sick with a fungal illness or sick enough to require a hospital stay?
 - How might these things influence how you think about Southsand’s problem and possible solutions?
 - Do your experiences make you focus on certain details in the recommendations more than others?
 - Do your experiences affect what you see as advantages or disadvantages of the recommendations?
- For students who need support organizing and writing their responses, you may wish to provide optional Student Sheet 9.2, “Writing Frame: Engaging in Argument from Evidence,” to compose their responses. Students could also use Student Sheet 9.2 only as a reference or as a checklist as they write their responses. A sample student response for this student sheet is shown at the end of this activity. For more information on a Writing Frame, see [Appendix 1: Literacy Strategies](#).

- Use Connections to Everyday Life item 3 to help students apply their understanding of cognitive shortcuts and cognitive biases to persuasive content they come across online.
- Conclude the activity by revisiting the Guiding Question, *How can communities evaluate science-based recommendations?* This activity was the first time students could apply the concepts to a larger community decision-making scenario. You might ask students to reflect on which slow-thinking techniques or aspects of an actively open mindset were the most effective at helping them evaluate the science-based recommendations.

EXTENSION (20 MIN)

8 Use the Extension as an opportunity for advanced learning.

- The extension gives students an opportunity to research a disease issue that is impacting their community. Information, public service announcements, and outbreak status can be found at the local public health department. Encourage students to use the skills they have learned in the unit to look at the data.
- Alternatively, students could investigate a wellness or safety problem in their school or community. Example topics could include school transportation and parking, school nutrition and exercise programs, or support for mental health.

SAMPLE STUDENT RESPONSES

BUILD UNDERSTANDING

① ARG Scoring Guide

Which recommendation do you think is the highest funding priority for helping Southsand City reduce risks from Southsand fever? Develop an argument supported by evidence from the Health Department Evidence cards and the Community Member Comment cards. In your response:

- a** make a claim about which recommendation best reduces the risk from Southsand fever.
- b** support your claim, using at least 3 pieces of evidence from the activity, and use reasoning to explain how each piece of evidence supports your claim
- c** describe and explain at least 1 piece of evidence against your claim or that supports an alternate claim. Use reasoning to explain why you still support your claim as the strongest.

Level 4 response

- a My claim is that a public health campaign is the best way for the city to reduce the risk of Southsand fever for residents. It would teach residents how to lower their chance of exposure to the disease and when to get medical help.*
- b My first piece of evidence is that treating Southsand fever too late can lead to more serious health problems. Delays in diagnosing the disease led to a 20% increase in severe cases such as long-term lung damage. This strongly supports my recommendation because better awareness about the disease could prevent this by helping people spot symptoms and seek treatment a lot earlier. Second, a study from nearby counties showed that these types of public campaigns can work. In counties that taught citizens about the flu, a larger percentage of residents knew the symptoms and exposure risks compared to residents in counties that did nothing. Residents were also more likely to say they would seek medical help if they had symptoms. This data comes from scientific studies of many people, so it is strong evidence that a similar public health campaign could work for Southsand fever. My third piece of evidence is that 75% of adults with Southsand fever were outdoor workers. Since the proposed campaign focuses on outdoor exposure risks, it will directly reach the largest and highest-risk group. This is strong evidence that the campaign is a good idea, because educating these workers on how to avoid the fungus could prevent the most new infections.*
- c One piece of evidence against my claim is that a study showed no difference in the percentage of people who said they would likely wear a mask. However, I'm still supporting this recommendation because even if people don't wear masks to prevent the fever, the campaign teaches them to recognize the symptoms. I think this could help make sure people get to the doctor quickly, which saves lives regardless of whether they wear a mask or not.*

Level 3 response

- a *My claim is that public education is the best recommendation for Southsand fever.*
- b *The first piece of evidence is that most people who got the disease work outdoors, and a public education campaign would inform people of how they get exposed to the disease. This could help prevent people from getting sick with Southsand fever if they know how to avoid it. My second piece of evidence is a study of nearby counties. It found that when people learned about a disease, they were more aware of the symptoms and said they would be more willing to seek medical help if they became ill. The third piece of evidence is that late diagnoses led to more severe medical issues and even death. This is all good evidence. A public campaign would educate residents on how to recognize the symptoms and seek medical help sooner.*
- c *An alternate recommendation is that they could use a new blood test to improve patient outcomes. Data showed that the new diagnostic blood test to quickly and accurately diagnose Southsand fever decreased the chance of long-term care and deaths from Southsand fever. However, I don't believe this will work as well as the public education campaign to reduce the risk of Southsand fever because it would not reach as many people.*

