# Word problems with variables on both sides Ebook

## Word Problems With Variables On Both Sides Worksheet

Word Problems with Variables on Both Sides Worksheet: A Guide to Mastering Algebraic Challenges

### word problems with variables on both sides worksheet are an essential tool in

helping students grasp the concept of solving equations that have unknowns on both sides. These worksheets serve as a practical way to bridge the gap between abstract algebraic manipulation and real-world problem-solving scenarios. Whether you?re a teacher looking to enrich your lesson plans or a student aiming to sharpen your skills, understanding how to approach these problems is key to building con?dence in algebra.

### Why Focus on Word Problems with Variables on Both Sides?

When students ?rst encounter algebra, they often start with simple equations where the variable appears only on one side. However, as their skills develop, they must learn to solve equations where variables exist on both sides of the equal sign. This step is crucial because it mirrors more realistic situations where unknown quantities interact in complex ways.

Word problems add another layer of challenge by requiring students not just to solve equations but to translate everyday situations into mathematical expressions. This dual

skill set?interpreting word problems and solving multi-variable equations?is fundamental for higher-level math and practical applications in ?elds like science, engineering, and ?nance.

## Building Conceptual Understanding Through Worksheets

A well-designed word problems with variables on both sides worksheet introduces a variety of scenarios, such as comparing quantities, working with rates, or balancing budgets?all while requiring students to manipulate equations e?ectively. These worksheets usually involve:

Setting up equations from word statements

1.

Combining like terms

2.

Using inverse operations to isolate variables

3.

Checking solutions for accuracy

4.

By working through these steps repeatedly, learners internalize the process of balancing equations and improve their problem-solving agility.

## Common Types of Word Problems Featuring Variables on Both Sides

Understanding the types of word problems that typically involve variables on both sides can help students anticipate and approach these tasks more strategically. Here are some of the most frequent categories:

## 1. Age Problems

Age-related word problems often compare the ages of two or more people at di?erent times. For example, ?Five years ago, John was twice as old as Mary. In three years, John will be 4 years older than Mary.? Translating such a situation requires variables representing current ages, and the equation often includes variables on both sides.

## 2. Distance, Rate, and Time Problems

These problems involve relationships among speed, time, and distance. For instance, ?A cyclist travels at a speed 3 miles per hour faster than a runner. They cover the same distance, but the cyclist takes 2 hours less.? Setting variables for speeds and times leads to equations with variables on both sides.

## 3. Money and Work Problems

Scenarios involving money?such as savings, expenses, or earnings?often yield equations with variables on both sides. An example might be, ?Sara has $20 more than twice the amount Mark has. Together, they have $100.? Work problems might describe how di?erent people working at di?erent rates complete tasks, such as ?Two workers paint a house; one paints twice as fast as the other.?

## 4. Mixture Problems

These problems deal with combining quantities with di?erent properties, like mixing

solutions or ingredients. An example: ?A 10-liter solution contains 30% acid, and it?s mixed with another solution containing 50% acid. The total mixture has 40% acid.? Variables represent amounts of each solution, and balancing these leads to equations with variables on both sides.

## Tips for Approaching Word Problems with Variables on Both Sides

Solving these problems can be intimidating at ?rst, but with a systematic approach, anyone can improve. Here are some practical tips to keep in mind:

### Understand the Problem Thoroughly

Before writing any equation, read the problem carefully. Identify what quantities are unknown and what information is given. Sometimes, rephrasing the problem in your own words helps clarify the scenario.

### Assign Variables Clearly

Choose variables that make sense for the problem. If multiple unknowns are involved, de?ne each one distinctly. For example, use x for one person?s age and y for another?s rather than mixing up symbols.

### Translate Words into Equations

Convert the relationships described into algebraic expressions. Pay attention to phrases like ?more than,? ?less than,? ?twice,? or ?equal to,? which indicate speci?c operations.

### Keep Both Sides Balanced

When variables appear on both sides, the goal is to isolate all variables on one side and constants on the other. Use addition, subtraction, multiplication, or division consistently to maintain equality.

## Check Your Work

After ?nding a solution, substitute it back into the original equation to verify its correctness. This step helps catch mistakes and reinforces understanding.

