

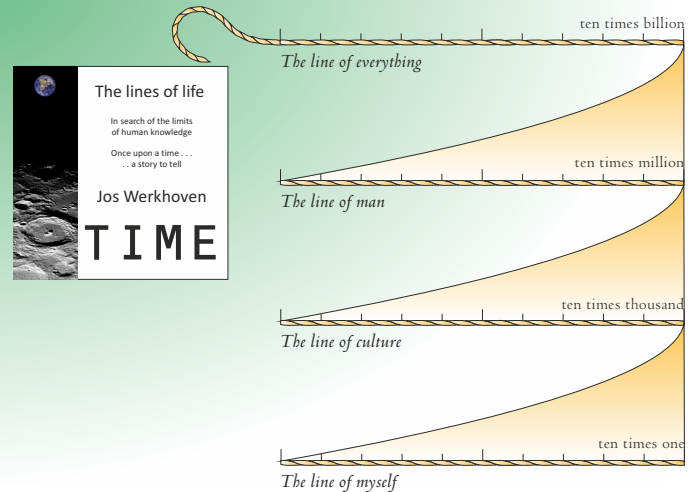
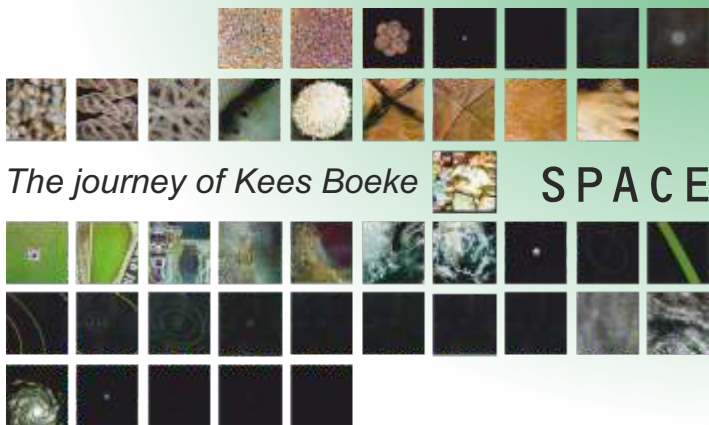


Once upon a time . . .
. . . a story to tell

QUESTIONING

Maria Montessori

Jos Werkhoven
QUESTIONING
SPACE and TIME



When you question space and time
everything is your teacher

Siddhartha Gautama Buddha
ca. 450 BC to about 370 BC.



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Kortenhoef, spring 2025

Warm greetings, dear reader,

First of all, I would like to introduce myself to you.

My name is Jos Werkhoven and I have always worked in and for (Montessori) education from 1972 to the present as a teacher, director, trainer, supervisor and developer of educational materials. Since 1995, the development of educational materials has received extra attention because I started working as an independent publisher. Publisher De Arend published, among other things: Reading material in the script font, The lines of life, The line of the day, Poetry for everyone, Mathematics Montessori Primary education, The Story Guide and Language as a means of communication and expression.

I will tell you much more about The lines of life later.

Now that you know a bit more about my educational past, it will not surprise you why I chose the text of Buddha ***"If you question space and time, everything is your teacher"*** as a start with the image placed next to it.

With the images of the three educational materials to be discussed, supplemented with the text below, I would first like to explain to you why I wrote the book:

„Once upon a time . . . a story to tell . . .“ with the subtitle ***„Questioning space and time.“***

With some reservations but absolutely out of conviction, I believe that humanity on our vulnerable spaceship earth, despite the diversity of cultures, has a common beginning and a common story.

Humanity needs that story to live together peacefully, sustainably and caringly for and with each other on our mother earth.

I see it as ***an inalienable right*** of every inhabitant of the earth that we may not withhold ***the essentials that touch our lives from humanity***. We can (and in my opinion must) offer humanity the essentials in education.

Knowledge and awareness of those essentials creates responsibility.

Maria Montessori once said: "We do not have to expect the elevation of humanity from politics or religion, but we may expect it from good education. "

In the above I have expressed ***my opinion***. I will mainly leave my opinion out of the book.

The scientifically substantiated data that appear from the three educational materials to be discussed are objective. We then speak of ***facts and theories***.

After the almost 2500 year old wisdom of Buddha, I fully support the words spoken in 2024 by Beatrice de Graaf (1976 - present, faculty professor of history at Utrecht University and holds the chair of History of International Relations).

Beatrice spoke the words quoted below during the Huizinga lecture 2024, entitled ***"We are the times. History in times of crisis"***¹.

On page 23 of the publication of the lecture she describes the core theme of the lecture as follows:

"That is why we cannot avoid the duty to develop stories in times of crisis from a basic attitude of amor mundi (love for the world). And that is possible. Because what Augustine and Huizinga did, . . . was to use history as a 'usable past' (description historian Van Wyck Brooks, 1918).

That means that you . . . tell history stories that give people direction. Stories that not only logically order the facts and explain what is going on, but that also offer a perspective for action, with an eye for human shortages and deficiencies."

Maria Montessori called this method:

'Cosmic education and upbringing'.

Cosmic stands for telling stories about all space and all time.

Education: Telling stories that not only logically order the facts and explain what is going on.

Upbringing: offering a perspective for action, with an eye for human shortcomings and deficiencies.

Maria Montessori was rightly nominated for the Nobel Peace Prize in 1949, 1950 and 1951.

On page 26 she continues:

"But if these stories are not supported by a series of beliefs, they will evaporate in the wind and remain a bit of entertainment."

And further on page 29:

"The Amsterdam philosopher Rik Peels recently explained that meaningful stories 'work', are resilient if they are supported by moral-epistemic attitudes²."

A little further:

"Such an attitude can be religiously inspired . . . but just as well secular: belief in the power of friendship and family, of democracy and the rule of law, of humanity and civilization. Such an attitude can be learned and cultivated. You can present it to others. A society in which people tell each other stories in this way becomes more hopeful and resilient."

I thank Boeddha and Beatrice de Graaf very much for their inspiring and motivating words.

Hopefully they will inspire you to continue reading this shortened story of my book written for education, 'Once upon a time . . . a story to tell . . .'.

In that book you will find even more inspiring and motivating words from many of my inspirators and more elaborated examples for education.

I wish you much reading pleasure.

Afterwards I would like to discuss with you what you have read.

INTRODUCTION

“Once upon a time a story to tell . . .”

I am going to tell you a short story about my book:

,Once upon a time . . . a story to tell . . .’.

Now I am indeed going to tell you a story, but in reality it is not MY story, it is OUR story.

OUR written in capital letters to emphasize that it is a story by and for every inhabitant of the earth: as humans we have a common origin in our shared living and residential space, our vulnerable spaceship ,earth’. Despite our different cultures we share a common history of origin.

There are of course hundreds, thousands, even millions of sub-stories to tell, **OUR** story always has as its basis **THE TOTALITY of space and time**.

For the record: with the totality of space and time we explicitly speak about all space and all time that man thinks he knows. Science is our source for this.

I will tell you later about my three most valued educational materials that have been developed for children, but are certainly not childish! As a former school teacher, I heartily recommend these materials to all my teaching colleagues on earth. In addition to my teaching colleagues, I also recommend the knowledge of these materials to all inhabitants of the earth; they probably offer many people further education.

The materials almost tell a story by themselves, so special, so wonderful, so beautiful and unfortunately sometimes so horrible; the best storyteller could never have imagined this: it is **OUR** story.

In most schools on earth, the story is not told or only partially told. All earthlings have the right to hear an honest and reliable story, have the right to receive the correct information.

In our current time it is a good thing to arm humanity against the difficult to verify information from social media, the untruths that many politicians tell you, the frequently spread fake news and the many conspiracy theories.

Good education can peacefully arm humanity against disinformation and provide answers to the problems that affect us.

If you don't have the book yet, you can download it [here](#). (A page with more downloads) It's free, so you can share it with anyone; that also applies to this abridged edition.

You can download an English version [here](#).

On this page you can find more free downloads related to the book.

And this story is about good education and providing good and correct information (and much more extensively in the previously mentioned book).

My wish.

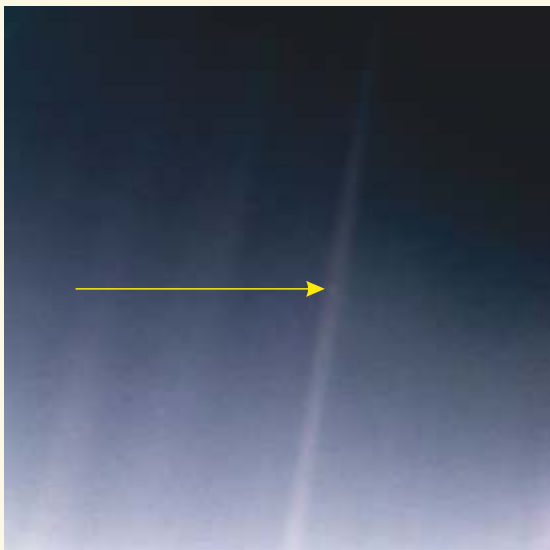
If the child, the human, the earthling, receives education and acquires knowledge about our common origin, history and place of residence in space and time, then that will **strengthen our awareness of our humanity** in the special universe in which we live.

That can be beautifully depicted with '**the pale blue dot**'.

The 'Pale Blue Dot' is a photo of the earth, taken on February 14, 1990 by NASA's Voyager 1 at a distance of 6 billion kilometers from the earth.

Barely visible in a large dark space with temperatures of -270 degrees and dangerous radiation, the earth floats, pixel-sized with almost 8 billion people who share a common origin and a common home.

photo 1



I cannot understand what this knowledge does to you; astronauts speak of the 'overview effect': the awe, the connection and the responsibility that wells up in space travelers at the sight of that fragile little ball with the atmosphere hanging around it like a thin shell, the earth.

Now I am not an astronaut, but I feel very well and understand what astronauts mean by the overview effect. So we can learn it; let us teach it to humanity, starting with the young children at school.

'*Scientia potentia est*' = '*knowledge is power*', a special statement, attributed to Francis Bacon (1597).

I see the word 'power' here as 'being able to', the potential, the strength and the responsibility that man obtains through knowledge to deal with each other and our spaceship earth in a caring, sustainable and peaceful way.

The materials for acquiring the knowledge that I will tell you about later, use as a source the knowledge that humanity has acquired to date and that can be verified by everyone: science.

As I gained more and more knowledge by working with the three educational materials, my amazement grew as to why I was not offered this knowledge as a child at school.

I therefore express once again the wish that every child on earth may hear the stories of space and time.

Because only if you know what is happening today and have knowledge about the past, can you as a human being steer towards change.

In our current time, science is under pressure: many see science as merely an opinion.

It is of great importance to make it clear to young children, before the big story is told, that no fairy tales are being told.

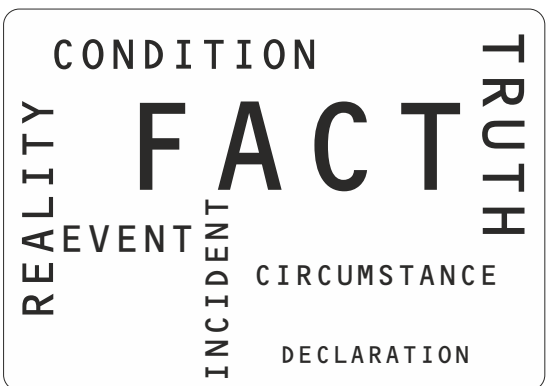
The big story is based only on facts and scientifically substantiated theories.

The children are therefore clearly told that the Big Bang and evolution, despite many scientific substantiations, are still called theories.

In the book I have included a story that explains how this can be made clear to the children and which exercises the children can do.

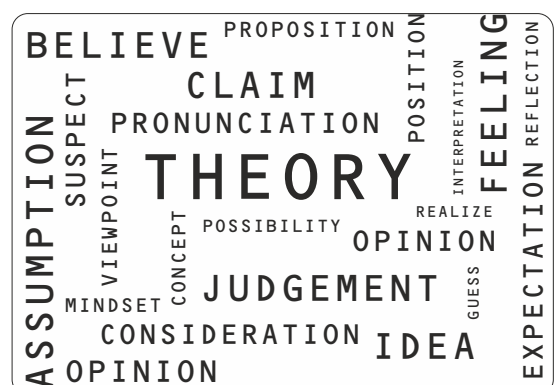
(You can also read that story [here](#) ^{downloads-1}.)

In the next chapter I will explain to you in seven images what children and humanity can achieve by questioning space and time.



I did a little research into words that come close in concept to **FACT** and **THEORY**.

It will probably not surprise you that there are far fewer concepts for **FACT** than for **THEORY**: it is easier to speculate about the world than to describe it as precisely as possible.



THE PUZZLE METAPHOR

Maria Montessori started **cosmic education** in India during the Second World War. Since the end of the last century, there is a scientific discipline that supports Maria Montessori's ideas with even more information: **Big History**.

For people who have never been introduced to cosmic education or Big History, I have created seven metaphorical images that, in my opinion, make clear what cosmic education/Big History education represents.

The frame below represents the totality of time and space, the universe, as man now thinks he knows it. The knowledge that man has acquired about the totality of time and space through science is now immense and is still growing (almost) exponentially every day. Please note: our total knowledge is limited, after all, we do not know everything by a long shot. The knowledge limit is the orange frame that you see.

This frame is repeated on every page, varied fillings, representing the knowledge of children, are then added.

You see a large white area. The metaphor of this area is in the white. White is not a colour, but if we consider the frame as white light, then we know that all the colours that exist are in the white light. Metaphorically, the white represents everything that we as humans think we know.



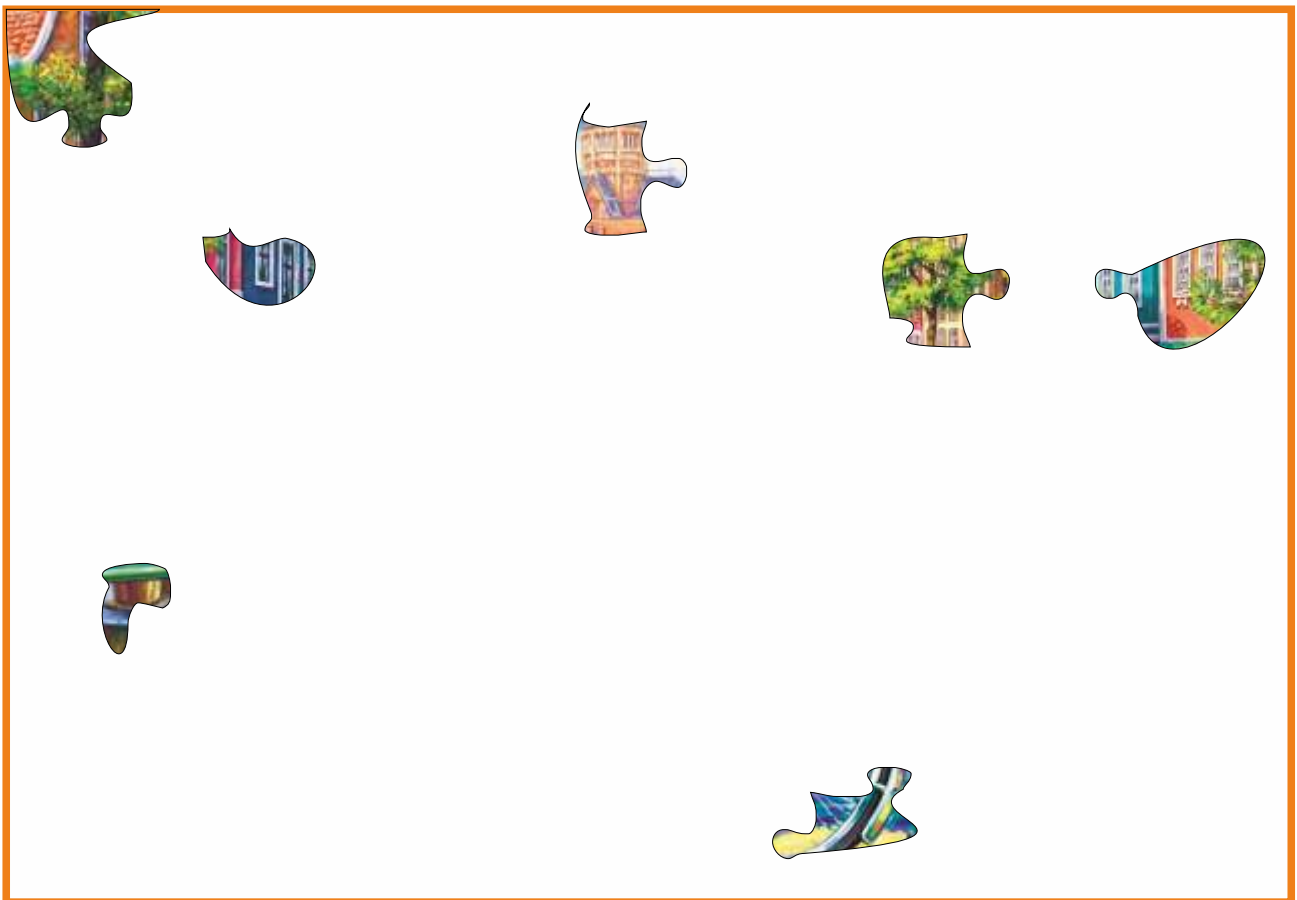
The knowledge our children possess before they enter school

The young child has already acquired a lot of different knowledge of the totality of time and space, the universe, before it comes to school.

The different shapes in white represent that knowledge. They do not yet know the rest of the white (all the knowledge to know).

The knowledge acquired by the child varies greatly per child, depending on environment, upbringing, interest, intelligence, etc.

Much knowledge is not yet connected to each other; relationships are not (yet) visible.

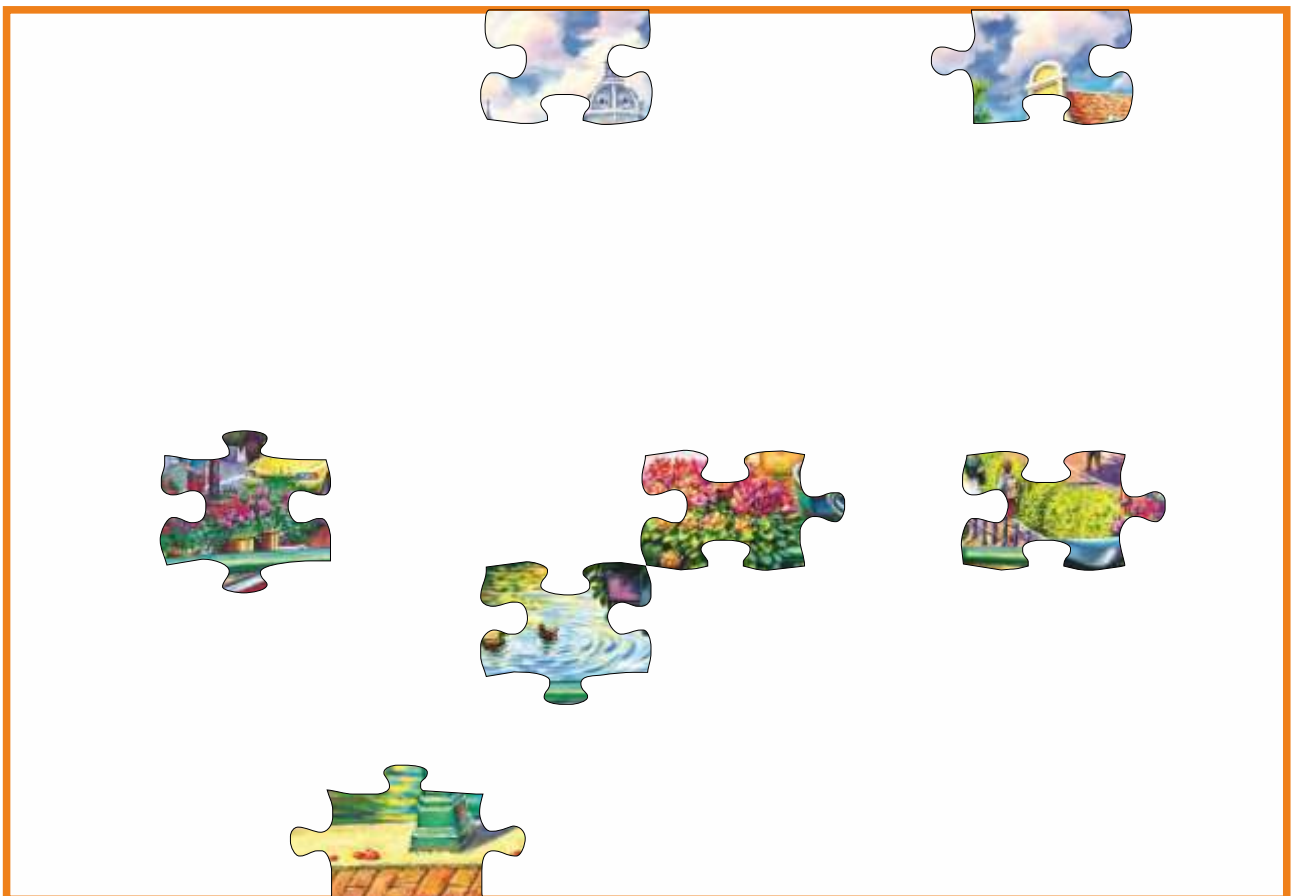


The knowledge we offer our children (3-18 years) at our schools

The 'own' knowledge that the child possesses when it comes to school (the previous image), I have temporarily left out in this image, but I will add it again in the next image. In my opinion, this makes it clearer what the school offers: the subjects language, arithmetic, geography, history, biology, music, gymnastics, etc. etc. The range of subjects can differ slightly per school. Each piece of the puzzle therefore represents a subject.

Are the subjects connected to each other? The individual pieces of the puzzle are clear, but is it clear to you yet which image the totality of the puzzle represents?

