

10 ways to make complex ideas accessible to non-specialists

1. Write short paragraphs to invite readers in
2. Include descriptive headings to make pages scannable
3. Include a doer
4. Move the doer to the front of the sentence
5. Don't make me think 1: Lead with the most important idea using plain language.
6. Lead with the most important idea using plain language.
7. Add technical detail as required, but only after plainly making the main point.
8. Define/explain/exemplify all technical terms the first time you use them.
9. Illustrate data and complex ideas with simple images
10. Don't make me think 2: Lead with a simple claim that relates to your research question; add details as required.

Question 1: Which example is easiest to read?

Example 1

The zebra mussel or *Dreissena polymorpha* is a small shellfish named for the striped pattern of its shell. These color patterns may vary from stripes to light or dark colored shells with no stripes (Benson, 2012). As they are mollusks they do not move on their own but rather attach to hard surfaces, the seafloor, and human structures like pipes, concrete, boats. They are even capable of attaching to the hard shell of another mollusk. These shellfish are typically found grouped together in large clusters rather than alone. The zebra mussel is native to the Black, Caspian and Azov seas (Benson, 2012). However, currently they are considered an invasive species. This is because they moved all the way from their native habitat to the rivers and lakes of the North American midwest. The first sighting of zebra mussels in North America occurred in the Canadian waters of Lake St. Clair. This body of water connects both Great Lakes Huron and Erie and because of this interconnectedness by 1990, zebra mussels colonized all of the Great Lakes (Benson, 2012). They progressed from the Great Lake Basin into the Illinois and Hudson rivers in the following year. The Illinois river is the principal tributary of the Mississippi river. A tributary is a river or stream flowing into a larger river or lake, this allowed the invasion to spread from the Illinois to the Mississippi river. The Mississippi river's drainage covers 12 million square miles, this wide reach fostered the spread of zebra mussel to the rest of the region. By 1992, the following rivers had established population of zebra mussels, Arkansas, Cumberland, Hudson, Illinois, Mississippi, Ohio, and Tennessee (Benson, 2012). Zebra mussels spread through these rivers and crossed over a large swathe of territory, surpassing both the Canadian border, and several state lines. By 1994, these states reported zebra mussels not only in their rivers, but in individual bodies of water such as lakes within their borders, Alabama, Arkansas, New York, Ohio, Pennsylvania, Tennessee, Utah, Vermont, West Virginia, and Wisconsin, and more recently Connecticut in 2002 (Benson, 2012). Zebra mussels host a different biology from most endemic Great-Lakes region bivalves. This biology enables their rapid spread (Drake, 2004). A bivalve is an aquatic mollusk whose compressed body is enclosed with a hinged shell. Oysters, mollusks, clams, mussels and scallops are all known as bivalves. The exotic zebra mussels dreissenids are dioecious (one sex per individual), with fertilization occurring in the water column. Endemic bivalves are monoecious (both sexes in one individual). The difference between these two reproductive styles is reproduction between two individuals inevitably leads to more genetic variation which is helpful from an evolutionary standpoint. Under their native habitat zebra mussel oogenesis (ovulation) occurs in autumn, with eggs developing until their release and fertilization in spring (DNR, N.D).

Example 2

The zebra mussel or *Dreissena polymorpha* is a small shellfish named for the striped pattern of its shell. These color patterns may vary from stripes to light or dark colored shells with no stripes (Benson, 2012). As they are mollusks they do not move on their own but rather attach to hard surfaces, the seafloor, and human structures like pipes, concrete, boats. They are even capable of attaching to the hard shell of another mollusk.

These shellfish are typically found grouped together in large clusters rather than alone. The zebra mussel is native to the Black, Caspian and Azov seas (Benson, 2012). However, currently they are considered an invasive species. This is because they moved all the way from their native habitat to the rivers and lakes of the North American midwest. The first sighting of zebra mussels in North America occurred in the Canadian waters of Lake St. Clair. This body of water connects both Great Lakes Huron and Erie and because of this interconnectedness by 1990, zebra mussels colonized all of the Great Lakes (Benson, 2012). They progressed from the Great Lake Basin into the Illinois and Hudson rivers in the following year.

The Illinois river is the principal tributary of the Mississippi river. A tributary is a river or stream flowing into a larger river or lake, this allowed the invasion to spread from the Illinois to the Mississippi river. The Mississippi river's drainage covers 12 million square miles, this wide reach fostered the spread of zebra mussel to the rest of the region. By 1992, the following rivers had established population of zebra mussels, Arkansas, Cumberland, Hudson, Illinois, Mississippi, Ohio, and Tennessee (Benson, 2012). Zebra mussels spread through these rivers and crossed over a large swathe of territory, surpassing both the Canadian border, and several state lines. By 1994, these states reported zebra mussels not only in their rivers, but in individual bodies of water such as lakes within their borders, Alabama, Arkansas, New York, Ohio, Pennsylvania, Tennessee, Utah, Vermont, West Virginia, and Wisconsin, and more recently Connecticut in 2002 (Benson, 2012). Zebra mussels host a different biology from most endemic Great-Lakes region bivalves. This biology enables their rapid spread (Drake, 2004). A bivalve is an aquatic mollusk whose compressed body is enclosed with a hinged shell. Oysters, mollusks, clams, mussels and scallops are all known as bivalves.