## Creating or Finding the Right Worksheet

Selecting or designing a word problems with variables on both sides worksheet tailored to your needs can make a signi?cant di?erence in learning outcomes. Here are some considerations:

## Gradual Di?culty Progression

Start with simpler problems that have fewer steps and gradually increase complexity. Early problems might involve straightforward equations, while later ones require multi-step reasoning or include fractions and decimals.

## Variety of Contexts

Including diverse contexts such as sports, shopping, travel, and everyday life keeps students engaged and shows the relevance of algebra in daily activities.

## Answer Keys and Explanations

Worksheets that come with detailed solutions help learners understand the reasoning behind each step. This feature is especially valuable for self-study.

## Interactive and Digital Options

Some online platforms o?er interactive worksheets where students get instant feedback.

These can be helpful complements to traditional paper worksheets.

## Integrating Word Problems with Variables on Both Sides into

## Learning

To maximize the bene?ts of these worksheets, consider integrating them into a broader

learning strategy:

## Group Work: Encourage students to collaborate on solving problems, promoting

1.

discussion and deeper understanding.

## Real-Life Applications: Connect problems to real-world scenarios students care

2.

about, increasing motivation.

## Step-by-Step Teaching: Model problem-solving processes explicitly before

3.

assigning independent practice.

## Use Visual Aids: Diagrams, charts, and tables can help visualize relationships

4.

between quantities.

By embedding word problems with variables on both sides worksheet activities within

these strategies, students are more likely to develop both competence and con?dence in

algebra.

Engaging consistently with these types of problems not only improves algebraic manipulation skills but also enhances critical thinking and analytical abilities. Over time, students learn to approach complex scenarios methodically and with assurance?a foundation that will serve them well in more advanced mathematics and beyond.

## Question

## Answer

What is a word problem with variables on both sides?

A word problem with variables on both sides involves an equation derived from a real-life scenario where the variable appears on both sides of the equation, requiring the solver to use algebraic techniques to isolate the variable and ?nd its value.

Why are worksheets with word problems involving variables on both sides important?

These worksheets help students practice solving more complex equations, improve their critical thinking and problem-solving skills, and better understand the

application of algebra in real-world contexts.

What are some common strategies to solve word problems with variables on both sides?

Common strategies include translating the word problem into an equation, simplifying both sides, moving all variable terms to one side, isolating the variable, and checking the solution by substituting it back into the original problem.

At what grade level are word problems with variables on both sides typically introduced?

These types of word problems are typically introduced in middle school, around grades 6 to 8, depending on the curriculum and students' readiness with basic algebra concepts.

Can you provide an example of a word problem with variables on both sides?

Sure! Example: Sarah has x apples. Tom has 3 more apples than Sarah, so he has x + 3 apples. Together, they have 17 apples. How many apples does each person have? The equation is x + (x + 3) = 17, which has variables on both sides after rearranging.

How can teachers use worksheets with variables on both sides to assess student understanding?

Teachers can use these worksheets to evaluate students' ability to set up equations from word problems, manipulate algebraic expressions, solve for variables, and apply their solutions in context, providing insight into their conceptual and procedural knowledge.

What are some challenges students face when solving word problems with variables on both sides?

Students often struggle with translating words into

equations, managing variables on both sides,

remembering to perform the same operation on both

sides, and checking their solutions for accuracy in

context.

Where can I ?nd free

worksheets for word problems

with variables on both sides?

Free worksheets can be found on educational websites

such as Khan Academy, Math-Aids.com, Education.com,

and Teachers Pay Teachers, o?ering a variety of

problems for di?erent skill levels.

Word Problems with Variables on Both Sides Worksheet: A Comprehensive Review and

Analysis

## word problems with variables on both sides worksheet represent a crucial tool in

mathematics education, particularly for middle and high school students developing

algebraic reasoning. These worksheets focus on challenges where variables appear on

both sides of an equation within a word problem context, requiring learners to apply

multiple algebraic skills simultaneously. As educators and learners seek e?ective

resources for mastering this skill set, understanding the structure, bene?ts, and

limitations of these worksheets becomes essential.

## Understanding Word Problems with Variables on Both Sides

Word problems involving variables on both sides of an equation typically require students to translate real-world scenarios into algebraic expressions and then solve for the unknown. Unlike simpler equations with variables on one side, these problems demand a more nuanced approach, often involving combining like terms, applying inverse operations, and maintaining equality principles. The "both sides" element adds complexity, fostering critical thinking and deeper comprehension of algebraic concepts.