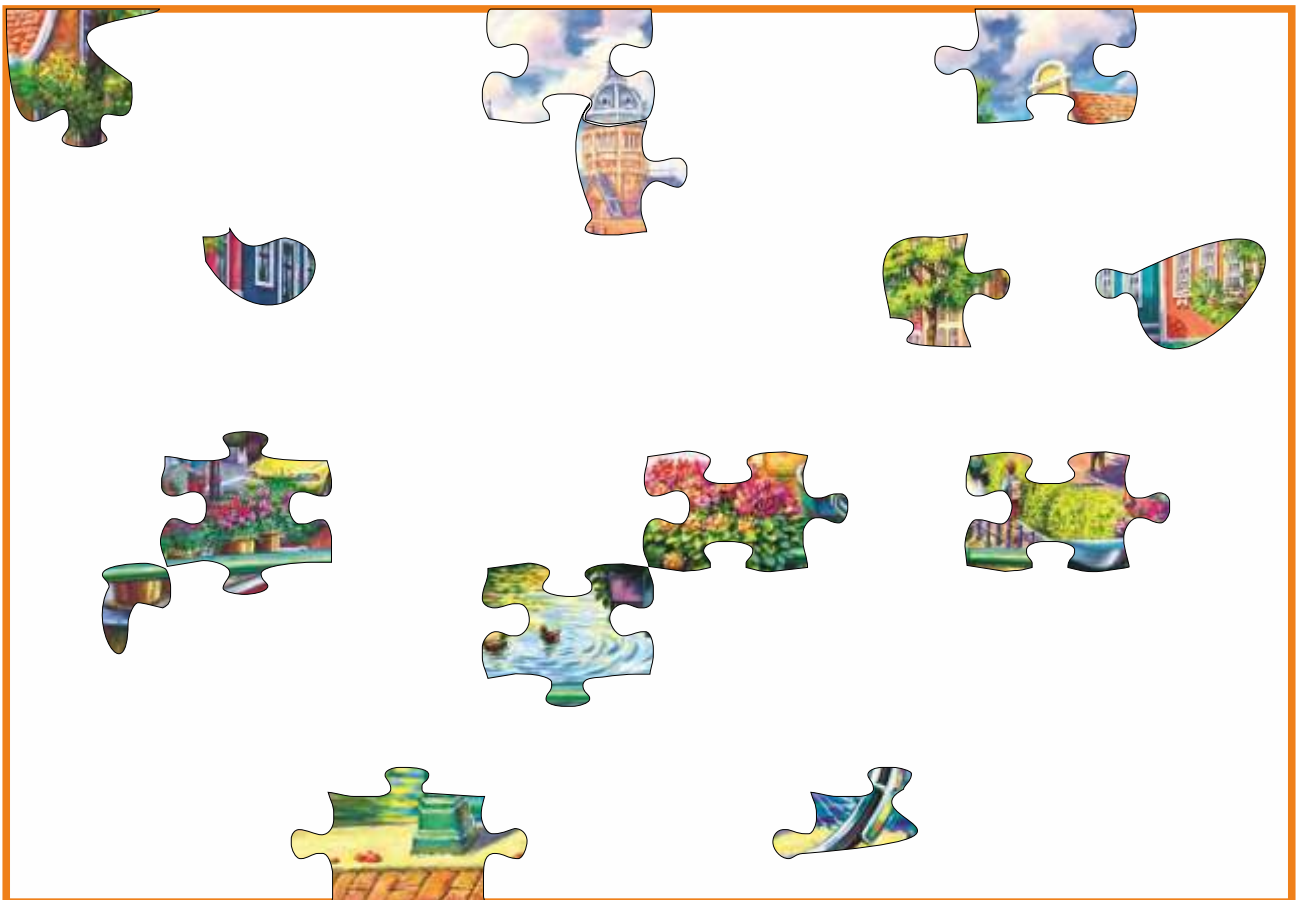
So at our schools we offer pieces of knowledge that are not yet connected to the reality in which we live.



Self-acquired knowledge plus the knowledge we offer our children at our schools

The self-acquired knowledge that the child possesses when it comes to school has now been added to the knowledge that we offer the children at school. During the school period, the child will also add a lot of its own non-school knowledge to the total supply of school knowledge.

Despite the growth of knowledge, the image of the totality of the puzzle has not become much clearer. We still lack the overview. The overview that we need to be able to better understand the known parts and to be able to place them in a larger whole.



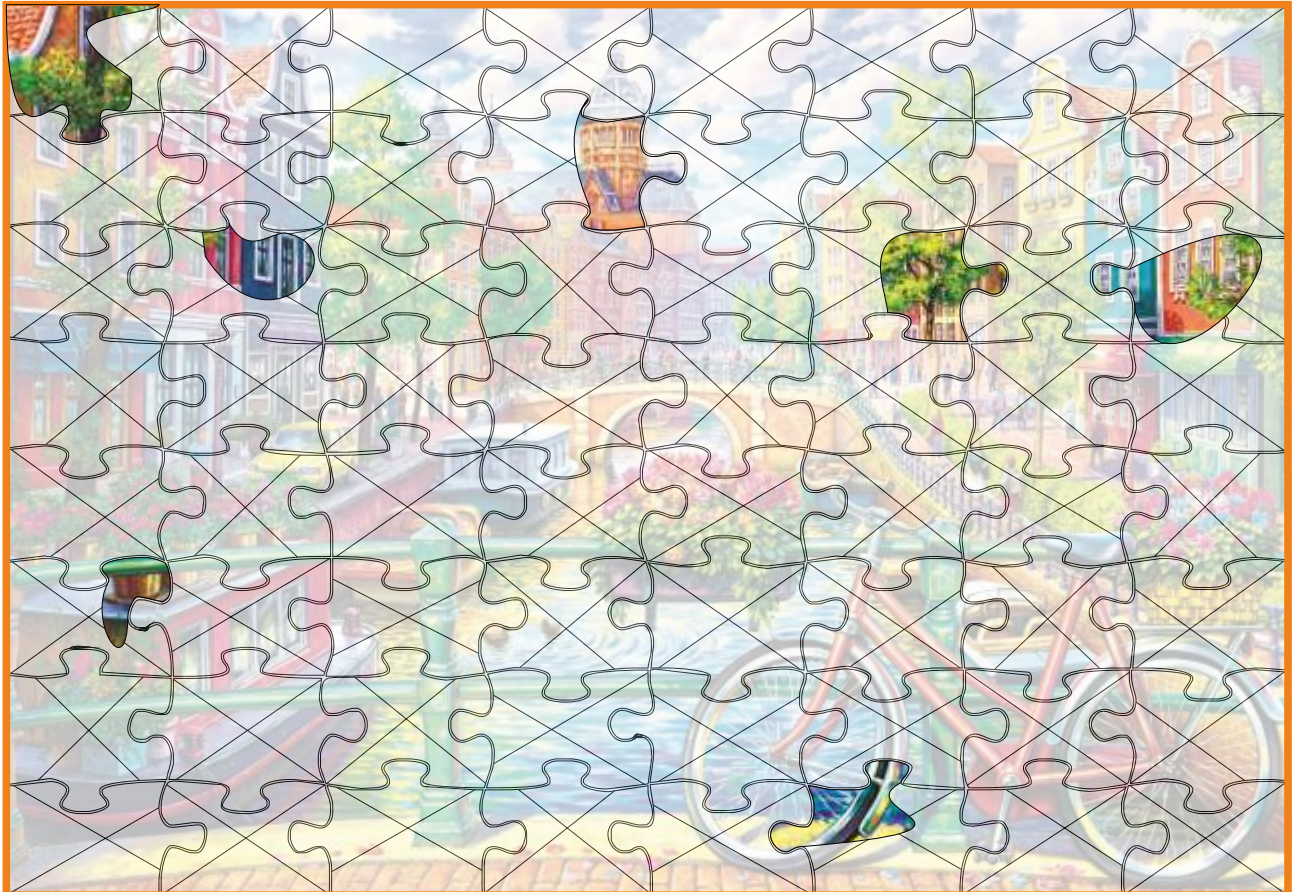
How nice would it be if

Yes, how wonderful would it be if we gave our children (from about six/seven years old) **an overview of the totality of time and space, the universe.**

That would look something like the image below. The knowledge that the children already possess when they start school has been added to the image. The total image is still not clear, but if you look closely, you will see what the image represents: the metaphor for the overview given to you of the totality of time and space, the universe.

Not yet clear, not yet complete, but the world has been opened up to us.

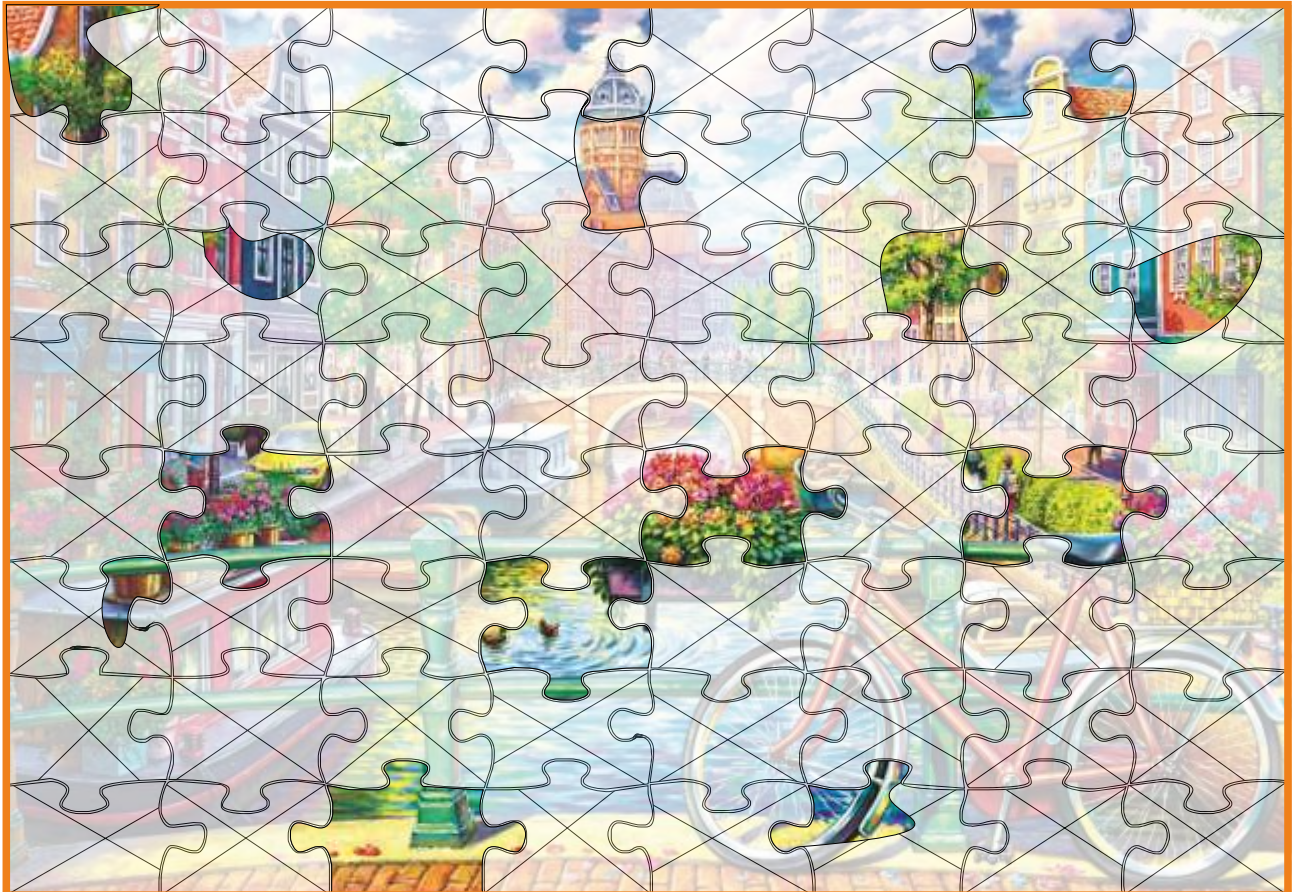
The chance is very great that we want to know much more about certain parts; curiosity has been aroused. We are going to study that!



Knowledge is connected

The already acquired own knowledge plus the knowledge that our education offers is placed in the totality of time and space, the universe. The child can place the acquired knowledge plus the knowledge of the various school subjects in and connect it with the whole of everything that can be known.

Give the child the opportunity to deepen subjects that are still vague, but can also become clear through further research.



Education will never be as clear
as the following

No, there is far too much knowledge to be known about very many things; no human being can handle that individually.

Note that the orange frame of the totality of time and space is missing here! The totality cannot be limited, reality will be greater than man now thinks he knows.

photo 2



QUESTIONING SPACE AND TIME

The Lines of Life - TIME

In the eighties of the last century I worked as a director and teacher of a Montessori school. In my role as director I had an evaluative interview after a visit to the school by the education inspectorate. He advised the school to work more with timelines. His advice led me into a research trajectory that will never end, but which you are now going to read about.

What was special in this situation was that Maria Montessori had already published about the use of timelines³ in 1947 in connection with what Maria Montessori called cosmic education and upbringing. Now I call that Big History education.

Unfortunately, there was hardly any contact between the Dutch Montessori Association and the Association Montessori Internationale in the last decades of the last century due to differences of opinion. This resulted in little or no attention being paid to cosmic education and upbringing in the Montessori education programs in the Netherlands. In the early seventies of the last century I followed a Montessori education without knowledge of and about cosmic education and upbringing. It was not until 1998 that her aforementioned book³ was published in the Netherlands by the Dutch Montessori Association. I can highly recommend it to you.

I discovered that Maria Montessori used a timeline of 300 metres in India during the war years of the Second World War. The 300 metres represented the age of the earth (then estimated at 3 billion years). The last 30 centimetres of the line were given a different colour and represented the age of man on earth (then estimated at about 3 million years). She had the children walk or cycle 299.7 metres to literally stand still at the last 0.3 metres: an experience that man had only been on earth for a very short time in relation to the age of the earth.

In those years (1988) Stephen Hawking published his book *The Universe*⁴. Reading that fantastic book completely changed my perspective on time, space and development. That is why I decided not to follow Maria Montessori's idea of her timeline: there was much more time and space than just the earth!

The material to gain insight, knowledge and overview about the time in which we live.

The idea of this material is about 40 years old and was developed by the undersigned, Jos Werkhoven.

It was given to me by the cosmos when I wanted to draw timelines in the eighties of the last century.

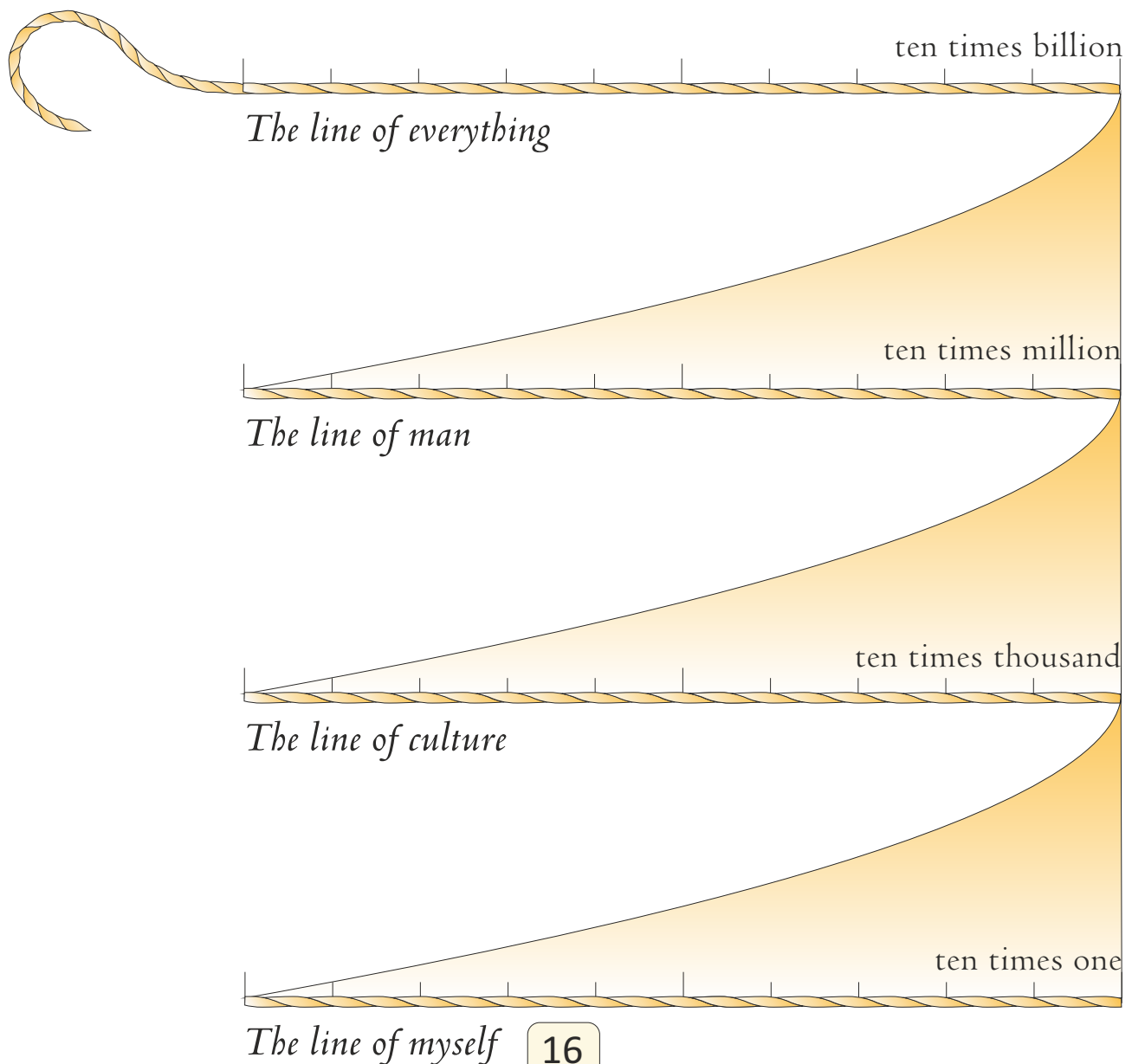
After some calculations and drawing, the overview below stood before me. The cosmos gave us four lines with a beautiful mathematical relationship: the total time in billions = 1.000^3 , the time of man in millions = 100^3 , the time of culture in thousands = 10^3 and the time of an average schoolchild in ones = 1^3 .

They were therefore timelines that very well indicated the relationship between:

- the age of the universe,
- the age of man on earth,
- the age of human culture,
- and the age of the individual child.

I immediately considered the timelines, provided to me by the universe, as universal for every person on earth.

The image below is scalable and free to [download](#)^{downloads-2}.



The lines are shaped like a rope because at school a thick rope was laid on the ground.

The recommended scale for each unit is one meter:

- one billion years is one meter,
- one million years is one meter,
- one thousand years is one meter,
- one single year is one meter.

The design is inspired by the word line, which has several meanings. I was an enthusiastic sailor and on a sailing boat we don't talk about ropes, but about lines.

My ship was old-fashioned cutter rigged with a gaff top and jib. The lines we used on the boat were strong, twisted 'ropes' as you can see in the image on the right.



The use of a rope is merely exemplary. Interest will certainly be immediately aroused when the teacher enters the classroom with such a beautiful bunch of rope on their back.

There are of course many other possibilities: paint the line on the playground, in the hallway, on a wall, draw on paper, etc. The teacher chooses.

The line in the photo is 13.8 meters long. In 2013, the age of the universe was adjusted to 13.8 billion years. The launch of the James Webb Space Telescope, which took place on December 25, 2021, may be able to arrive at an even more accurate age of the universe.

In the overview, you can see on The Line of Everything: ten times a billion. You know that the age is not ten billion years, but 13.8 billion years. The straight part of the line is divided into ten equal parts of one billion years each. The ten (of billion) represents our decimal system in which we calculate and which is reflected in the other three lines. The beginning of the line is deliberately curved to a question mark model and is 3.8 meters long. The question mark model represents the still not exactly known age plus the fact that the origin of our universe is still a theory.

EVERYTHING can be placed on the Lines of Life, so choices have to be made. When publishing *The Lines of Life* in 1997, I was guided by the following principles:

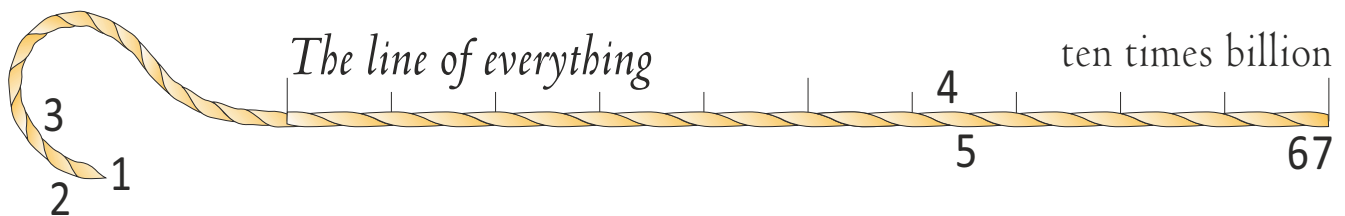
- The information provided must do justice to every inhabitant of the earth.
We all (wherever in the world) are and are often raised within the boundaries of our own culture.
"If we continue to do that, we will never know how vast the area of existing reality is; our attitude will remain narrow-minded and chauvinistic. It is of great importance for the development of humanity on our globe that we all obtain a broader view, so that we can learn to see ourselves in our relative position in the great and mysterious universe in which we were born and live." (quote Kees Boeke⁶⁾)
- Coherent stories must be told in which the 'subjects' we know (geography-geology, physics, history and biology) can be integrated.
"School brings us into contact with different aspects of existence, but often they are not connected to each other, so that there is a real danger that we collect a large number of separate images, without realizing that they all together form one large whole. It is therefore important for our education as people to have resources at our disposal that can give us a broader and more coherent picture of our world and thus a truly cosmic view of the universe and our place in it, a cosmic orientation." (Quote Kees Boeke⁶)
- It should be able to be a connecting link with the current method.
It is not always wise for teachers to completely change their own method. Both child and teacher can lose their grip. It is pleasant to have instruments that can give the current method an innovative impulse, without having to completely abandon the familiar method.
- There must be enough room for own cultural and school input.

All the development markers that I had chosen and that were provided with the publication of the four lines are listed in the appendices on page 72 and further. On the following pages you will see per line only a few important examples of developments and/or events.

A first presentation of ***The Line of Everything*** could be: placing major events on the line. Some of these major events are:

1. the Big Bang;
2. formation of atoms and molecules, the building blocks of the cosmos and us as humans;
3. formation of stars and galaxies;
4. formation of our solar system and the earth;
5. the origin of life;
6. the origin of mammals;
7. the origin of humanity,

Placed on a line of 13.8 meters it looks like this.



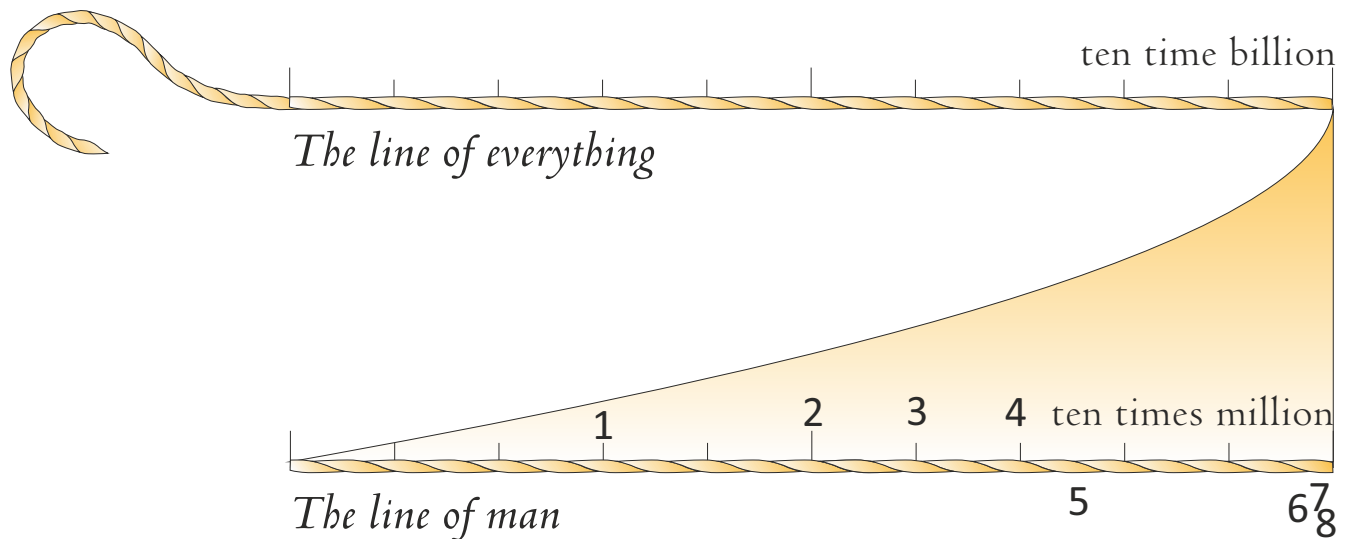
It is beautiful to experience that the development from the first life to the life of man took more than 3 billion years.