Level 2 response

- a *I think that people in Southsand City should learn more about the disease.*
- b *My evidence is that a study in nearby counties showed that education about the symptoms and risks of a disease can encourage people to visit their doctor if they get sick. This indicates that people were more willing to follow health guidelines after learning about a disease. Another piece of evidence is that 75% of people who got the fever were outdoor workers. Educating these workers could help prevent a lot of infections.*
- c *However, educating citizens does not always work. The same study in one of the counties showed no difference in the number of people who said they would likely wear a mask. So education about the disease might not actually change how people behave or make them safer.*

Level 1 response

- a *My claim is that Southsand City should build more hospitals to treat the disease.*
- b *The fungus causing the disease is found in the soil, and it could be treated more effectively if there were more hospitals. Also, there probably aren't enough medical professionals available. More hospitals and doctors could help lower people's risk of getting the disease.*
- c *However, some of the other recommendations might work as well.*

② Consider your response to Build Understanding item 1 and then describe

a any of your own cognitive biases or cognitive shortcuts that may have affected your thinking.

My dad is a teacher, so I tend to think that educating people is always a good solution because that is what he taught me. I suppose this could have led me to an availability bias that favored the recommendation that educates people about the symptoms and risk factors.

b at least one trade-off for the solution you have chosen.

One trade-off is that it was the most expensive of the recommendations, and the cost of the recommendation means that the city would not be able to implement more than one solution to address Southsland fever.

CONNECTIONS TO EVERYDAY LIFE

③ Provide an everyday example of how online comments that include cognitive biases, cognitive shortcuts, and limited evidence can still be persuasive to a reader.

One example of this is online reviews. They can be persuasive even though they are biased because there are so many of them. Also, some of the biases such as conflict of interest are not apparent when you read the reviews.

COMMUNITY MEMBER	CLAIM	COGNITIVE SHORTCUTS AND/OR COGNITIVE BIAS	EVIDENCE SUPPORTING THEIR IDEAS	EVIDENCE REFUTING THEIR IDEAS
Erykah: Public Education				
Circle one: ☐ AGREE ☐ DISAGREE		NOTES:		
Gerald: Diagnostic Testing				
Circle one: ☐ AGREE ☐ DISAGREE		NOTES:		

CONTINUED

COMMUNITY MEMBER	CLAIM	COGNITIVE SHORTCUTS AND/OR COGNITIVE BIAS	EVIDENCE SUPPORTING THEIR IDEAS	EVIDENCE REFUTING THEIR IDEAS
Jimena: Soil Stabilization				
Circle one: ☐ AGREE ☐ DISAGREE		NOTES:		
Marshall: Protective Gear				
Circle one: ☐ AGREE ☐ DISAGREE		NOTES:		

COMMUNITY MEMBER	CLAIM	COGNITIVE SHORTCUTS AND/OR COGNITIVE BIAS	EVIDENCE SUPPORTING THEIR IDEAS	EVIDENCE REFUTING THEIR IDEAS
Erykah: Public Education	<i>People need to be educated on the facts about Southsland fever.</i>	<i>anchoring shortcut</i>	<i>Evidence Card 6: Public health campaign for flu increased people's awareness of symptoms and risks, made them more likely to ask for medical advice.</i> <i>Evidence Card 8: Patients who get prompt medical diagnosis and treatment experience less severe Southsland fever disease.</i>	<i>none</i>
Circle one: ☒ AGREE ☐ DISAGREE		NOTES: <i>I agree because awareness leads to early treatment and lessens the chance of severe disease.</i>		
Gerald: Diagnostic Testing	<i>The blood test is not reliable, so we shouldn't use it.</i>	<i>confirmation bias</i>	<i>Evidence Card 4: The blood test is not very accurate within the first 2 weeks of infection.</i>	<i>Evidence Card 4: The blood test is very accurate beyond 2 weeks of infection.</i> <i>Evidence Card 5: Blood test led to increase in patients with full recovery, decrease in patients needing long-term care, and small decrease in patient deaths.</i> <i>Evidence Card 8: Delays in diagnosis lead to poor patient outcomes.</i>
Circle one: ☐ AGREE ☒ DISAGREE		NOTES: <i>Data refutes his claim.</i>		