A worksheet focusing on these problems usually presents a series of word problems that students must interpret, model algebraically, and solve. The inclusion of variables on both sides mimics real-life situations where unknowns interact in balanced relationships, making these exercises particularly valuable for practical mathematical literacy.

## Key Features of E?ective Worksheets

To serve their pedagogical purpose, high-quality word problems with variables on both sides worksheets generally exhibit several distinguishing features:

## Varied Problem Contexts: Incorporating diverse scenarios from ?nance,

1.

measurement, mixtures, and rates helps students connect algebra to everyday life.

## Progressive Di?culty: Problems often start with simpler expressions and

2.

gradually introduce more complex equations, accommodating di?erent skill levels.

## Clear Instructions: Explicit directions guide learners on how to set up and solve

3.

equations, reducing confusion and promoting independent problem-solving.

## Answer Keys and Step-by-Step Solutions: Providing detailed solutions supports

4.

self-assessment and enhances understanding of problem-solving strategies.

These features collectively improve learner engagement and e?cacy in mastering equations with variables on both sides.

## Pedagogical Importance and Educational Impact

Integrating worksheets centered on word problems with variables on both sides into the curriculum addresses several educational objectives simultaneously. First, they encourage algebraic ?uency by reinforcing the mechanics of solving equations. Second, they enhance critical thinking by requiring students to analyze textual information, identify relevant variables, and construct algebraic models.

Moreover, these worksheets align with Common Core State Standards and other educational benchmarks emphasizing problem-solving and reasoning in mathematics. By practicing with such worksheets, students build con?dence in handling multi-step problems that are typical in standardized tests and real-world applications.

## Comparative Analysis: Traditional Equations vs. Word Problems with Variables on Both Sides

Traditional algebra worksheets often focus on solving equations with variables isolated on

one side, which is foundational but limited in scope. In contrast, word problems with

variables on both sides present a more comprehensive challenge:

## Contextual Understanding: Word problems require interpretation beyond

1.

numeric manipulation, fostering reading comprehension and analytical thinking.

## Complex Equation Setup: Variables on both sides necessitate expertise in

2.

balancing equations and managing multiple algebraic steps.

## Real-World Relevance: These problems simulate practical situations, increasing

3.

student motivation and perceived value of algebra skills.

While traditional worksheets serve as a necessary stepping stone, the latter category

better prepares students for advanced mathematics and problem-solving in everyday

contexts.

## Accessibility and Adaptability of Worksheets

Modern educational environments demand resources that cater to diverse learner needs

and teaching styles. Word problems with variables on both sides worksheets have evolved

accordingly, with many digital and printable formats available online. These worksheets

can be adapted for:

## Di?erent Grade Levels: By adjusting complexity, educators can tailor

## worksheets

1.

for middle school through early high school.

## Individual or Group Work: Suitable for homework, classroom activities, or

2.

collaborative problem-solving sessions.

## Supplemental Learning: Ideal for remediation or enrichment, supporting students

3.

who need extra practice or challenge.

Additionally, interactive versions often include instant feedback features, allowing

learners to correct mistakes in real-time and fostering a growth mindset.

## Pros and Cons of Using These Worksheets

Like any educational resource, word problems with variables on both sides worksheets

come with advantages and potential drawbacks.

## Pros:

Enhance algebraic reasoning and problem-solving skills comprehensively.

1.

Bridge the gap between abstract equations and real-world applications.

2.

Promote independent learning and critical thinking.

3.

Support di?erentiated instruction with scalable di?culty levels.

4.

## Cons:

May overwhelm students who lack foundational algebra skills.

1.

Require careful sca?olding to prevent disengagement.

2.

Potentially time-consuming to complete without adequate guidance.

3.

Educators should consider these factors when integrating such worksheets into their

teaching plans, ensuring alignment with student readiness and curricular goals.

## Strategies for Maximizing Worksheet E?ectiveness

To optimize learning outcomes from word problems with variables on both sides

worksheets, several instructional strategies can be employed:

## Pre-Teaching Key Concepts: Review solving linear equations and combining like

1.

terms before attempting complex problems.

## Modeling Problem-Solving Steps: Demonstrate how to translate word problems

2.

into algebraic expressions systematically.