It is extremely surprising for us as humans to see ourselves on a timeline of 13.8 meters somewhere in the last centimeter of that long line = 10 million years.

Within those 10 million years, the most important first developments of man occurred; ***The line of man*** was now there too! The associated calculation: 1 meter of the Line of everything = 1 billion years, 1 decimeter = 100 million years, 1 centimeter = 10 million years.

Working with the decimal system and thinking of beautiful proportions, *The line of man* had to be 10 meters long. So one centimeter of The line of everything was magnified 1000 times to the 10 meter long Line of man.

That looks like this.



Major events in *The line of man*, the developments of various human species and the origin of agriculture and livestock farming:

1. Sahelanthropus tchadensis;
2. Ardipithecus (several species);
3. Australopithecus (several species);
4. Paranthropus (several species);
5. Homo habilis (several species);
6. Homo sapiens (300,000 years);
7. Homo sapiens sapiens (40,000 years);
8. Agriculture and livestock farming (approximately 10,000 years).

For the last three developments, I have added the time in years, due to the reduced scale on this page. On a long line of 10 meters, homo sapiens comes at 30 cm, homo sapiens sapiens at 4 cm and the origin of agriculture and livestock farming at 1 cm.

In *The Line of Everything*, we saw humanity emerge in the last centimeter, a very important event for mankind.

How surprising it was to see that in *The Line of man*, a very important event could once again be placed in the last centimeter: the emergence of agriculture and livestock farming. Historians describe this development as a unique revolution. For more than 99% of human history, man has lived as a nomadic hunter-gatherer. About 15,000 years ago - 10,000 years ago, man began to grow food and domesticate animals. As a result, the nomadic existence came to an end for many.

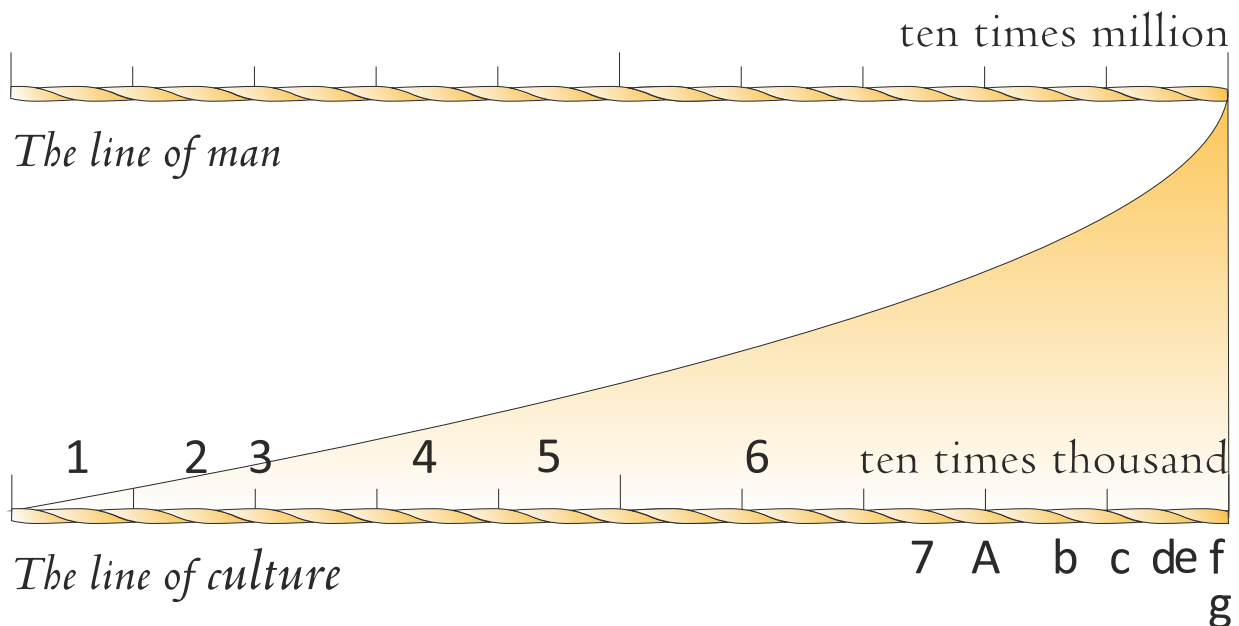
Analogous to *The Line of Everything* and *The Line of man*, the next line presented itself automatically due to the great change in the special culture of man: settling in one place instead of the nomadic existence. **The line of culture** was now there too!

The corresponding calculation:

1 meter of the Line of man = 1 million years, 1 decimeter = 100 thousand years, 1 centimeter = 10 thousand years.

Again working with the decimal system and thinking of beautiful proportions, *The Line of culture* had to be 10 meters long. So one centimeter of *The Line of man* was magnified 1000 times to the 10 meter long Line of Culture.

This is what it looks like.



Enkele van de grote gebeurtenissen van de lijn van de cultuur zijn de eerste gebruiken, ontdekkingen of daden van de mens.

- | | |
|--------------------------------------|---|
| 1. Breakthrough of rice cultivation; | A. Supposed birth of Jesus Christ, Anno Domini 0, abbreviated AD 0; |
| 2. First weaving; | b. First printed works, AD 700; |
| 3. First irrigation; | c. First use of compass, AD 1115; |
| 4. First use of copper; | d. Slave trade, AD 1560; |
| 5. First use of wheel; | e. Invention of steam engine, AD 1712; |
| 6. First use of bronze; | f. First use of atomic bomb, AD 1945; |
| 7. Blown glass; | g. Me, AD present. |

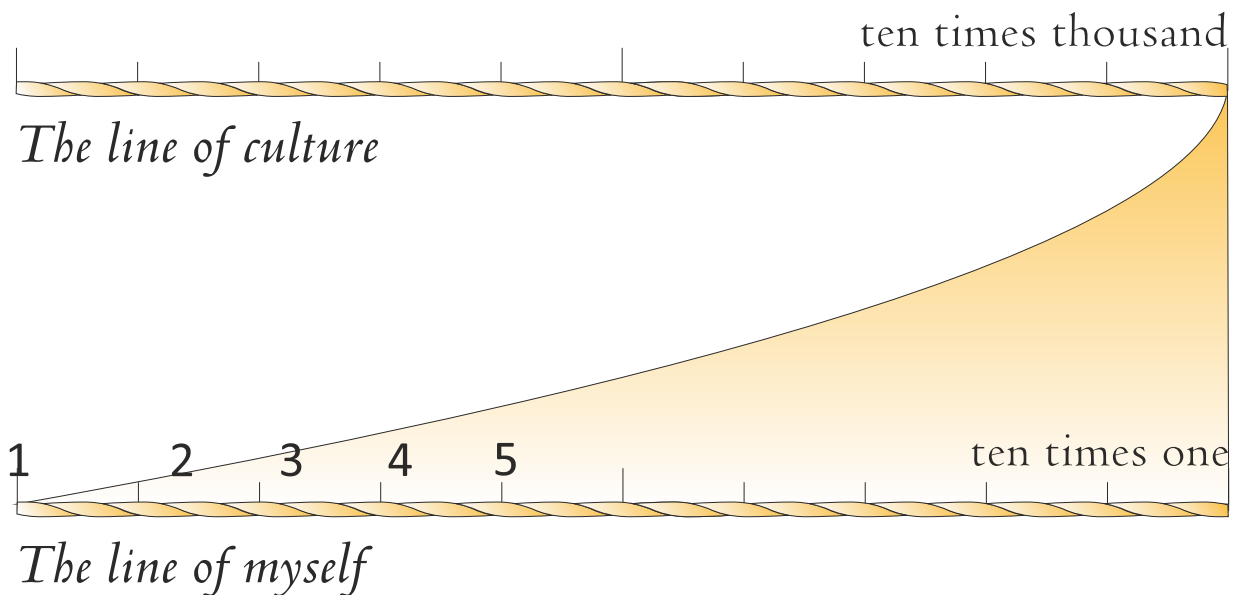
For the third time, analogous to the first three lines, the fourth line presented itself automatically. The last centimeter of *The Line of culture* means 10 years, or the average age of a primary school child for whom the lines were initially intended.

The line of myself was now there too! The corresponding calculation:

1 meter of the *Line of culture* = 1,000 years, 1 decimeter = 100 years, 1 centimeter = 10 years.

Again working with the decimal system and thinking of beautiful proportions, *The Line of myself* had to be 10 meters long. So one centimeter of *The Line of culture* was magnified 1,000 times to the 10-meter-long *Line of myself*.

This is what it looks like.



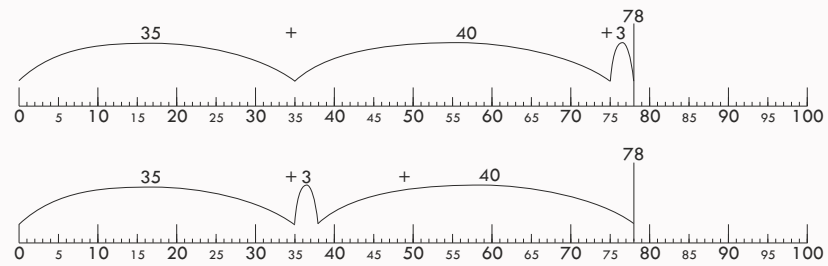
With *The line of myself*, the children could work independently.

They could now place important events from their lives on a 10-meter long line, as I did in the example above with a few events.

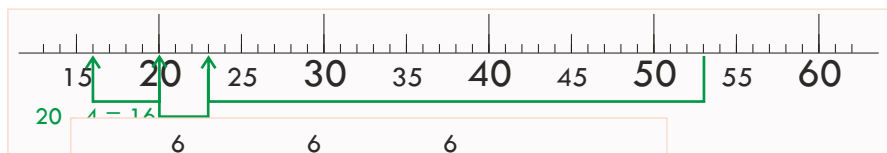
1. I was born;
2. I can walk;
3. I can talk;
4. I am toilet trained;
5. I go to school.

Finally, the use of lines in mathematics education is highly recommended.

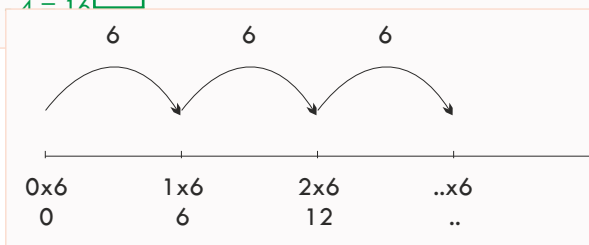
ADD UP



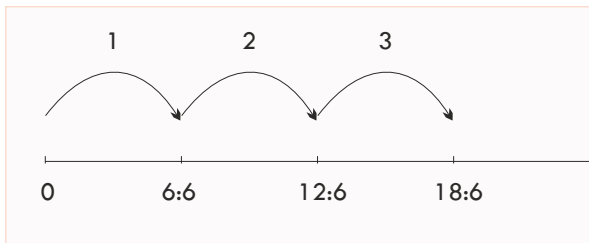
SUBTRACT



MULTIPLICATION



DIVISION



And what do you think of the use of a line below?

photo 3



photo 4



photo 5



Afbeelding: Bol.com

QUESTIONING SPACE AND TIME

Powers of ten – SPACE

INTRODUCTION

The discovery of an overview in time, which *The Lines of Life* offered me, was already an aha-erlebnis experience, it became even more beautiful when I came into contact with *The Powers of Ten*, or '*Tiendesprongen*' after the original idea of Kees Boeke⁶ that he first presented in 1927. In 1959 it was published as a book in the Netherlands under the name '*We in the universe, a universe in us*'⁶.

During a holiday in Twente I visited an observatory where a slide show was shown of '*The Powers of Ten*' by P. and P. Morrison⁷.

'*The Powers of Ten*' was an updated version in colour of the idea of Kees Boeke.

'*The Powers of Ten*' offered me a wonderful overview of space!

The ***dimensions of space and time*** in which we live suddenly became clear and understandable to me.



photo 6

And how special: in September 2021, Kees Boeke's book was republished by Walburg pers⁸ under the original title '*Tiendesprongen*'.

On their website, there are two beautiful recommendations from well-known Dutch scientists:

Robbert Dijkgraaf:

'We now see Boeke's leaps of ten all over the world. It has become a permanent part of the canon of modern science.'

Vincent Icke:

'Over the years, I have seen that almost everyone has the same reaction to tenth leaps as I do.'

Joy, wonder, admiration, and again and again that sensation: that's how it is, really, just look.'

It is a work of art that makes our universe tangible, visible and therefore understandable. The Night Watch of physics.'

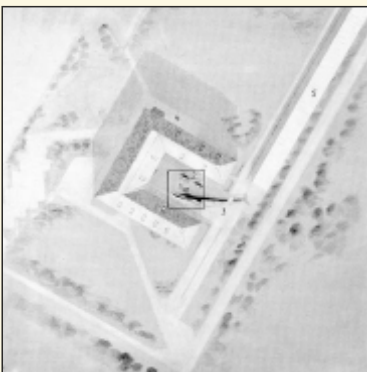
THE POWERS OF TEN BY KEES BOEKE A CLOSER LOOK.

I will now show you a number of images of *The powers of ten* in small format and with abbreviated text.

The abbreviated texts and reduced images are intended to give you an overview of the totality of space, in the same way as I did with time using *the handout for The lines of life*.

A scanned version (Dutch) of the entire book by Kees Boeke, *We in the universe, a universe in us*⁶, can be downloaded here:

https://www.dearend.nl/pdf/Kees_Boeke.pdf



On the left you see three reduced images from Kees Boeke's booklet.

Kees Boeke worked with the following dimensions for the initial drawing: the first drawing was a scale drawing of 1.5 metres, viewed from a height of 5 metres. The subsequent drawings were all drawn in the ratio and scale of 1:10, the 'tenth jumps'.



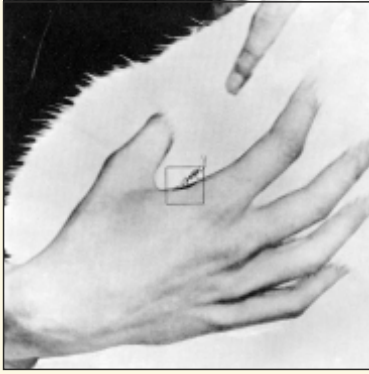
The bottom drawing is the initial drawing. A girl is sitting in a chair with a cat on her lap in the courtyard of the 'Workplace Children's Community' in Bilthoven (The school of Kees Boeke).

The scale of the drawing above is 10 times as large. In the middle you see a small square: the initial drawing in the ratio of 1:10. You will see this small square again in every new drawing.

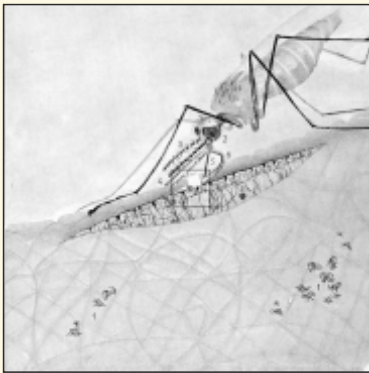


Kees Boeke placed the largest mammal on earth next to the 'mammal' girl: the blue whale. Quote: "We want to compare the dimensions of this largest mammal with those of the human child and the cat."

The scale of the top drawing is 100 times larger. The blue whale is now visible at its greatest possible length of about 30 meters. The 'Workplace Children's Community' is now fully visible with its U-shape.



The drawing below the starting drawing follows the opposite path in the proportion and is 10 times smaller. Kees Boeke placed an insect on the hand: a mosquito and several things with reason that are not visible now, but are explained in the booklet.



The bottom drawing is 100 times smaller.

Quote: *"The malaria mosquito is clearly visible: its large compound eyes (2), antennae (3) and jaws (4); also its proboscis (5), with which it bites the child. We see the flexible sheath (6) that is bent against the skin."*

So much for Kees Boeke.

I will now show you *The Powers of Ten* in small size and with abbreviated text, with some images of the Studio of Charles and Ray Eames from the book by Philip and Phylis Morrison⁷. These images were made about 50 years later than the drawings by Kees Boeke, which means that more new scientific insights have been incorporated. In their introduction, Philip and Phylis Morrison write:

"We trust that the well-informed reader will find as much satisfaction as we do in seeing so much knowledge brought together scale by scale. Everyone can see how much we have owed to the scientific community in our work; we have compiled a guide rather than written an original treatise."

You can download all large images ^{downloads-3}:

https://www.DeArend.nl/Rusland/Powers_of_ten.pdf

Eams Office has placed a video of the Powers of Ten on You Tube⁷.

In my book *,Once upon a time . . . a story to tell . . .'* you will also find all the reduced images with accompanying and explanatory text.

EAMES OFFICE'S POWERS OF TEN A CLOSER LOOK.



The start - 1 meter - 10^0 meters

The Greek sophist *Protagoras* already wrote: "*Man is the measure of all things.*"

Here the man is lying on a rug. Photographed at a height of 1 meter in a marked square with a length and width of 1 meter. (10^0 is 1)

A child of 3 to 4 years is about 1 meter tall.

We will continue with the blue square that you see on the hand. Now we go up in the power of 10 to 101.



10 meters - 10^1 meters

You see the man lying on a rug on a lawn.

Photographed at a height of 10 meters in a marked square with a length and width of 10 meters. (10^1 is 10)

A three-story house is about 10 meters high.

The blue square in the middle is the scale of the previous photo.

This designation is repeated in every photo.



100 meters - 10^2 meters

The man on the blanket is lying on a lawn, wedged between a highway and a marina.

100 meters is a commonly used distance in sports: swimming, athletics.

Some trees can grow to 100 meters high: Sequoia, Yellow meranti, Douglas fir.

The 100 meter scale is a solid global limit for the size of living beings.

So much for zooming out to 100 meters. You can see and read the other 26 steps to the limits of our knowledge in my book *,Once upon a time . . . a story to tell . . .'*

I will now show you a few images with text of the micro journey of *The powers of ten*. All 17 micro steps of ten with accompanying text can be found in my book, *Once upon a time... a story to tell...*

If you use the large images of *The powers of ten*⁷ on a screen, it is very nice to make the macro journey a bit faster.

You then start with the *eXtreme Deep Field* photo of the Hubble (the last image) and zoom in again until you are back at the starting point of the journey, the man on the rug in the park.

And that is the beginning of the micro journey of *The powers of ten*.



The start - 1 meter - 10^0 meters

I repeat. The Greek sophist *Protagoras* already wrote: "*Man is the measure of all things.*"

Here, man is lying on a rug. Photographed at a height of 1 meter in a marked square with a length and width of 1 meter. (10^0 is 1)

We now continue with the blue square that you see on the hand.

Now we go down in the power of 10 to 10^{-1} .



0.1 meter - 10 centimeters - 10^{-1} meters

We are approximately on the scale of a child's hand. The pen that is used to write is usually a little more than 10 cm in size.

Kees Boeke placed a large mammal (the blue whale) in the macro journey to illustrate the proportions, so I can add a photo of a mammal in approximately the same scale.

An adult mouse grows to about 10 centimeters, including tail.



1 centimeter - 10^{-2} meters

We look at the skin on a scale that we can still perceive with our eyes. The use of a magnifying glass is already very helpful for many.

The fly on the skin is also about 1 cm.

The fingertip of an adult, a button on a shirt, a key on a keyboard.

We still perceive it all without any problems or we can handle it without any problems.



0.1 centimeter - 1 millimeter - 10^{-3} meters

We now come to a scale where we call upon the help of a microscope to be able to look accurately.

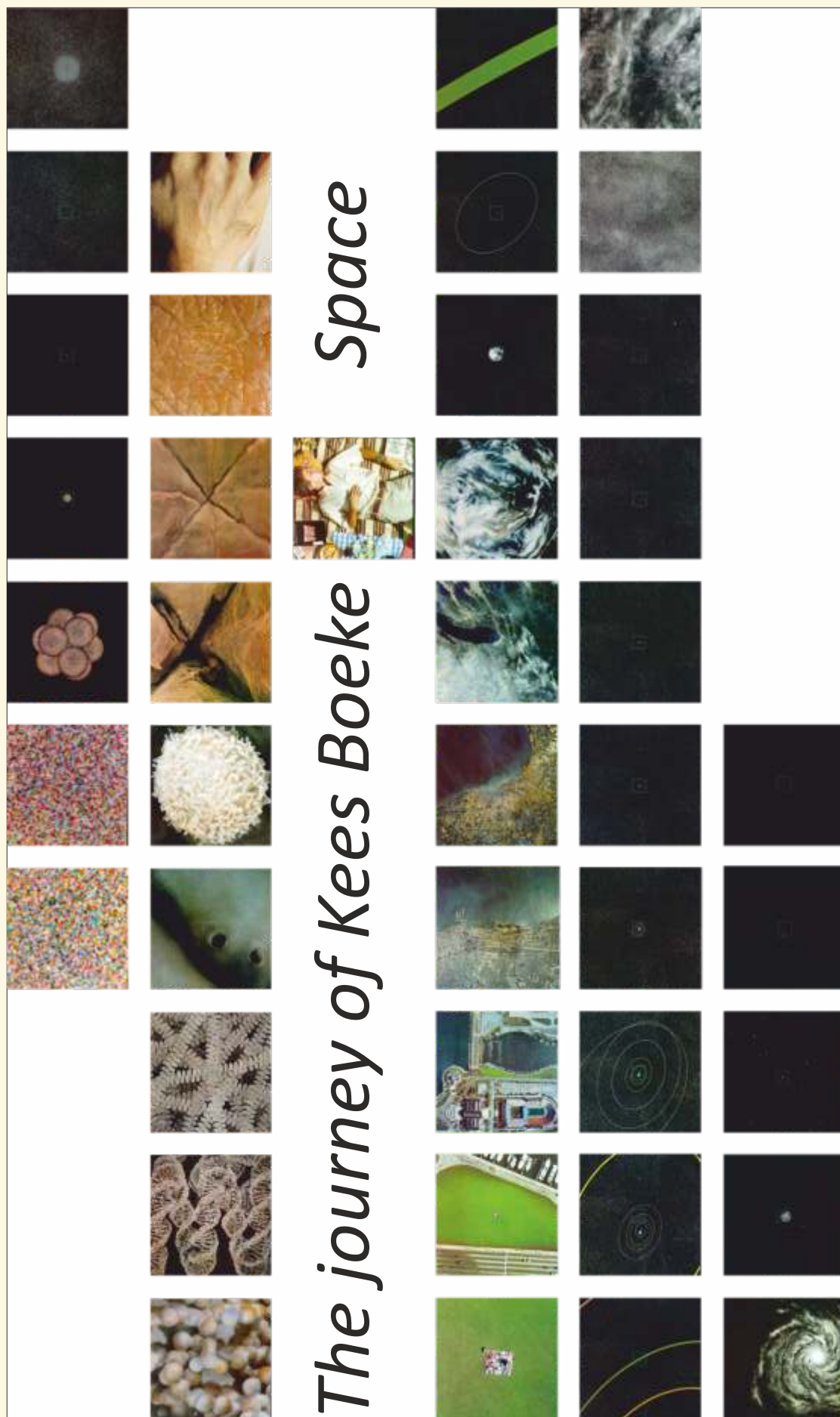
The microscope that could open up new worlds for man. The Dutchman Anthonie Van Leeuwenhoek (1632 - 1723) is best known for his self-made microscope and his pioneering work in cell biology and microbiology. He has many discoveries to his name in the world that we are now about to enter.

