Section Matemática e Literatura:
diferentes tempos, diferentes escritas e diferentes uso
2024, Volume 6, e2024028
Pages 1–19
10.33532/revemop.e2024028

revemop
ISSN 2596-0245

The study of the thematic unit of quantities and measures mediated by the narrative The Adventures of Pinocchio

O estudo da unidade temática de grandezas e medidas intermediado pela narrativa As Aventuras do Pinóquio

El estudio de la unidad temática de magnitudes y medidas mediado por la narrativa Las Aventuras de Pinocho

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Abstract
This article presents some activities of a didactic sequence, designed from the narrative The Adventures of Pinocchio, for the teaching of the thematic unit of quantities and measures in a second year of Elementary School. The main proposal presented here is that children's literature is a powerful cultural object that can be intertwined with mathematics, aiming at the teaching of mathematics, because, at the same time that it raises discussions of an emotional and psychological nature, it opens space for the discussion of mathematical contents and the language of this discipline, which has parallels with the mother tongue, which is the one that tells the story.
Keywords: Children's literature and mathematics. Quantities and measures. Didactic Sequences. The adventures of Pinocchio.

Resumo
Este artigo apresenta algumas atividades de uma sequência didática, pensada a partir da narrativa As aventuras do Pinóquio, para o ensino da unidade temática de grandezas e medidas em um segundo ano do Ensino Fundamental. A proposta principal aqui exposta é a de que a literatura infantil é um objeto cultural potente que pode ser entrelaçado à matemática, visando ao ensino dessa, pois, ao mesmo tempo que suscita discussões de cunho emocional e psicológico, abre espaço para que sejam discutidos conteúdos matemáticos e a linguagem própria desta disciplina, a qual guarda paralelos com a língua materna, que é a que conta a história.
Palavras-chave: Literatura infantil e matemática. Grandezas e medidas. Sequências Didáticas. As aventuras do Pinóquio.

Resumen
En este artículo se presentan algunas actividades de una secuencia didáctica, basada en la narración Las Aventuras de Pinocho, para la enseñanza de la unidad temática de magnitudes y medidas en el segundo curso de primaria. La principal propuesta aquí es que la literatura infantil es un poderoso objeto cultural que puede entrelazarse con las matemáticas, con vistas a su enseñanza, porque, al mismo tiempo que suscita discusiones emocionales y psicológicas, también abre espacio para discutir contenidos matemáticos y el lenguaje de esta materia, que tiene paralelismos con la lengua materna, que es la que narra la historia.
Palabras clave: Literatura infantil y matemáticas. Magnitudes y medidas. Secuencias Didácticas. Las Aventuras de Pinocho.

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1. Introdution

This article aims to present some activities that are part of a didactic sequence (DS) developed as a section of the dissertation *As Aventuras do Pinóquio no contexto do ensino de Grandezas e Medidas no 2.º ano dos anos iniciais* [The Adventures of Pinocchio in the context of teaching quantities and measurements in the 2nd grade of the initial years]. The teaching sequence was designed to work with the unit Time, as Pinocchio's story presented possibilities for developing activities on the theme. The first author of this article developed the activities presented here as part of her dissertation, supervised by the second author and later applied in a class taught by the third author.

The need to measure and quantify is as old as human civilizations. According to Ribeiro (2019), regarding measurement, humans initially used body parts as parameters, such as the thumb, feet, and arms. However, as time went by, new requirements appeared, making it necessary to adopt standardized units of measurement, which would facilitate understanding and trade. Only in 1790 did the Paris Academy of Sciences establish the meter, which became the universal standard adopted in most countries; with it, new measuring instruments also emerged (Machado, 2012a). This standardization is now school content, and children are expected to learn how to count, measure, compare measurements and relate instruments to each type of measurement.

It is undeniable that, when children begin school, they have previous and empirical knowledge about magnitudes and measurements, as they have already experienced situations that raised these questions (such as when the mother asks who of the siblings is heavier or taller). Several authors, whom we echo, reinforce that this knowledge can be approached and studied from children's literature, which is present at various moments in children's education, whether through the handling of books, "story time[4]," or work done with puppets or teaching sheets. These practices can be used to contextualize mathematics learning, establishing a pedagogical relationship between literature and the content to be taught.

Thus, we bring the work As Aventuras do Pinóquio [The Adventures of Pinocchio][5] (Collodi, 2002) to assist in developing activities (didactic sequences - DSs) that aim to teach quantities and measurements through excerpts from the literary narrative. The DSs were developed based on theoretical studies on literature and mathematics by Abramovich (2006), Coelho (2000), Maria (2009), Cunha (2019), Cunha and Montoito (2021), Machado (2012), Montoito (2019), and Martins (2020), with an emphasis on the National Common Curriculum Base – BNCC (BRASIL, 2018). Although this article only presents part of a created DS, with activities for the teacher to work on some notions and measurements on time, we highlight that all the material is available for free download as an educational product[6].

