Warm-Up | Evaluating Scientific Explanations

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Lesson Question	

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Lesson Goals

Analyze [   ] explanations.

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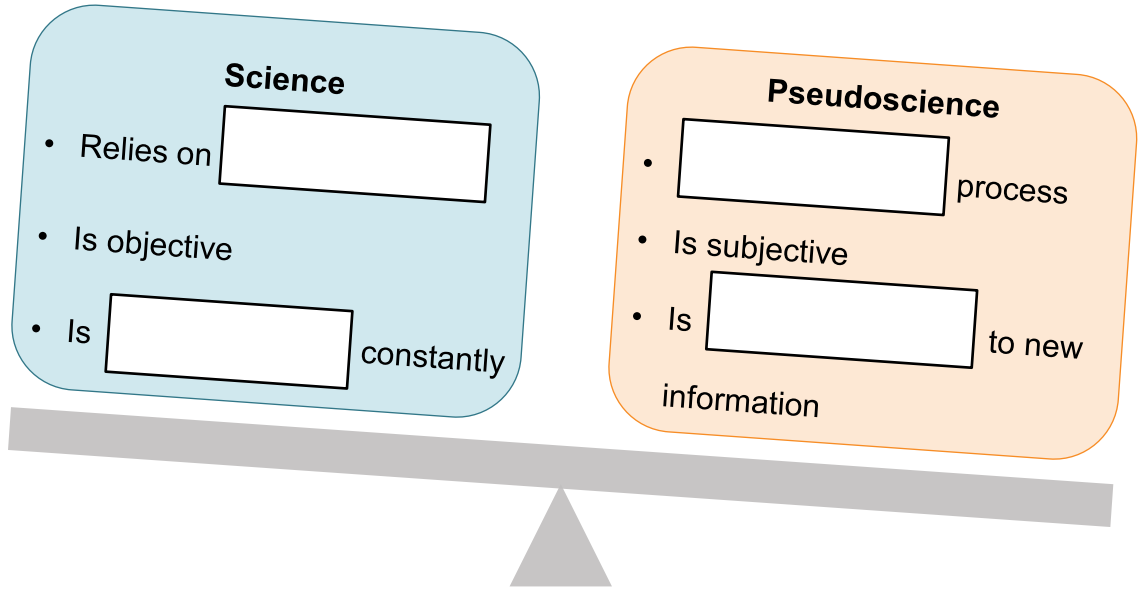**Evaluate** scientific arguments using [   ] .

W2K
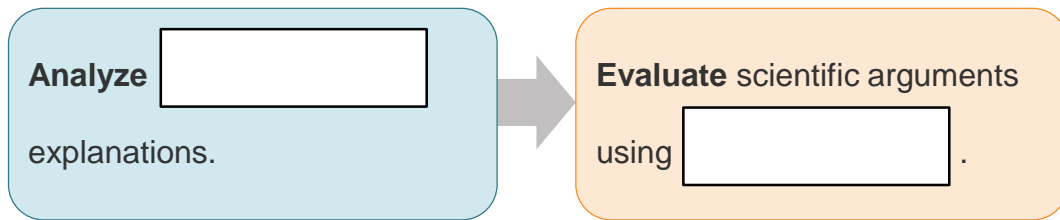
Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

claim	a statement saying that what is presented is [ ]
peer review	the [ ] by which the quality of a scientific research paper is [ ] by other scientists in the same field

Warm-Up | Evaluating Scientific Explanations

Science vs. Pseudoscience

Science

- Relies on [_____]

- Is objective

- Is [_____] constantly

Pseudoscience

- [_____] process

- Is subjective

- Is [_____] to new information

Slide 2

Scientific Claims

A [_____] is a [_____] saying that what is presented

is [_____] .

Scientific claims are [_____] that is:

- from a [_____] experiment.

- based on multiple [_____] .