So much for zooming in to 1 millimeter.

You can see and read the other 13 steps to the limits of our knowledge in my book *,Once upon a time . . . a story to tell . . .'*

On the next page I have placed all 42 steps of ten to present the (visible) cosmos to man. In my book *,Once upon a time . . . a story to tell . . .'* I also make a big jump from 10^{-16} to 10^{-33} , the so far invisible smallest particles of string theory.

In addition, you will find in my book, placed between the powers of ten, many beautiful photos of the Hubble Space telescope that were not yet available at the time of the publication of Eams Office. The photos are supplemented with texts about the latest discoveries of science.



Space

The journey of Kees Boeke

To present the (visible) cosmos to man. In my book *'Once upon a time . . . a story to tell . . .'* I also make a big leap from 10^{-16} to 10^{33} , the hitherto invisible smallest particles of string theory.

QUESTIONING SPACE AND TIME

Resume

Hopefully, after reading the abbreviated texts and seeing the images of space and time, you have gained an overview of space and more insight into time. Perhaps you have also already experienced the consciousness effects of the overview effect.

- In any case, you have seen how the relationships in space and time are.
- You have seen how important developments in time have been placed and have followed each other.
- You have seen how large and grand our universe is.
- You may also have seen how certain developments in time have influenced each other.
- You may also have seen what connections and relationships there are in our grand universe.

In my opinion, the above five aspects are essential.

Essential to be able to study, understand and maintain the world in relation to the other and the earth in order to be able to live together peacefully and sustainably with the other on our beautiful planet earth.

It will then be very helpful if you know:

- where you come from, what your history is;
- where you live and how you can take care of that;
- who you are in relation to the other;
- where you want to go in life in relation to the other and the earth.

This chapter is called *Questioning Space and Time* and is also the subtitle of the book.

That is how I have always called my method. I liked the simplicity of working with three things in our wonderful world:

1. space;
2. time;
3. questioning.

Now in this chapter we have already received many answers by mainly looking at how space and time present themselves to us. Several questions can and should be asked.

The title of this shortened book is '*Once upon a time a story to tell . . .*'.

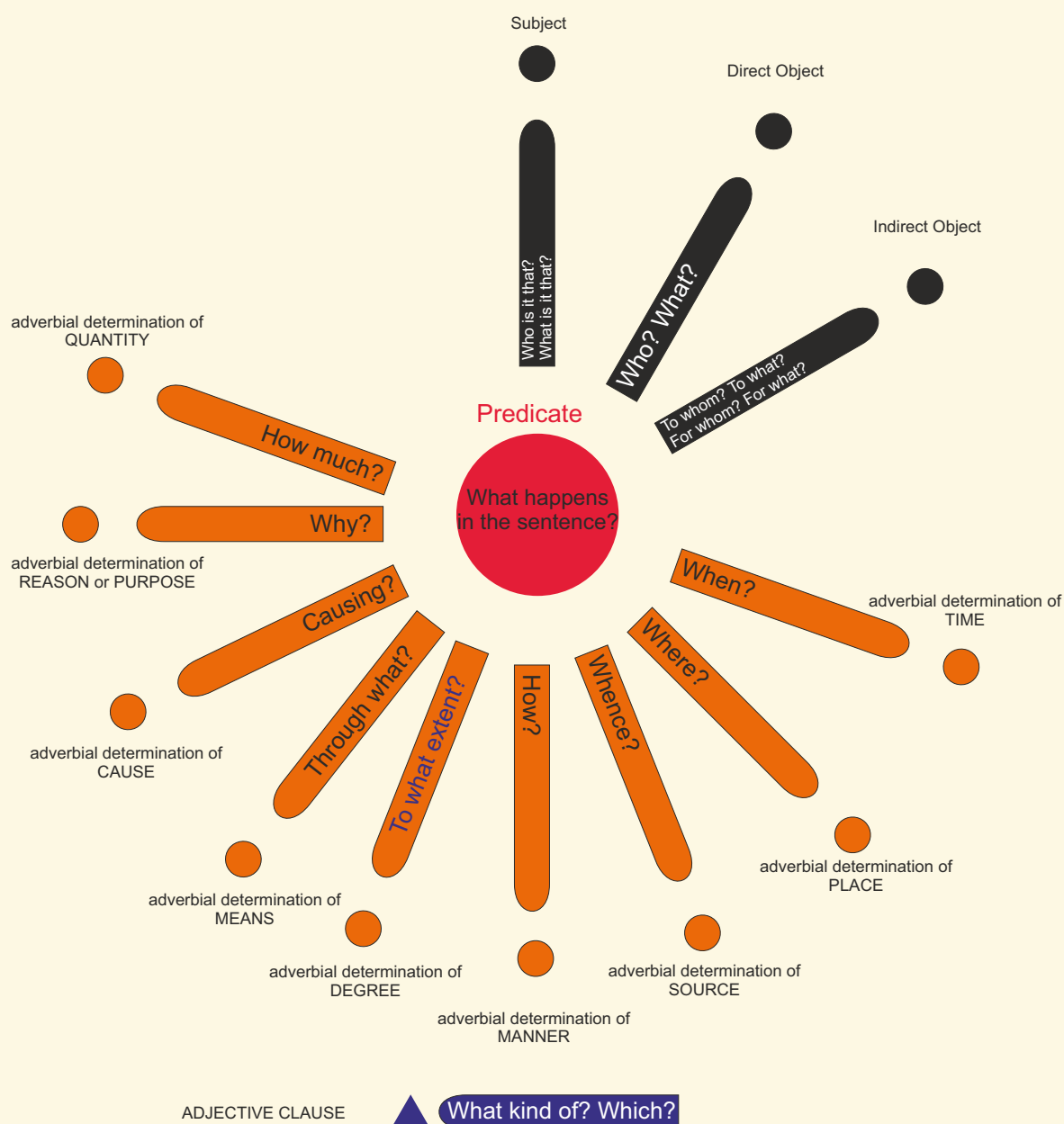
The previous chapters have, just by looking carefully, already given us a decent story. Several stories can and should be told.

How we could tackle that with simple tools, I will now describe in the next chapter.

QUESTIONING SPACE AND TIME

Consideration of Maria Montessori's sentence analysis material and patterns in language.

Questioning space and time material for sentence analysis of Maria Montessori



QUESTIONING SPACE AND TIME

Consideration of Maria Montessori's sentence analysis material and patterns in language.

INTRODUCTION

Maria Montessori's sentence analysis material is one of the most powerful and beautiful didactic materials I have ever worked with.

Before I describe my experiences, findings and reflections, I will first explain the material as Maria Montessori developed it.

The material is not, as shown on the previous page, offered in its entirety at once.

The children also do not yet learn the names of the parts of the sentences; that comes later. The essence is that ***the language structure is experienced and exposed by asking questions.***

DESCRIPTION OF SENTENCE ANALYSIS MATERIAL

The **red circle** can be described as: the energy, the core activity(ies) that everything revolves around, what happens in the sentence: the verb or verbs in the sentence.

- *What happens? (predicate)*

The sentences that the children initially work with do not have a nominal predicate. The linking verbs are offered later.

Example sentence with a nominal predicate:

My grandpa **seems confused**. The **nominal predicate** is here **seems confused**.

The **black arrows** can be described as: the connections of the entities {main person(s) and/or main thing(s)} with the core activity in the sentence.

- *Who is it that? What is it that? (subject)*
- *Who? What? (direct object)*
- *To whom? To what? For whom? For what? (indirect object)*

The **orange arrows** can be described as: how the core activity(ies) are performed by the entities {main person(s) and/or main issue(s)}.

There are more than the ten adverbial phrases that you see in Maria Montessori's example. For primary school, those ten are fine. I will now list just a few for you:

- *When? (Adverbial phrase of time)*
- *Where? (Adverbial phrase of place)*
- *Where to? (Adverbial phrase of direction)*
- *From where? (Adverbial phrase of origin)*
- *How? (Adverbial phrase of quality)*

The **blue arrow** can be described as: the further explanation of the persons/things in the sentence.

You ask these questions to the nouns in the sentence.

- *What kind? Which?* (**Adjective clause**)

I will give you one sentence as an example and I challenge you to practice further with your children or yourself.

The sentence on a paper strip reads:

I bake large and small pancakes in the kitchen for adults and children.

- *What is happening in the sentence?*

bake - the child cuts out the word and places it on the corresponding red circle.

- *Who is baking?*

I - the child cuts out the word and places it on the corresponding black circle.

- *What am I baking?*

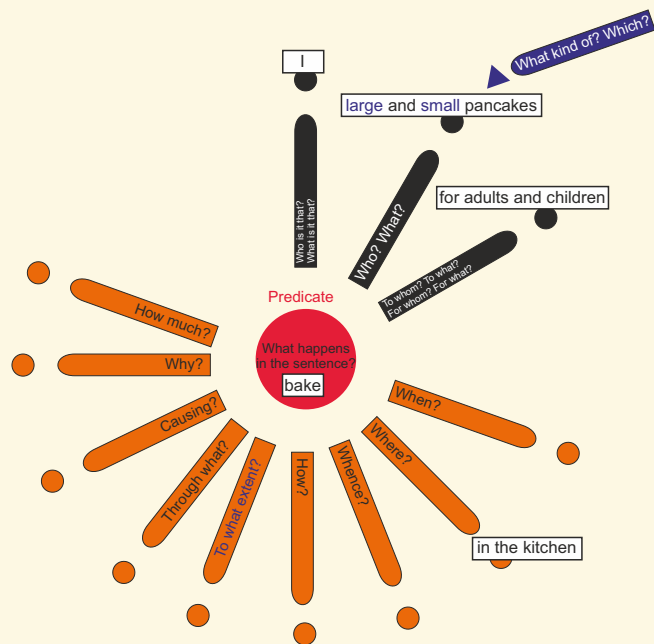
big and small pancakes - the child cuts out the sentence part and places it on the corresponding black circle.

- *For whom do I bake large and small pancakes?*

for adults and children - the child cuts out the sentence part and places it on the corresponding black circle.

- *Where do I bake large and small pancakes for adults and children?*

in the kitchen - the child cuts out the sentence part and places it on the corresponding orange circle.



The sentence is completely analyzed. The blue questions are now asked to the nouns of the sentence that can give an answer (adults and children do not answer).

- *What kind of pancakes?*

big and small - the child underlines or colors the words blue.

After parsing it is 'sensible' (lovely to use this word here) and fun to have the child do the following with the separate parts of the sentence. There are even more possibilities than below.

(do) I	bake	big and small pancakes	in the kitchen	for adults and children	?
big and small pancakes	I	bake	in the kitchen	for adults and children	
in the kitchen	I	bake	big and small pancakes	for adults and children	
for adults and children	I	bake	big and small pancakes	in the kitchen	
I	bake	in the kitchen	for adults and children	big and small pancakes	

THE EXPLANATORY BEAUTY OF THE MATERIAL - structure of language.

In my opinion, the explanatory beauty of the material is most beautifully expressed when, as a teacher, you have conversations about the structure of the language before offering the material.

From a historical perspective, this could also be the moment to philosophize with the children about how language may have originated with humans. Humans and their science do not yet have an answer to that. So we have to rely on assumptions. It is sensible and fun for the children to once again reflect on the concepts of facts and opinions, as described in my previously published article, download [here](#)^{downloads-1}

An interesting article to read in advance is from NPOkennis.nl⁹ "Do all languages have the same origin?" The quote below is from that article.

"In order to find out something about when language originated, we have to ask ourselves what language is needed for. For example, we use it to name and categorize things from our environment, such as plants and animals. And also to make plans, build social networks and teach each other things. All of this is related to symbolic thinking: a way of thinking in which we use a word, or for example a drawing, to indicate something else.

At the moment that humans start using symbols (such as cave drawings or jewelry) to depict things, language must have already existed, many researchers think. This means that they date the first language to around 100,000 years ago."

A beautiful way of expressing why language is so important to us. That applies in general, but in particular to the study of space and time. That is why I am giving it the attention it deserves in this shortened story. In any case, making use of the structure of language has helped me a great deal in studying and understanding space and time. I would like to share that with you.

Conversations about the structure of language may already be fueled by philosophical conversations about the origin of language. A comparative metaphor can also be helpful in this.

As an example, I will give the metaphorical comparison of language with a house.

A house is built with many different parts: foundation, stones, windows, doors, glass, steel, cement, water, sand, paint, bell, etc.

The house is the sentence, the different parts are the words.

With the different parts (the words) of the house (the sentence) you can also build something other than a house: a road with a bridge over it; a station, a hotel etc. You will also read later that 'the building of the universe' follows the same patterns.

After this, we will talk about how a building is created.

To be able **to build**, a lot of **energy** is needed and a lot of **people and materials** and it can be done **in many different ways and places**.

Whatever you

- **builds** with **energy**, you need

PREDICATE

- **people** and **materials** and **tools**
and it can be in

SUBJECT. DIRECT OBJECT
INDIRECT OBJECT

- **many different ways and places.**

ADVERBIALS

The interpretive beauty of language can thus be read and described without asking the corresponding sentence analysis questions.

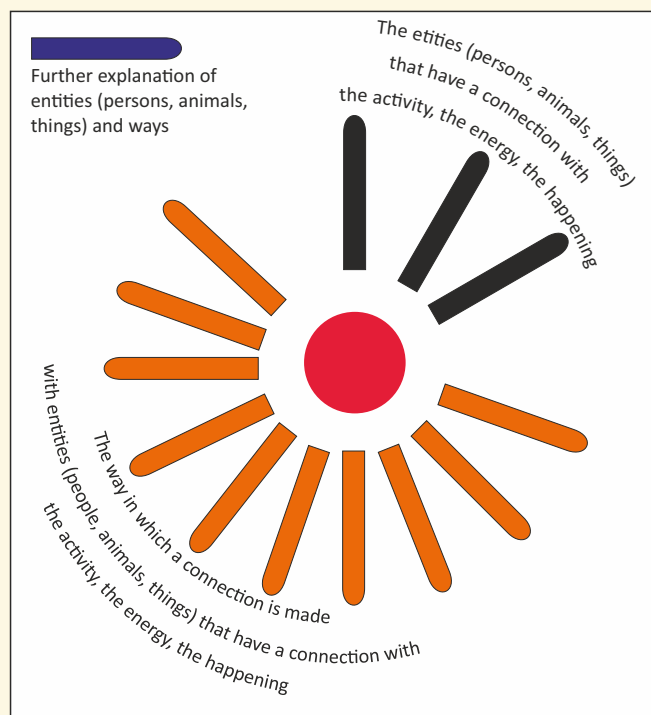
The image on the next page makes that clear.

Everything in our entire universe is constantly **in motion**. There is therefore always **activity, energy, development**.
The red circle.

There is always a direct relationship between activity, energy, development and **an independence (entity)**.
The black arrows

There is always **a certain way** in which the connecting relationship is (is) entered into (undergone) with (by) the independence (entity).
The orange arrows.

The **independence** can be further defined. **The blue arrow.**



REFLECTION ON SENTENCE ANALYSIS

I would like to reflect on the word 'sentence analysis' with you.

You have just read the linguistic explanation and consideration. And if all goes well, you have all also become acquainted with the concept of sentence analysis at school and have, as it is called, analysed many sentences, in a rational way.

I am curious to hear from you whether you have also experienced the explanatory simplicity of the above-mentioned consideration without the image of the material of Maria Montessori. Even with my knowledge of this material, it took me a long time to see it. It was again a real *aha-erlebnis*. No one has ever pointed this out to me.

However, *sentence analysis* can also be interpreted philosophically in the sense of: *considering the meaning of life*.

As an amateur philosopher, I keep my consideration simple and use the basic materials of our universe: **energy** and **matter**.

You have probably already encountered the most famous equation in physics:

$E = mc^2$ by Albert Einstein. The formula describes the relationship between the mass of an object - **matter** - and the **energy** present within this mass.

•

In physics, there is therefore an entangled relationship between **energy** and **matter** and we see exactly the same thing in language. We say that there is only a rational sentence if it has a **subject** and a **predicate**. If one of these two is missing, there is no rational sentence.

There are many languages in which the entangled relationship between **predicate** and **subject** is immediately recognizable: the **predicate** and the **subject** together form one word.

The sentence "*I walk.*" in some other languages, there are even more:

- | | | | |
|--------------|---------|--------------|------------|
| • Spanish: | camino | • Hungarian: | sétálok |
| • Turkish: | Yürürüm | • Greek: | περπατάω |
| • Bosnian: | hodam | • Zulu: | Ngiyahamba |
| • Bulgarian: | вървя | • Arabic: | امشي |

If we consider the universe scientifically/physically, we assume that **the universe originated** from one big **explosion of energy**: the Big Bang. With this consideration we give a rational meaning to our existence with language:

- | | | |
|---------------------------|---------------------|------------------|
| • What happens? | arises | predicate |
| • What is it that arises? | the universe | subject |

With the sentence "*The universe arises,*" we have a correct rational meaning, and with this consideration we give a philosophical meaning to our existence:

- meaning;
 - we try to understand how everything came into being;
 - as humans we want to give meaning to our existence;
- we want answers to our questions;
 - where do we come from
 - why are we?
 - where are we?
 - who are we?
 - where are we going?

With the above philosophical questions, we are now going to stand with both feet on the ground: we would like to know the answers.

As humanity, we are fortunate with our curiosity that our science provides us with. Not that science has an answer to all the above questions, but science provides a solid and reliable basis for our education.

QUESTIONING SPACE AND TIME

Is there a relationship between the patterns of language and the patterns we observe in the universe?

INTRODUCTION

You are now starting a chapter with a question in the subtitle.

I would like to ask that question, but I have no certainty about the correctness of a positive answer. I therefore assume that the following assumption on my part is no coincidence.

I expect that it is no coincidence that language has adopted the pattern that we find everywhere in the universe.

If we consider this question only at the level of language, then the following, which you were able to read extensively in the previous paragraph, is already a good start of 'evidence'.

Let me repeat the essence for you:

Everything in our entire universe is constantly **in motion**. So there is always **activity, energy, development**.
The **red circle**.

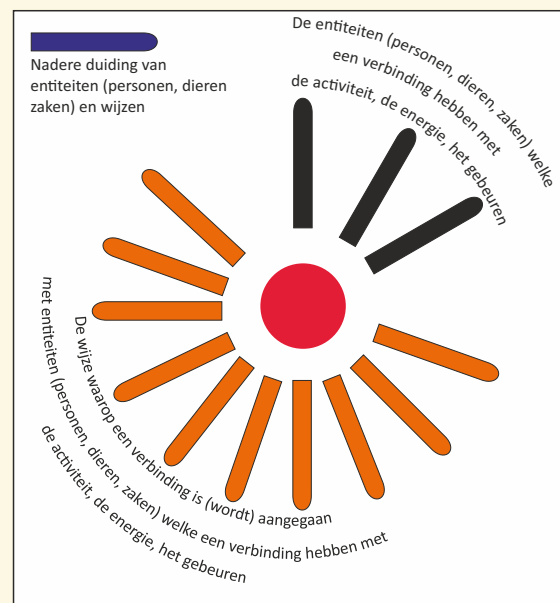
There is always a direct relationship between the activity, energy, development and an **independence (entity)**.
The **black arrows**.

There is always **a certain way** in which the connecting relationship is (is) entered into (undergone) with (by) the independence.
The **orange arrows**.

The **independence** can be further defined.
The **blue arrow**.

When we observe our universe, we see patterns that are expressed in language as above.

In my book I describe several examples, now I limit myself to probably the most complex structure in the universe: our brains.



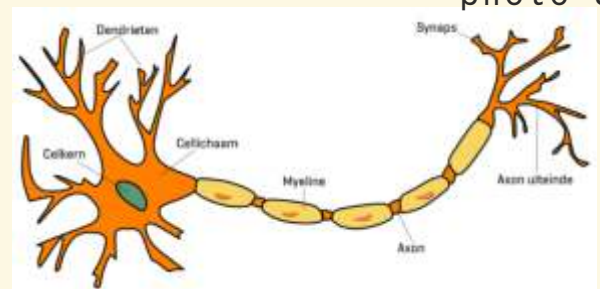
Perhaps the most beautiful example is found in our brains. The brain is a complex organ; the human brain is made up of an average of 86 billion neurons (nerve cells - photo 22), each of which is connected to a large number of other neurons, (photo 7) sometimes many thousands. It is probably the most complex structure in the universe.

photo 7



The brain controls and coordinates sensory systems, movement, behavior and homeostatic bodily functions such as breathing, blood pressure and body temperature. The brain is the source of movement, memory, cognition (consciousness) and emotion.

photo 8



Despite the brain being the most complex system we think we know, the pattern of the brain is as simple as you can see in photo 7 above of a few neurons with the connecting wires.

Again we see the pattern of an energetic (cell) nucleus of the neuron

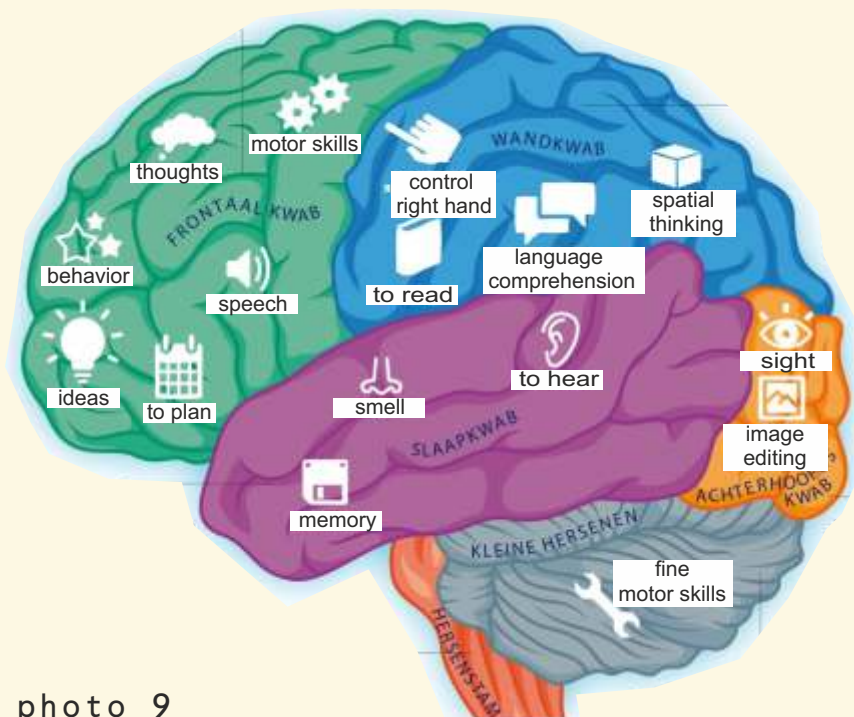


photo 9

On the left you see a simplified representation of various functions of the brain.

