# Paleoeconomics Instructions

*Homo neanderthalensis* was the most recent archaic human. Neanderthals first appeared in Eurasia as early as 400,000 years ago, where they lived successfully until their extinction about 40,000 ago—just a few thousand years after the arrival of the first early modern humans. While Neanderthals have traditionally been caricatured as big, hairy, dumb, stooping brutes, scholars today believe they stood erect, were capable of complex speech, and were roughly as intelligent as modern humans. The caricature was right on two counts, though: Neanderthals were big and they were hairy, making them well suited for central Eurasia's harsh winters.

How is it then that strong, smart Neanderthals who'd been established in Eurasia for so long were so quickly shoved aside by skinny humans who, relatively speaking, were completely new to the continent? While anthropologists and biologists have been debating this issue for decades, economist have only recently weighed in. These economists suggest commerce explains why humans flourished in Eurasia at the (fatal) expense of Neanderthals. More specifically, while early modern humans engaged in trade with one another, Neanderthals didn't and therefore ultimately went extinct.[†]

In class, you'll get to the play the role of a human hunter-gatherer in a game that helps explain why trade may've allowed humans to displace Neanderthals even though Neanderthals were, on average, better adapted to life in Eurasia. We'll assume prehistoric humans produced and consumed only two goods: meat and berries. Every participant in this game must consume meat and berries in fixed one-to-one proportions—think of this as a prehistoric Happy Meal. In any round, your payoff is $1 times the minimum of the number of pounds of meat or pounds of berries you acquired in that round. For example, suppose you have 7 pounds of meat and 4 pounds of berries at the end of a round. Since the minimum of 7 and 4 is 4, your payoff would be $1 × 4 = $4.

Everyone has 24 hours of labor time to divide between producing meat and berries. Assume both Neanderthals and humans can be divided into one of two "clans." The amount of time it takes members of each clan to produce meat or berries is summarized in the following table.

| | Neanderthals (before humans arrive) | |
|---|---|---|
| | Meat | Berries |
| Uplanders | 5 hours per pound | 1 hour per pound |
| Lowlanders | 1 hour per pound | 5 hours per pound |
| | **Neanderthals (after humans arrive)** | |
| | Meat | Berries |
| Uplanders | 6 hours per pound | 2 hours per pound |
| Lowlanders | 2 hours per pound | 6 hours per pound |
| | **Humans** | |
| | Meat | Berries |
| Uplanders | 9 hours per pound | 3 hours per pound |
| Lowlanders | 3 hours per pound | 9 hours per pound |

This assumes that after humans arrive in Eurasia, there's more competition for resources, so it takes Neanderthals longer to produce meat or berries than it did before humans arrived.

**Trading Directions**

As a participant in this game, you'll be assigned to one of the two human clans and then be asked to allocate your 24 hours between producing meat and producing berries. You should prepare for this game by completing the questions associated with this activity, and by thinking about the best strategy for members of each clan both with and without trade between clans.

In the first round, you'll be allowed to trade, but only with members of your own clan. Before you make your decisions about what to produce in this round, you may want to look around for possible trading partners and discuss the terms at which you'd trade. When you've decided on your time allocation, go to the instructor, who'll give you meat and berry tickets representing the number of units you produced. To simplify trading, the instructor won't give you tickets for fractional units of meat or berries. After you've received your meat and berry tickets, you can make trades with anyone from your own clan. To make a trade, simply exchange tickets with someone who's willing to make a deal with you. Trade in fractional tickets isn't allowed, but fractional "prices" can be achieved by, for example, trading 2 pounds of meat for 1 pound of berries, or 2 pounds of meat for 3 pounds of berries.

When you've completed trading, record the number of pounds of meat and berries you're left with on your Scoresheet and calculate your payoff. Remember that your payoff is $1 times the minimum of the number of pounds of meat and the number of pounds of berries you have at the end of trading.

When the first round is completed, we'll conduct a second round. The second round will be different in that you'll be allowed to trade with anyone in the room. Tickets acquired in the first round are of no use in the second round and should be returned to the instructor. Once again, you must decide how to allocate your time between producing meat and producing berries. When you receive your tickets, you can trade them with anyone who's willing. When you've finished trading, return to your seat and calculate your payoff for this round. If the instructor declares this to be the last round of the day, record your total payoff from all rounds on your Scoresheet and turn in the Scoresheet and tickets.

