Guide to Create Math Tasks in Easy Language

MathCityMap

Why Easy Language?

Many people have difficulties with reading and understanding.

For example people with learning difficulties (Inclusion Europe, 2010).

Or people who do NOT speak English very well (Inclusion Europe, 2010).

Therefore, there is Easy Language.

There are standards for Easy Language.

For Europe, there are for example the standards of Inclusion Europe (2010).

First, a text is written in Easy Language with these standards.

Then, the text is reviewed.

By the people, the text is made for.

That secures that the text is easy to read and understand (Netzwerk Leichte Sprache e.V., 2022).

Why Easy Language in Math Tasks?

For many people, the language in math tasks is difficult to understand.

A study examined the influence of language in the final math exams in grade 10 in Germany.

The study showed that language has an influence on maths performance (Prediger et al., 2015).

The students with language difficulties had problems with reading.

For example, because of difficult sentences (Prediger et al., 2015).

The students with language difficulties had problems with grammar too (Prediger et al., 2015).

And with vocabulary (Prediger et al., 2015).

Therefore, there should be math tasks written in Easy Language.

Or math tasks should additionally be rewritten in Easy Language.

The content of the task should NOT be changed (Netzwerk Leichte Sprache e.V., 2022).

Why Outdoor-Math-Tasks in Easy Language?

The study showed that language has an influence on maths performance.

Because the math tasks are language-based (Prediger et al., 2015).

That means, the tasks do NOT only test the calculation skills.

They test the application and use of maths in sample situations (Prediger et al., 2015).

Outdoor-Math-Tasks are tasks with examples in the environment.

The students get tasks outside the classroom.

To solve the task, the students find a lot of information in the environment.

The connection between the information and maths is NOT immediately clear.

Therefore, there should be Outdoor-Math-Tasks in Easy Language.

Structure of the Guide

This guide provides an overview of the standards to create math tasks in Easy Language.

The guide is based on the standards of Inclusion Europe (2010).

And on the standards of Netzwerk Leichte Sprache e.V. (2022).

The standards refer to

1. **Words**
2. **Numbers and symbols**
3. **Sentences**
4. **Layout.**

Finally, some math tasks will be analysed with these standards (5.).

1. Words

(1) Use words that are easy to understand.

 triumph

 win

(1) Use familiar words. Avoid foreign words and words from other languages.
If this is not possible, explain difficult words with examples.

 vice versa

 reversed

(1) It is important that the words describe the things exactly.

 groceries

 food and drinks

1. Words

(4) Use the same words to describe the same things.

building, construction, house

To describe a building always use the word ‚house' .

(4) Use short words.

If that is not possible, separate long words with a dash.

Avoid initials and abbreviations.

cobblestone

cobble-stone

1. Words

(6) Avoid passive language. Use active language.

At this point, the distance is measured

At this point, we measure the distance.

(6) Use positive words.

If this is NOT possible, point out NEGATIVE words.

Tomorrow it isn‘t the weekend.

Tomorrow is a working day. / Tomorrow it is NOT the weekend.

(6) Avoid metaphors.

Metaphors are sentences, that do NOT mean, what they say.

I am drowning in work.

I am very stressed and overwhelmed with my home-work.

2. Numbers and Symbols

(1) Use digits for numbers. NOT words.

There are seven stones on the wall.

There are 7 stones on the wall.

(1) Use Arabic numerals.

They are better known than Roman numerals.

IX + XIII = XXII

9 + 13 = 22

3.Sentences

(1) Keep the sentences short.

Make one statement in one sentence.

Avoid subordinate clauses.

Each new sentence starts in a new line.

On a cold day, Juri went to the forest to collect some leaves.

Juri went to the forest.

It was cold.

He collected some leaves.

(1) It is allowed to use in-complete sentences.

A sentence can start with *and*, *or*, *but*.

Calculate the height and length of the rectangle.

Calculate the height of the rectangle. And the length.

3.Sentences

(3) Use easy sentence structures.

First, name the subject.

Then, describe the plot.

Avoid special characters, like /, -, &.

To calculate the surface area, you need the length of the sides.

You need the length of the sides to calculate the surface area.

(3) Directly address the readers.

With words like *you*.

4. Layout

(1) Write a new sentences in a new line.

(2) Write the words in one line that are connected by the meaning.

Do NOT separate words at the end of a line.

(3) Images must belong to the text.

And images must be clear and sharp.

(4) The most important information must be easy to get.

For example, the important information can be at the beginning of the task.

(5) Highlight important information and words.

For example by using ALL CAPS.

Calculate the perimeter of the rectangle.

Calculate the PERIMETER of the rectangle.

5. Examples

Task 1 (Graffiti)

The GRAFFITI shows blue waves.

YOU want to spray this graffiti with a different colour.

1 SPRAY CAN paints 1 square meter.

How many SPRAY CANS do you need?

This task is easy to understand, because:

- **there are digits used to describe numbers.**
- **each sentence starts in a new line.**
- **the sentences are short without subordinate clauses.**
- **the students are addressed directly.**

5. Examples

Task 2 (Punctuality of buses)

The RMV organises the BUSES in Frankfurt.

The RMV has a goal.

Just 20% of all buses should NOT be punctual.

It is MONDAY.

If the RMV is right.

How many buses of line 69 to the Hügel-Straße will arrive PUNCTUAL?

The task is easy to understand, because:

- each sentence starts in a new line.
- there are no difficult or long words.
- NEGATIVE language is pointed out.

5. Examples

Task 3 (Ladder)

How many ways are there to climb up the ladder to get onto the climbing frame, if you are only allowed to touch each rung of the ladder once, but you can skip individual steps?

The task is difficult to understand, because:

- 👎 **the question is too long.**
- 👎 **‚step' and ‚rung' are both used to describe the same thing.**
- 👎 **there are subordinate clauses.**

Alternative: **You want to climb up the LADDER.**

You are only allowed to touch each rung ONCE.

You can SKIP individual rungs.

How many WAYS exist to get onto the climbing frame?

5. Examples

Task 4 (Cobblestones)

How many rectangular cobblestones, the ones laid on the right and left, are needed to pave the entire unpaved area of soil in the same pattern?

The task is difficult to understand, because:

- 👎 **the question is too long.**
- 👎 **there is a subordinate clause and a passive.**
- 👎 **the word cobblestone is long.**

Alternative:

YOU can see COBBLE-STONES on the left and right.

Rectangular cobble-stones.

YOU have to pave the AREA of soil.

With the SAME cobble-stones in the SAME pattern.

How many cobble-stones do you need?

References

Inclusion Europe. (2010). *Information for all. European standards for making information easy to read*. Inclusion Europe. https://www.inclusion-europe.eu/wp-content/uploads/2017/06/EN_Information_for_all.pdf

Netzwerk Leichte Sprache e.V. (2022). *Die Regeln für Leichte Sprache*. Netzwerk Leichte Sprache e.V. https://www.netzwerk-leichte-sprache.de/fileadmin/content/documents/regeln/Regelwerk_NLS_Neuauflage-2022.pdf

Prediger, S., Wilhelm, N., Büchter, A., Gürsoy, E. & Benholz, C. (2015). Sprachkompetenz und Mathematikleistung – Empirische Untersuchung sprachlich bedingter Hürden in den Zentralen Prüfungen 10. *Journal für Mathematik-Didaktik*, *36*, 77-104.
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