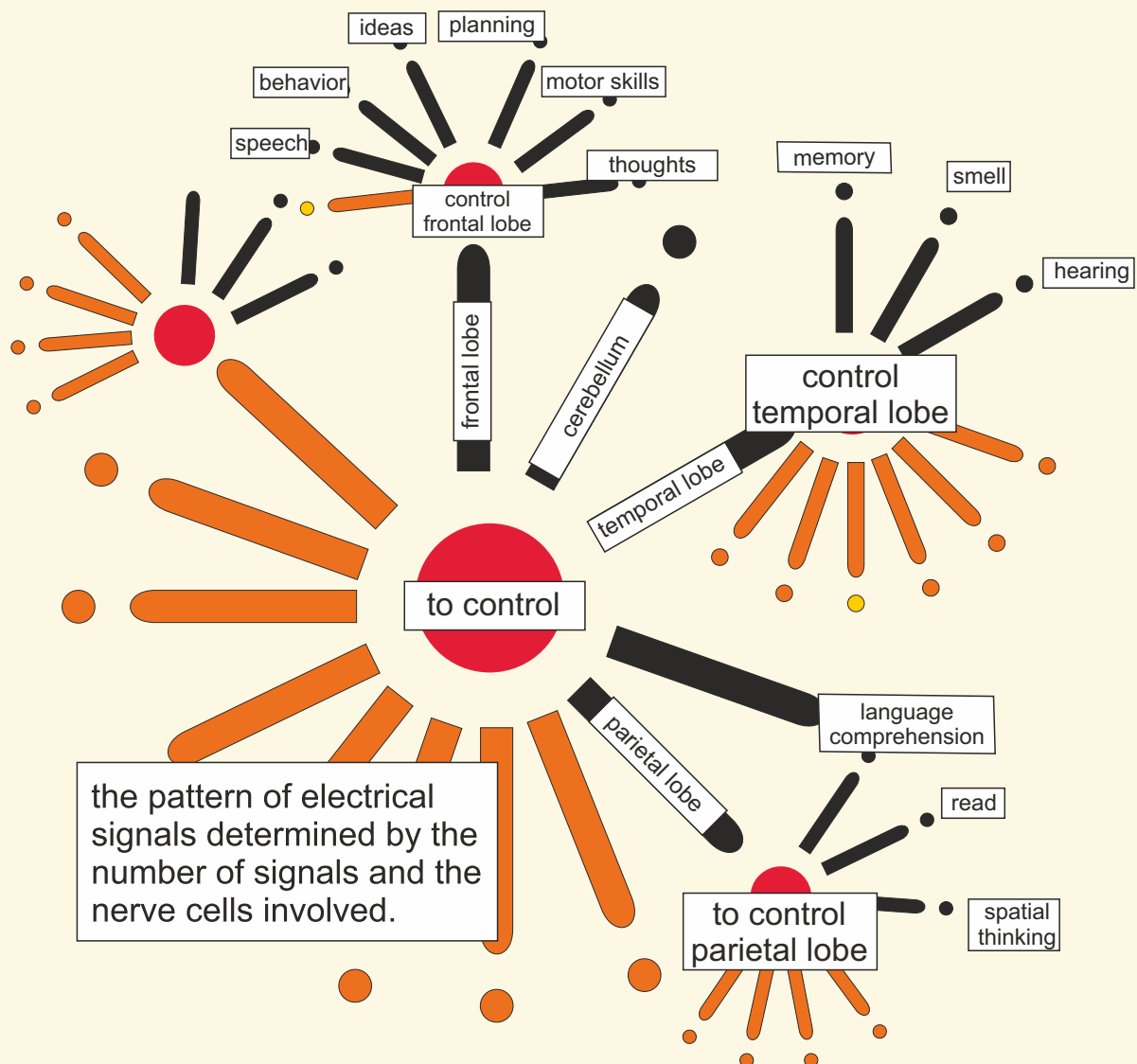
On the next page you see a very simplified representation of the brain using the patterns of language.

I have not put anything at the orange arrows. Not because the control is not done in a special way, but my knowledge about it is minimal.

The Dutch brain foundation says the following about that:

“The nerve cells communicate with each other by exchanging electrical signals via the extensions. The information that has to be transferred is formed by the pattern of electrical signals. The pattern is determined by the number of signals and the nerve cells that are involved.”

The brain also remains a very challenging research project for science and there is still much to learn about how the brain works.



RESUME

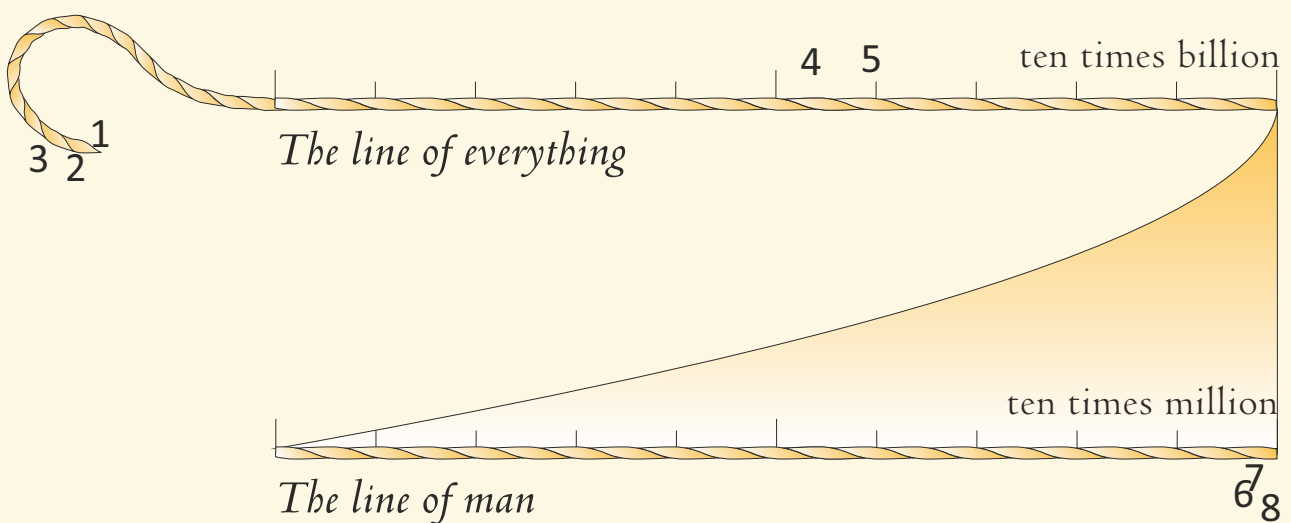
It remains a great wonder, but if we look at the beginning of our space and time descriptively, we can say that the universe started out 'simple'. Simple in the sense of simplicity, few ingredients: energy, matter, space, time.

As time went by and the universe expanded, the universe evolved to a greater complexity: with probably our human brain as the most complex system we think we know in the universe.

In his book '*Maps of Time*'¹⁰, Big Historian David Christian explains the increasing complexity using the thresholds of Big History.

- 1 - The Big Bang.
- 2 - The stars light up.
- 3 - New chemical compounds.
- 4 - The origin of the earth and our solar system.
- 5 - The origin of life.
- 6 - The coming of the human species; Collective learning.
- 7 - The inventions of agriculture.
- 8 - The modern revolution.

Projected on The lines of life:



We now place the simplicity of the origin of the universe in patterns of language next to the great complexity of the repeating patterns of the brain.

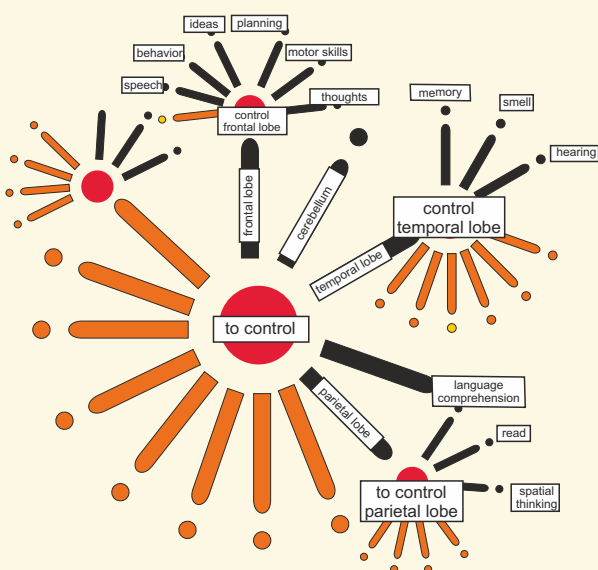
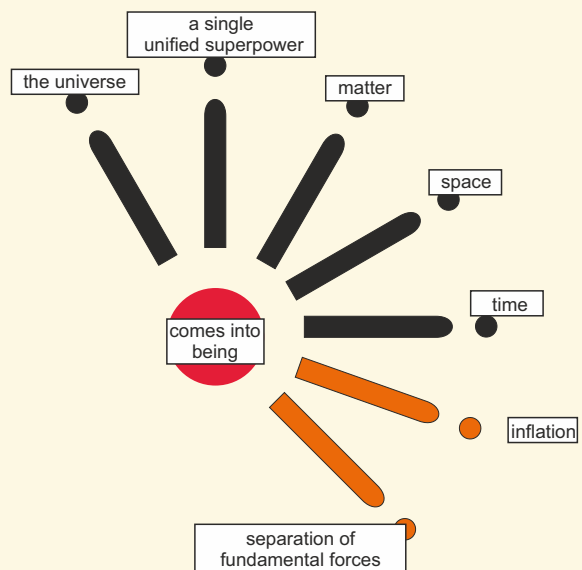
Note: we do not ask the sentence analysis questions, but follow the patterns of language:

Our universe came into being with a gigantic burst of energy. There is always **activity, energy, development** from the beginning:
TO COME INTO BEING.

There is always a direct relationship between activity, energy, development and an **entity: THE UNIVERSE,**
A SINGLE UNIFIED SUPER FORCE,
MATTER, SPACE, TIME.

There is always **a certain way** in which the connecting relationship is (is) entered into (undergone) with (by) the self.

INFLATION, SEPARATION
FUNDAMENTAL FORCES



On the left you see again a greatly simplified representation of the repeating patterns of the brain.

Despite the fact that physicists and biologists can add a lot to these representations, my wonderment remains.

My wonderment at the fact that the still not fully understood simplicity of the beginning, has developed in the time of the evolution of the universe with repeating patterns into the most complex system that we think we know and still do not fully understand.

And that, despite the limited knowledge I have of these matters, I still think I understand to a certain extent how our universe came into being, developed and continues to develop and now presents itself to me in its immense diversity.

I suppose that my imagination is responsible for this.

In the next chapter I will describe how I myself have worked with the patterns of language for my own study and also for the preparation for the offers to children. You will also read there how I offered the children to independently study any subject by working with the patterns of language.

The beauty of the patterns of the sentence analysis material is that you can use them to analyze language and learn to understand language structures; that is how Maria Montessori also developed the material.

However, I have experienced it as even more beautiful that you can create language with the help of the patterns of language. Simply put in other words:

- analyze subjects;
- arrange and describe ingredients;
- describe ways of origin and development.

And the above does not only apply to children, but to anyone who wants to delve into any subject.

I like to repeat:

"Although it is material developed for children, the material is certainly not childish."

That shows the special anecdote that I would like to share with you:

From former student Ingrid Takken (Dr. Maria Montessorischool Huizen - primary education) I received her dissertation from Australia with the following statement:

"Many thanks again Jos. I was able to write my thesis with the help of the question structures that you taught me."

Read about her work: <https://www.researchgate.net/scientific-contributions/Ingrid-Takken-45485576>

QUESTIONING SPACE AND TIME

Collecting ingredients
with the aim of composing a story

INTRODUCTION

In order to be able to compose and tell the shared story of the cosmos and man, you need starting points and ingredients.

As a starting point I used *The Line of Everything* from *The Lines of Life*. The ingredients were the marker moments (See the appendix marker moments on page 72) which deserved a place on *The Line of Everything*.

Later the Big History source books^{9, 10, 11, 12, 13} were added.

Within Big History the 'tipping points' in the total history (greater complexity, new developments) are often called thresholds. The thresholds are:

- The Big Bang.
- The stars light up.
- New chemical compounds.
- The origin of the earth and our solar system.
- The origin of life.
- The coming of the human species; Collective learning.
- The inventions of agriculture.
- The modern revolution.

An important advantage of using the thresholds of Big History as starting ingredients is the simplicity of the number of ingredients to be able to tell the universal story. They are all eight very essential ingredients of our universal story.

In addition to my own deeply felt wish that all people on earth may (must!) hear these stories, I would like to give you the following three quotes from H.G. Wells, Maria Montessori and Kees Boeke as additional motivation to start compiling and telling the stories.

In 1921, H.G. Wells¹⁴ already wrote the following about this in response to the carnage of the First World War:

*"There can be no other peace, we now realize, than a common, worldwide peace; no other prosperity than a universally prevailing prosperity. But common peace and prosperity are not possible without **common historical ideas** [...] If they have nothing but narrow, selfish, and contradictory nationalistic traditions, races and peoples must slide into conflict and destructive violence."*

Maria Montessori¹⁵ also wrote the following in 1947 about her cosmic upbringing and education:

“Let us offer the child a vision of the entire universe. The universe is an impressive reality and an answer to all questions. We will walk this path of life together, for all things are part of the universe, all are connected in an all-embracing unity. This image helps the child’s mind to focus, to stop wandering in an aimless search for knowledge.”

Already partially quoted earlier: Kees Boeke⁶ wrote in 1959 in the foreword to his brilliant book ‘We in the Universe, the Universe in Us’:

“.....We all, children and adults alike, are inclined to live in our own little world..... if we do that, we can easily forget how vast the area of existing reality is and our attitude can then easily become narrow-minded and chauvinistic. It is necessary that we acquire a broader view, so that we can learn to see ourselves in our relative position in the great and mysterious universe in which we were born and live. School brought us into contact with various aspects of existence, but often they are not connected to each other, so that the danger is not imaginary that we collect a great many separate images, without realizing that they all together form one great whole. It is therefore important for our education as human beings to have means at our disposal that can give us a broader and more coherent picture of our world and thus a truly cosmic view of the universe and our place in it, a cosmic orientation.”

NO MORE DELAY, LET'S START NOW.

KOSMOS STELT ZICH VOOR

Jos Werkhoven



On the left you see the title pages of the first three stories that I have composed and written as an example.

In my book *"Once upon a time . . . a story to tell . . ."* I describe for you my working methods how I have collected ingredients to be able to develop, compose and write the three stories *"Kosmos introduces itself"*⁵, *"Birth of Cosmos"*⁶ and *"The story of all building blocks"*⁷.

In this abridged edition I limit myself to the story *"Birth of Cosmos"*.

I repeat emphatically that the stories are examples. The universal story is a great and big story in which everything that is fits.

They were also not written to say: *"Tell these stories to start the universal story."*

You will make your own choices and you will draw from what *The Lines of Life*, *The Powers of Ten* and *The Patterns of Language* offer you.

I hope that the following paragraph will help you with that.



The three sample stories in English language can be downloaded free of charge from <https://www.dearend.nl/BigHistory/index.htm>

(I used Google translation to translate the three stories.

Google translate does that very well, but here and there something strange creeps in.

No problem for the information, hopefully no problem for your language sense either.)

EXAMPLE - “COSMOS INTRODUCES ITSELF”

delving into and collecting and arranging the ingredients

The first method.

If you choose the method to have “*Cosmos*” (that is you temporarily) introduce himself, then it must be very clear to you and the children that you are playing a temporary role. After all, you are not going to tell the children fairy tales. But even though “*Cosmos*” cannot speak in reality, the *cosmos* can. Examples are given.

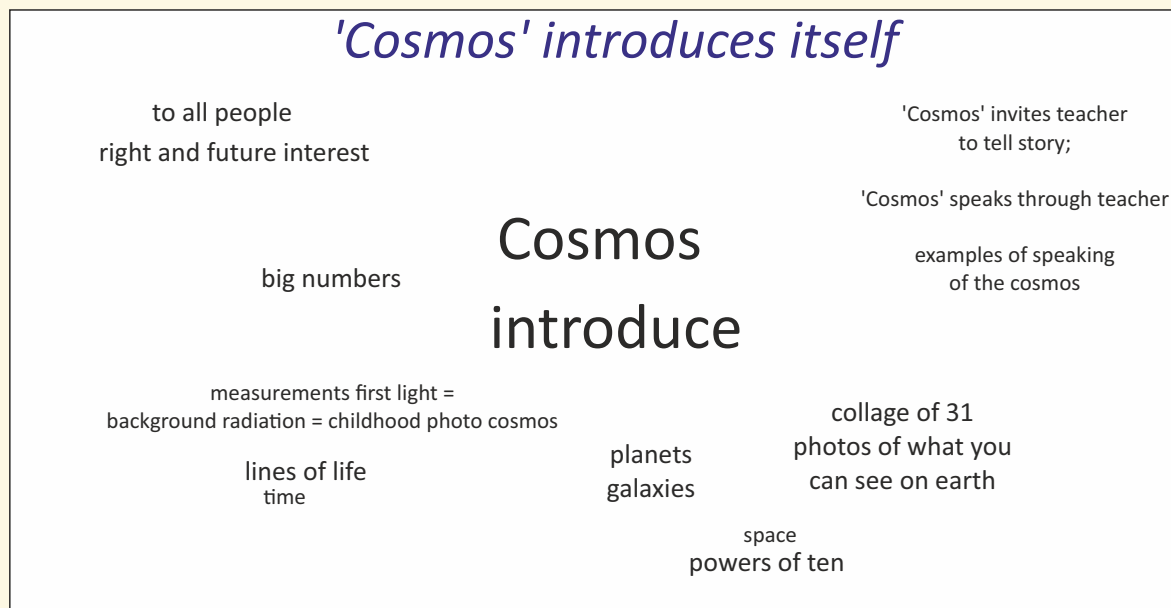
The second method.

This will probably be familiar to you: namely, creating a brain-storm.

You place the words **Kosmos** and **introduce** in the middle. (Do you understand my use of color here?)

Around it, you place the concepts that you want to tell the children about.

My brainstorm looked like this. The subjects that I wanted to tell the children about naturally came closer together due to previous experiences.

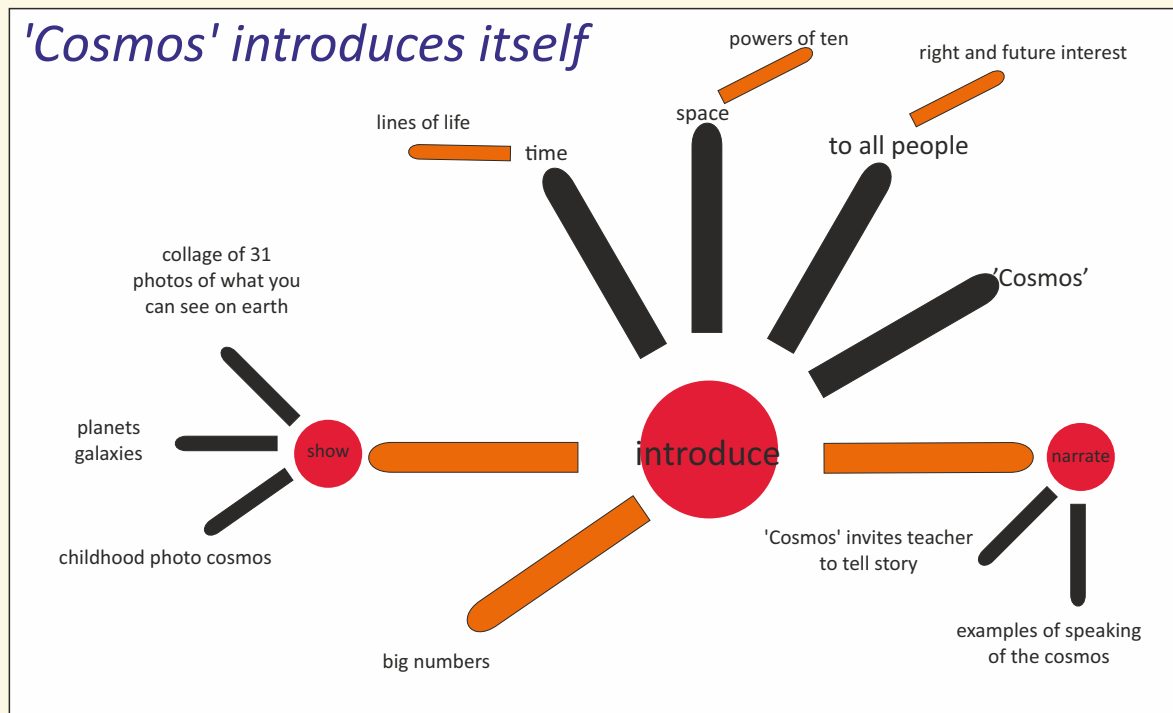


The third method.

This phase consists of arranging the subjects according to the patterns of language and the patterns of the cosmos as described in the previous chapter. You can look at that on the next page.

I will now write out this third phase for you in full. It looks quite extensive, but: **practice makes perfect!**

When you have gained more experience with this method of preparation, you will discover that the patterns will almost automatically emerge for you: your thinking and acting will then follow the patterns of the cosmos and language.



The relations between **activity, energy, development** and **entities** and **the ways in which they occur** are in our present case:

introduce

The activity, energy, development is in the middle.
In our current case: **introduce**

'Cosmos'

It is 'Cosmos' who introduces himself in the role of the narrating teacher.
(We will soon let the cosmos itself speak with examples.)

to all people

'Cosmos' introduces itself to all people of the earth.
The reason lies in the fact that **every person on earth has the right to learn the history of the cosmos from the beginning to the present.**



Space

A beautiful way to represent the dimension of space is:
in the manner of using the **Powers of Ten (Kees Boeke - Eames Office)**.



Time

A beautiful way to represent the dimension of time is:



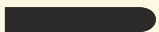
in the manner of using **The Lines of Life**.



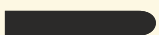
The way in which the story continues is done with:



Narrate



'Cosmos' invites **the teacher to tell the story**; 'Cosmos' **temporarily speaks through the teacher**.



We give **examples** of **the actual 'speaking'** of the **cosmos**.



The way in which the story continues is done by:



showing:

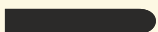
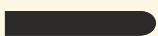


Photo of the background radiation of 30,000 years after the Big Bang.



photos of planets and galaxies

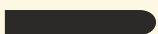


photo collage of 31 objects that you can encounter on earth.



The way the story continues is done with: **large numbers**

The greatness of the cosmos demands an understanding of the large numbers.

Please note: In my book *"Once upon a time . . . a story to tell . . ."* I describe for you in one hundred pages my extensive motivation for the choice and the content of the three stories.

QUESTIONING SPACE AND TIME

Description of the investigative method for children using language patterns

In this chapter I will describe for you how the children can start working in an investigative way with the help of the patterns of the sentence analysis material of Maria Montessori.

I will show you the complete '*quality card*' that I made for the children to use in their investigation.