****** At the end of the hour, I'll draw one student's name at random. That student will ******
****** receive a cash payment equal to 50% of their total payoff from all rounds. ******
****** This makes it all the more important that you work through the pre-lab questions ******

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[†] For a much more detailed discussion, see Horan, Bulte, and Shogren's paper, "How Trade Saved Humanity from Biological Exclusion: An Economic Theory of Neanderthal Extinction," in the *Journal of Economic Behavior and Organization*.

**Lesson Plan for "Paleoeconomics: A Classroom Game Demonstrating How Trade May Explain the Rise of Humans and the Demise of Neanderthals"**

**Grade Level**: Introductory Economics (undergraduate or high school)
**Duration**: 50 minutes (including gameplay and discussion)

**Learning Objectives**

By the end of this lesson, students will:

1. Understand the concept of comparative advantage and gains from trade.
2. Analyze the role of specialization and trade in historical and modern contexts.
3. Explore how trade impacts societies differently and relate it to current global trade issues.
4. Experience decision-making in a simulated trade environment.

**Materials Needed**

1. **Handouts**:
    - Game instructions (print or digital copy).
    - Color-coded score sheets (Uplanders and Lowlanders).
2. **Tokens**: Meat and berry tickets (printable templates).
3. **Whiteboard or Projector**: To display production tables and summarize results.
4. **Optional Incentive**: Small monetary reward for randomly selected player.

**Lesson Outline**

**Preparation (Before Class)**

1. Assign the **game instructions** as pre-class reading.
2. Provide an **online or paper quiz** to ensure students understand the rules (four questions about production and trade strategies).

**Lesson Execution**

**Introduction (5 minutes)**

- **Context**: Briefly explain the research question inspired by Horan et al. (2005): How did trade help early humans outcompete Neanderthals? Highlight the anthropological and economic aspects of the game.
- **Conceptual Overview**:
    - Define comparative advantage and gains from trade.
    - Explain the importance of trade in history and its relevance today.

**Gameplay (25 minutes)**

**Round 1: Autarky (10 minutes)**

1. **Setup**: Assign students to either Uplanders or Lowlanders (roughly 50/50 split).
2. **Rules**: Students produce meat and/or berries but can only trade within their own clan.
3. **Action**: Students decide their production, collect tickets from the instructor, and complete within-clan trade if desired.
4. **Outcome Discussion**: Ask:
    - How much did you earn? (Most will say $2.)
    - Why was within-clan trade ineffective?

**Round 2: Trade Between Clans (15 minutes)**

1. **Setup**: Students keep previous clan assignment. Allow students to trade between clans.
2. **Rules**: Students decide their production, emphasizing specialization based on the production table.
3. **Action**: Students decide their production, collect tickets from the instructor, and complete within- or between-clan trades if desired.
4. **Outcome Discussion**:
    - Raise hands for different earnings levels (e.g., $2, $3, $4).
    - Ask top earners to share strategies.
    - Summarize the key difference between rounds.

**Discussion (20 minutes)**

1. **Historical Application**:
    - Relate results to the extinction of Neanderthals: How did trade impact humans' survival compared to Neanderthals?
    - Discuss how the subsistence threshold affects population growth.
2. **Modern Application**:
    - Compare the game to current trade dynamics (e.g., South Korea vs. North Korea).
    - Discuss distributional impacts: Who benefits most/least from trade in modern economies?
3. **Policy Implications**:
    - What policies could help individuals hurt by trade without eliminating its benefits?
    - Relate to U.S.-China trade impacts or tariffs.

**Assessment**

Post-Class Assignment (Optional):

- Summarize game results and discuss opportunity cost, specialization, and comparative advantage.
- Reflect on trade's role in historical context.
- Complete an Excel-based exercise to analyze the data from the game.