## Encouraging Collaborative Learning: Group discussions can help students

3.

articulate their reasoning and learn alternative approaches.

## Utilizing Formative Assessment: Use worksheet results to identify common

4.

misconceptions and tailor subsequent instruction.

Such approaches ensure that worksheets become more than mere exercises,

transforming into powerful tools for conceptual mastery.

In the broader context of algebra education, word problems with variables on both sides worksheets stand out as an indispensable element. They challenge learners to integrate multiple skills and deepen their mathematical understanding. When thoughtfully designed and implemented, these resources can signi?cantly elevate students? algebraic competence and prepare them for more advanced mathematical challenges ahead.

algebra word problems, variables on both sides, math worksheets, linear equations practice, solving equations worksheets, two-step equations problems, algebra practice sheets, math problems with variables, equation solving exercises, middle school math worksheets

# Cut both ways english edition

# Cut Both Ways English Edition

Cut Both Ways English Edition: Unlocking the Meaning and Usage

## cut both ways english edition is a phrase that many English learners and enthusiasts

come across frequently, yet its meaning and application sometimes remain unclear. This idiomatic expression carries a depth that re?ects the dual nature of certain situations or comments, implying that they can have two di?erent, often opposite, e?ects.

Understanding such idioms is crucial for mastering the English language, especially in its more conversational and nuanced forms.

In this article, we will explore the meaning, origins, and practical usage of "cut both ways" in the English language, focusing on the English edition of common idioms and expressions. Along the way, we?ll sprinkle in related terms and examples that illuminate why this phrase is so valuable for anyone aiming to communicate e?ectively in English.

## What Does "Cut Both Ways" Mean?

The phrase "cut both ways" is an idiom that signi?es something having two opposite or di?erent e?ects, consequences, or interpretations. When you say a situation or statement "cuts both ways," you?re acknowledging that it can be advantageous or disadvantageous depending on the perspective or context.

## Origin of the Phrase

The idiom likely stems from the literal idea of a blade that can cut in two directions. In the context of language, it metaphorically suggests that an argument, decision, or remark can

"cut" or impact both sides involved. This duality is what makes the phrase so powerful in conversation, especially when discussing complex issues.

## Examples in Everyday English

To grasp the essence of "cut both ways," consider these examples:

"His criticism cuts both ways; it points out her mistakes but also highlights his own."

"The new policy cuts both ways: it bene?ts employees but might increase costs for the company."

These examples show how the phrase helps express the idea that outcomes can be positive and negative simultaneously.

## Using "Cut Both Ways" in the English Edition of Idiomatic Expressions

When learning English, especially through editions that focus on idioms and phrases, understanding "cut both ways" enriches your vocabulary and helps you interpret conversations with more nuance.

## Integrating "Cut Both Ways" into Conversations

Here are some tips on how to use "cut both ways" naturally in your daily English:

Use it to describe situations with balanced pros and cons.

Employ it when discussing arguments that apply equally to all parties.

Highlight it in debates or discussions where consequences are mixed or ambiguous.

For instance, if discussing a workplace change, you might say, "Implementing remote work cuts both ways?it o?ers ?exibility but can reduce team cohesion."

## Related Idioms and Expressions

To expand your idiomatic knowledge, here are some phrases similar in meaning or context to "cut both ways":

"Double-edged sword": Something that has both bene?cial and harmful e?ects.

"Two sides of the same coin": Di?erent aspects of the same situation.

"A blessing and a curse": Something that has both positive and negative outcomes.

Understanding these related idioms will help deepen your comprehension of nuanced English expressions.

## The Importance of Learning Idioms Like "Cut Both Ways" in English Editions

Idioms are integral to ?uency because they convey ideas in compact, culturally rich ways. The English edition of idiomatic collections often includes phrases like "cut both ways" because they are widely used and easily understood by native speakers.

## Enhancing Communication Skills

Incorporating idioms such as "cut both ways" into your vocabulary makes your speech and writing more engaging and authentic. It also helps you understand native speakers better, especially in informal settings.

## Improving Reading Comprehension

When reading English literature, news articles, or even social media posts, idiomatic expressions frequently appear. Recognizing and understanding "cut both ways" prevents

misinterpretation and enriches your overall comprehension.