4 A very common activity in early childhood education and the early years, when the teacher reads stories to the children, either in the classroom or in the school library. Stories are used both as a delight and as an introduction to content and learning.

5 If the teacher wishes to use a digital work, instead of the published edition indicated here, he/she can download it at: https://mojo.org.br/ebook/as-aventuras-do-pinocchio/

6 Disponível no site https://educapes.capes.gov.br/handle/capes/729841

2. Beyond mathematics: quantities and measurements and their relations with other areas

We may ask ourselves: What is measuring? To answer this question, Lorenzato (2006) states that the concept of measurement is quite broad and can refer to mass, distance, and temperature, among other quantities, each with its specificities. When we try to express, predict, compare, and estimate (among other actions) measurements, we establish connections between geometric and arithmetic knowledge. According to Machado (2012a, p. 09), "[...] we often say that something is small or big. This classification is always the result of a comparison." Even when one of the terms is not explicit, there is still an analogy; in other words, if someone says: "What a big dog!" they will be comparing the dog they saw with another one they already know since the related quantities are always in the same category (Machado, 2012a).

Therefore, we can say that magnitude is a process of comparison between two measurements of the same species, which allows us to answer the question: How many times does one measurement fit into the other? Therefore, a quantity is everything that can be measured, while measurement is what quantifies quantity. In short, to measure anything, the student must perform three steps:

1) Decide which specific attribute of the object (or phenomenon) should be measured.
2) Choose a unit of measurement that has that attribute and is appropriate.
3) Compare units by filling, covering, matching, or some other method, with the attribute being measured (Van de Walle, 2009, p. 405).

With this, Van de Walle (2009), when citing the first step, makes it clear that the student needs to understand which property is to be measured; the second step refers to the fact that the student needs to understand which unit he/she can use for the property under study. The third step points to the understanding the student should have about which devices are used for measurements, that is, knowing the appropriate instruments and how they work. It is important to highlight that the choice of unit is based on practicality, convenience, and economy.

Machado (2012a) talks about what it means to measure when asking, "What is bigger: your age or your brother's foot?" (Machado, 2012a, p. 11). Through this question, the author clarifies that measuring is an act of comparing but that we can only compare two quantities of the same kind (such as time with time, and mass with mass). According to Soares (2010, p. 55), the concept of measuring is stated as "Comparing with what is established as a unit. A unit of measurement must be appropriate to the quantity to be measured: length is not measured using kilograms."

In short, we can say that, for a child to build knowledge about the concept of quantities and measurements, they first need to know what will be measured: the length of a space, the mass of an object, the capacity of a container, etc. Afterwards, it is necessary to define which instrument is appropriate for each choice, such as the meter or tape measure for length, the scale for weight, the liter or cubic meter for capacity measurement, etc., and, finally, express the result.

The thematic unit of quantities and measurements can be integrated with other areas of knowledge, encouraging interdisciplinary work. Carvalho (2010) points out that the concept of quantities and measurements is important for the natural and human sciences and appears, for

example, evidencing the connection with history because, when working with time, it is possible to construct the historical timeline of the object of knowledge that is being studied. Regarding the natural sciences, some authors argue that, when talking about animals, the concept of mass, length, duration of gestation, etc., should be explored. Quantities and measurements can also be put into dialogue with: the Portuguese language, regarding orality when students are asked to describe situations that use words that describe the phenomena under study (greater than/less than), and to learn the abbreviations of units (such as km, kg); religious education, when issues related to the notion of temporality are covered; art, since quantities and geometric shapes often appear in works of art; physical education since several activities help children establish spatial relationships with their surroundings, and games that use anthropometric measurements.

In addition to interdisciplinary approaches, the unit of quantities and measurements can –and should– support transdisciplinary studies: in environmental issues, it can be present in the preparation of tables that show the decomposition time of materials (such as plastic and paper), the amount of water consumed in homes per month, the amount of recycled waste produced at home, among others; in the health area, it is essential to have an idea of measurements to establish medications; in the theme of consumption and expenditure, its knowledge is relevant to understand the monetary system, rates, interest, etc.

We realized there is no shortage of examples of the applicability of quantities and measurements, which led us to think about the different strategies that can be used to help their learning and recollection. Among the possible strategies, we chose to work supported by children's literature.