**Extension Ideas**

- **Advanced Classes**: Introduce numerical modeling of trade payoffs or discuss the Horan et al. model in depth.
- **Interdisciplinary Approach**: Collaborate with anthropology instructors to explore evolutionary biology aspects.

# Notes for Instructors

I've included three rounds on the handout rather than the two discussed in the paper in case instructors feel the need (or have the time) to run an additional round. For example, it sometimes takes one round for students to understand how the game works. In this case, an instructor may want to run the round without trade between clans twice.

To make it easier for students to find potential trading partners either within their own clan or from the other clan, it's helpful to print the Uplander and Lowlander Scoresheets on different colored paper. Blue for the Uplanders and pink for the Lowlanders, for example. This color combination helps me remember which clan is which. The blue sheets make me think of berries, the good for which Uplanders have to comparative (and absolute) advantage. The pink sheets make me think of meat, the good for which Lowlanders have to comparative (and absolute) advantage.

In order for trading between Uplanders and Lowlanders to work the way it's described in the paper, it's important to print out the same number of scoresheets for Uplanders and for Lowlanders. (For example, 15 Uplander Scoresheets and 15 Lowlander Scoresheets for a class of 30 students.) This way, each Lowlander can trade with an Uplander.

# Uplander Scoresheet

Round 1

In this round, I produced

_____ pounds of meat and _____pounds of berries.

After I finished trading, I was able to consume

_____ pounds of meat and _____pounds of berries.

My payoff for this round is $_____

Round 2

In this round, I produced

_____ pounds of meat and _____pounds of berries.

After I finished trading, I was able to consume

_____ pounds of meat and _____pounds of berries.

My payoff for this round is $_____

Round 3

In this round, I produced

_____ pounds of meat and _____pounds of berries.

After I finished trading, I was able to consume

_____ pounds of meat and _____pounds of berries.

My payoff for this round is $_____

# Lowlander Scoresheet

Round 1

In this round, I produced

_____ pounds of meat and _____pounds of berries.

After I finished trading, I was able to consume

_____ pounds of meat and _____pounds of berries.

My payoff for this round is $_____

Round 2

In this round, I produced

_____ pounds of meat and _____pounds of berries.

After I finished trading, I was able to consume

_____ pounds of meat and _____pounds of berries.

My payoff for this round is $_____

Round 3

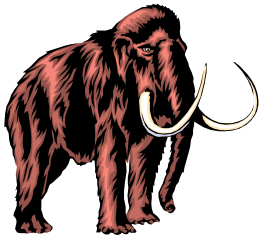
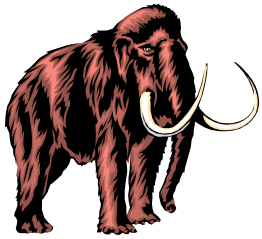
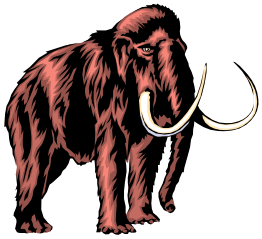
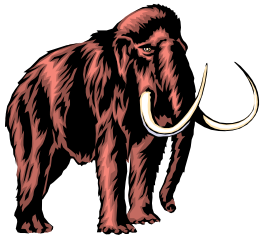
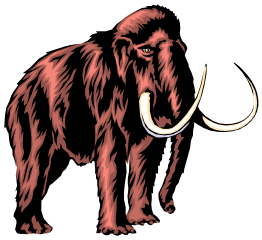
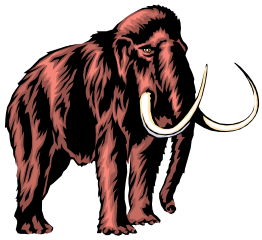
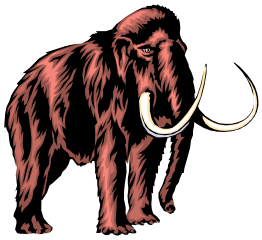
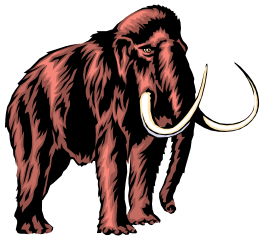
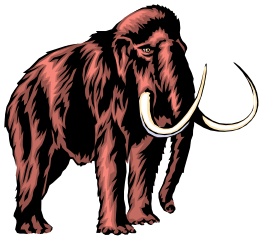
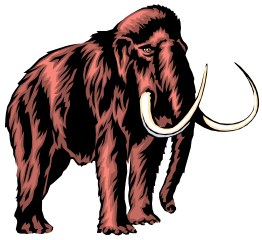
In this round, I produced