The exotic zebra mussels dreissenids are dioecious (one sex per individual), with fertilization occurring in the water column. Endemic bivalves are monoecious (both sexes in one individual). The difference between these two reproductive styles is reproduction between two individuals inevitably leads to more genetic variation which is helpful from an evolutionary standpoint. Under their native habitat zebra mussel oogenesis (ovulation) occurs in autumn, with eggs developing until their release and fertilization in spring (DNR, N.D). When these species spread to warmer areas however, their reproduction occurs continually throughout the years. Zebra mussels reproduce in a way that leads to genetic variation and reproduce for a longer period of time. These biological traits allow them to out-reproduce the local population.

Example 3

Introduction to the zebra mussel

The zebra mussel or *Dreissena polymorpha* is a small shellfish named for the striped pattern of its shell. These color patterns may vary from stripes to light or dark colored shells with no stripes (Benson, 2012). As they are mollusks they do not move on their own but rather attach to hard surfaces, the seafloor, and human structures like pipes, concrete, boats. They are even capable of attaching to the hard shell of another mollusk.

A species on the move

These shellfish are typically found grouped together in large clusters rather than alone. The zebra mussel is native to the Black, Caspian and Azov Seas (Benson, 2012). However, currently they are considered an invasive species. This is because they moved all the way from their native habitat to the rivers and lakes of the North American midwest. They progressed from the Great Lake Basin into the Illinois and Hudson rivers in the following year.

Paths of no resistance

The Mississippi river's drainage covers 12 million square miles, this wide reach fostered the spread of zebra mussel to the rest of the region. By 1992, the following rivers had established population of zebra mussels, Arkansas, Cumberland, Hudson, Illinois, Mississippi, Ohio, and Tennessee (Benson, 2012).

Zebra mussels spread through these rivers and crossed over a large swathe of territory, surpassing both the Canadian border, and several state lines. By 1994, these states reported zebra mussels not only in their rivers, but in individual bodies of water such as lakes within their borders, Alabama, Arkansas, New York, Ohio, Pennsylvania, Tennessee, Utah, Vermont, West Virginia, and Wisconsin, and more recently Connecticut in 2002 (Benson, 2012). Zebra mussels host a different biology from most endemic Great-Lakes region bivalves. This biology enables their rapid spread (Drake, 2004).

The biology of invasion

The exotic zebra mussels dreissenids are dioecious (one sex per individual), with fertilization occurring in the water column. Endemic bivalves are monoecious (both sexes in one individual). The difference between these two reproductive styles is reproduction between two individuals inevitably leads to more genetic variation which is helpful from an evolutionary standpoint. When these species spread to warmer areas however, their reproduction occurs continually throughout the years. Zebra mussels reproduce in a way that leads to genetic variation and reproduce for a longer period of time. These biological traits allow them to out-reproduce the local population.

Conclusion 1. Write short paragraphs to invite readers in

Conclusion 2. Include descriptive headings to make pages scannable

Question 2: Which sentences are easier to read?

A	B
<p>Another half hour was spent by each team member on analyzing the data.</p>	<p>Each team member spent a half-hour analyzing the data.</p>
<p>First to be covered is what exactly the feasibility of passing an ordinance is to increase boat inspections.</p>	<p>We begin by discussing the feasibility of passing an ordinance to increase boat inspections.</p>
<p>The major problem with writing this report is making sure all the requirements are met.</p>	<p>Our team's goal is to meet all report requirements.</p>

Conclusion 3. Include the doer

Conclusion 4. Move the doer to the front of the sentence

Question 3: When should I use technical terms?

Academic style	Readable style
<p>The exotic zebra mussels dreissenids are dioecious (one sex per individual), with fertilization occurring in the water column.</p>	<p>Females release eggs into the water, and males release sperm, and fertilization occurs after they are released.</p>
<p>Conclusion 5. Use familiar terms.</p>	
<p>Endemic bivalves are monoecious (both sexes in one individual). The difference between these two reproductive styles is reproduction between two individuals inevitably leads to more genetic variation which is helpful from an evolutionary standpoint. Under their native habitat zebra mussel oogenesis (ovulation) occurs in autumn, with eggs developing until their release and fertilization in spring (DNR, N.D). When these species spread to warmer areas however, their reproduction occurs continually throughout the years. Zebra mussels reproduce in a way that leads to genetic variation and reproduce for a longer period of time. These biological traits allow them to out-reproduce the local population.</p>	<p>Zebra mussels are invasive because as they adapt to their environments, they can reproduce faster than native species.</p>
<p>Conclusion: Don't make me think (1)</p> <ol style="list-style-type: none"> 6. Lead with the most important idea using plain language. 7. Add technical detail as required, but only after plainly making the main point. 8. Define/explain/exemplify all technical terms the first time you use them. 	