3. Brief discussions on education, children's literature, and mathematics, based on Pinocchio's character

It is quite common for children, at some point, to hear from their parents: "If you lie, your nose will grow longer!" This phrase became known from the children's classic *The Adventures of Pinocchio*, by Carlo Collodi (1826-1890), a story about a wooden puppet (a marionette) who wants to become a real boy. Before becoming Pinocchio, the name his creator Geppetto gave him, the puppet was just a simple piece of wood, the kind used to light a fireplace or cook beans. When carved, This piece of wood showed the existence of a clever creature who projected the desire to become a real boy; to do so, he needed to prove himself worthy. This wish is granted to him by a fairy after many adventures –and misadventures– the puppet experienced. Pinocchio's (Collodi, 2002) experiences offer us powerful literary passages to work on the content of quantities and measurements, as we will show in Section 4. For Manzi and Nachbin (2022), *The Adventures of Pinocchio* is one of those stories that,

> [...] through repetition, it is a fundamental part of the experience and a voice that is [...] always different and at the same time –the indefinite time of the imperfect past, of "once upon a time," of sinking into the dream– equal. [...]. Fairy tales are, along with sacred texts, the few books that are still read aloud on a daily basis (Manzi; Nachbin, 2022, p. 14).

The story of Pinocchio was first published in separate chapters between 1881 and 1883. Rosa (2014) says that this period coincided with when childhood began to be treated differently

from adult life, and, as a result, pedagogues, moralists, and the Church took the task of educating children, often considering children's literature as a channel for that. It is no wonder that Pinocchio goes through several situations that reinforce morals and good behavior, such as not lying, not skipping school, respecting his father, etc. The teacher-reader will[7] easily notice that Geppetto, the Talking Cricket and the Blue Fairy in the story always try to show Pinocchio the best path -schooling.

Pinocchio brings the polyphony of several fairy tale characters: the curious, the naive, and the severe. According to Manzi and Nachbin (2022), their story is seen as the first fairy tale created in the context of modern man, for whom "[...] basic education from childhood onwards has become mandatory and begins to determine the course of everyone's life" (Manzi; Nachbin, 2022, p. 20). When referring to Pinocchio, Martins (2020) speaks of the existence of a lasting tension between a body that wants to become a real boy and, at the same time, moves away from the submission imposed by the social, cultural, and political machinery, in which the child is subjected to rules and morals: it is driven by his desires that Pinocchio always finds paths that divert him from going to school because, for the wooden puppet, school always comes last. Martins (2020) still asks: How long can the school wait? There are two distinct ways to answer this question. The first considers the school as a physical-geographical space that will not move. The second understands school as a way of thinking, and "[...] it is the only one capable of, within a society, offering leisure, as it takes students out of the social order, placing them together, on an equal footing, in a time dedicated to study" (Martins, 2020, p. 189). In an allegory with the narrative of Pinocchio, Alves (2010), with a critical eye, focuses on the need to be careful not to turn real boys into wooden puppets in the school.

Reflecting on Pinocchio's story and approaching it to the issues of mathematics education, we can conjecture, based on Bicudo (2010), about the need for mathematics educators to bring meaning to their classes, always considering language –in this case, literary language and all the aesthetics that surround it– and technique. "Therefore, mathematics must be worked on from different perspectives, articulated with how other areas of knowledge and their respective disciplines are presented in the school world" (Bicudo, 2010, p. 218).

Another researcher in mathematics education, D'Ambrósio (2011), explains that mathematics taught and learned in the classroom must be made more attractive, transforming it into something interesting, useful, appealing, current, and integrated into everyday life, which continues to be a challenge for the 21st century. Actions favoring it help develop literacy, which the same author describes as being "[...] the ability to process written and spoken information, which includes reading, writing, calculation, dialogue, decalogue, media, and Internet in everyday life [Communicative Instruments]" (D'Ambrosio, 2011, p. 66-67) –we understand that it favors, in this set, an approach that connects literature and mathematics, although we are clear that this connection can occur with greater or lesser emphasis in one of the parts, depending on the teacher's approach.

Today, mathematics, from the perspective of literacy, is focused on a more dynamic approach, which no longer sees what is wrong as punishment but as a condition for other paths that are important in the construction of learning. From this perspective, the union between literature and

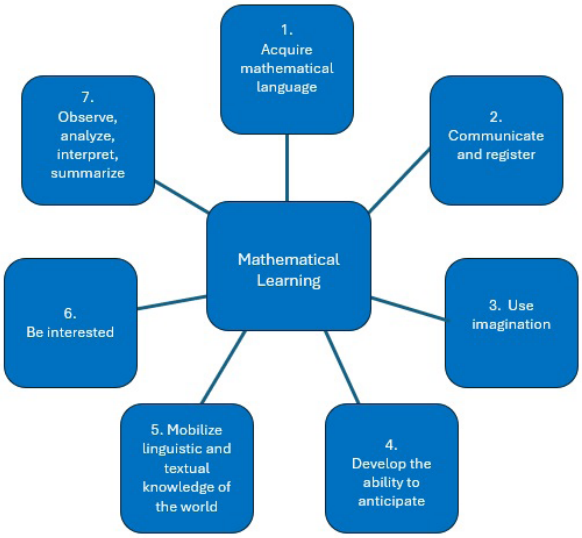
7 *"Professor-leitor"* [Teacher-reader] is a term used by Maria (2009) to refer to those teachers who have the habit of reading books that do not deal, specifically and exclusively, with the content they teach. For the researcher, teacher-readers end up developing a strong taste for literature and, as a result, are more inclined to try to bring it closer, in their classes, to the content they teach, establishing interrelations between them and the stories.