_____ pounds of meat and _____pounds of berries.

After I finished trading, I was able to consume

_____ pounds of meat and _____pounds of berries.

My payoff for this round is $_____

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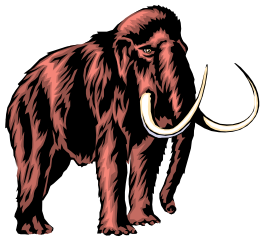
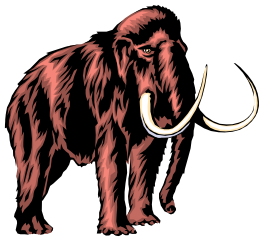
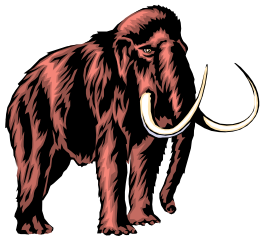
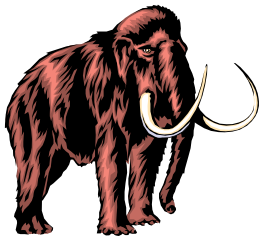
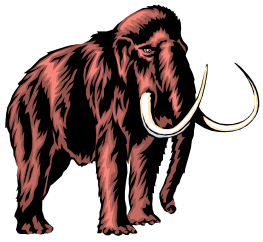
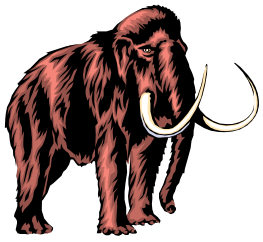
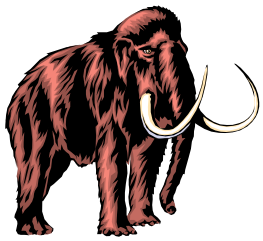
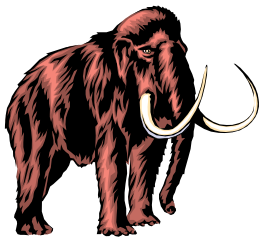
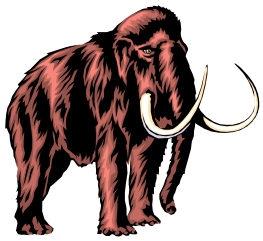
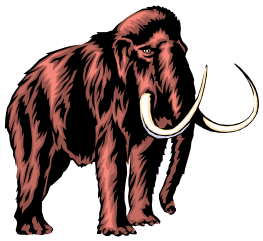
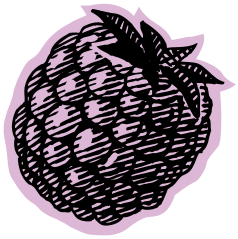
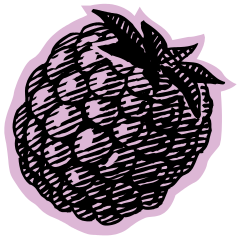
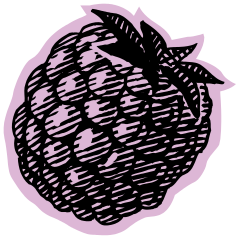
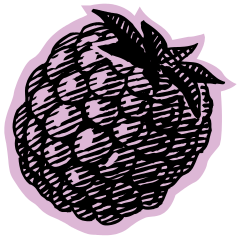
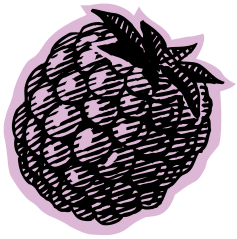
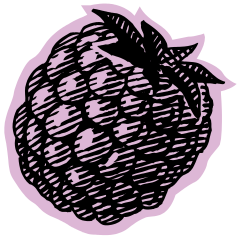
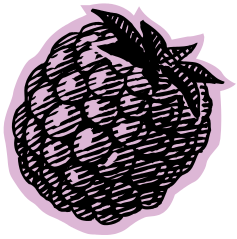
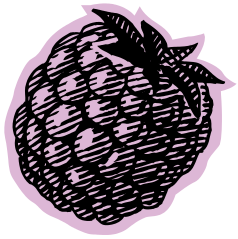
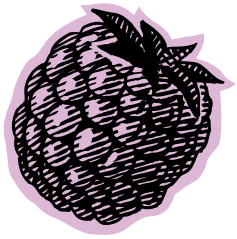
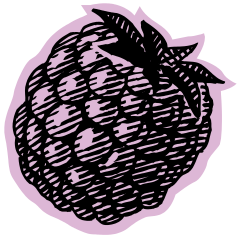
|  x5 |  x5 |
|  x5 |  x5 |
|  x5 |  x5 |
|  x5 |  x5 |
|  x5 |  x5 |

