

Hasenschule: Was bedeutet das? Bitte erklären das mir.

What does it mean? Please explain me that.

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Abstract: One class room of Hasenschule, one of my student was learning multiplication. The question was, “A piece of bread costs 2.9 Euro. How much the total price if you bought two quantity of bread.” She was easily able to answer the question as 5.9 Euro, $2.9 \times 2 = 5.9$. However, when the quantity is four, she could not answer the question. There is a comprehensive explanation why this happened. This is a story of how it was found.

1 Math is a kind of language.

When my students asked me a question, I usually answered the following:

“Was bedeutet das? Bitte erklären das mir.”

“What does it mean? Could you please explain me that?”

I continue as:

“Mathe ist eine Sprache. Es gibt eine

Bedeutung.”

“Math is a language. There is usually some meaning.”

When I asked my students to explain the meaning of the question, they sometimes answer me, “You are a teacher, you explain me.” Well, that’s true. But, I want to know they understand the question. I also want to teach them how to explain something. Therefore, I ask them, “What does the question mean?”, “Is it true?”, “Please explain that why.”

Sometimes some students cried saying, “You didn’t teach me an answer.” or “You didn’t help me. Help me, please.” I was thinking, “The answer is not so important. I want you to learn how to learn by yourself. This is a practice. I wish soon you don’t need my help. I want you to practice to solve a new problem. In the future, you will confront a total new problem that no human kind ever met, and you need to solve it. I want to help you to prepare that time because I can not help you that time.” How-

ever, I am also still learning how to solve a new problem. I cannot really teach it since I still don't know it well. Therefore, I said, "Please don't cry. You can understand if you think slowly, take time as much you need. If you can not do it today, there is a tomorrow. The answer is not so important. The understanding is the most important." By the way, in German the word "correct" is "richtig" and "important" is "wichtig". I can not say well that "Richtig ist nicht so wichtig." since for Japanese, "r" and "w" are difficult to pronounce. This makes them laugh.

Five months ago, one student was always crying and her grade was always 5. She got last month 2 in math. I am so happy for her. ('1' is the highest grade in Germany.)

2 Case S

S. was solving a multiplication problem. One piece of black bread costs 2.9 Euro. How much is the each of Anzahl (quantity) : 2, 4, 6, and 8? Figure 1 show the problem.

She answered the first question of Anzahl (quantity) 2 case as 5.8 Euro. (As shown in the figure, some European countries including Germany use the comma as the decimal point. In this text I use period as the decimal point.) However, next question, she calculated 2.9×5.8 for the quantity 4 case. I asked her why she did it. (In Figure 2, you can see the trace of that.)

She believe she should do that and she explained something. However, I didn't understand it. So, I said, I don't understand your explanation. It turns out she also doesn't know why she did that. So I wrote Figure 2, then I explained if we have four pieces of bread, 4×2.9 would be the answer.

b)



Schwarzbrot 2,90 €

Anzahl	Preis
2	5,80 €
4	11,60 €
6	17,40 €
8	23,20 €

Figure 1: Case S. question.

First she fixed my figure to put the shadow on the left side of the bread, so it looks more realistic.

However, she said she don't know what to do for the quantity six case. I was puzzled, why she couldn't. I asked her to write down what is the question in a normal sentence. She might not know what the question is. She didn't know what the question is. I told her that the question is I want to buy 2.9 Euro four pieces of bread as seen in Figure 2. She understood what this means, but she didn't understand why this is relevant to the problem.

I asked her all the related words. "What is black bread?" She knows it. 2.9 Euro? OK. "What is quantity? (Was ist die Anzahl?)" It took a while, but she answered "I don't know. (Ich weiss night.)" I see! I

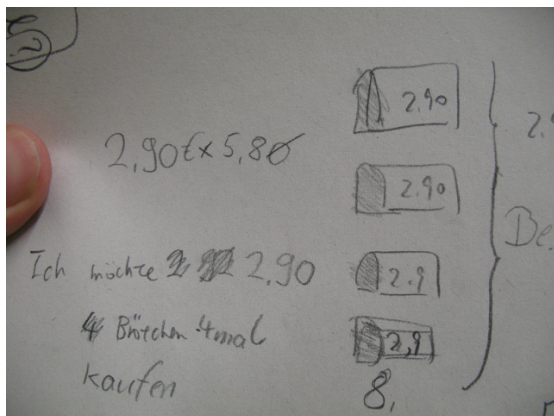


Figure 2: How to calculate the price?

told her, “I think this means ‘how many’, but, actually I also don’t know this German word, so let’s ask other teacher.” My guess was correct, she said, “Ah, you mean how many pieces (Wie viel Stück).”