mathematics gained more relevance after the implementation of the Plano Nacional pela Alfabetização na Idade Certa (PNAIC) [National Plan for Literacy at the Right Age], a federal government program that aimed to teach all children to read and write by the third grade of school (Brasil, 2014). In 2014, a program focused on mathematics was implemented to make up for the lack of learning of content that students had regarding this subject, and literature came to help in the teaching and learning processes. Currently, the BNCC, in this line of thought, describes the potential of literature in the school environment, as it understands it as a

> [...] campo para o exercício da empatia e do diálogo, tendo em vista a potência da arte e da literatura como expedientes que permitem o contato com diversificados valores, comportamentos, crenças, desejos e conflitos, o que contribui para reconhecer e compreender modos distintos de ser e estar no mundo e, pelo reconhecimento do que é diverso, compreender a si mesmo e desenvolver uma atitude de respeito e valorização do que é diferente (Brasil, 2018, p. 139).

A literatura infantil e a matemática podem, portanto, se entrelaçar em diversos momentos pedagógicos, como descreve Cunha (2019), ao ressaltar que o aluno, estando atento à história, tem seus sentidos de curiosidade, interesse e atenção despertos para a escuta, de modo que sua aprendizagem é amplamente favorecida. Além disso, Cunha e Montoito (2021) apresentam sete categorias sobre as potencialidades da literatura para o ensino de matemática, o que pode ser visto na figura a seguir.

Figura 1: Conhecimentos e habilidades que a literatura auxilia a mobilizar na aprendizagem de Matemática



Fonte: Cunha e Montoito (2021, p. 11)

From this flowchart, we can identify the movements that occur with knowledge and skills in the mathematical context based on reading literature in mathematics class. Souza and Paulo (2018) argue that, when discussing a story, the ideas and the outcome it may have do not necessarily need to be related to mathematics, but depending on how it is conducted, mathematical skills can be developed regarding ideas or concepts in the interactions between the mediator (teacher-reader) and the child.

Machado (2012) emphasizes that it is necessary to re-enchant mathematics. Fairy tales and mathematics are ideal for the transition between reality and fiction because, through stories, children come across characters such as the fairy godmother and the witch, the good guy and the bad guy, etc. In mathematics, language tends to be more direct, less seductive, but equally capable of establishing a context to be developed, which is why children's literature can be presented as a bias to enhance mathematics teaching and learning, showing that everyone can be enchanted by words and establish parallels between both languages, the mother tongue and mathematics.

4. The development of didactic sequences based on *The Adventures of Pinocchio*

In the specific case of this article, we will present activities from a teaching sequence, which was developed as part of the dissertation of the first author of this article, based on excerpts from The Adventures of Pinocchio. The DSs have been used as a methodology for teaching and learning in the classroom. They help to organize teaching work and can also be used in all areas of knowledge since, according to Paula and Barreto (2016), a DS allows relating concepts, procedures, and attitudes while working with a playful configuration. In it, the teacher identifies whether students achieved progress and objectives, making it possible to resume what was not covered. Cabral (2017) argues that the didactic sequence should not be considered a lesson plan, as it requires adopting different teaching and learning strategies while admitting that the teacher establishes the time needed to carry out the sequence. In turn, Zabala (2014) describes DSs as "[...] a set of ordered, structured, and articulated activities for the achievement of certain educational objectives, which have a beginning and an end known by both teachers and students" (Zabala, 2014, p. 24).

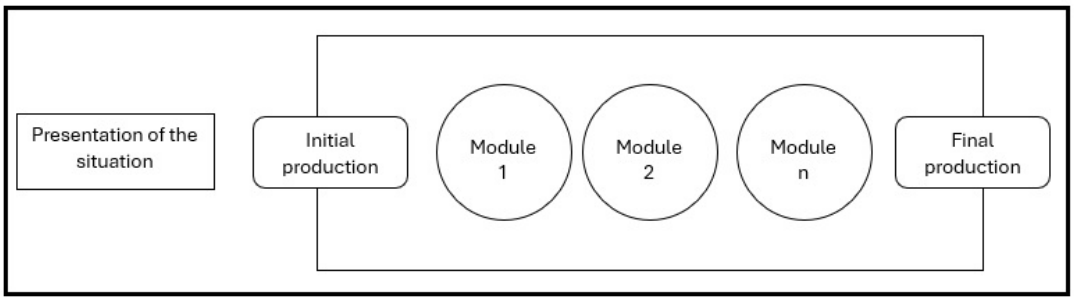
The authors above describe that DSs are interventions organized step by step so that at the end of the sequence, the student can understand the contents of the teaching objects. Therefore, according to Costa (2013), didactic sequences are didactic activities whose degree of complexity increases as the action develops. They can be treated in a disciplinary, interdisciplinary, and transdisciplinary way and involve the reflective process of teachers and students in ordered, structured, and articulated activities.