You will find successively:

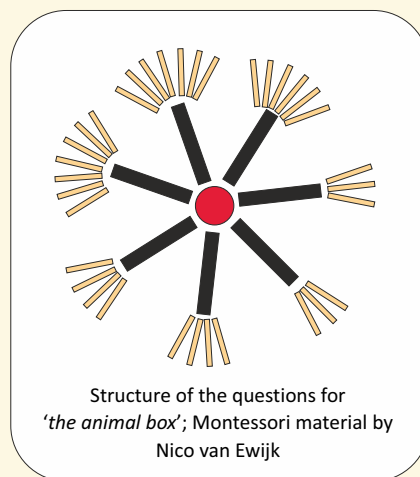
- Overview of 'The whole is more than the sum of its parts'.
- Material for sentence analysis by Dr. Maria Montessori.
- Description of preparing, processing and presenting a story, essay, paper, speech, presentation.
- **The starting point is the child's assignment to himself and/or the teacher's request to the child to study a subject. The goal is to arrive at a presentation in which the child is accountable to his teacher and/or group, school, parents, etc.**
- **The presentation can take the form of a story, paper, speech, performance, work of art, etc.**
- **This presentation is added to the child's portfolio, including feedback from the teacher, group, school, parents, etc.**
- Copy sheet to be used with the described method.
- Two special anecdotes from my teaching practice that show the power of the material.

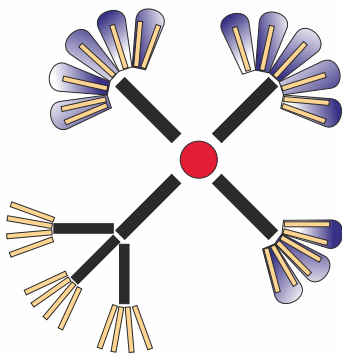
Attachments (from page 80):

(The four examples have been enlarged and expanded with the texts added as appendices at the back of the book on page 81 and further.)

I have added the following four appendices because they so nicely follow the patterns of Dr. Maria Montessori's sentence parsing material.

- '*Questions related to the animal box*' by Nico van Ewijk for the study of animals





Structure of the questions in
History in periods of
A. Romein-Verschoor
and
J. Prins-Werker

- 'Questions concerning History in periods'
by J. Prins Werken and Dr. A. Romein-
Verschoor for the study of ancient and
current cultures.

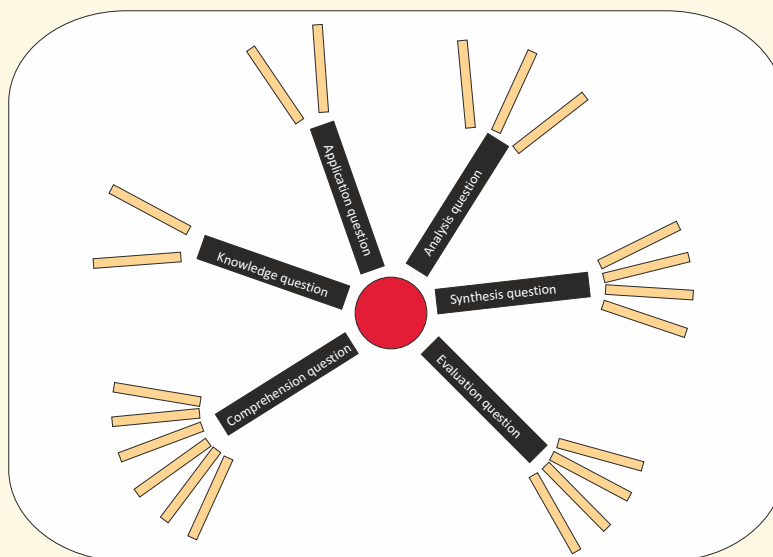
- 'Questions belonging to ,Verhalenwijzer'
(*The Story Guide*) by Bea Heres Diddens;
an overview of all aspects you can think
of when writing a story. You can add your
own questions.



Structure of the questions in
'Verhalenwijzer' (story guide)
by
Bea Heres Diddens

- knowledge question
- comprehension question
- application question
- analysis question
- synthesis question
- evaluation question

- Finally, you will also find an overview
of question types in the appendices
(page 85).

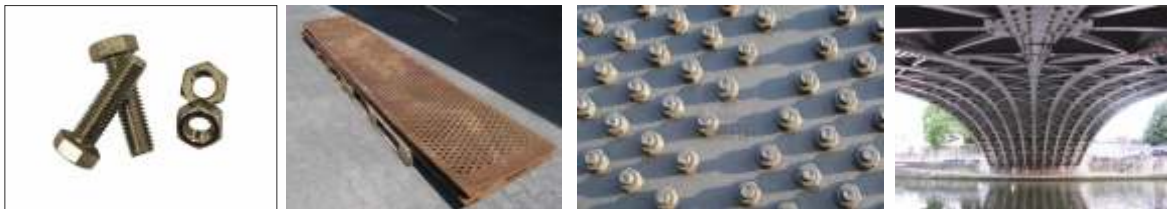


N.B.: The quality maps are shown slightly reduced.
The original size was A4.

Quality maps '*question structures*'

The whole is greater than the sum of its parts.

From part..... →to the whole.
From nuts and bolts.....via sheet material.....to construction... →and bridge.



Child..... →and city.
.....children.....family.....

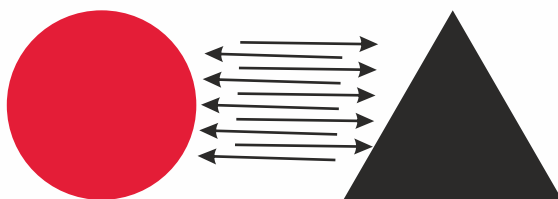


From periodic table of elements..... →to our solar system.

periodic table of elements



From connection of energy and matter..... →to sentence (meaning).



PROVERB

what is happening?

SUBJECT

Who is it that?
What is it that?

This is already well known to you and your children, but the overview belongs on the quality maps.

Questioning space and time

Questioning:
material for sentence analysis of Maria Montessori



N.B.: On the cards you will find learning conversations; they are **essential** for control, reflection and progress of the work. There are two conversations noted, there can always be more if necessary.

Story, essay, paper, speech, presentation prepare, process and present

- * child and/or teacher determine(s) the topic.
- * Depending on the situation - teacher's offer or child's own choice - the teacher is leading in the next activity.
- * The child makes a mind map/brainstorm on a blank sheet of paper about everything involved in the chosen topic. Here the teacher can be leading by giving a minimum of subtopics that will in any case be part of the presentation.
- * **Essence: learning conversation 1.**
It lays the foundation for an optimal presentation according to the child's possibilities. It gives the teacher more insight into the child's understanding and possibilities.
It gives the child more insight into the essentials and possibilities of the subject. After completion of the above, there is a learning conversation between teacher and child.
 - Is the mind map complete enough?
 - What can be added? What can be removed?
 - The teacher can give the child a reading/study assignment from a specific book.
 - The teacher can ask the child to gather more information in another way (film, interview, etc.).
 - The teacher will in any case ask the child questions.
- * The child is instructed to make an initial arrangement in groups on the back of the sheet of paper. The teacher asks the child to think carefully about why he or she wants to bring subtopics together or keep them separate.
 - Which subtopics do you take together?
 - Which subtopics do you want to treat separately?

N.B.: On the cards you will find learning conversations; they are **essential** for control, reflection and progress of the work. There are two conversations noted, there can always be more if necessary.

❖ **Essence: learning conversation 2.**

It gives the teacher insight into the child's understanding/level. The basis of the presentation is completed.

- The child explains why it has arrived at this arrangement.
- The teacher still has the opportunity to apply (small) corrections in consultation with the child.

- ❖ The final arrangement is now made on a sheet of paper as shown here.

The arrangement is that of a well-written text: subject with introduction, chapters, paragraphs, possibly subparagraphs, conclusion.

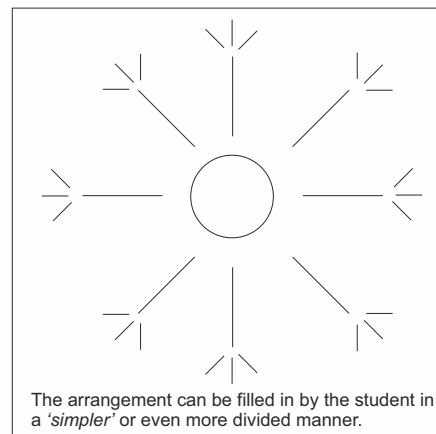
- ❖ After checking by the teacher, the child can now work independently.

- ❖ Each time the child works on it, he or she submits the work for possible daily feedback from the teacher.

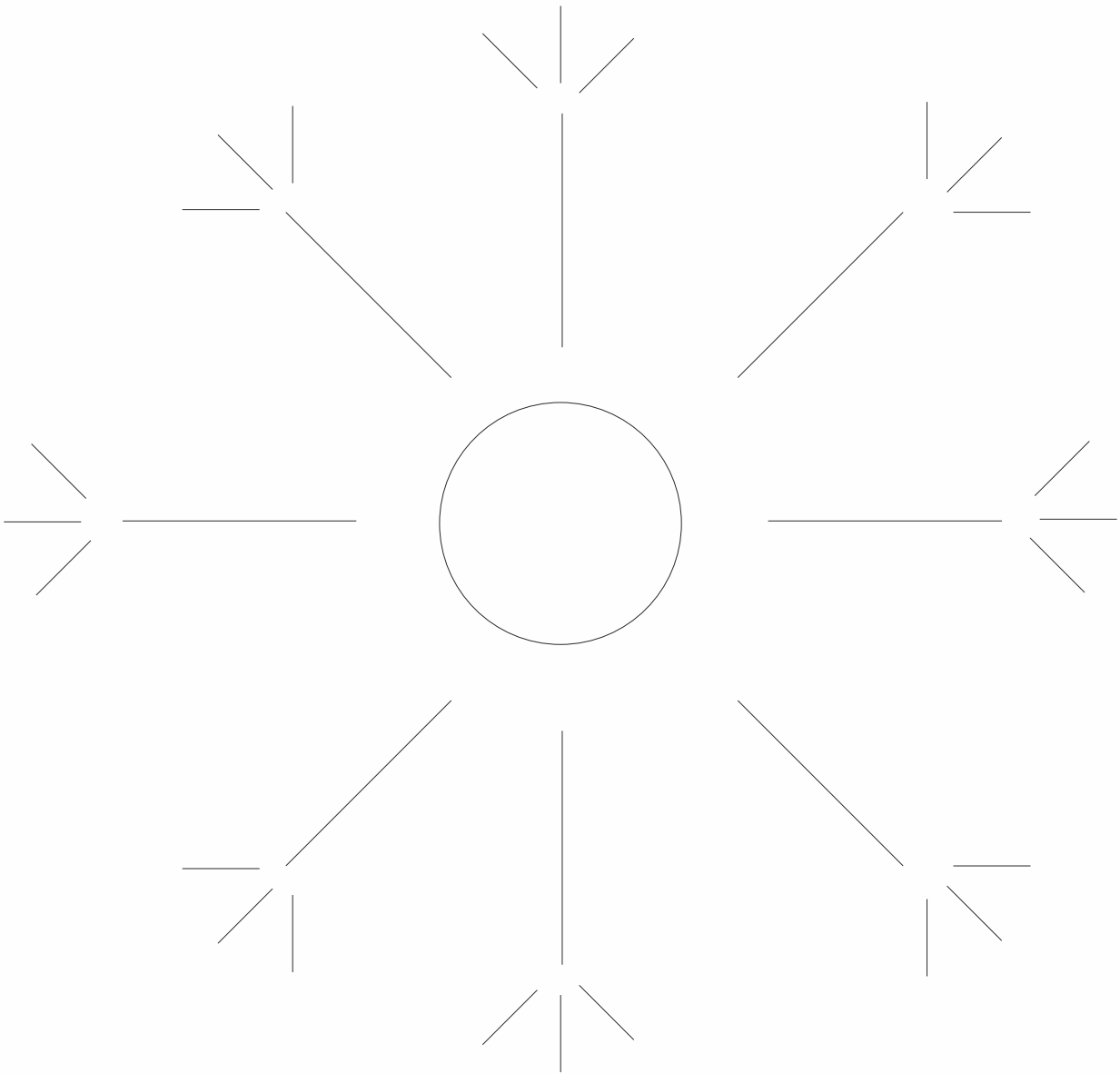
- ❖ Before the final version there is an independent organization of the child for feedback other than teacher. This can of course also always be done in between.

- ❖ Presentation to teacher/group, school, parents. Feedback from teacher/group.

- ❖ Final version goes into the child's portfolio including all feedback.



The copy sheet on which the children make their final arrangement after brainstorming and initial arrangement. This arrangement is just an example; the children can expand the arrangement themselves or leave out parts.



TWO SPECIAL ANECDOTES

Years after I had stood in front of the class I was confronted in a special way with three experiences, which convincingly demonstrated the power of working with the patterns of language.

The first experience that I am now describing is also the introduction to the first anecdote, but already says a lot about the power of the material.

At the time I worked part-time at a school and did various tasks there. I was asked to guide children in writing a paper. The school had set the goal of having the children write at least one paper per year. I thought it was a nice question and I knew how to approach it: namely in the way that you have just read on the quality cards.

Because the library was in a large hall, I suggested working there with the children: books at hand and sufficient work space for the children.

Because I also had other tasks, there was only one moment when I could supervise the children: Friday afternoon. Normally not the most productive afternoon for child and teacher. However, that would turn out differently!!!

Because I could not and did not want to start with a class full of children at once, I gradually built up the number of children. In the end, it came down to the fact that every Friday afternoon more than one class full of children was working in the hall: between thirty and forty children was absolutely no exception. The special thing was that I had enough time to supervise the children (see the **learning conversations** in the described work text). I found it even better that the children were all working very well; quite special for a Friday afternoon and also with so many in the hall.

The first anecdote.

The second experience I am describing now provided the first anecdote, about five years after I left the school.

One day I was visiting and visited some classes. In the upper grades an Angolan girl came towards me who had only been in the Netherlands for two years. She proudly showed me her paper 'Angola'.

She spoke and wrote very good Dutch; I immediately saw a beautiful layout of the paper. I asked her how she had tackled the paper.

She walked away for a moment and came back with a few sheets of paper: the copy sheets from the previous page! I immediately replied: *"How nice that you still use this."*

I walked over to the new teacher who was unknown to me and said the same thing to her: *"How nice that you still use this."*

She looked at me in disbelief and asked: *"What is this?"* The Angolan girl took her teacher to the cupboard and showed her where she got it from. Clearly visible! The teacher did not know the contents of her cupboards well! 🤔
(The importance of a well-prepared environment presented itself here!) I asked the Angolan girl: *"How did you do it without the teacher?"*
"Oh, other children told me how to do it!"
Never before have I been so beautifully confronted with the content of Maria Montessori's wonderful teaching method: *"Help me to do it myself."*
Not via the teacher this time, but via fellow pupils! 😊

■ The second anecdote.

The third experience I am describing now yielded the second anecdote, which I briefly mentioned earlier in this book. I do so with great pleasure because it is not the work of primary school pupils, but the work of a graduate scientist.

I like to repeat: *"Working with the patterns of language is indeed material developed for children, but the material is certainly not childish."*

That is shown by the following special anecdote which I would like to share with you.

Even before I guided children with their papers, I worked with the language patterns in my own class. If the children wanted to write a story, essay or paper, I put them on the right track with the help of the described language patterns.

Both the children and I found this a very pleasant way of working. The children because they knew exactly what they could do and therefore started working independently.

I myself became well informed about the children's thinking and working quality.

Years later the following happened.

I received her recently published dissertation from ex-pupil Ingrid Takken (Dr. Maria Montessorischool Huizen) from Australia. She wrote to me about her emigration and studies and that she was happy to have now obtained her doctorate. She also told me how she had tackled her thesis. The following sentence moved me:

"Thank you again, Jos. I was able to write my thesis with the help of the question structures that you taught me."

You can read more about her work at:

researchgate.net/scientific-contributions/Ingrid-Takken-45485576

QUESTIONING SPACE AND TIME

Framework “To take care of development”

Perspectives (future)	Formulas (present)	Stories (past)	Levels (origin)
Worldview	Observe	Major events	Universe
Concept	Research	Fundamental issues	Humanity
Enabling environment	Build	Characteristic customs and habits	Culture
Example	Learn	Own experiences	Self
Object	Subject	Time	Space

Introduction

The framework above was developed by Anne-Marie Poorthuis, my wife. Anne-Marie and I have worked together extensively and written for the International Big History Association and given Big History courses for teachers.

The framework ‘*To take care of development*’ emerged from the above activities.

You can read the full article on the framework [here](#)¹⁶, but I would like to quote the introductory text of the article to get a first idea of the framework:

"The great events in the universe and the fundamental questions that we as humanity are confronted with, make us realize that the world is bigger than ourselves and that the way we live has an influence on it, without us being able to fully understand it. This poses great challenges for us. How can we as humans act carefully in this and help ensure development in relation to everything that is?"

We introduce a framework that can help us to observe, investigate, build and learn the relationships with everything that is.

*This framework is inspired by ‘The Lines of Life’ and shows the relationship between **four levels of origin in the past, present and future: the universe, humanity, culture and the individual self.***

*This results in 16 starting points that are interrelated and all contribute to development. In **Bateson’s words**, the 16 starting points form a connecting pattern that shows itself as ‘**a dance of interacting parts**’.*

The framework is itself an empty shell, which fills itself from the starting point we choose. It does not matter where we start. Every starting point is an entrance, as long as we then make connections with everything that is there. With the help of the framework we can always see what still needs attention.”

Example 1. - Let’s dance!

Consideration of the starting point of the worldview

In the following pages I will describe for you one possible example of how the scheme can be considered from different perspectives.

In the book ‘*Once upon a time... a story to tell...*’ I describe also two other examples

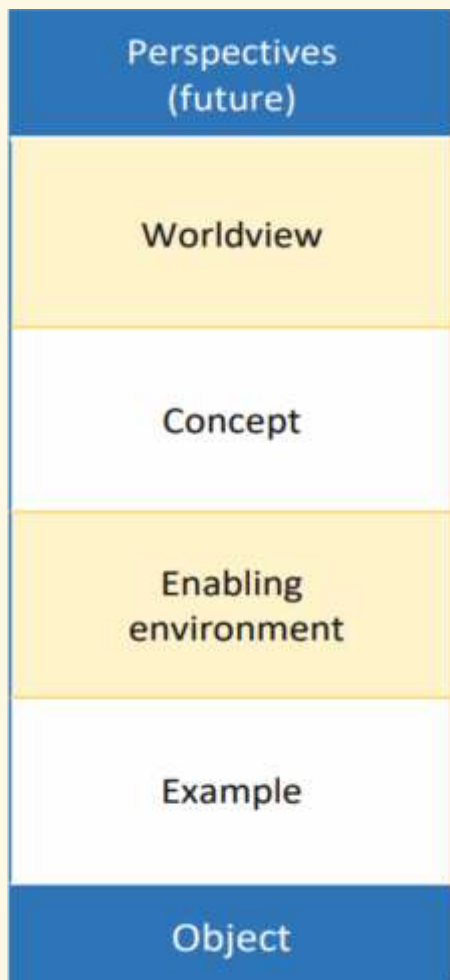
I would like to repeat:

“To paraphrase Bateson, the 16 starting points form a connecting pattern that unfolds as a dance of interacting parts.”

And Anne-Marie wrote:

“The framework is an empty shell in itself, which fills itself from the starting point we choose. It doesn’t matter where we start. Every starting point is an entrance, as long as we then make connections with everything that is there.” (Starting points are in yellow and white.)

So: **“Let’s dance!”**



In the texts below, the **word concepts** of the diagram from the white, yellow and blue fields are always **printed in bold**.

Please note: the descriptions that follow are far from complete: I only mention a few exemplary possibilities of the 16 starting points; I can really imagine that discussing the 16 starting points with each other can provide a lot of material for discussion and text to describe.

This applies to the school (**culture**), but certainly also to your organization (**culture**) in which you work or to **yourself** as an individual.

First I want to describe for you as a possible example the starting point **worldview** from **future perspectives, object**.

You and I (as **self**), or we as (**culture** or **humanity** or **universe**) are therefore the **subject** who will consider the **object worldview**.

Let us start with **ourselves**: what **role** do I play as an **example** to promote a **future worldview**?

Example

As for **me**, I expect that after reading the book up to here you will by now have an idea of what my desired **worldview** looks like! 😊

It is desirable if '**I myself**' have formulated the desired **worldview** after obtaining the knowledge that the considerations yield in relation to the other 15 starting points. We make connections with everything that is there:

- we **observe**,
- we **research**
- we **build** and
- we **learn**.

The **enabling environment** to arrive at the **concept** of a desired **worldview** can be read below as I discuss the **levels of origin**.

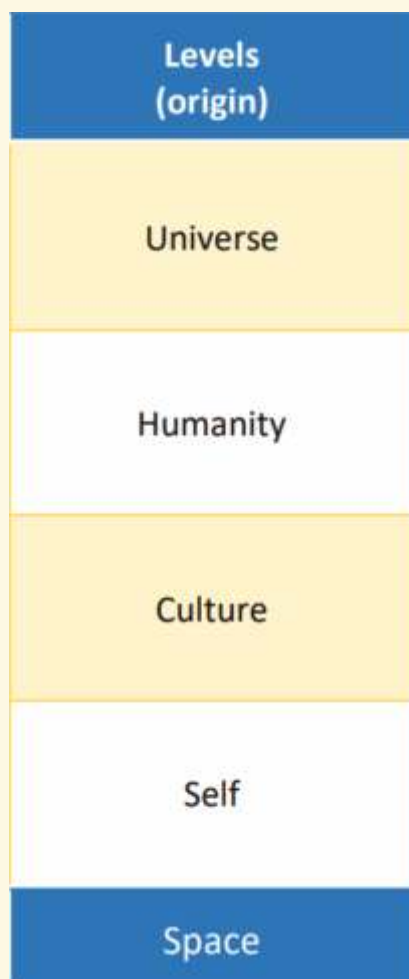
As a school it is in any case wise to offer parents and children as **objective** a **worldview perspective** for the **future** as possible:

- What do we offer the children? (All aspects of the scheme?)
- What do we give the children? (All aspects of the scheme?)
- What do we show the children? (All aspects of the scheme?)
- How are we an example to the children? (All aspects of the scheme?)

Enabling environment

Concept

The **starting point Worldview** considered from **the levels of origin, space**.



If we consider the **worldview** at the **level of the universe**, then we can talk about how we stand with respect to:

- The management of the moon (and other planets such as Mars etc.).
- There are currently many countries that want to exploit the moon. Who has a say in this? Who is the owner?
- The 'emigration' of people to the moon and Mars?
- How do we manage all the 'waste from spacecraft and satellites' that float around our earth?
- Who manages and takes care of that?

Universe

The above is still partly a **future perspective**, but a number of issues are already extremely topical. And **'we', 'humanity'**, have not yet made any agreements about current affairs and the future.

- We will certainly talk to each other about our planet earth.
- Do we see planet earth as one common home? Here comes **humanity**, our **culture** and **ourselves**.

- Do we see **humanity** as one in which many different **cultures** live together peacefully and caringly and sustainably?

If we see **humanity** as one, then there is a good chance that we will also look at planet earth in this way, which we will jointly care for as **humanity**.

If we see **humanity** as a collection of different **cultures** that all have their say, then there is a good chance that the above question (seeing the earth as one shared home that we can jointly care for) remains unanswered.

We can conclude that this is the current situation on our earth; where we are confronted with still unresolved problems such as climate change and the distribution of water, food and housing (the refugees).

- And how do I look at it **myself**? Do I have a different opinion compared to others? What **role** do I play?

