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Amazon tribe passes geometry test

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Contents

The Article	2
Warm-ups	3
Before Reading / Listening	4
While Reading / Listening	5
Listening Gap Fill	6
After Reading	7
Discussion	8
Speaking	9
Homework	10
Answers	11

22 January, 2006

THE ARTICLE

Amazon tribe passes geometry test

Researchers in France and at Harvard University have discovered that isolated tribes in the Amazon jungle know as much about geometry as high-schoolers do. Research showed that although the tribes people did not know the technical words of geometry, they used the concepts in their everyday lives. They could also use distance, angle and other features in maps to find hidden objects. Dr. Elizabeth Spelke, a co-researcher of the study, said: "...adults and children with no formal education [can] categorize geometrical forms." She concluded that geometry is a part of all humans, regardless of their schooling.

The study of geometry was conducted on the Munduruku people, who live in an isolated and remote part of Brazil. Co-author Stanislas Dehaene said there is a lot of research on maps, navigation and sense of direction with the jungle dwellers, but very little work on geometry. He said the concepts of 'point,' 'line,' 'parallel' and 'square' versus 'rectangle' are difficult concepts. He wanted to find out how much the Munduruku people knew about them. The research showed that Munduruku children rivaled the performance of American children doing similar geometry tests.

Source: <http://www.sciencemag.org/>

WARM-UPS

1. AMAZONIAN: You live deep in the rainforest in the Amazon. Talk to the other “Amazon people” in the class about life in the rainforest. Are you good at numbers and geometry? What things in your everyday life do you need numbers for? Compare to see who has the most uses.

2. CHAT: In pairs / groups, decide which of these topics or words are most interesting and which are most boring.

Researchers / Harvard / Amazon jungle / geometry / technical words / maps / formal education / sense of direction / right angles / squares / tests / concepts

Have a chat about the topics you liked. For more conversation, change topics and partners frequently.

3. PREDICTION: Talk with your partner(s) about what you think the article will be about. Use the words in the “chat” section above to help you. Change partners and share and compare your predictions.

4. INNATE ABILITIES: Talk about the following innate abilities, shared at birth by all humans. Which are the most important to you? Which would you like to improve?

- a. Geometry skills
- b. Language learning ability
- c. Capacity for great love
- d. Balancing
- e. Singing
- f. Using our hands to make things
- g. Sense of direction
- h. Riding a bicycle

5. GEOMETRY: Spend one minute writing down all of the different words you associate with the word “geometry”. Share your words with your partner(s) and talk about them. Together, put the words into different categories.

6. SCHOOL: Are you good with numbers? In pairs / groups, talk about the following. Were you good at these things at school? Are you good at them now?

- a. Geometry
- b. Mental arithmetic
- c. Algebra
- d. Long division
- e. Statistics
- f. Trigonometry

BEFORE READING / LISTENING

1. TRUE / FALSE: Look at the article's headline and guess whether these sentences are true (T) or false (F):

- a. Amazon tribes people passed the Harvard University entrance test. T / F
- b. Tribes people in the Amazon know the technical words of geometry. T / F
- c. The tribes people were able to find hidden objects using maps. T / F
- d. A researcher said knowledge of geometry is innate in all people. T / F
- e. The Munduruku people live on the edge of Rio de Janeiro. T / F
- f. A researcher said very little work has been done on sense of direction. T / F
- g. A researcher said the concepts of lines and squares are easy. T / F
- h. Amazon children did as well as American children on geometry tests. T / F

2. SYNONYM MATCH: Match the following synonyms from the article:

- | | |
|--------------------|---------------|
| a. discovered | guidance |
| b. isolated | irrespective |
| c. technical words | points |
| d. features | as opposed to |
| e. regardless | jargon |
| f. conducted | oblong |
| g. navigation | far flung |
| h. rectangle | matched |
| i. versus | found |
| j. rivaled | carried out |

3. PHRASE MATCH: Match the following phrases from the article (sometimes more than one combination is possible):

- | | |
|-----------------------------------|-----------------------------|
| a. isolated | to find hidden objects |
| b. the technical words | the Munduruku people knew |
| c. features in maps | is a part of all humans |
| d. children with no formal | part of Brazil |
| e. She concluded that geometry | of American children |
| f. an isolated and remote | tribes in the Amazon jungle |
| g. there is a lot of research | of geometry |
| h. navigation and sense | on maps |
| i. He wanted to find out how much | education |
| j. rivaled the performance | of direction |

WHILE READING / LISTENING

GAP FILL: Put the words in the column on the right into the gaps in the text.