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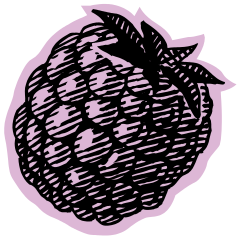
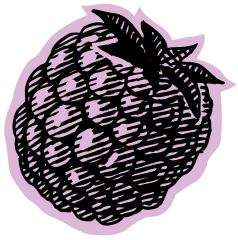
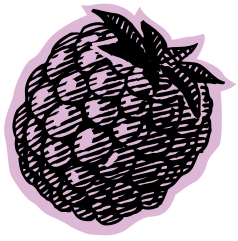
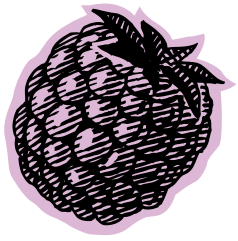
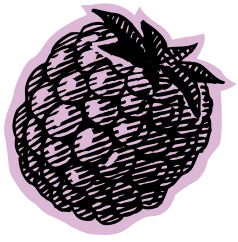
|  x5 |  x5 |
|  x5 |  x5 |
|  x5 |  x5 |
|  x5 |  x5 |
|  x5 |  x5 |

10 pages of each kind of x1 ticket and 4 pages of each kind of x5 ticket should be plenty for a class of 30.

# Paleoeconomics Quiz

1) While you won't be playing the role of Neanderthals, it's still useful to think about their production decisions. If you're a Neanderthal Uplander, how many hours would it take you to produce 6 pounds of meat and 11 pounds of berries before humans arrive? After humans arrive?

2) How many hours would it take a Neanderthal Lowlander to produce 4 pounds of meat and 3 pounds of berries before humans arrive? After humans arrive?

3) Suppose a Neanderthal Uplander has 24 hours to divide between producing meat and producing berries. Assuming his payoff is equal to $1 times the minimum of the number of pounds of meat and berries that he produces, what's the highest payoff he can hope to achieve before humans arrive? After humans arrive?

Hint: Think of the combination of one pound of meat and one pound of berries as a prehistoric Happy Meal. How long does it take to produce one of these Happy Meals? How many Happy Meals could a Neanderthal Uplander produce in 24 hours?

4) Suppose a Neanderthal Lowlander has 24 hours to divide between producing meat and producing berries. Assuming her payoff is equal to $1 times the minimum of the number of pounds of meat and berries that she produces, what's the highest payoff she can hope to achieve before humans arrive? After humans arrive?

# Paleoeconomics Quiz (Key)

1) While you won't be playing the role of Neanderthals, it's still useful to think about their production decisions. If you're a Neanderthal Uplander, how many hours would it take you to produce 6 pounds of meat and 11 pounds of berries before humans arrive? After humans arrive?

*Before humans arrive, it would take you 5 hours/pound × 6 pounds = 30 hours to produce the meat and 1 hour/pound × 11 pounds = 11 hours to produce the berries. That's a total of 41 hours. After humans arrive, it would take you 6 hours/pound × 6 pounds = 36 hours to produce the meat and 2 hour/pound × 11 pounds = 22 hours to produce the berries. That's a total of 58 hours.*

2) How many hours would it take a Neanderthal Lowlander to produce 4 pounds of meat and 3 pounds of berries before humans arrive? After humans arrive?