Humanity

If we consider the **worldview** at the level of **humanity**, **humanity** can choose from several **concepts**, some of which have already been partially mentioned above:

- Do we see **humanity** as one or as a system of cooperating **cultures** or as a collection of independent **cultures**?
- Or do we see other possibilities for **humanity**?
- We can conclude that **humanity** currently has only one described **concept** for a **worldview**: the United Nations. Due to the existence of a veto right, it is not easy for **humanity** to reach global agreements.

If we consider the worldview at the level of culture, we may conclude that an enabling environment for a worldview is only possible if cultures wish to cooperate.

Culture

Good questions for studying cultures were developed in the previous century by Dr. A. Romein-Verschoor (historian) and J. Prins-Werker (Montessori teacher), called *History in period*. You will find the questions in the appendices on pages 80 and 81 at the back of the book.

The starting point **Worldview** considered from the **levels of stories (past), time**.

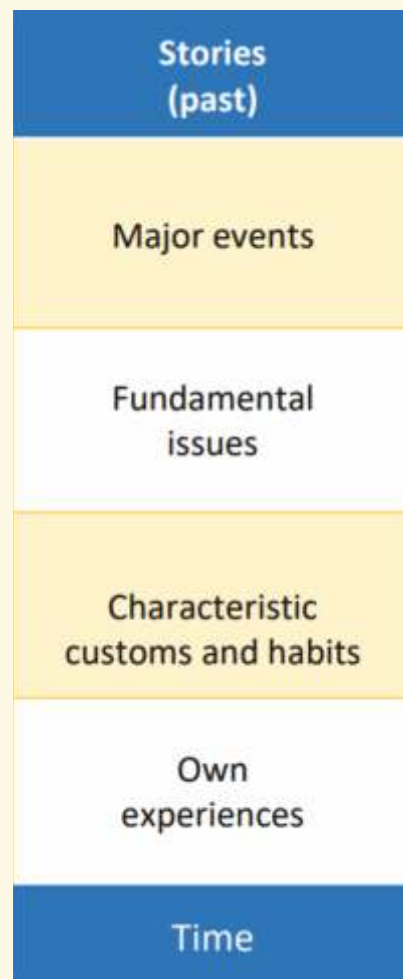
If we consider the **worldview** from the **level of one's own experiences**, then that is of course very personal. I do this briefly from my own life and upbringing:

own experiences

- My year of birth is 1950. Relevant, because it was five years after the end of World War II.
- In my family of five brothers and sisters (born

between 1933 and 1948) the war was often discussed and what the family had experienced. That made a big impression on me as a child: the injustice that was done to innocent people. As a child, I therefore had the following important wish: we had to build a just and peaceful society together.

- The political conversations with my father when I was a bit older contributed greatly to my previously formulated wish.
- My encounter with Montessori education when I was at teacher training college. On the grave of Maria Montessori in Noordwijk is the following text, which is characteristic of the essence of her educational work:
 - *"I ask the sweet and powerful children to build peace with me in man and in the world."*
 - Without describing it further in words, I expect that after reading this book up to here, you will have a good idea of my desired world view.



If we consider the **worldview** from **the level of the characteristic customs and habits of the (own) culture**, then **the culture** in which you live is strongly decisive:

Characteristic customs and habits

We know many different cultures on earth. There are many cultures that live together peacefully. There are many cultures that live together peacefully and cooperate in an economic (EU), defensive (NATO), care (WHO) or meteorological (WMO) context.

- There are cultures that do not live together peacefully: Russia/Ukraine, Israel/Hamas, China/Taiwan, many African countries and more.
- There are many international groups that work together worldwide: doctors without borders, Amnesty International and more.
- For cooperation in the world, the most decisive factor is in which country one lives.
- Virtually all countries in the world are members of the United Nations, but that does not mean that they cooperate (peacefully). The question is: Is the culture in which we live able to create an enabling environment to cooperate and live together with other cultures worldwide in a peaceful and sustainable way?

If we consider the **worldview** from **the level of the Fundamental Issues of Humanity**, then the way **humanity** is viewed is very decisive, I repeat the essentials discussed earlier:

Fundamental
issues

- Do we see **humanity** as one or as a complex of **cooperating cultures** or as a collection of **independent cultures**?
- Do we see other possibilities for **humanity**?
- We can conclude that **humanity** currently has only one described **concept** for a **worldview**: the United Nations. Observing the work of the United Nations, we cannot yet say that all countries together do not yet consider peaceful and sustainable cooperation as **a fundamental issue for humanity**.

If we consider the **worldview** from the **level of the major events in the universe**, I first refer to the previous descriptions of **the worldview at the level of the universe**:

Major
events

- There we read that we can expect **major events** now and in the future, but that **the cultures or humanity**, whether or not they cooperate, have not yet made any agreements about this.
- **Major events** from the past still play a role today (2024).
The extinction of the dinosaurs 66 million years ago was caused by the impact of a meteorite on Earth.
NASA will continue to experiment in 2024 after a first successful attempt in 2022 to push a space rock into a different orbit using a 'space bullet' (spacecraft DART). In this way, they want to try to prevent a similar situation from 66 million years ago.

The starting point **Worldview** considered from the **levels of formulas (present), subject**.

I have deliberately taken this column of the diagram as the last description.

After all, we are **the subject** that studies **the object** in space and time.

Finally, because this column shows what we have already done quite a bit up to where we are now in this book: we have **observed** a lot, we have **researched** a lot, we are (hopefully) well able **to build** and have already **learned** a lot: the dance of the interacting parts in practice.

- If we follow the evolutionary development of man from primate to the present, then:
- can we assume that **observing** the world (**worldview**) was initially the most common:
 - where can we sleep safely?
 - are there dangerous animals?
 - it is wet here, we are looking for something dry.
 - where can we find good food?
 - etc. etc.
- **researching** the world (**worldview**) will have taken on an increasingly important place:
 - which animals are dangerous? (experimental)
 - which food can we eat/not eat? (experimental)
 - what can we do with branches/stones/bones/skins (and everything that one came across)?
 - etc. etc.
- building the world (**worldview**) is then the next step: making fire yourself, making tools (including hand axes), clothing from skins.
 - etc. etc.
- **learning** from the world (**worldview**) is present in **observing, researching and building**.

Humans are the only mammals capable of **collective learning**.

Collective learning is sharing our knowledge with each other and passing it on from generation to generation and **building** on possible ideas in order to come up with new ones.



- With children (and you very likely with yourself) you can clearly see that there are different ways of **learning**:
 - one learns more by **observing** (looking, listening);
 - another learns more by doing (**building**);
 - yet another is more of a **researcher**;
 - and many do it all alternately or simultaneously: **observing, researching, building = learning**.

I hope I have been clear enough for you in all the foregoing concerning the consideration of the **worldview**: we have **observed** much, **researched** much, **built** much and hopefully **learned** much with all starting points.

It was a dance of interacting parts.

So much for this first described example.

In my book ,**Once upon a time . . . a story to tell. . .** I work out two more examples:

- the starting point **major events** from **stories (past), time**
- **Telling a universal story for us as humanity!**

QUESTIONING SPACE AND TIME

At work

You have now reached the end of the abridged edition of the book *'Once upon a time . . . a story to tell . . .'*. I am very curious what you thought of it. Your reaction(s), remark(s), addition(s), comments are very much appreciated.

You can send an email to Werkhoven@DeArend.nl or call +31-6-45173638

I am also prepared to visit your school or organization free of charge (travel expenses only) to answer your questions with your team or to discuss a previously agreed theme from the book. A theme that you propose yourself and that touches on the message of this book is also fine.

You can also arrange that by email or telephone.

But now: get to work!

At least, that is what I hope (and expect???)

Now you have read this book and have become acquainted with three beautiful educational materials, but the stories do not come to you automatically (except for the three example stories.)

Depending on your knowledge and education, you will certainly have to make a work investment: now you will have to ask the questions and find the answers that you do not yet know.

That is a necessary, important, but certainly also a pleasant path.

- You are working on your own development that you will enjoy your whole life.
- Most likely you will not stop your development and you will continue to ask the important questions throughout your life.
- You will be and remain an example for your children, students or colleagues.

At the start of the stories I also told the children the following comparative information:

"Good morning, dear children...today will be a very special day. I think and I hope that it will be a day that you will never forget in your life. Because today I am going to start telling a story that I know for sure that when you go to secondary school, I will not have finished telling."

But still, you won't be angry with me for not telling the ending yet. I think that you will have become so curious that, without needing my stories anymore, you will start looking for the next story yourself. I expect, and to be honest, I hope that you will do that together; each with your own task. But well... we will see in a few years, let me start now.

It is a story, so special, so amazing, so exciting... the best storyteller could never have imagined it."

Finally, I have not given you a 'textbook' that you can take a test or exam on and that will no longer be of any value in a few years because the world is changing so quickly.

I have given you three beautiful objective ingredients that are universal for every person on earth:

- the overview of **time**
- the overview of **space**
- **the patterns of language** (and the universe?)

I hope that you will be able (metaphorical speaking) '*to prepare tasty and nutritious meals with these ingredients*' or in other words: '*tell beautiful and good stories!*'

I wish you much fun and success!

APPENDICES

marking moments

Disclaimer marking moments

In 1997 I added the *handout marking moments* to the publications of *The Lines of life*.

Source of most marking moments: *Nigel Calder, Timescale, An Atlas of the Fourth Dimension*, 1984, Chatto & Windus Publishers, London¹⁹.

Note: 1997 and in those almost thirty years new discoveries have been made or dates adjusted by improved research. The only change in the list that I have added is the age of the universe: from 13.7 to 13.8 billion years.

- Please do not see this as laziness on my part, but as an encouragement for you to always consult multiple sources when looking for information in order to arrive at reliable information.
- Therefore, see the handout primarily as a first yet **to be checked** list of many moments of origin and development. The list already gives you a story without additional words.

I'll give you one recent example of a scientific discovery..

You see in the markers the age of galaxies is 12.7 billion years ago. We now know that the oldest galaxy JADES-GS-z14-0 is 800 million years older.

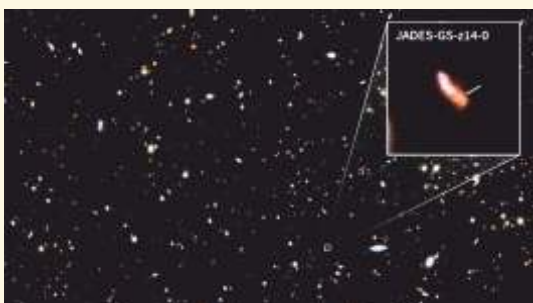
You can read in this link *,James Webb telescope sees oldest galaxy ever: 13.5 billion years old.*¹³¹

Quotes from the link:

„Scientists have discovered the oldest galaxy ever. The light shone about 290 million years after the Big Bang and is now approaching Earth about 13.5 billion years later.

The light was seen with the American-European James Webb Space Telescope, which was launched at the end of 2021.

It is much more advanced than its predecessors and can therefore look much further back in time. The discoverers were initially somewhat hesitant, because the light was brighter than expected, but measurements showed the age to be correct.“



The photo of the galaxy JADES-GS-z14-0 from the James Webb telescope.

photo 10



The line of everything

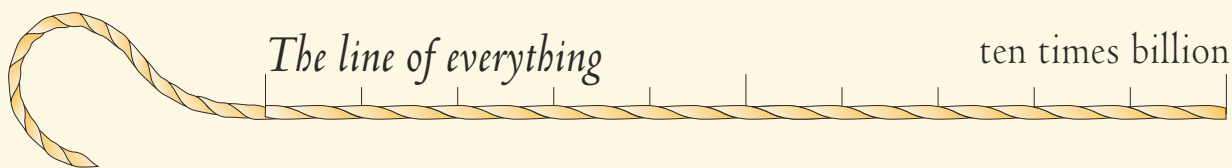
ten times billion

13.8	Big Bang The first second: The formation of gravity, protons, neutrons, electrons. After 3 minutes: Formation of helium, hydrogen and lithium.	0.65	Supercontinent Gondwanaland
13.4	Formation of atoms	0.6	First crustaceans
13	Transparent universe	0.51	First vertebrates
12.7	Formation of galaxies	0.5	Beginning of rich development of marine life: first fish,
11.7	Formation of the Milky Way	0.44	Ice ages
4.7	Presolar supernova (the prelude to the formation of our solar system)	0.425	Lungfish
4.6	Formation of the earth		First land plants
4.45	First seas formed in impact craters	0.395	Insects
4.276	Oldest minerals	0.370	Amphibians, land snails
3.9	Oldest rocks		Trees
	Formation of life	0.330	Winged insects
3.5	Bacteria and algae	0.313	Reptiles
	Living reefs (stromatolites)	0.310	Pelycosaurs
3	Moon and Mercury (geologically) dead due to rapid cooling and thick crust.	0.290	Ice ages
2.9	Formation of gold	0.260	Peak in coal formation
2.8	Formation of first land		Warm and humid climate
2.5	First finds indicating land ice	0.256	Therapsids
	Formation of iron	0.245	Permian catastrophe: 96% of all marine life destroyed, on land all large reptiles. Formation of Pangaea, drop in sea level Collision with icy comet???
2.3	Ice ages, supercontinent Kenora	0.240	Cynodonts
2.2	Mountain building impulse	0.235	Dinosaurs
1.8	Oxygen revolution: purple bacteria		Flowers
1.7	First animals (single-celled)	0.225	Pterosaurs
1.6	Blue-green algae	0.200	First mammals
1.5	Supercontinent Amazonia, first plants	0.175	Brachiosaurus
		0.170	Peak in oil formation
1.3	Multicellular organisms, micro-seaweed	0.150	First bird: Archaeopteryx
	1 mm	0.125	Marsupial mammals
1	Mars geologically dead	0.114	lower revolution
0.95	Ice ages		Modern mammals
0.85	Formation of copper	0.100	India leaves Antarctica
0.77	Ice ages		
0.7	Oldest worm-like fossils		
0.67	Ice ages		
	Jelly-like fish		



Archaeopteryx

photo 11



0,067 Comet impact: global distribution of extraterrestrial iridium
Significantly changed conditions
Dinosaur extinction



photo 12

0.065 Evolution of flora and fauna
Rahona Ostromi. Fossil find provides evidence of this bird as the base of the bird lineage.

0.060 North America leaves Europe

0.055 Equidae

0.035 First great apes

0.024 Emergence of grass

0.015 Human branch split from the apes, the Ramapithecus. This is where the Human Family (Hominidae) begins. The Ramapithecus is generally accepted as the ancestor of the evolutionary line that leads to humans. The characteristics that are selected for include: smaller incisors, larger molars with a flat chewing surface, the first molar has two cusps instead of one, the canines are smaller, the lower jaw is V-shaped instead of U-shaped and fairly robust. In these characteristics, this group closely resembles modern humans.

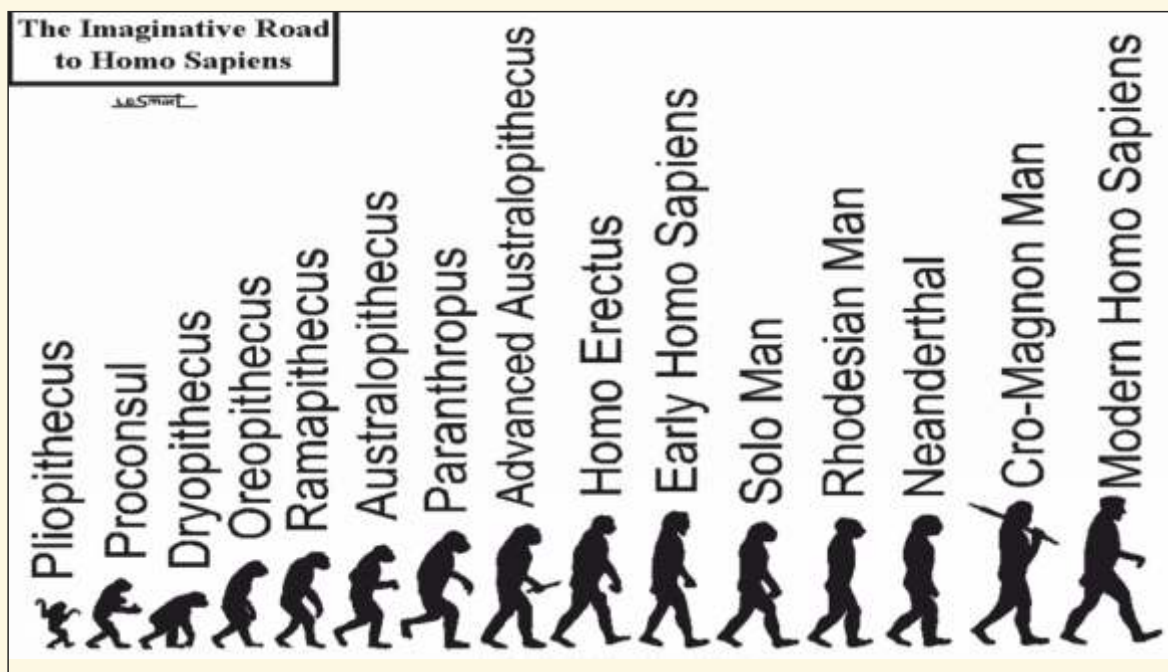
0.011 Strong growth of grazing animals

0.010 Origin of the Alps

0.007 Humans.

Very recent discoveries (1995-1996) of the Australopithecus afarensis

photo 13



The line of man

ten times million

10	Ramapithecus
10	Origin of the Alps
7	Man. Very recent finds (1995-1996) of Australopithecus afarensis, Australopithecus robustus, Australopithecus habilis. Australopithecus habilis developed into the species Homo habilis = handy man, as they certainly used tools.
7	Elephants
6.3	Mediterranean Sea dried up
6	Modern dogs
4.5	Camels, bears, pigs
3.7	Modern horses
3.5	Cattle Lucy, Australopithecus afarensis Found in Ethiopia, on the banks of the Hadar in the Afar Awash Valley. Lucy is the most complete Australopithecus skeleton ever found. She was found among the remains of 34 adults and 10 children who belonged to one group. The interesting thing about the find is that it is possible to compare the proportions of the body parts. Lucy had very long arms compared to her legs. It is therefore assumed that she had a climbing lifestyle. However, the pelvis also shows that she walked upright. She does have one instead of two knobs on her molar (see Ramapithecus).
3.5	Fossil footprints found in Tanzania, Laeotil. Proof that this hominid walked on two legs. In addition to the footprints, bones were also found.
3.2	Cheetah



Reconstruction of
Lucy, the
Australopithecus
afarensis

photo 14

2,5	Homo habilis. Oudste gevonden stenen werktuig gevonden in Gona-gebied, de grens van Kenia en Ethiopië, niet van beginnelingen in de steentechnologie (Nature 23-01-97). De bewerking van de stenen is vrijwel identiek aan die van stenen die eerder in Zuid-Ethiopië (2,3 miljoen) en in de Olduvai-kloof (1,8 miljoen) zijn gevonden en worden daardoor gerekend tot de Olduvaiaanse cultuur. Pas in de Acheu-lische cultuur, die 1,6 miljoen jaar geleden vrij abrupt verschijnt, worden andere, meer geavanceerdere steenbewerkingen toegepast, onder meer om handbijlen te maken.
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Reconstruction of fossil footprints
found in Tanzania, Laeotil.



The line of man

ten times million

1.8	Modern big cats, bison, sheep, wild boars
1.6	Start of the ice age period in the northern hemisphere: Günz.
1.5	Homo erectus, the upright man Finds in Algeria, Morocco, Tanzania (Oldowai) and South Africa (Swartkrans). The average cranial capacity had now increased to 850 cm ³ . This species probably migrated from Africa to Eurasia, the Peking man.
1	Australopithecus africanus and robustus extinct.
0.700	Brown bears
0.650	Wolves
0.550	Ice age northern hemisphere (Mindel)
0.500	Homo erectus in Eurasia. Use of fire. Finds in Indonesia, Java at Trinil on the Solo River. Finds in China, Choukoutien (near Peking). The cranial capacity was now on average 1000 cm ³ ; this man is also called the Peking man. The importance of this find was the evidence that this group used fire.
0.500	Llamas
0.420	Hut construction on beaches of Nice. Confirmed by find in Terra Amata, Nice. These shelters were 9 x 4.5 meters and contained hearths and places for preparing food.
0.300	Ice age northern hemisphere (Riss)
0.300	Homo pre-sapiens. The best-known finds are the skull of Swanscombe (England) and the skull of Steinheim (Germany). The skull capacity was on average 1300 cm ³ .
0.250	First inhabitants of the Low Countries
0.200	Cave bears, goats, modern cattle
0.150	Woolly mammoth

Woolly mammoth

photo 16



0.120	Homo sapiens neanderthalensis. Find in the Neandertal near Düsseldorf (Germany). They probably lived in tents made of skins, in addition to living in caves. They cared for their dead and gave gifts such as goat horns (Teshik-Tash, Tajikistan) and flowers identified by pollen (Shanidar cave, Iraq). Their tool technology was given a culture name: Mousterian culture (after the site Le Moustier, France). Their cranial capacity is comparable to modern humans. They inhabited Eurasia from western Europe to Central Asia.
0.100	Northern Hemisphere Ice Age (Würm)
0.073	Toba explosion (volcano in Indonesia created largest crater lake: 40 km in diameter)
0.072	Polar bear
0.040	Breakthrough of modern man Use of knife-shaped tools Seafaring
0.040	Homo sapiens sapiens. This is modern, recent man. He is capable of artistic expressions, as evidenced by the cave paintings of Lascaux and Altamira and the Venus figurines. A well-known representative is Cro-Magnon man (rock shelter of Cro-Magnon, southern France).

The line of man

ten times million

0.035	Use of calendars
0.034	Neanderthal extinct
0.030	Trade in flints from mines in Poland and Czechoslovakia
0.029	Ceramics of Venus figurines in Czechoslovakia, at the same time the first communities larger than family ties
0.025	Self-produced clothing
0.020	Use of bow and arrow
0.018	Cultivation of barley and wheat on the Nile. (Gazelles and goats managed in Jordan and Palestine.)
0.017	Use of lamps and ropes
0.014	Use of fishing tools
0.013	Pottery
0.012	Dog as a pet
0.0107	First written signs indicating quantities (sheep, grain).
0.0106	Jericho as the first city, surrounded by a 4-meter high wall.
0.010	Extensive fishing
0.010	Breakthrough agriculture

photo 17

Contrary to what you read on the left about Venus figurines (information from more than 25 years ago), the oldest discovered Venus figurine is 38,000 years old (Hohle Fels, Germany). It is also the oldest figurative work of art in the world.



photo 18

MEANING	VOGEL	OS	STER HEMEL GOD	WATER
oldest form				
90° rotated ± 3100 BC				
Classical Sumerian ± 2400 BC				
Old Akkadian ± 2200 BC				
Old Babylonian ± 1700 BC				
New Babylonian ± 700 BC				

Comparison of ancient writing forms.

The 'oldest form' in the comparison may be more than 10,000 years old.

The line of culture

ten times thousand

9.5	Breakthrough agriculture, rice.
9	Rising sea level.
8.8	Cattle tamed.
8.5	Weaving discovered.
8	Irrigation.
6.5	Copper smelted. Stone houses.
6	Breakthrough dairy cow.
	Use animal energy.
5.5	First use wheel.

photo 19



The oldest wheel in the world to date is said to have been found in Slovenia, in a marsh area south of Ljubljana (see photo), dated between 3500 and 3250 BC.

There are various theories about the oldest wheels in the world. Some archaeologists believe that the wheel came to Europe from the Middle East. Archaeological finds in various places in Europe, including Germany and Poland, would indicate that the wheel was already in use here in the fourth millennium BC.