Evaluation of Claims

To determine if a scientific claim is [_____] , you should be able to

answer these questions.

- What is the [_____] ?

- What is the [_____] of the claim?

- How [_____] and [_____] is the information

supporting the claim?

Slide 2

Claims about Caffeine: Example

Step 1: Identify what is being stated as a fact.

- Claim: Caffeine improves mental ⬚ and motor ⬚ .

Step 2: Determine the importance of this claim.

- Importance: People drink caffeinated drinks to help them ⬚ in the morning or to ⬚ alertness.

Step 3: Ask: how accurate and consistent is the information supporting this claim?

- Accuracy and consistency: This study was from a university research study. The study shows for all ten subjects, the average time to fit the beads on the pegs ⬚ . This shows that caffeine ⬚ a person's fine motor skills.

If the information supporting the claim is factual from a reliable reference, you know that the information is ⬚ and ⬚ .

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Scientific Claims

Assessing a claim requires you to look at its ☐ .

- How will the information ☐ ?

  This information could be used by manufacturers or by people who want

  to avoid BPA.

- Who may ☐ from the claim?

  Someone who can benefit financially may use the data to help promote

  a ☐ . In this example, manufacturers who produce

  containers that do not contain BPA could sell lots of new containers.

  On the other hand, it may also be used by an organization that

  wants to promote the well-being of fetuses, infants, and children and

  ☐ them from being exposed to ☐

  substances.

- How does the claim ☐ to you?

  If it doesn't relate to you, you may ☐ the claim.

  However, if you drink from containers that are made using BPA, you

  may want to pay closer ☐ to this.

Instruction | Evaluating Scientific Explanations

- [＿＿＿＿] did you read the information? Is the source [＿＿＿＿]?

A story from a celebrity magazine might be quite different from a story in a scientific publication aimed at general audiences. In this case, the story was published by the *US Department of Health and Human Services, National Institute of Health*. The information is [＿＿＿＿].

The claim is probably [＿＿＿＿] as well, as it is supported by [＿＿＿＿] from a [＿＿＿＿] source.

Quality of Scientific Claims

Scientific claims are [＿＿＿＿] by data that are based on multiple trials from a controlled experiment.