Then, she solved 6 and 8 cases so easy. I always have fun to find what they don’t understand. They usually don’t know what they don’t understand themselves. I asked her what is her mother tongue. She talks her father with German and her mother with Turkish. However, I don’t see so much problem in that case.

When I was a high school student, the students are classified with literature course and science course. Japanese and English were important in the literature course and Mathematics and Science were important in the science course. I didn’t understand this classification because to learn Mathematics and Science I needed Japanese and English. Without Japanese and English I can not learn any Mathematics and Science. I can not think anything without language. So, my favorite classes were Japanese and Mathematics. I am not sure there is still this classification in Japan. I am more confident now that the language is so essential. I learn the

word Anzahl in math teaching last week with S.

By the way, in Japan the price of four pieces of bread should be calculated as 2.9×4 and 4×2.9 sometimes is not correct. (<http://www.asahi.com/shimen/articles/TKY201301240620.html>) In Japanese, “I bought bread four times (パンを4つ買いました)” is natural saying order, so maybe this is reflected. But, in English or in German, four pieces of bread (vier Stück) is also natural. In Japanese, we can also say in the same order (4つのパンを買いました). I think this too much restriction harms later because: 1. later a student learns algebra, then constant factor multiplication of x is ax instead of xa . 2.9×4 becomes wrong without any reason explained, 2. ax is the international standard in math. In this global time, teaching the international standard is wrong sounds not so good idea. These two reasons, I think we should not make the 4×2.9 wrong.

3 Case A.

A. was studying geometry. That time, A Rechtschreibung (spelling) teacher Ms M watched her. The question was how many cross point (Schnittpunkt) of the three lines (Gerade) in the figure. In the question figure, the cross points are emphasized, but, she could not answer the question. Ms M asked me to help her.

As usual, I asked her, “Could you please explain me what is a line? (Bitte erklären mir was ist Gerade.)” She answered me “A line is a line. (Gerade ist Gerade.)” Well, that’s true, but there is no information.

“How the school taught you. A line has an end? Or a line has no end?” “A line has no end.” I see, so I know she learned the difference between line, half line (ray), and

segment at her school. “OK, then what is Schnittpunkt?” I actually didn’t know what is a Schnittpunkt. She answered, “I don’t know.” So we asked other teacher, what is a Schnittpunkt. It is a cross point of two lines. This actually solved her problem. I think I am better teacher when I teach in German, since my German is not good, therefore, I first need to know what is the problem. I asked the meaning of the question to my student. I found many students just don’t know what the question means. Therefore, many teacher failed to teach. If a student doesn’t know the meaning of the question, teaching answer has no meaning.

Now we back to the problem, the question is clear. Then she classified the all cases of the 0, 1, 2, 3 Schnittpunkte correctly.

I asked her what is her mother tongue. She use Spanish and English at home. I should remember I should always first check the question is clear or not. I wish soon she can figure out what she didn’t understand by herself.

Today, I asked my students, “What does this mean?” Some students think I don’t understand math questions. Actually No, I don’t understand them well. In Hasenschule, when a student became better, she/he usually became both German and math became better.

A few days ago, coincidentally, only A. took a math course. But another teacher was there. So, I just watch how she learn from the other teacher. She learned a calendar math. I saw a word “Schaltjahr” that I didn’t know the meaning. So, I asked her, what is a “Schaltjahr”. She explained me it well. (Schaltjahr in English is a leap year.) I asked her why it is called “Schaltjahr”. She didn’t know, the other teacher didn’t know either. By the way, why leap year is called leap year is an interesting. Japanese leap

year is “閏年”, the character shows ‘a king is behind the gate.’, since that day the king don’t do the official work. My next question is why such strange year exists? Although, the other teacher seems to continue to teach how to calculate the days, so I didn’t have a chance to tell that story. Maybe another time.