SAMPLE STUDENT RESPONSE

STUDENT SHEET 9.1

EVALUATING COMMUNITY MEMBER COMMENTS

NAME

CONTINUED

COMMUNITY MEMBER	CLAIM	COGNITIVE SHORTCUTS AND/OR COGNITIVE BIAS	EVIDENCE SUPPORTING THEIR IDEAS	EVIDENCE REFUTING THEIR IDEAS
Jimena: Soil Stabilization	<i>We should wet the soil to avoid having more workers become ill with Southsand fever.</i>	<i>availability shortcut</i>	<i>Evidence Card 1: Higher % of workers who dig in soil have Southsand fever symptoms.</i>	<i>Evidence Card 1: Higher % of workers exposed to a dust cloud had Southsand fever symptoms.</i> <i>Evidence Card 1: Higher % of workers who wet the soil had fewer Southsand fever symptoms.</i>
Circle one: ☒ AGREE ☐ DISAGREE		NOTES: <i>She made a cognitive shortcut, but the data backs it up.</i>		
Marshall: Protective Gear	<i>Installing HEPA filters will be more effective than having people wear masks.</i>	<i>conflict of interest</i> <i>conformity bias</i>	<i>Evidence Card 2: HEPA filters reduce fungus in the air inside buildings.</i> <i>Evidence Card 6: Public health campaign, but did not make people more likely to wear a mask, even when they knew the risks.</i>	<i>Evidence Card 3: 75% of working adults with Southsand fever were outdoor workers.</i> <i>Evidence Card 7: Most types of mask materials are effective at filtering fungal particles compared with no masks.</i>
Circle one: ☐ AGREE ☒ DISAGREE		NOTES: <i>While I think that masks are not cool, I can't agree because people are getting sick from something outdoors, not from being indoors.</i>		

CLAIM (statement about how the disease is spreading)

My claim is:

EVIDENCE (data and observations related to the claim)

The first piece of evidence that supports my claim is

The second piece of evidence that supports my claim is

The third piece of evidence that supports my claim is

CONTINUED

REASONING (how or why each piece of evidence supports the claim)**First piece of evidence: My reasoning is that****Second piece of evidence: My reasoning is that****Third piece of evidence: My reasoning is that****Lastly, evidence against my claim or that supports an alternate claim is****However, I still support my claim as the most likely because**

CLAIM (statement about how the disease is spreading)

My claim is:

that a public health campaign is the best way for the city to reduce the risk of Southsand fever for residents.

EVIDENCE (data and observations related to the claim)

The first piece of evidence that supports my claim is

that 75% of adults with Southsand fever are outdoor workers.

The second piece of evidence that supports my claim is

that delays in diagnosing Southsand fever led to a 20% increase in severe cases, such as long-term lung damage or death.

The third piece of evidence that supports my claim is

that a study from nearby counties showed that when counties used public health campaigns, more residents recognized symptoms and were willing to see a doctor compared to counties that did nothing.

REASONING (how or why each piece of evidence supports the claim)**First piece of evidence: My reasoning is that**

if the public health campaign specifically focuses on outdoor exposure risks, it will reach the largest and most vulnerable group. Educating these workers on how to avoid the fungus could prevent the most new infections.

Second piece of evidence: My reasoning is that

education could help people recognize the symptoms earlier. A public health campaign could encourage residents to seek treatment before the disease causes serious health problems, such as long-term lung damage.

Third piece of evidence: My reasoning is that

because people in the study were more likely to say they would seek medical help after being educated, a similar public health campaign could work in Southsand City. Education would increase the rate of residents getting diagnosed and treated correctly. This could help prevent more serious cases.

Lastly, evidence against my claim or that supports an alternate claim is

that the study in a nearby county showed no difference in the amount of people who said they would likely wear a mask. This means the campaign didn't really have an impact in helping people avoid getting sick.

However, I still support my claim as the most likely because

the campaign could do more than just encourage mask-wearing. It could teach residents how to avoid exposure through safer digging habits and how to recognize symptoms early. By getting patients to the doctor faster, the campaign could save lives even if a lot of people choose not to wear masks.