5.5	First use of writing.
5.4	Start of Egyptian culture
5	Use of donkey and camel as beasts of burden.
4.8	Use of plough
4	Start of Chinese culture.
3.9	Start of Greek culture.
3.8	Use of bronze
3.050	First use of iron (breakthrough 2,800).
2.750	Rise of the Maya.

2,700	Start of Roman culture.
2,600	First coinage
2,500	First preaching of Buddha.
	Blown glass
2,030	Use of water power.
2,000	Birth of Jesus Christ (AD 0).
(AD)	<i>From this moment on, the marking moments are recorded according to the Christian calendar (AD).</i>
100	Use of paper.
162	Severe epidemics in Eurasia.
304	Breakthrough of the Huns.
500	Use of plough.
500	Use of abacus.
570	Birth of Mohammed, founder of Islam.
632	Breakthrough of the Arabs. Start of Islam.
700	First printed works (China).
768	Empire of Charlemagne.
1000	Islamic science (Arabic words: algebra and alchemy, theory books on lenses).
1115	First use of compass for navigation (China).

photo 20



The luopan, the first compass used for navigation in China.

photo 21



The si nan, spoon compass, was used in China more than 1000 years earlier for geomancy (divination). It is an iron spoon on a copper plate. The handle points south.

The line of culture

ten times thousand

1211	Breakthrough of the Mongols.
1290	Population decline due to bubonic plague.
1320	Rise of the Aztecs.
1356	Use of gunpowder for cannons.
1380	Cast iron in Europe.
1455	Use of the printing press.
1492	Breakthrough of explorers.
1560	Sugar and slave trade.
1579	Union of Utrecht.
1600	Emergence of imperialist companies.
1609	Use of astronomical telescope.



photo 22

The telescope above is most likely Hans Lippershey's first telescope.

"The invention of the telescope is often attributed to the Middelburg lens grinder Hans Lippershey. In 1608, this Zeelander applied for a patent on an instrument 'to see far away'." (Quote from Historiek.net)

Sometimes Galileo Galilei is also mentioned as the first inventor. In any case, he improved the telescope.

1621	Dutch spice monopoly.
1644	Manchu breakthrough in China.
1687	Newton writes the 'Principia'.
1690	Rise of liberalism.
1712	Invention of the steam engine.
1771	Discovery of oxygen.
1776 J	Jefferson; Declaration of Independence of the United States.
1789	French Revolution.
1825	Fossil fuel revolution.
1849	Gold rush.

1859	Charles Darwin writes 'On the origin of species'.
1867	Rise of Marxism.
1878	Invention of the telephone.
1885	First automobile.
1896	Discovery of radioactivity.
1903	First airplane.
1906	Discovery of electrons.
1914	First World War.
1917	Russian Revolution.
1922	First radio broadcast.
1940	Second World War.
1942	First nuclear energy.
1943	First computer.
1945	First use of atomic bomb.
1945	Establishment of the United Nations.
1948	Universal Declaration of Human Rights.
1949	Establishment of NATO.
1950	Breakthrough of television.
1953	Discovery of gene structure.
1955	Establishment of the Warsaw Pact.
1957	First space flight.
1960	Decolonization of Africa.
1967	Establishment of the European Community.
1969	Neil Armstrong takes first step on the moon.
1991	Gulf War.
1993	Abolition of Apartheid.
1999	Introduction of the Euro.

Here you see what I already announced in the disclaimer: these are the milestones that were included with the first edition of The Lines of Life in 1997.

When I wrote this text, it was 2024. So 25 years have passed since the introduction of the Euro.

There were definitely a number of special milestones in the last period that you can fill in yourself.

The line of myself

ten times one

The lines of life came with illustrated marker moments and loose word cards. The children could use these, but the idea was that each child would compose his (her) own life line with their own events that they chose.

Here you will find a list of the cards that were included.

Geïllustreerde markeringsmomenten.

Birth	End of Ramadan	A little sister was born.
10 x a birthday	I learned to crawl	I was allowed to join a sports club.
First time at primary school	I learned to stand	I was in the hospital.
Sinterklaas	I learned to walk	First school trip.
Christmas	I learned to swim	I learned to read.
Start of vacation	I learned to ride a bike	
End of vacation	I got a pet	
Start of Ramadan	A little brother was born	

Extra word cards included. (number of cards included in brackets)

Monday (2x)	next week	this month
Tuesday (2x)		next month
Wednesday (2x)	January (2x)	
Thursday (2x)	February (2x)	first quarter (2x)
Friday (2x)	March (2x)	second quarter (2x)
Saturday (2x)	April (2x)	third quarter (2x)
Sunday (2x)	May (2x)	fourth quarter (2x)
	June (2x)	
the day before yesterday	July (2x)	free (3x)
yesterday	August (2x)	
today	September (2x)	dad's birthday
tomorrow	October (2x)	mom's birthday
the day after tomorrow	November (2x)	grandpa's birthday
	December (2x)	grandma's birthday
last week		
this week	last month	

APPENDICES

questions history in periods

Questions about

(DUTCH) HISTORY IN PERIODES

BY

J. Prins Werker (Montessori teacher)

and

Dr. A. Romein-Verschoor (famous Dutch historian)

To study

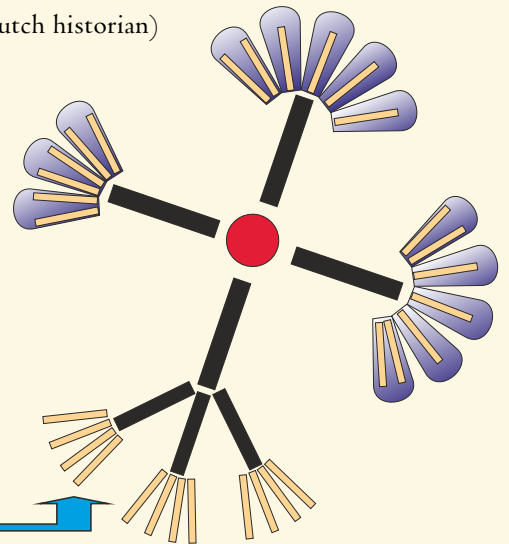
OLD and CURRENT CULTURES

Formerly published by J. Muusses, Purmerend, The Netherlands, 1953
to study the:

- Germanic time
- Middle Ages
- 17th century
- 19th century

translation: Jos Werkhoven

question structure of the material



What was (is) the nature?

What was (is) the soil?
What was (is) the climate?

What flora?
Which animals?

What people lived (lives) there?
How came it there?

What work was (is) done?

Which work?
Which activities?

What production?

Which vehicles
and technology?

How did people made the land
more habitable?

How did people used nature?

What was (is) civilization?

What thoughts
about life and death?

What language
and tradition?

What decoration
and art?

What religion
or wisdom?

Festivals and entertainment?

Who were (are)
the spiritual leaders?

What were (are)
the rights?

What was (is) education?
What was (is) the science?

What was (is) society?

How did live (lives) family?

Clothes?
Food?
Gear?

Houses?

Family?
Habits?
Way of life?

Childcare?

How did live (lives) the people?

Which groups
were (are) there?

What was (is)
the settlement?

What was (is)
the government?

How was the possession
of money and property?
Charity?

What was (is) the exchange with other nations?

Traffic
and barter?

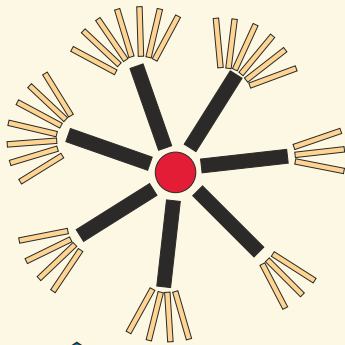
Travel
and move?

Slavery
and subjugation?

War
and conquest

APPENDICES

questions animal box



↑ question structure
of the material



Questions to study
animals
by
Nico van Ewijk

Observe

What does the animal look like?

How does the animal move?

What kind of noises
produces the animal?

What do you feel
when you stroke the animal?

How does the animal
reacts to you?

How does the animal perceive?

Life and living

Where in the wild
lives the animal?

Which plants grow in the
environment of the animal?

What other animals live
in their environment?

Does the animal has enemies?
Which?

Is the animal an enemy
to other animals?

What kind of home
has the animal?

Where does the animal live
when it lives with people?

Throughout the year

What does the animal
during the day?

What does the animal
during the night?

What does the animal in:
spring, summer,
autumn, winter?

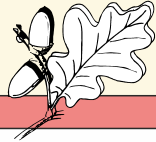
How old the animal
can become?

Alone or together

Does the animal lives alone
or in a group?

Does the group has a leader?

How becomes the animal
leader of the group?



Food and drink

What does the animal eat and drink?

How the animal obtains its food?

How does the animal eat?

Where does the animal saves its food?

Humans and animals

To which family the animal belong to?

Is the animal useful?

Is the animal threatened by man?
Is the animal protected by man?

What ancestors has the animal?

Young animals

In what way
duplicates the animal?
How the animal multiplies?

How is the young animal born?

How are the young animals
cared for?

How are the young animals
protected?

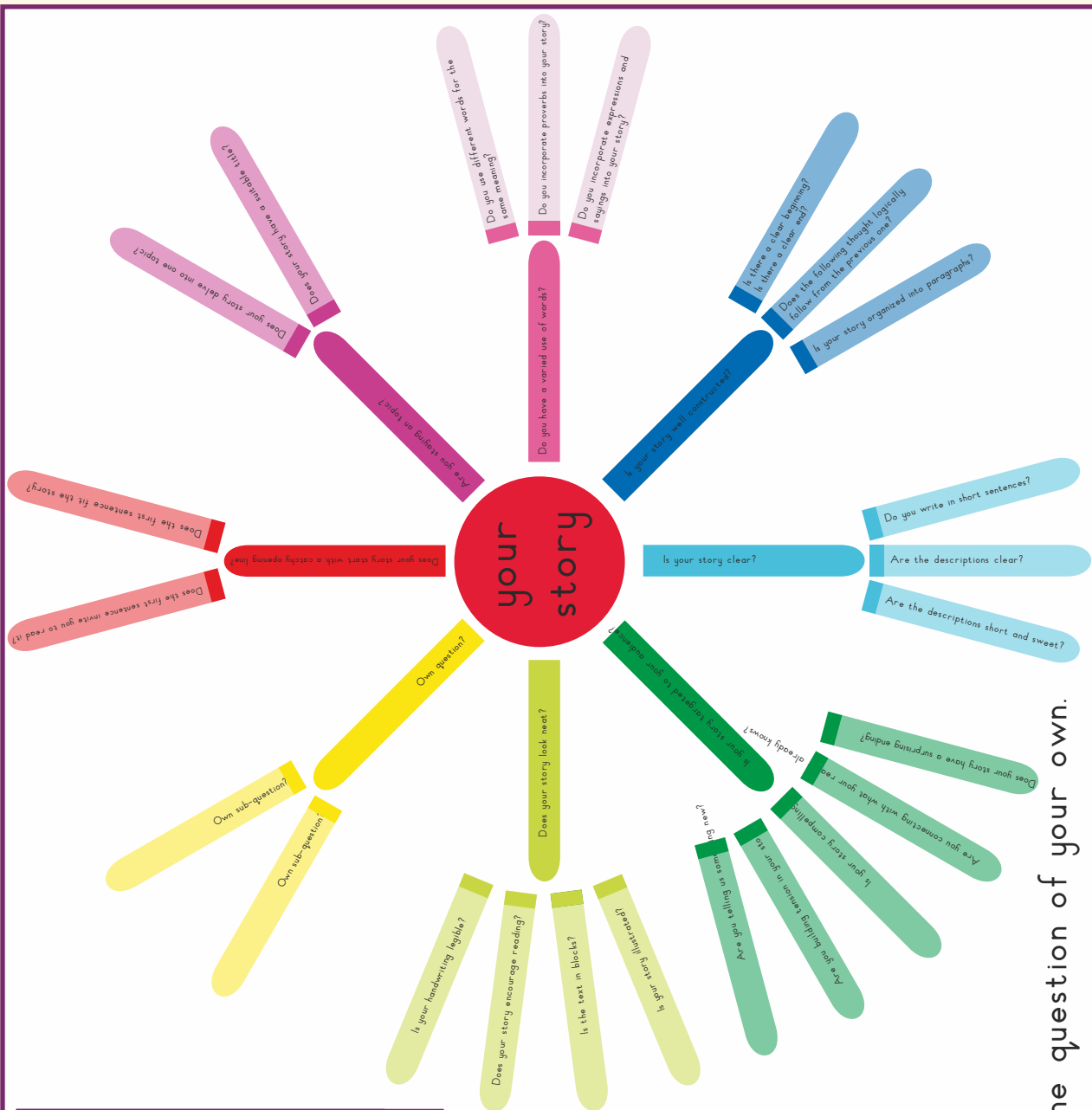
How do the young animals play?

Do the young animals change
as they grow?

How long do the young
animals stay with their parents?

APPENDICES

questions story guide= 'Verhalenwijzer'



Bea Heres Diddens
Illustraties Gertjan van Eijk

Uitgeverij De Arcand
ISBN 978-90-77085-51-6



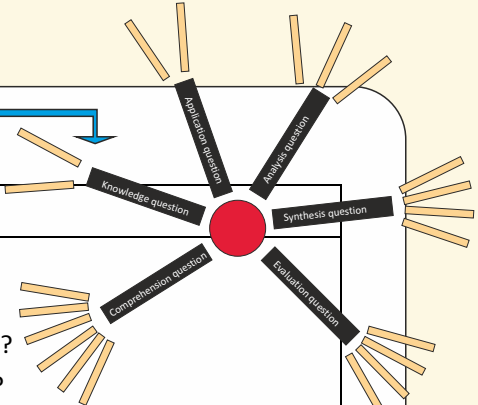
question structure
of the material

An overview
of all aspects
you can think about
when writing your story.
You can add more than one question of your own.

APPENDICES

types of questions

question structure of the material



Type of question	Activity	Examples
1. Knowledge question	- The remembering of facts or observations. - Remembering definition.	- What? - Who? - Where? - When? - Why? (if the cause is given)
2 Comprehension question	- Provide descriptions. - Determining the main points and essentials. - To compare. - Establishing coherence and connections. - Explain in your own words. - Describe differences.	- What is the essence of ...? - What are the main points? - What is the similarity between ... ? - What is the difference between ... ? - How could it be otherwise?
3 Application question	- Certain principles, techniques, rules, methods, apply to an example (problem) with only a good answer if possibility - Recognizing principles, methods, concepts in examples	- If (Wim has 49 cents) how much (he can then buy 8 cent balloons)? - What is the geographical latitude of Moscow? - Which of these poems is a sonnet?
4 Analysis question	- Indicate motives and causes - Drawing conclusions - Drawing conclusions to support the statement	- What idea is at the heart of this? - What evidence can you find that confirms (the law that air expands when heated)? - What arguments can be put forward?
5 Synthesis question	- Troubleshooting. - Making predictions. - Come up with something original and/or execute. - Carry out work orders.	- What would happen if...? - What do you predict would happen if...? - What is a solution for this problem?
6 Evaluation question	- Giving opinions on certain issues - The shelf life of certain assess opinions. - What meaning do you attribute to. - Assess the value of a solution to a problem.	- What is your opinion on this issue? - What value does this solution have for . . .? - What meaning do you attribute to?

LITERATURE – NOTES

1. Just in Dutch:

Huizinga-lezing 2024, Wij zijn de tijden. Geschiedenis in crisistijd, Beatrice de Graaf, Uitgeverij EW 2024.

Translated:

Huizinga Lecture 2024, We are the times. History in times of crisis, Beatrice de Graaf, Publisher EW 2024.

2. Peels, Rik (26-27 september 2024), 'Resilience in Extreme Beliefs and Resilience in Religious and Secular Faith', keynote lecture Fifth International Workshop of the Extreme Beliefs Project, Amsterdam.

3. To educate the human potential, Maria Montessori. Montessori-Pierson Estates, 1947.

Dutch translation: Onderwijs en het menselijk potentieel. Nederlandse Montessori Vereniging, 1998.

4. Het heelal (The universe), Stephen Hawking. Bert Bakker, 1988.

5. Article by Jos Werkhoven, previously published in:

- 'Evolution; a Big History perspective', Uchitel Publishing House, Volgograd, Rusland 2011

- 'Education and understanding Big History around the world', Primus Books, Delhi, India 2016.

- Maria Montessori, an example of Big History in primary education.

A publication of the International Big History Association. Download:

https://www.dearend.nl/BigHistory/documenten/2016_Maria_Montessori_example_Big_History_Origins_VI_10.pdf

- Dutch version:

<https://www.dearend.nl/BigHistory/documenten/Er%20was%20eens.pdf>

6. Dutch: Kees Boeke - Wij in het heelal, een heelal in ons.

Translated: Kees Boeke - We in the universe, a universe in us.

https://www.dearend.nl/pdf/Kees_Boeke.pdf

7. A beautiful colour edition, inspired by Kees Boeke, edited by P. and P. Morrison (1982) Powers of ten. Natuur en techniek, ISBN 9070157489. (No longer available).

You can download the PDF of the images:

https://www.dearend.nl/Rusland/Powers_of_ten.pdf

Charles and Ray Eames made the film Powers of Ten from this in 1995.

<https://www.youtube.com/watch?v=OfKBhvDjuy0&t>

(more animations on YouTube, search for Powers of Ten).

8. Just Dutch: Kees Boeke, Tiendesprongen, 2021, Uitgeverij Walburg pers.

9. Dutch: NPOkennis.nl "Do all languages have the same origin?"

<https://npokennis.nl/longread/7679/hebben-alle-talen-dezelfde-oorsprong>

10. Christian, D. (2004): "Maps of Time": An Introduction to "Big History", University of California Press.
11. Macquarie University (2016) - Dutch: Het Big History boek onder redactie van Helen Fewster, Uitgeverij Lannoo, Tiel, 2017.
12. Spier, F. (1996): The Structure of Big History: From the Big Bang until today,
13. Spier, F. (1999): Dutch: Geschiedenis in het groot. Een alomvattende visie. Amsterdam University Press. (Translated: Big History. A comprehensive vision.)
14. H.G. Wells, Outline of History: Being a Plain History of Life and Mankind, third edition, New York, Macmillan, 1921, p. VI
15. Maria Montessori, Dutch: Onderwijs en het menselijk potentieel. Nederlandse Montessori Vereniging, 1998. English title: To educate the human potential/
16. Dutch: Raamwerk „Zorg dragen voor ontwikkeling“ Translated: „Framework to take care of development“.
https://bighistoryonderwijs.nl/?page_id=26
17. Bateson, G. (1972/2000). Steps to an ecology of mind. The University of Chicago Press.
18. Nigel Calder, *Timescale, An Atlas of the Fourth Dimension*, 1984, Publisher Chatto & Windus, London.
19. Dutch website <https://nos.nl/artikel/2522652-james-webb-telescoop-ziet-oudste-sterrenstelsel-ooit-13-5-miljard-jaar-oud>

DOWNLOADS

0. The materials mentioned and used and more in the essay and book are all free to download from <https://www.DeArend.nl/BigHistory/index.htm>
Although it is a Dutch website, your browser can easily translate it for you.
1. Article by Jos Werkhoven, previously published in:
 - 'Evolution; a Big History perspective', Uchitel Publishing House, Volgograd, Rusland 2011
 - 'Education and understanding Big History around the world', Primus Books, Delhi, India 2016.
 - Maria Montessori, an example of Big History in primary education. A publication of the International Big History Association. Download: https://www.dearend.nl/BigHistory/documenten/2016_Maria_Montessori_example_Big_History_Origins_VI_10.pdf
2. Scalable vector graphic of *The Lines of Life* (English version) without loss of quality.
https://www.dearend.nl/pdf/Lijnen%20overzicht_Engels.pdf
3. Large images Powers of ten Eames Office:
https://www.DeArend.nl/Rusland/Powers_of_ten.pdf
5. The story '*Cosmos introduces itself*'
<https://www.dearend.nl/BigHistory/documenten/Cosmos%20introduces%20itself.pdf>
- 6 The story '*Birth of cosmos*'
<https://www.dearend.nl/BigHistory/documenten/Birth%20of%20cosmos.pdf>
7. The story '*The story of all building blocks*'
<https://www.dearend.nl/BigHistory/documenten/The%20story%20of%20all%20building%20blocks.pdf>
8. Wij in het heelal, een heelal in ons. (in Dutch)
https://www.dearend.nl/pdf/Kees_Boeke.pdf
9. Brochure '*Lines of life*', Google translated from Dutch. Some mistakes.
https://www.dearend.nl/pdf/Lines_of_life_brochure_English.pdf

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1. <https://www.nasa.gov/missions/voyager-program/pale-blue-dot-revisited/>
2. <https://www.puzzlemania.nl/amsterdam-canal-ii-1000-pieces-cobblehill>
3. <https://www.instagram.com/basisschooldeborne/>
4. <https://www.leukekinderactiviteiten.nl/techniek/touwtjespringen/54>.
5. <https://www.tuinartikelen.nu/klimtouw-met-knopen.html>
6. <https://www.walburgpers.nl/nl/book/9789462496699/tiendesprongen>
7. brain cell with neurons
<https://herseninstituut.nl/brainfacts/zenuwcel/>
8. nerve cell (neuron). <https://herseninstituut.nl/brainfacts/zenuwcel/>
9. About the functioning of the brain for UMC Utrecht: richard@axioma.nl
10. James Webb telescoop, NASA-ESA
11. Archeopterix. Bridgeman Images.
<https://www.newscientist.com/article/mg24232322-200-the-evolution-of-archaeopteryx-is-stranger-than-anyone-imagined/>
12. Dinosaur comet impact.Flickr. James Howlet.
<https://www.flickr.com/photos/howlett1802/4950609672/>
13. Evolution of man.
<https://gacbe.ac.in/pdf/ematerial/18BZO54C-U4.pdf>
14. Lucy, de Australopithecus afarensis. Photo Ernestol Lazarus
https://en.wikipedia.org/wiki/Lucy_%28Australopithecus%29
15. Reconstruction of fossil footprints found in Tanzania, Laeotil.
<https://nl.wikipedia.org/wiki/Laetoli>
- 16.Woolly mammoth.
<https://www.sg.uu.nl/artikelen/2020/06/hoe-wetenschappers-puzzelen-met-mammoet-dna>
17. Venus statuette.
<https://paleo-art.naturalsciences.be/NL/venus/venus.html>
18. Comparison of early writing.
https://www.dbnl.org/tekst/neij002univ01_01/neij002univ01_01_0010.php

19. Oldest wooden wheel
[https://commons.wikimedia.org/wiki/File:Ljubljana_Marshes_Wheel_with_axle_\(oldest_wooden_wheel_yet_discovered\).jpg](https://commons.wikimedia.org/wiki/File:Ljubljana_Marshes_Wheel_with_axle_(oldest_wooden_wheel_yet_discovered).jpg)
20. Luopan. Oldest compass for navigation
<https://en.wikipedia.org/wiki/Luopan>
21. The si nan, compass for geomancy.
<https://historianet.nl/techniek/uitvindingen/kompas-was-duivels-instrument>
22. Telescope Hans Lippershey.
<https://www.zeeuwseankers.nl/verhaal/de-telescoop-en-de-wetenschap>

ONCE UPON A TIME . . .

A STORY TO TELL . . .

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