*Before humans arrive, it would take you 1 hour/pound × 4 pounds = 4 hours to produce the meat and 5 hours/pound × 3 pounds = 15 hours to produce the berries. That's a total of 19 hours. After humans arrive, it would take you 2 hours/pound × 4 pounds = 8 hours to produce the meat and 6 hour/pound × 3 pounds = 18 hours to produce the berries. That's a total of 26 hours.*

3) Suppose a Neanderthal Uplander has 24 hours to divide between producing meat and producing berries. Assuming his payoff is equal to $1 times the minimum of the number of pounds of meat and berries that he produces, what's the highest payoff he can hope to achieve before humans arrive? After humans arrive?

Hint: Think of the combination of one pound of meat and one pound of berries as a prehistoric Happy Meal. How long does it take to produce one of these Happy Meals? How many Happy Meals could a Neanderthal Uplander produce in 24 hours?

*Before humans arrive, it takes him 5 hours to produce a pound of meat and 1 hour to produce a pound of berries. That means it takes a total of 6 hours to produce a complete prehistoric Happy Meal. In 24 hours, he could do that four times. That's 24 hours ÷ 6 hours/prehistoric Happy Meal = 4 prehistoric Happy Meals. If his payoff is $1 per prehistoric Happy Meal, that means he earns a $4 payoff. After humans arrive, it takes him 8 hours to produce a complete prehistoric Happy Meal. In 24 hours, he could do that three times, earning a $3 payoff.*

4) Suppose a Neanderthal Lowlander has 24 hours to divide between producing meat and producing berries. Assuming her payoff is equal to $1 times the minimum of the number of pounds of meat and berries that she produces, what's the highest payoff she can hope to achieve before humans arrive? After humans arrive?

*Before humans arrive, it takes her 6 hours to produce a complete prehistoric Happy Meal. In 24 hours, she could do that four times, earning a $4 payoff. After humans arrive, it takes her 8 hours to produce a complete prehistoric Happy Meal. In 24 hours, she could do that three times, earning a $3 payoff.*

# Paleoeconomics Assignment

Here's a table summarizing how long it takes Neanderthals and humans in each clan to make meat and berries.

| | Neanderthals (before humans arrive) | |
|---|---|---|
| | Meat | Berries |
| Uplanders | 5 hours per pound | 1 hour per pound |
| Lowlanders | 1 hour per pound | 5 hours per pound |
| | **Neanderthals (after humans arrive)** | |
| | Meat | Berries |
| Uplanders | 6 hours per pound | 2 hours per pound |
| Lowlanders | 2 hours per pound | 6 hours per pound |
| | **Humans** | |
| | Meat | Berries |
| Uplanders | 9 hours per pound | 3 hours per pound |
| Lowlanders | 3 hours per pound | 9 hours per pound |

1) Briefly explain why a human trading with another human from their own clan isn't likely to improve their payoff relative to simply consuming what they produce themself.

2) If there is no trade between clans, human Uplanders should produce (more meat than berries, more berries than meat, or the same amount of meat as berries) and human Lowlanders should produce (more meat than berries, more berries than meat, or the same amount of meat as berries)? (Underline the correct answers.)

3) When there is no trade between clans, what is the highest payoff a human Uplander can achieve given 24 hours? What is the highest payoff that a human Lowlander can achieve in 24 hours?

4) This assignment's Excel file (which you can download here: bit.ly/3yUafv9) reports hypothetical data from Round 2. The tables list the number of pounds of meat and berries produced and the final holdings of meat and berries after trade for each human Uplander and Lowlander. Calculate each person's payoff as the minimum of their final holdings of meat and final holdings of berries. You can do this easily in Excel using the MIN function. For example, "=MIN(C3:D3)" returns the smaller of the two numbers entered in cells C3 and D3. You can download a free student version of Microsoft Office (which includes Excel) here: bit.ly/3sEis8w.