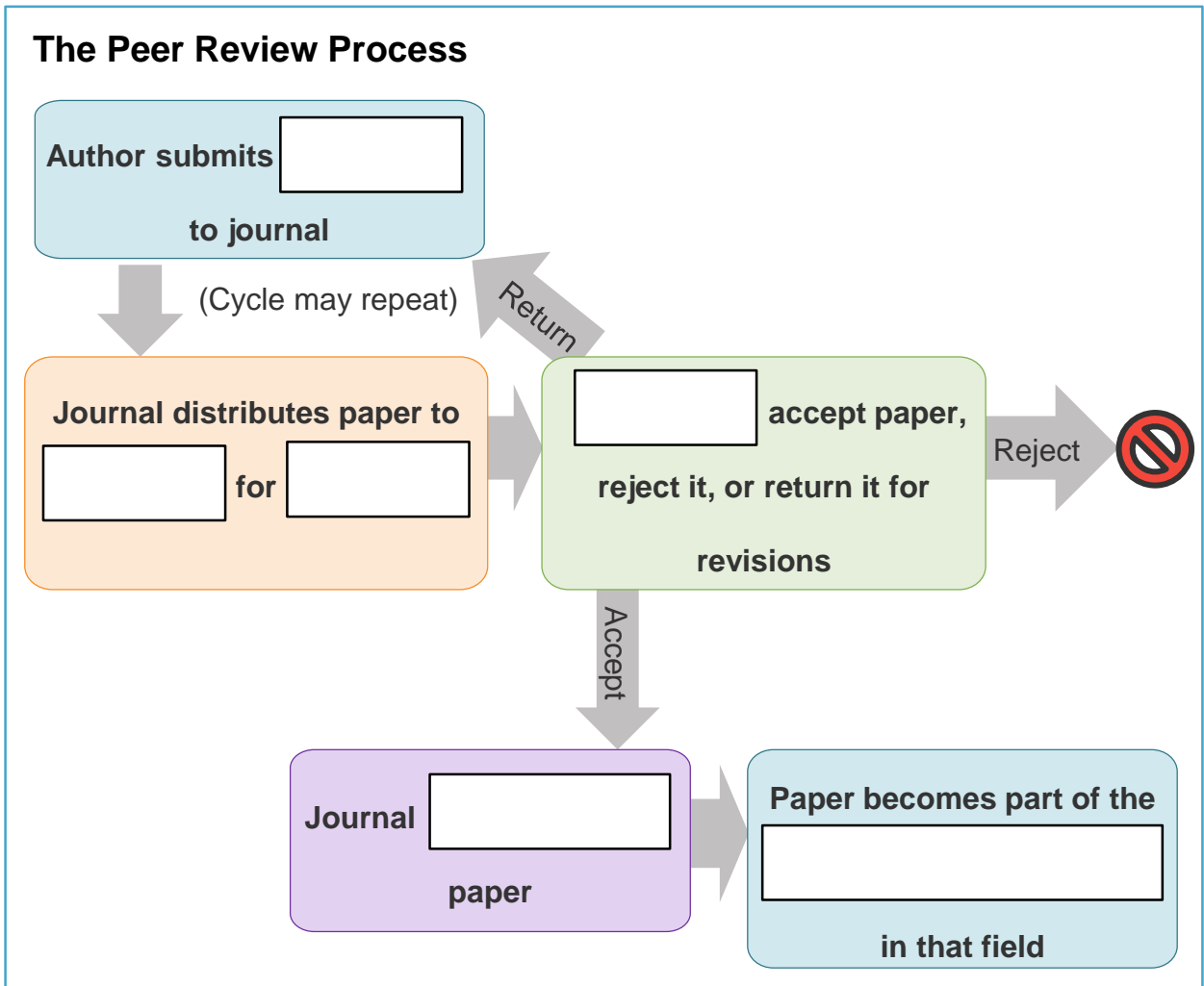The quality of a scientific claim depends on the [＿＿＿＿] used to collect data.

[＿＿＿＿] is one way to ensure that data can be trusted.

- Allows others in the field to judge [＿＿＿＿]

- Helps ensure [＿＿＿＿] of the profession

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The Peer Review Process

Author submits [____] to journal

→ (Cycle may repeat)

Journal distributes paper to [____] for [____]

→ Return

[____] accept paper, reject it, or return it for revisions

→ Reject 🚫

↓ Accept

Journal [____] paper

→ Paper becomes part of the [____] in that field

Reasons for Peer Review

- [____] the standards of the field
- Identify [____] of [____]
- [____] conclusions
- Direct [____]

Instruction | Evaluating Scientific Explanations

Sources of Data

- [_____] did the data come from?

- What is the [_____] of the source?

- Is the source an [_____] on the subject?

- If data are from a [_____] source and the results are

  [_____] by multiple tests, the evidence supporting a

  scientific claim is [_____].

Reliable vs. Unreliable Sources

Reliable Sources	Unreliable Sources
• [_____] scientific journals	• [_____] websites and blogs
• Encyclopedias	• Online encyclopedias edited by the [_____]
• Nonfiction books written by [_____]	• Magazines and newspaper [_____]
• [_____] websites and publications	• Books written by [_____]
	• Advertisements

Summary | Evaluating Scientific Explanations

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Lesson Question	How are scientific explanations evaluated?

✓

Answer

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Review: Key Concepts

If data are from a [   ] and the results are validated

by [   ] , the evidence supporting a scientific claim

is reliable.

- Quality depends on [   ] .

- Can be [   ] by peer review

Use this space to write any questions or thoughts about this lesson.