SOUTHSAND HEALTH DEPARTMENT

Recommendations for Reducing Risks from Southsand Fever


DIAGNOSTIC TESTING

Funding for medical providers to use a newly developed diagnostic blood test to quickly and accurately diagnose Southsand fever. This helps prevent unnecessary treatments and prolonged illness that could lead to long-term care or death.


PUBLIC EDUCATION

A public health campaign to educate community members about the symptoms of Southsand fever and the outdoor exposures that put people at risk of contracting Southsand fever. The campaign will encourage residents to contact their doctor if they believe they have been exposed to the fungus or notice symptoms.


PROTECTIVE GEAR

Grants for companies and community organizations to buy and use devices that can successfully filter particles such as pollen, dust, and airborne microbes out of the air. This includes:

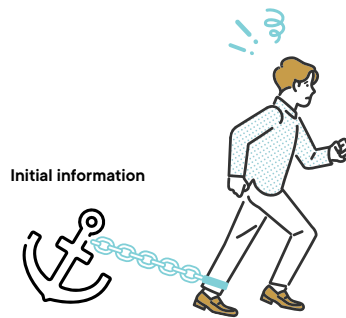
- protective gear (such as masks) to reduce breathing in the fungal pathogen when outdoors.
- high efficiency particulate air (HEPA) filters to reduce the number of fungal pathogens in indoor spaces.


SOIL STABILIZATION

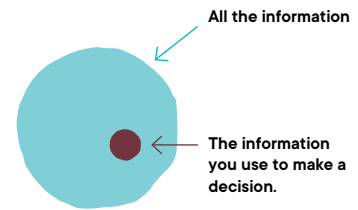
Grants for companies and community organizations to reduce activities that disturb soil or produce dust, including money to:

- support soil wetting (for individual community members) to reduce the amount of airborne dust and particles.
- fund soil-stabilization projects such as planting ground-cover plants to retain soil and prevent airborne dust.
- buy advanced soil-wetting equipment and large-scale soil dust covers for companies.

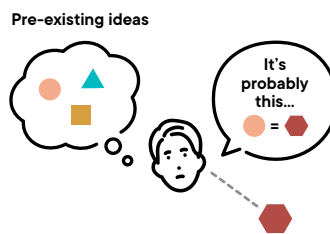
COGNITIVE SHORTCUTS



Anchoring Shortcut



Availability Shortcut



Representativeness Shortcut

COGNITIVE BIASES



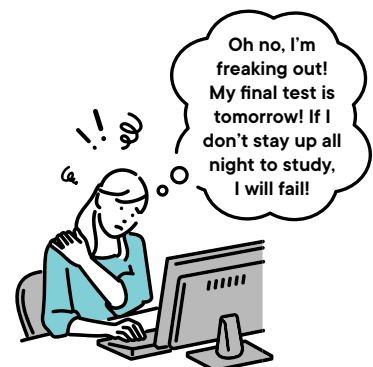
Confirmation Bias



Conflict of Interest



Conformity Bias



Emotion Bias

WHEN TO USE THIS SCORING GUIDE:

This Scoring Guide is used when students are developing effective evidence-based arguments.

WHAT TO LOOK FOR:

- Response includes a clear and relevant claim.
- Response includes sufficient evidence, including multiple lines of evidence when appropriate.
- Reasoning is logical, sufficient, and connects the evidence to the claim.

LEVEL	GENERAL DESCRIPTION		
	CLAIM	EVIDENCE	REASONING
Level 4 Complete and correct	The student's claim is clear and relevant.	The student's evidence supports the claim; is relevant, accurate, and sufficient; AND the student evaluates the strength of the evidence in supporting the claim.	The student's reasoning is appropriate, logically connected to the claim, and sufficient.
Level 3 Almost there	The student's claim is relevant BUT incomplete.	The student's evidence is relevant, accurate, and sufficient.	The student's reasoning is appropriate and logically connected to the claim BUT is not sufficient.

LEVEL	GENERAL DESCRIPTION		
	CLAIM	EVIDENCE	REASONING
Level 2 On the way	The student's claim seems relevant BUT is unclear.	The student's evidence is relevant BUT is incomplete and/or contains inaccuracies.	The student's reasoning is incomplete or not logically connected to the claim.
Level 1 Getting started	The student's claim is irrelevant.	The student's evidence is irrelevant or does not support the claim.	The student's reasoning does not logically support the claim and does not connect the claim to the evidence.
Level 0 Missing or off task	The student provided no claim.	The student provided no evidence.	The student provided no reasoning.
X	The student had no opportunity to respond.		