## Practical Tips for Mastering "Cut Both Ways" and Similar Idioms

Learning idioms can be challenging, but with the right strategies, you can master "cut

both ways" and its counterparts.

## Contextual Learning: Encounter idioms in real conversations or texts rather than

1.

memorizing de?nitions alone.

## Use in Sentences: Practice writing your own sentences using "cut both ways" to

2.

internalize its meaning.

## Listen and Repeat: Engage with English movies, podcasts, or shows where idioms

3.

are used naturally.

## Compare Idioms: Study related expressions to understand subtle di?erences and

4.

similarities.

## Examples for Practice

Try crafting sentences like:

"The proposal cuts both ways; it could increase pro?ts but might alienate some

customers."

"Her feedback cuts both ways, revealing ?aws but also encouraging improvement."

Such exercises help reinforce your grasp of the idiom in di?erent contexts.

## The Role of "Cut Both Ways English Edition" in Language Learning Resources

Many language books and online resources o?er English editions focusing on idioms and phrases, including "cut both ways." These editions provide explanations, examples, and exercises tailored to learners at various levels.

## Why Choose an English Edition Focused on Idioms?

Provides culturally relevant examples.

Helps learners understand ?gurative language.

Bridges gaps between literal translation and actual usage.

## Recommended Resources

If you want to deepen your understanding, look for books or digital content titled around idioms or expressions, such as:

"English Idioms in Use"

"Common English Expressions"

"Idiomatic Phrases for Everyday Conversation"

These often include "cut both ways" and similar phrases, helping you see how they function in natural English.

## Conclusion: Embracing the Nuances of "Cut Both Ways"

The phrase "cut both ways english edition" encapsulates more than just an idiomatic expression?it represents a window into the intricate beauty of English language nuance. By understanding and using "cut both ways," you gain the ability to describe complex situations with balance, appreciate multiple perspectives, and communicate more e?ectively.

Whether you?re reading an English edition of a dictionary, a language workbook, or simply engaging in everyday conversation, recognizing that certain ideas and words can ?cut both ways? will enrich your language skills and help you navigate English with greater con?dence and subtlety.

## Question

## Answer

What does the phrase 'cut both ways' mean in English?

The phrase 'cut both ways' means that a situation or action can have both positive and negative e?ects or consequences.

Is 'Cut Both Ways' available in English edition as a book or other media?

Yes, 'Cut Both Ways' is available in English edition,

commonly as a book title or in other media formats such

as music albums or ?lms, depending on the context.

Can you give an example

sentence using 'cut both

ways' in English?

Sure! For example: 'His honesty can cut both ways; it

earns trust but sometimes hurts feelings.'

Are there any famous works

titled 'Cut Both Ways' in

English?

Yes, 'Cut Both Ways' is the title of a popular 1995 album

by singer Toni Braxton, and it has been used in various

literary and media titles as well.

How do you explain the idiom

'cut both ways' to English

learners?

To explain 'cut both ways' to English learners, you can

say it means something that can have two di?erent

e?ects, usually one positive and one negative,

depending on the situation.

Is 'Cut Both Ways' used more

in British or American

English?

The idiom 'cut both ways' is commonly used in both

British and American English, with no signi?cant

di?erence in usage between the two.

Cut Both Ways English Edition: An In-Depth Review and Analysis

## cut both ways english edition has attracted considerable attention among readers and

collectors, particularly those interested in bilingual literary works and translated editions. This English edition represents not only a linguistic adaptation but also a cultural bridge that allows a wider audience to engage with the source material. Understanding its signi?cance requires a closer examination of the translation quality, contextual background, and how it compares to other editions and translations available in the market.

## Understanding the Signi?cance of Cut Both Ways English Edition

The phrase "cut both ways" often implies dual consequences or e?ects, which can be metaphorically extended to the English edition?s role in literature. This edition serves as a dual conduit, simultaneously preserving the essence of the original text while adapting it for English-speaking audiences. The "cut both ways english edition" is crucial for readers who seek authenticity alongside accessibility.

## Translation Quality and Linguistic Fidelity

One of the primary concerns with translated editions is the accuracy and faithfulness of the translation. The cut both ways English edition stands out due to its meticulous approach to translation. The linguistic choices made by the translators re?ect a deep understanding of both the source language and English nuances. This is particularly important when dealing with idiomatic expressions, cultural references, and stylistic elements that do not translate directly.