The concept of didactic sequences arose because French researchers were concerned about language teaching in France in 1996. According to French official documents, "[...] didactic sequence is defined as an approach that unifies discourse studies and text approaches, involving writing practices, [...] but with open sequences related to different objects of knowledge" (Porto; Lapuente; Nörnberg, 2018, p. 28).

The structuring of didactic sequences in mathematics was first proposed by the Frenchman Guy Brousseau in 1996, who indicated activities in which students actively participated and were encouraged to solve the proposed activities. Thus, to contemplate what Brousseau proposed, Leal, Brandão, and Albuquerque (2012) point out seven main factors for any didactic sequence: 1. Valuing students' prior knowledge; 2. Proposing challenging activities that stimulate reflection; 3. Teaching centered on problematization; 4. Encouraging students to explain their knowledge verbally; 5. Emphasis on the systematization of constructed knowledge; 6. Teaching centered on the interaction between students; 7. Progression between activities, with increasing demands regarding the degree of complexity.

From the diagram in Figure 2, it is clear that, for Dolz, Noverraz, and Schneuwly (2004, p. 96), "[...] a 'didactic sequence' is a set of school activities organized in a systematic way around an oral or written textual genre."

Figura 2: Estrutura de organização de uma sequência didática



Fonte: Dolz; Noverraz; Schneuwly (2004)

Thus, we can say that the didactic sequences are divided into four stages:

- Presentation of the situation: when the teacher shares the object of study and the problem to be solved with the large group in the classroom; there is no need for a final product through the activities carried out by the children.
- Initial production: this is the stage in which we aim to diagnose the knowledge that children already have on the subject to be studied, which provides elements for planning the following stages.
- Development of modules: through different stages, activities and strategies are developed to achieve the didactic objectives.
- Final production: this is when, together with the teacher, the child puts into practice the knowledge acquired throughout the activity. At this stage, the teacher must assess whether the teaching sequences contributed to learning or whether there is a need to develop new activities if the proposed objectives are not achieved.

Below, we present part of the DS: Pinocchio counting the hours. Originally, it was designed to be developed over eight classes, with a total of 15 activities; however, here we provide examples of just some of the activities to exemplify to the reader how we thought the process of connecting the story of Pinocchio to activities that worked on the measurement of Time. It is worth remembering that our suggestion is that DSs be worked on alternately with reading *The Adventures of Pinocchio*.

4.1. Didactic sequence 1: Pinocchio counting the hours

In Didactic Sequence 1[8], which we called Pinocchio counting the hours, we addressed the object of knowledge Measure of Time, emphasizing skill EF02MA19, based on elements extracted and highlighted in the book The Adventures of Pinocchio (Collodi, 2002). To this end, we used simple language similar to the tale so that its structure would often seem like a dialogue with the student, just as Collodi (2020) wrote his narrative.

Objects of knowledge: Measurements of Time: time interval, reading time on digital and analog clocks.

8 Didactic Sequence 2, Pinocchio counting the days, will not be presented in this article; however, as already mentioned, it can be found by consulting the educational product developed.

Skill: (EF02MA19) - Measure the duration of a time interval using a digital clock and record the start and end times of the interval.

Learning objectives: Read and write the exact time on a digital and analog clock; Identify that a day has 24 hours; Use the hours to record the time in daily tasks; Differentiate the periods of the day (morning, afternoon, and night) through the hours.

Learning path: when developing skill EF02MA19, the student must realize that to measure the duration of a time interval, he/she must understand that day, month, year, and hours are distinct units of time measurement, in addition to knowing how to use the measuring instrument (reading time) on digital and analog clocks (with hands). It is also vital that students learn different instruments for measuring time, such as the sundial and the water clock, and understand the use of the digital clock, highlighting the idea of the concept of an hour and half of time, so that they can see that keeping time is an activity in their daily lives, and that each activity has a duration also measured in units of time. Thus, the student will be able to understand the concept of temporality: before, during, and after (past, present, and future). Using an analog clock or clock with hands makes it easier to see the passage of time, unlike other older measuring instruments (such as hourglasses, sundials, etc.). The teacher should emphasize that it is important that students know the time intervals and ask them to justify their decisions.

Resources: digital clock, clock with hands, writing pencil, eraser, notebook, pencil sharpener, photocopies, colored pencils, scissors, glue stick, A4 paper, speaker with pen drive input or Bluetooth, shoe box, flashlight, dynamics, and the book *The Adventures of Pinocchio* (Collodi, 2002).