5) Use the table below to report the average payoffs for human Uplanders and Lowlanders with trade between clans and the largest payoff they could have possibly received in Round 1 when there was no trade between clans. You can use the AVERAGE command in Excel to quickly calculate average payoffs for the middle column. For example, "=AVERAGE(E3:E32)" calculates the average of all entries in cells E3 through E32. Use your answers from part 3 to complete the right-hand column.

| | Average payoff with trade between clans | Maximum payoff *without* trade between clans (see your answers from part 3) |
|---|---|---|
| Uplanders | | |
| Lowlanders | | |

6) Are human Uplanders better off with trade between clans or without it? What about human Lowlanders? Briefly explain.

7) What do you think determines which clan will specialize in meat production when there is trade between clans? Use the concepts of opportunity cost and comparative advantage to explain your answer.

8) Suppose the minimum quantity of food Neanderthals and humans need to sustain themselves and their offspring is four complete prehistoric Happy Meals (four pounds of meat and four pounds of berries).

A) Before humans arrived in Eurasia, would Neanderthal Uplanders and Lowlanders have been able to produce this minimum quantity of food, assuming Neanderthals don't trade? Briefly explain.

B) After humans arrived in Eurasia, would Neanderthal Uplanders and Lowlanders have been able to produce this minimum quantity of food, assuming Neanderthals don't trade? Briefly explain.

C) Would human Uplanders and Lowlanders have been able to produce this minimum quantity of food *without* trade between clans? Briefly explain.

D) Would human Uplanders and Lowlanders have been able to consume this minimum quantity of food *with* trade between clans? Briefly explain.

E) Can your answers from parts A through D help explain why humans were able to outcompete Neanderthals in Eurasia? Briefly explain.

# Paleoeconomics Economics (Key)

Here's a table summarizing how long it takes Neanderthals and humans in each clan to make meat and berries.

| | Neanderthals (before humans arrive) | |
|---|---|---|
| | Meat | Berries |
| Uplanders | 5 hours per pound | 1 hour per pound |
| Lowlanders | 1 hour per pound | 5 hours per pound |
| | **Neanderthals (after humans arrive)** | |
| | Meat | Berries |
| Uplanders | 6 hours per pound | 2 hours per pound |
| Lowlanders | 2 hours per pound | 6 hours per pound |
| | **Humans** | |
| | Meat | Berries |
| Uplanders | 9 hours per pound | 3 hours per pound |
| Lowlanders | 3 hours per pound | 9 hours per pound |

1) Briefly explain why a human trading with another human from their own clan isn't likely to improve their payoff relative to simply consuming what they produce themself.

*There are no potential gains from trade when the two traders have the same set of skills for producing both meat and berries (i.e., when they have the same opportunity costs). You enjoy gains from trade when you trade with someone whose opportunity costs are different than yours.*

2) If there is no trade between clans, human Uplanders should produce (more meat than berries, more berries than meat, or the same amount of meat as berries) and human Lowlanders should produce (more meat than berries, more berries than meat, or the same amount of meat as berries)? (Underline the correct answers.)

3) When there is no trade between clans, what is the highest payoff a human Uplander can achieve given 24 hours? What is the highest payoff that a human Lowlander can achieve in 24 hours?

*In the absence of trade between clans, you achieve the highest payoff by producing equal quantities of meat and berries. For human Uplanders, that means producing 2 units of each good. For human Lowlanders, that also mean producing 2 units of each. To understand why, think about things in terms of Happy Meals. It takes an Uplander 9 + 3 = 12 hours to make one complete Happy Meal. In 24 hours, he can do this two times, meaning he should produce two pounds of meat and two pounds of berries.*

*Similarly, it takes a Lowlander 3 + 9 = 12 hours to make one complete Happy Meal. In 24 hours, she can do this two times, meaning she should also produce two pounds of meat and two pounds of berries.*

4) This assignment's Excel file (which you can download here: bit.ly/3yUafv9) reports hypothetical data from Round 2. The tables list the number of pounds of meat and berries produced and the final holdings of meat and berries after trade for each human Uplander and Lowlander. Calculate each person's payoff as the minimum of their final holdings of meat and final holdings of berries. You can do this easily in Excel using the MIN function. For example, "=MIN(C3:D3)" returns the smaller of the two numbers entered in cells C3 and D3. You can download a free student version of Microsoft Office (which includes Excel) here: bit.ly/3sEis8w.