WHEN TO USE THIS SCORING GUIDE:

This Scoring Guide is used when students are developing effective evidence-based arguments.

WHAT TO LOOK FOR:

- Response includes a clear and relevant claim.
- Response includes sufficient evidence, including multiple lines of evidence when appropriate.
- Reasoning is logical, sufficient, and connects the evidence to the claim.

LEVEL	ITEM-SPECIFIC DESCRIPTION		
	CLAIM	EVIDENCE	REASONING
Level 4 Complete and correct	The student’s claim is clear and relevant.	The student’s evidence supports the claim; is relevant, accurate, and sufficient; AND the student evaluates the strength of the evidence in supporting the claim.	The student’s reasoning is appropriate, logically connected to the claim, and sufficient.
The student’s response includes: • a clear claim about which of the four recommendations would be the most effective at reducing the risk of the fictional disease. • at least 3 pieces of evidence from the Evidence cards in the activity, including the use of quantitative evidence. • an accurate description of the strength of each piece of evidence and how it supports their claim about disease transmission. • a thorough description of at least 1 piece of evidence that supports a different recommendation method.			

LEVEL	ITEM-SPECIFIC DESCRIPTION		
	CLAIM	EVIDENCE	REASONING
Level 3 Almost there	The student's claim is relevant BUT incomplete.	The student's evidence is relevant, accurate, and sufficient.	The student's reasoning is appropriate and logically connected to the claim BUT is not sufficient.
	The student's response includes: • a claim about which of the four recommendations would be the most effective at reducing the risk of the fictional disease. • at least 3 pieces of evidence from the Evidence cards in the activity. • at least 1 piece of evidence that contradicts their claim or supports a different recommendation. • a description of the strength of each piece of evidence that may not be accurate.		
Level 2 On the way	The student's claim seems relevant BUT is unclear.	The student's evidence is relevant BUT is incomplete and/or contains inaccuracies.	The student's reasoning is incomplete or not logically connected to the claim.
	The student's response includes: • an unclear claim about which of the four recommendations would be the most effective at reducing the risk of the fictional disease. • 1 or 2 pieces of evidence from the activity to support their claim. • at least 1 piece of evidence that contradicts their claim or supports a different recommendation.		

LEVEL	ITEM-SPECIFIC DESCRIPTION		
	CLAIM	EVIDENCE	REASONING
Level 1 Getting started	The student’s claim is irrelevant.	The student’s evidence is irrelevant or does not support the claim.	The student’s reasoning does not logically support the claim and does not connect the claim to the evidence.
	The student’s response includes: • a claim that is unrelated to any of the four recommendations. • a description of evidence that is irrelevant to their claim. • no evidence that contradicts their claim or that supports a different recommendation.		
Level 0 Missing or off task	The student provided no claim.	The student provided no evidence.	The student provided no reasoning.
X	The student had no opportunity to respond.		

Jimena

CONSTRUCTION WORKER

I got sick, and I think it was from contaminated soil at my job site. This is because everyone I know who got Southsand fever works with me in construction. We specialize in soil removal for construction, so we are exposed to airborne dirt particles all day long. I'm going to wet the soil before we start the next job. We might have to dig in mud, but at least we'll all be safer.

SCIENTIFIC THINKING FOR ALL: A TOOLKIT

UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: COMMUNITY MEMBER COMMENT CARDS

Marshall

INDUSTRY ALLIANCE FOR CLEAN AIR BUSINESSES

My friends don't believe in masks, so they won't wear them. I won't wear one either, especially around my friends. It doesn't matter if masks stop the spread of respiratory viruses or fungal particles because they aren't cool. It is a better idea to install HEPA filters in all the city buildings. Filters are much better than masks because they significantly lower fungus spores in the air and limit people's exposure to pollen, pollution, and other microbes. This will be a great investment for Southsand City!

SCIENTIFIC THINKING FOR ALL: A TOOLKIT

UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: COMMUNITY MEMBER COMMENT CARDS

Gerald

COMMUNITY TOWN CLERK

This blood test is so new, I don't think that we should trust it. I just knew it wasn't a reliable test, so I wasn't surprised when I heard of a doctor who refused to use it. When I searched online for "Southsand fever after testing negative," I found several stories about people who got the test, and it was wrong. It just doesn't make sense to use an unreliable test.