Amazon tribe passes geometry test

Researchers in France and at Harvard University have _____ that isolated tribes in the Amazon jungle know as _____ about geometry as high-schoolers do. Research showed that _____ the tribes people did not know the technical words of geometry, they used the concepts in their _____ lives. They could also use _____, angle and other features in maps to find hidden _____. Dr. Elizabeth Spelke, a co-researcher of the study, said: "...adults and children with no _____ education [can] categorize geometrical forms." She concluded that geometry is a part of all humans, _____ of their schooling.

The study of geometry was _____ on the Munduruku people, who live in an isolated and _____ part of Brazil. Co-author Stanislas Dehaene said there is a lot of research on maps, navigation and _____ of direction with the jungle dwellers, but very little _____ on geometry. He said the concepts of 'point,' 'line,' 'parallel' and '_____' versus 'rectangle' are difficult _____. He wanted to find out how much the Munduruku people knew about them. The research showed that Munduruku children _____ the performance of American children doing _____ geometry tests.

much
regardless
everyday
discovered
objects
although
distance
formal
square
sense
similar
conducted
rivalled
work
remote
concepts

LISTENING

Listen and fill in the spaces.

Amazon tribe passes geometry test

Researchers in France and at Harvard University have discovered that _____ tribes in the Amazon jungle know as much about geometry as high-schoolers do. Research showed that _____ the tribes people did not know the technical words of geometry, they used the concepts in their _____ lives. They could also use distance, angle and other _____ in maps to find hidden objects. Dr. Elizabeth Spelke, a co-researcher of the study, said: "...adults and children with no _____ education [can] categorize geometrical forms." She concluded that geometry is a part of all humans, _____ of their schooling.

The study of geometry was _____ on the Munduruku people, who live in an isolated and _____ part of Brazil. Co-author Stanislas Dehaene said there is a lot of research on maps, navigation and sense of direction with the jungle _____, but very little work on geometry. He said the concepts of 'point,' 'line,' 'parallel' and 'square' _____ 'rectangle' are difficult concepts. He wanted to find out how much the Munduruku people knew about them. The research showed that Munduruku children _____ the performance of American children doing _____ geometry tests.

AFTER READING / LISTENING

1. WORD SEARCH: Look in your dictionaries / computer to find collocates, other meanings, information, synonyms ... for the words **'right'** and **'angle'**.

- Share your findings with your partners.
- Make questions using the words you found.
- Ask your partner / group your questions.

2. ARTICLE QUESTIONS: Look back at the article and write down some questions you would like to ask the class about the text.

- Share your questions with other classmates / groups.
- Ask your partner / group your questions.

3. GAP FILL: In pairs / groups, compare your answers to this exercise. Check your answers. Talk about the words from the activity. Were they new, interesting, worth learning...?

4. VOCABULARY: Circle any words you do not understand. In groups, pool unknown words and use dictionaries to find their meanings.

5. STUDENT "GEOMETRY" SURVEY: In pairs / groups, write down questions about geometry, mathematics and other number-related areas of study.

- Ask other classmates your questions and note down their answers.
- Go back to your original partner / group and compare your findings.
- Make mini-presentations to other groups on your findings.

6. TEST EACH OTHER: Look at the words below. With your partner, try to recall exactly how these were used in the text:

- | | |
|--------------|--------------|
| • discovered | • conducted |
| • showed | • navigation |
| • everyday | • sense |
| • find | • versus |
| • formal | • find out |
| • regardless | • rivaled |

DISCUSSION

STUDENT A's QUESTIONS (Do not show these to student B)

- a. Did the headline make you want to read the article?
- b. Are you good at geometry?
- c. Did you like things like geometry and math (maths) at school?
- d. Are you surprised at the conclusions of this research?
- e. Do you think you might have a better sense of direction than the people in the Amazon?
- f. Do you think your geometry skills might be better than those of the people in the Amazon?
- g. Are you good at reading maps?
- h. What innate abilities do you think are most important?
- i. What do you think is the use of this study?
- j. What is meant by 'point,' 'line,' 'parallel,' 'square' and 'rectangle'?