5) Use the table below to report the average payoffs for human Uplanders and Lowlanders with trade between clans and the largest payoff they could have possibly received in Round 1 when there was no trade between clans. You can use the AVERAGE command in Excel to quickly calculate average payoffs for the middle column. For example, "=AVERAGE(E3:E32)" calculates the average of all entries in cells E3 through E32. Use your answers from part 3 to complete the right-hand column.

| | Average payoff with trade between clans | Maximum payoff *without* trade between clans (see your answers from part 3) |
|---|---|---|
| Uplanders | *$3.63* | *$2* |
| Lowlanders | *$3.67* | *$2* |

6) Are human Uplanders better off with trade between clans or without it? What about human Lowlanders? Briefly explain.

*Members of both clans were better off on average with trade than would've been possible without trade. In fact, most people's payoffs double!*

7) What do you think determines which clan will specialize in meat production when there is trade between clans? Use the concepts of opportunity cost and comparative advantage to explain your answer.

*If your clan can produce a good at a lower opportunity cost than the other clan can, then your clan should specialize in producing that good. For example, a human Uplander gives up producing just one third of a pound of meat for every pound of berries he produces, which is another way of saying that his opportunity cost of producing a pound of berries is one third of a pound of meat. A human Lowlander's opportunity cost of one pound of berries, on the other hand, is three pounds of meat. Because Uplanders can produce berries at a lower opportunity cost than Lowlanders can, Uplanders should specialize in producing berries.*

*Similarly, a human Lowlander gives up just one third of a pound of berries for every additional pound of meat she produces, while a human Uplander gives up three pounds of berries per pound of meat. Since the Lowlander's opportunity cost of producing meat is lower than the Uplanders, Lowlanders should specialize in producing meat.*

8) Suppose the minimum quantity of food Neanderthals and humans need to sustain themselves and their offspring is four complete prehistoric Happy Meals (four pounds of meat and four pounds of berries).

A) Before humans arrived in Eurasia, would Neanderthal Uplanders and Lowlanders have been able to produce this minimum quantity of food, assuming Neanderthals don't trade? Briefly explain.

*Before humans arrived, it took Neanderthals in either clan 5 + 1 = 6 hours to make a Happy Meal. They could do this four times in 24 hours, meaning they were just able to produce the minimum quantity of food needed to sustain themselves.*

B) After humans arrived in Eurasia, would Neanderthal Uplanders and Lowlanders have been able to produce this minimum quantity of food, assuming Neanderthals don't trade? Briefly explain.

*After humans arrived, it took Neanderthals in either clan 6 + 2 = 8 hours to make a Happy Meal. They could do this just three times in 24 hours, meaning they were no longer able to produce the minimum quantity of food needed to sustain themselves.*

C) Would human Uplanders and Lowlanders have been able to produce this minimum quantity of food *without* trade between clans? Briefly explain.

*Without trade, it would take humans in either clan 9 + 3 = 12 hours to make a Happy Meal. They could do this just two times in 24 hours, meaning they wouldn't even come close to the minimum quantity of food needed to sustain themselves.*

D) Would human Uplanders and Lowlanders have been able to consume this minimum quantity of food *with* trade between clans? Briefly explain.

*With specialization and trade, humans could potentially consume four Happy Meals (as was the case for most players in the Excel spreadsheet). With trade, humans were able to consume the minimum quantity of food needed to sustain themselves.*

E) Can your answers from parts A through D help explain why humans were able to outcompete Neanderthals in Eurasia? Briefly explain.

*They can. Before humans arrived, Neanderthals were able to produce enough food to sustain themselves. After humans arrived, the increased competition for resources meant Neanderthals were no longer able to sustain themselves, suggesting their population would decline. Even though Neanderthals had an absolute advantage in producing meat and berries compared with humans, specialization and trade allowed the humans to consume enough food to sustain themselves, meaning their population could grow.*