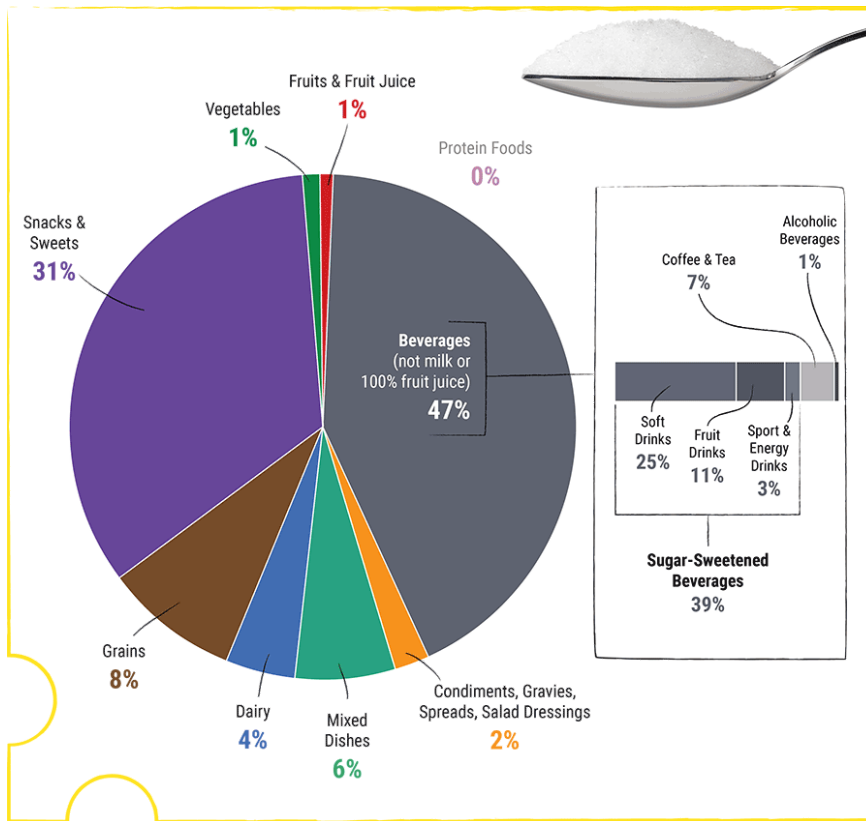
Question 4: What should I do with numbers or other dense information?

Academic style

The country’s current health epidemic is created by a mix of many issues that extend much further than just the definitions and main and minor factors. For example, the percentage of added sugars in the diet of the U.S. population ages 2 years and older that comes from different food categories includes Beverages (not milk or 100% fruit juice) 47%; Snacks & Sweets 31%; Grains 8%; Mixed Dishes 6%; Dairy 4%; Condiments, Gravies, Spreads, Salad Dressings 2%; Vegetables 1%; Fruits & Fruit Juice 1%; Protein Foods: 0%.

An inset bar chart expands the Beverages (not milk or 100% fruit juice) category to depict the percentage of added sugars in the diet from different types of beverages: Soft Drinks 25%; Fruit Drinks 11%; Coffee & Tea 7%; Sport & Energy Drinks 3%; Alcoholic Beverages 1%. Together, Soft Drinks, Fruit Drinks, and Sport & Energy Drinks are called Sugar-Sweetened Beverages, which comprise 39% of added sugars.

Readable style



DATA SOURCE: What We Eat in America (WWEIA) Food Category analyses for the 2015 Dietary Guidelines Advisory Committee. Estimates based on day 1 dietary recalls from WWEIA, NHANES 2009-2010. Retrieved from <https://health.gov/dietaryguidelines/2015/guidelines/chapter-2/a-closer-look-at-current-intakes-and-recommended-shifts/>

Conclusion 9. Illustrate data and complex ideas with simple images.

Question 5: What should I leave in/take out?

Hey, we found this information!

What does the information have to do with the research question about effective ways of reducing zebra mussels?

Zebra mussels are not only associated with a decline in native animal populations; in fact, studies suggest that zebra mussels cause an influx in the bass and perch populations of certain fresh-water environments. The increase in fish populations can be attributed to a fish's tendency to favor and consume zebra mussels that consumed crayfish and other small animals. However, even with an increase in predatory fish populations, the study shows no reduction in the incidence of zebra mussel population size.

Introducing predators that eat zebra mussels does not work.

Conclusion: Don't make me think (2).

10. Lead with a simple claim that relates to your research question; add details as required.