SCIENTIFIC THINKING FOR ALL: A TOOLKIT

UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: COMMUNITY MEMBER COMMENT CARDS

Erykah

DIRECTOR OF SOUTHSAND HEALTH CENTER

Increasing education about Southsand fever is the easiest way to make sure everyone can get their facts straight about the disease. We did a survey that found 90% of people thought Southsand fever was caused by a flu virus. That was before epidemiologists figured out it was a fungus, so it's probably a much lower number now, but there are still a lot of people who don't know it isn't a virus!

SCIENTIFIC THINKING FOR ALL: A TOOLKIT

UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: COMMUNITY MEMBER COMMENT CARDS

EVIDENCE CARD 1

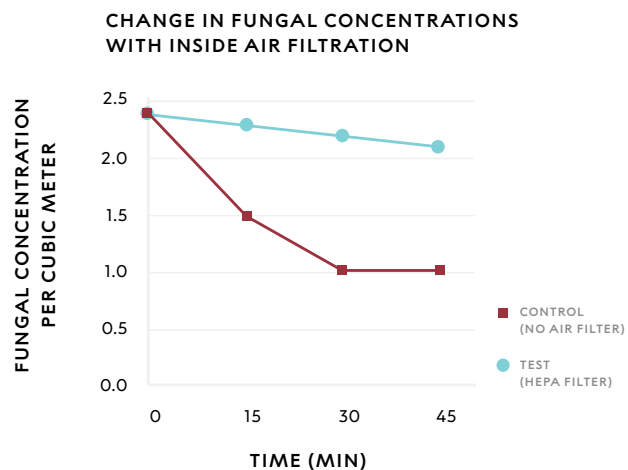
A local university professor conducted a survey to determine if different types of outdoor work activities were associated with Southsand fever symptoms. She surveyed construction workers working on a large-scale solar panel installation project. She compared the work activities of 325 workers without Southsand fever symptoms to 89 workers with Southsand fever symptoms. Some workers participated in more than one work activity.

TYPE OF WORK ACTIVITY	WITHOUT SOUTHSAND FEVER SYMPTOMS (325 WORKERS)	WITH SOUTHSAND FEVER SYMPTOMS (89 WORKERS)
active digging	16%	27%
wetting soil before active digging	62%	31%
working in a trench	22%	46%
exposed to dust cloud	29%	81%

SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS

EVIDENCE CARD 2

A research group at the local university recently conducted a test of a new HEPA filter product. This test showed that using the HEPA filter inside a closed home for 45 minutes resulted in a 58% reduction of indoor fungus particles compared to a 12.5% reduction from no filter and with natural ventilation. The HEPA filter gave an over 4.5 times bigger reduction for fungal particles.

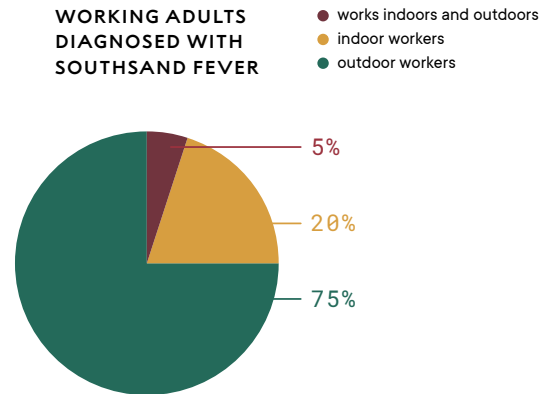


SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS

EVIDENCE CARD 3

The Southsand Health Department investigations found that of working adults with Southsand fever, 75% were outdoor workers, 20% were indoor workers, and 5% worked equal time indoors and outdoors.