STUDENT B's QUESTIONS (Do not show these to student A)

- a. Did you like reading this article?
- b. What do you think about what you read?
- c. Do you know all of the jargon of geometry?
- d. What other kinds of jargon in English do you know?
- e. What everyday things do you think the Amazon people use geometry for?
- f. Would you like to conduct a two-year study in the Amazon?
- g. Would you prefer to study the people of the Amazon or the flowers and animals?
- h. What do you think American schoolchildren will think about this study?
- i. Would you swap your life to live in the Amazon rainforest?
- j. Did you like this discussion?

AFTER DISCUSSION: Join another partner / group and tell them what you talked about.

- a. What was the most interesting thing you heard?
- b. Was there a question you didn't like?
- c. Was there something you totally disagreed with?
- d. What did you like talking about?
- e. Which was the most difficult question?

SPEAKING

SCHOOL SUBJECTS: Do all children around the world learn the same things? In pairs / groups, talk about the differences between what the children of the Munduruku might learn in class compared with what children in your country learn.

SUBJECT	MUNDURUKU PEOPLE	YOUR COUNTRY
Geometry		
History		
Geography		
Literature		
Physical education		
Music		
Crafts		

Change partners and share and compare your ideas.

Talk about what parts of the Munduruku education you would also like to receive.

HOMEWORK

1. VOCABULARY EXTENSION: Choose several of the words from the text. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

2. INTERNET: Search the Internet and find more information on the Munduruku tribe. Share your findings with your class in the next lesson. Did you all find out similar things?

3. GEOMETRY: Write an essay about why you think geometry is important in our lives. Read your essay to your partner(s) in your next class. Did you all write about similar things?

4. A DAY IN THE LIFE: You live deep in the Amazon rainforest. Write an account of one day in your life. What are your thoughts on what is happening in the world today? Read what you wrote to your classmates in the next lesson. Did everyone have similar days and thoughts?

ANSWERS

TRUE / FALSE:

- a. F b. F c. T d. T e. F f. F g. F h. T

SYNONYM MATCH:

- | | |
|--------------------|---------------|
| a. discovered | found |
| b. isolated | far flung |
| c. technical words | jargon |
| d. features | points |
| e. regardless | irrespective |
| f. conducted | carried out |
| g. navigation | guidance |
| h. rectangle | oblong |
| i. versus | as opposed to |
| j. rivaled | matched |

PHRASE MATCH:

- | | |
|-----------------------------------|-----------------------------|
| a. isolated | tribes in the Amazon jungle |
| b. the technical words | of geometry |
| c. features in maps | to find hidden objects |
| d. children with no formal | education |
| e. She concluded that geometry | is a part of all humans |
| f. an isolated and remote | part of Brazil |
| g. there is a lot of research | on maps |
| h. navigation and sense | of direction |
| i. He wanted to find out how much | the Munduruku people knew |
| j. rivaled the performance | of American children |

GAP FILL:

Amazon tribe passes geometry test

Researchers in France and at Harvard University have **discovered** that isolated tribes in the Amazon jungle know as **much** about geometry as high-schoolers do. Research showed that **although** the tribes people did not know the technical words of geometry, they used the concepts in their **everyday** lives. They could also use **distance**, angle and other features in maps to find hidden **objects**. Dr. Elizabeth Spelke, a co-researcher of the study, said: "...adults and children with no **formal** education [can] categorize geometrical forms." She concluded that geometry is a part of all humans, **regardless** of their schooling.

The study of geometry was **conducted** on the Munduruku people, who live in an isolated and **remote** part of Brazil. Co-author Stanislas Dehaene said there is a lot of research on maps, navigation and **sense** of direction with the jungle dwellers, but very little **work** on geometry. He said the concepts of 'point,' 'line,' 'parallel' and '**square**' versus 'rectangle' are difficult **concepts**. He wanted to find out how much the Munduruku people knew about them. The research showed that Munduruku children **rivaled** the performance of American children doing **similar** geometry tests.