Assessment: The assessment will take place through students' logs, observations, and exchange of experiences, registering the activities carried out in groups, pairs, and individually on sheets prepared by the teacher or in their class diary. Assessment in the didactic sequence will allow the teacher to understand students' teaching-learning process, verifying their progression and reflecting on their pedagogical practice. The assessment will be diagnostic, when students, individually and collectively, present their previous knowledge and experiences; it will be procedural, making it possible to verify students' progress throughout the activities and verify whether the objectives the teacher proposed were achieved, which will allow him/her to review his/her practices and develop new strategies, if necessary. It will be summative when verifying, at the end of the activities, whether students managed to achieve the proposed objectives.

Class organization: in groups, pairs, and individually, depending on the activity.

Duration[9]**:** Eight classes.

Class 2 – In this class, students will understand how to read the time on a digital clock and how this reading relates to the periods of the day (morning, afternoon, and night).

Activity 1 – Firstly, before carrying out this activity, we suggest that the teacher ask the students if they think it is important to know how to read the time and, if so, ask why. The teacher can take the opportunity to ask what types of clocks they usually use at home and explain to students that nowadays, digital clocks are usual but that until recently, only clocks with hands were used. We

9 It refers to the total duration of the DS, and not just the activities presented here.

understand that it is important that the teacher brings these two types of clocks and, if possible, an hourglass to class and images of other types of clocks, such as sundials, water clocks, and cuckoo clocks, among others so that students can expand their knowledge and understand how they work.

After this first moment, hand out Activity 1 and read it out loud to the class. Draw the activity clock on the board. Ask students if they know how to read the time and how to read it on a digital clock (the one to the left of the colon and the right of the colon).

Part a) The teacher can take advantage of and return to the numerical order, showing that on a digital clock, the hours go from 1 to 23, and on a clock with hands, from 1 to 12. From 10 am onwards, working on the relationship to the positional value of numbers is possible.

Interdisciplinarity:

History - (EF02HI07) Work with time markers, the types of clocks used today, and how they were in the past; (EF02HI10) Based on time marking, how it works in the student's community, what works during the day and at night, such as bakeries, stores, supermarkets, etc., for example.

Religious education - (EF02ER01) Concerning hours, the family activities that the family usually carries out together.

Part b) The teacher can now work with ascending and descending orders of numbers. Example 1, 2, ..., 19 and 19, ..., 2, 1 or use the regularity in twos, in threes.

Interdisciplinarity:

Natural sciences - (EF02CI01) Discuss the use of wood, what it is for, how long it takes to decompose in nature when discarded, its conscious use, etc.

Cross-Cutting Contemporary Theme – The activity can also be worked on with a focus on the environment: an environmental education theme, which can address deforestation in the Amazon, for example.

Table 1: Activities 1a and 1b, from Class 2[10]

Master Guava was very happy with the piece of wood he had before him. Read what happened.

As soon as Master Guava saw that piece of wood, he became very excited and, rubbing his hands, spoke to himself in a low voice:

— This wood appeared at just the right time, I want to use it to make the leg of a small table.

Indeed, he immediately picked up a sharp axe to remove the cork and chip it. However, as he prepared to give the first blow, he kept his arm in the air because he heard a feeble voice:

— Don't hit me too hard!

Can you imagine how good old Master Guava felt?

(Collodi, 2020, p. 5-6)

a) At that moment, Master Guava looked at his watch. What time was it showing when he said the wood had appeared at the right time?

_____

_____

b) Soon after, Master Guava heard a little voice. He did not know where it came from and thought that if someone were hidden inside the wood, he would see it!

Saying this, he picked up the poor piece of wood with both hands and began to hit it mercilessly against the walls of the room.

Then he waited to see if the little voice complained. He waited two minutes and nothing; five minutes and nothing; ten minutes and nothing!

— I see — he said then, pretending to find it funny and scratching his wig. — I see that little voice that said "ouch" was my imagination! Let's get back to work.

(Collodi, 2020, p. 07)

It is showing _____ hours and _____ minutes. So, what is to the left of the (:) colon is the _____ and to the right of the (:) are the _____.

Source: Bohrer and Montoito (2023)

Other activities followed, such as marking and reading the time on a digital clock, which were always created based on excerpts from Pinocchio's story. They were designed so that, gradually, the teacher can introduce the reading of time on a clock with hands and work on its equivalence

10 To facilitate teacher access to the work, and also to democratize the educational product, the excerpts cited here were taken from the edition available for free download, as informed in footnote number 1. However, for pedagogical reasons, while the work reads "Pinocchio," in the extracts shown here we chose to change the character's name into the Portuguese Brazilian "Pinóquio," better known among us.

with the equivalent representation on a digital clock. The following activities are two of those that composed Class 5

Class 5 – The activities in this class will help assess whether students understand how to read the time on a digital and an analog clock and identify the periods of the day (morning, afternoon, and night).