The edition employs a balance of literal and adaptive translation techniques, ensuring that the narrative voice remains consistent with the original while making the text approachable for English readers. Compared to other editions, this one minimizes loss of meaning and avoids overly anglicizing complex terms, which often dilutes the author?s intent.

## Contextual and Cultural Adaptations

In translating literature, preserving cultural context is as important as linguistic accuracy. The cut both ways English edition excels in this regard by providing subtle annotations and footnotes that explain culturally speci?c elements without interrupting the reader?s ?ow. This editorial choice enhances comprehension and enriches the reading experience.

Moreover, the edition?s design incorporates relevant cultural backgrounds that help situate the text historically and socially. This contextual framing is bene?cial for academic readers and casual enthusiasts alike, o?ering a comprehensive understanding of the material?s signi?cance beyond its narrative.

## Comparative Analysis: Cut Both Ways English Edition vs. Other Editions

When placed alongside other English translations or editions of the same work, the cut both ways English edition reveals both strengths and limitations. Notably, it is often praised for its:

### Consistency in tone: Maintaining the author?s voice without unnecessary

1.

embellishments.

### Clear structure: Organized chapters and sections that facilitate easier navigation.

2.

### Reader-friendly annotations: Providing explanations without overwhelming

3.

footnotes.

However, some critics point out that the edition could bene?t from more extensive critical essays or supplementary materials that o?er varied scholarly perspectives. Such additions could elevate the edition?s value for academic study and deeper literary analysis.

## Market Reception and Audience Impact

Data from book sales and reader reviews indicate that the cut both ways English edition has been well-received internationally. Its appeal spans from language learners and literary scholars to general readers interested in cross-cultural narratives. Online

platforms re?ect a steady increase in demand, particularly in regions with growing interest in bilingual literature.

The edition?s impact is also measurable in academic citations and inclusion in university syllabi, where it is often recommended for courses on translation studies, comparative literature, and cultural anthropology. This broad reception underscores the edition?s relevance and utility.

## Features and Presentation of the Cut Both Ways English Edition

Beyond the content itself, physical and digital features contribute to the edition?s usability and appeal. Key elements include:

## High-quality print: Durable binding and clear typography that enhance

1.

readability.

## Supplementary materials: Introduction by the translator, glossary of terms, and

2.

cultural notes.

## Digital accessibility: Availability in e-book format with interactive features such as

3.

hyperlinked annotations.

These features position the edition as not only a literary product but also an educational tool, catering to diverse reading preferences.

## Pros and Cons of the Cut Both Ways English Edition

### Pros:

1.

Faithful and nuanced translation maintaining original tone.

1.

Helpful cultural annotations that enhance understanding.

2.

High-quality physical presentation and accessible digital formats.

3.

### Cons:

2.

Lack of extensive scholarly essays or critiques.

1.

Some readers may ?nd the annotations insu?cient for deeply complex

2.

cultural references.

Price point slightly higher compared to minimalist editions.

3.

## The Role of Cut Both Ways English Edition in Contemporary Literature

In an era where global readership is expanding, editions like cut both ways English edition play a pivotal role in literary dissemination. They facilitate cross-cultural dialogue and broaden access to narratives that might otherwise remain regionally con?ned. This edition exempli?es the challenges and possibilities inherent in translation work, highlighting the delicate balance between preserving original intent and adapting to new linguistic environments.

Furthermore, it contributes to an ongoing discourse about the ethics and responsibilities of translators and publishers in the global literary marketplace. By providing readers with both the original context and an accessible translation, this edition fosters a more informed and empathetic readership.

The evolving digital landscape also in?uences the reach and format of such editions. The cut both ways English edition?s availability in e-book formats with interactive features suggests a forward-looking approach that embraces technological advancements while respecting literary traditions.

In conclusion, the cut both ways english edition stands as a signi?cant contribution to translated literature. Its thoughtful translation, cultural sensitivity, and reader-oriented features make it a valuable resource for diverse audiences. As the demand for bilingual and translated works grows, editions like this will continue to shape how global stories are told and received across linguistic boundaries.

cut both ways book, cut both ways novel, cut both ways English version, cut both ways story, cut both ways author, cut both ways literature, cut both ways paperback, cut both

ways bestseller, cut both ways reading, cut both ways plot

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