**WORKING ADULTS
DIAGNOSED WITH
SOUTHSAND FEVER**



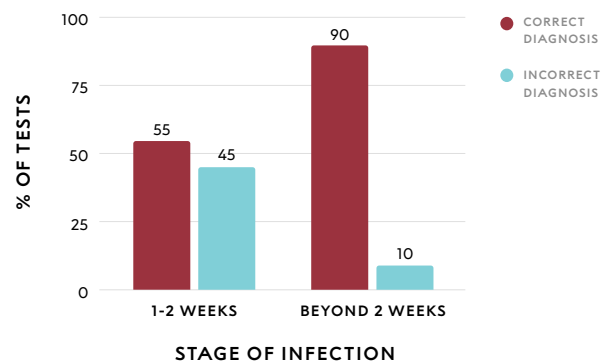
SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS

EVIDENCE CARD 4

Researchers at the local university developed the new diagnostic blood test and conducted a study to determine its effectiveness. The study looked at over 1,000 participants and found that the test

- gave a correct diagnosis 55% of the time when patients were within 2 weeks of the start of infection.
- gave a correct diagnosis 90% of the time when patients were beyond 2 weeks from the start of infection.

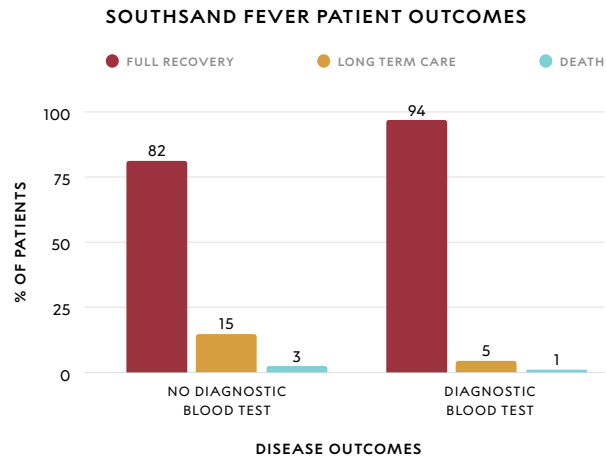
**STUDY RESULTS OF SOUTHSAND
FEVER BLOOD TEST**



SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS

EVIDENCE CARD 5

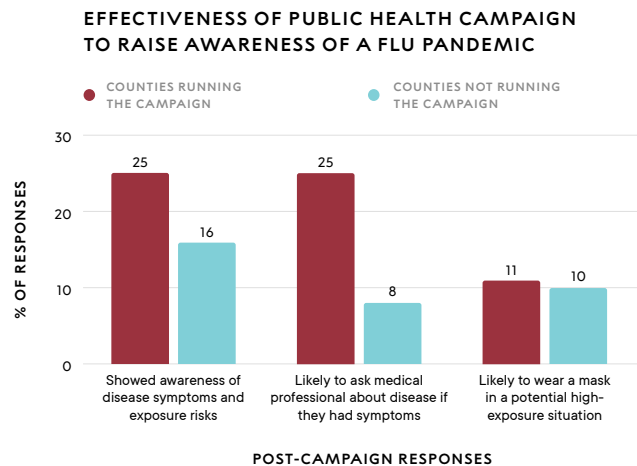
According to the data from the Southsand Health Department, the new blood test started being used at various health-care locations in the area. The following graph shows the data on 2,027 patient outcomes. The diagnostic blood test increased the number of patients who fully recovered. It also decreased deaths and the number of people who needed long-term care.



SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS

EVIDENCE CARD 6

The following survey results are from a public health campaign a few years ago to raise awareness of a flu epidemic. The study, conducted by the Southsand Community Health Center and the local university, collected data on people's awareness of the symptoms and exposure risks of the disease and some actions they might take as a result.



SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS

EVIDENCE CARD 7

The local university made a model to show the effectiveness of materials used in common types of protective masks against various airborne particles. They tested the materials and compared them to the natural filtration through our nose and throat during breathing.

FILTERING EFFICIENCY OF MASK MATERIALS*

PARTICLE TYPE	UNMASKED BREATHING	COTTON CLOTH	N95 MATERIAL
pollen	40%	96%	99%
fungal spores	25%	95%	99%
wildfire smoke	1%	35%	98%
viral particles	5%	60%	96%

*Materials modeled in ideal conditions without consideration of mask fit.

SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS

EVIDENCE CARD 8

Analysis of patient outcomes from Southsand Hospital showed that delays in diagnosis of Southsand fever led to a 20% increase in severe Southsand fever disease. This included severe lung symptoms, long-term lung damage, and hospitalization. Patients who got prompt medical testing and care were less likely to experience severe Southsand fever symptoms.

SCIENTIFIC THINKING FOR ALL: A TOOLKIT • UNIT 5: SKILLS TO EVALUATE THINKING, ACTIVITY 9: HEALTH DEPARTMENT EVIDENCE CARDS