Activity 7 – Students will be given a photocopy of an analog clock to handle it during this and other activities proposed by the teacher. This activity will allow students to develop personal strategies for adding up the hours and marking them on the analog and the digital clocks.

Interdisciplinarity:

Physical education - (EF12EF06) Discuss the importance of observing the rules and regulations of precision and target sports to ensure one's own integrity and that of other participants.

Pinocchio's escape can lead to games involving races, the rules of which must be stipulated and observed.

Activity 8 – This activity will reinforce writing and reading the time on a digital and analog clock. In this activity, the student will develop personal strategies to add up the hours and mark them on the clock and digital clock, in addition to knowing how to name the period of the day (morning, afternoon, and night) by marking the hours.

Interdisciplinarity:

Geography - (EF02GE06) Relate day and night to different types of social activities (school hours, business hours, sleep, etc.).

Other questions regarding social activities carried out at different times throughout 24 hours may be addressed, such as what people can do during the day, what is not advisable for children, and why.

Table 2: Activity 7, from Class 5

Without thinking for another minute, he started running through the woods. In the meantime, the killers went on chasing him.

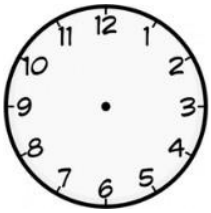
After running for almost two hours, out of breath, he finally arrived at the door of that little house and knocked.

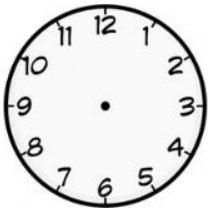
No one replied.

He knocked harder again because he could hear his pursuers' footsteps and heavy breathing closer and closer.

(Collodi, 2020, p. 64)

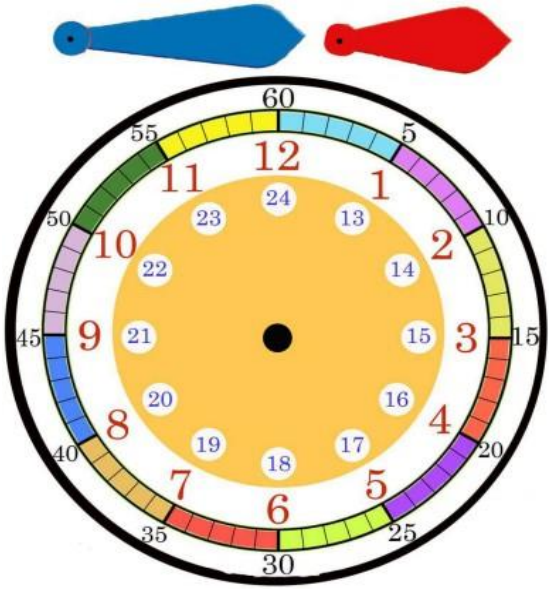
a) When Pinocchio started running, the first clock showed 11 o'clock. Mark that time on the first clock and on the second clock two hours later.





b) And how would you mark these times on the digital clock?

Clock with hands to cut and play



Source: Bohrer and Montoito (2023)

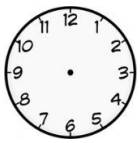
Chart 3: Activity 8, from Class 5

Pinocchio, once a puppet who did not want to work or study, now studies on his own and helps Geppetto and the Fairy.

When Pinocchio returned home, his father asked:
— And the new clothes?
— I couldn't find anything that suited me. No-one is perfect! I'll buy it next time.
That night, instead of going to bed at ten, Pinocchio worked until midnight! And instead of making eight wicker baskets, he made sixteen.
Then, he went to bed and slept. In his dream, he seemed to see the Fairy, all beautiful and smiling, who, after kissing him, said:
— Well done, Pinocchio! Because of your good heart, I forgive you for all the mischief you've done up until now.

(Collodi, 2020, p. 214)

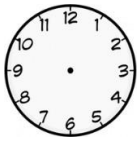
a) Pinocchio always went to bed at 10 o'clock at night. Mark that time on the digital clock and



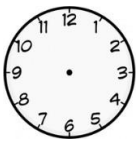
the clock with hands.

b) Now, make the registers on the digital and the analog clocks, as requested below.

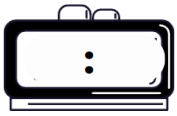
3 in the afternoon

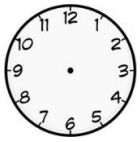


8 in the morning



9 at night





Source: Bohrer and Montoito (2023)

After other activities, in Class 6, after the students have worked on writing and reading the time on clocks several times, the teacher proposes activities involving writing the time, such as the one shown below:

Class 6 – In this activity, the student, through the insert, will realize that each action has a beginning and an end and that there is a time interval between one circus session and another. We suggest that the teacher discusses with the students that these activities, such as circus presentations and cinema, usually have several sessions a day, which allows reaching a consensus that there are time intervals between them.

Interdisciplinarity:

Portuguese language – (EF02LP01) When producing the text, use the correct spelling of known words or words with syllabic structures already mastered, capital letters at the beginning of

sentences and proper nouns, segmentation between words, full stop, question mark, and exclamation mark.

The activity lets us remember that texts are read from top to bottom and left to right. They can also develop a poster about this type of genre; the class can create a single poster, taking care of the layout (size of images, letters, colors, etc.).

Table 4: Activity 11, from Class 6

Pinocchio was on his way to school when he heard the sound of fifes and drums… and ended up selling his primer to watch the Puppet Theater.

— What is this tent? — asked Pinocchio to a little boy from the village.

— Read what is written on the poster, and you will know.

— I would read it with pleasure, but I still don't know how to read.

— What a dumb! Then I will read it to you. Know, then, that on that poster, in red letters like fire, it says: Great Puppet Theater.

— Has the play started long?

— It's about to begin.

— And how much is the ticket?

— Four copper coins.

(Collodi, 2020, p. 36)

Look at the poster below and answer.

a) What time does the 1st session start?

_____

b) What time does the 2nd session start?

_____

c) What is the time interval between the 1st and 2nd theater sessions?

_____

d) What is the time of the extra session?

_____

e) What is the time interval between the dance performances with the donkey?

_____

Source: Bohrer and Montoito (2023)

As we said previously, it is not feasible to present in this article the entire DS created, given that it comprises several activities designed for a set of eight classes. What we brought here as an example was a clipping from the first DS[11] which was prepared by the first author of this article as part of her dissertation and has been applied in some second-grade classes, including one of the third author of the article.

What we want to emphasize, based on the examples given, is that organizing a DS is much more than simply developing an activity: it has to be thought out step by step, considering the

11 DS 2, ***Pinocchio counting the days***, will not be presented in this article, and this is another reason why we invite readers to download the educational product that contains both DSs in full.

context, the materials that will be used, the advancement of the topics studied in each activity, its possible interdisciplinary approaches, and its extension, etc. Each of the activities presented in this article –and, consequently, each one that forms the totality of the pedagogical material created– was designed considering all these elements and created to contemplate the seven points listed by Leal, Brandão, and Albuquerque (2012, p. 150).

The DSs can address the most diverse subjects; the teacher makes this choice, establishes their criteria and invents them, being able to use their inventiveness and creativity at will. The DSs can get as close as the teacher wants to their students' realities.

5. Final considerations

The elaboration of the dissertation that originated the activities presented here enabled the first author's in-depth understanding of the conceptualizations about quantities and measurements, which was essential for creating the DSs. As for the second author, he could, once again, bring literature and mathematics closer together, helping the researcher in theoretical and practical studies on the pedagogical potential of this union. For the third author, the educational product that contains all the DSs, originating from the defended dissertation, proved to be a pedagogically appropriate material for her students' level, which is why she chose to apply the DSs, with some minor changes, with her class.

We can say that children's literature has shown a playful resource for teaching and learning about quantities and measurements for the 2nd grade of elementary school through the narrative The Adventures of Pinocchio (Collodi, 2002). Pinocchio shows how the intertwining between literature and mathematics can be a resource to assist the teaching and learning process of the thematic unit of quantities and measurements, aiming at the development of skills recommended in the BNCC (Brasil, 2018).

With the provision of this article –and the educational product mentioned above, which presents activities on the measure Time– it is possible for other teachers to replicate them and assess students at all stages through them.

Using literature as a didactic object for teaching mathematics strengthens pedagogical practices that give rise to creativity and affection. From this perspective, Pinocchio invites the student to dive into the world of make-believe and simultaneously think about real issues in everyday life. However, whenever the teacher wishes, he/she can start again: "Once upon a time..." other didactic sequences designed to teach other thematic units based on other stories.

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Editorial History
Received on 06/03/2024.
Accepted on 09/08/2024.
Published on 26/11/2024.

How to cite – ABNT
BOHRER, Jordana Vahl; MONTOITO, Rafael; DAVID, Erenita Martins. OThe study of the thematic unit of quantities and measures mediated by the narrative The Adventures of Pinocchio. **REVEMOP**, Ouro Petro/MG, Brasil, v. 6, e2024028, 2024. https://doi.org/10.33532/revemop.e2024028

How to cite – APA
Bohrer, J. V., Montoito, R., & David, E. M. (2024). The study of the thematic unit of quantities and measures mediated by the narrative The Adventures of Pinocchio. *REVEMOP*, *6*, e2024028. https://doi.org/10.33532/revemop.e2024028

This article was funded by the Minas Gerais State Research Support Foundation (Fundação de Amparo à Pesquisa do Estado de Minas Gerais–FAPEMIG), Project APQ-04960-23, Notice N. 008/2023–Support program for scientific and technological publications.