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Problem posing activities in primary school mathematics textbooks

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Abstract. Textbooks are important for mathematics as they are for other courses. Problem posing is one of the important activities in mathematics education. In this manner, the goal of this study is to analyse the problem-posing activities in primary school mathematics textbooks offered by Ministry of National Education and used in 2017-2018 and 2018-2019 school years. For this purpose, 10 primary school mathematics textbooks were analysed with document analysis method according to their years, grade levels, learning domains, sub-learning domains and types of problem posing. We analyzed the number of problems posed, learning domains that it includes, the number of sub-learning, and problem types. Results showed that there are more activities in the textbooks in the school year of 2017-2018 than in the textbooks used in the school year of 2018-2019 in all grade levels except second grade level. In addition, no problem posing activity was found in any of the first-grade books. It is considered that increasing the number of problem-posing activities in the textbooks and diversifying the problem-posing type are necessary.

Keywords: Mathematics, primary school mathematics textbooks, problem posing

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INTRODUCTION

Course materials are important for teachers and students. The learning environment and teaching materials are as important as the influence of teachers, students and parents in the teaching process. The most important and basic learning and teaching tool used in elementary education level covering the ages of 6-14 is textbooks (Güngör, 2014). Textbook is an important component in the learning process (Pratama & Retnawati, 2018). Textbook is a material that can help students and teachers. Textbooks prepared for students are a source for teachers as well (Keleş, 2001). Textbooks allow the students to complete their prior knowledge and to anticipate and prepare for the activities to be done. As the active participation of students in learning eliminates many of the disciplinary problems in the teaching environment, textbooks thus contribute to the creation of a good learning environment (Kaya & Azar, 2010). According to the Ministry of National Education Textbooks Regulation (2012), the course is organized to cover the education program and learning methods and strategies are considered, and high level thinking skills are developed. Failure of textbooks being appropriate can render course negative, cause students to lose attention to the course, to begin to dislike learning, and block their thoughts (Ayçiçeği & Oktay, 1996). Many researchers think that textbooks are important in explaining student success and emphasize that it is also important to examine them (Alajmi, 2012; Engin, 2015; Reçber, 2012; Kaban-Sarıkıyak, 2006; Li, 2000; Sarpkaya, 2011).

Textbooks are important for mathematics as they are for other courses. It is important that the activities in mathematics textbooks are organized in a way that teachers can apply them in the classroom and lead students to explore knowledge. It is important that the activies in the textbooks are planned to take less time by considering that they have quality to satisfy the needs, attract attention and provide conceptual understanding (Bozkurt & Kuran, 2016). It has been

emphasized in many studies that teachers and textbooks are the most effective tool in mathematics education and that a particular importance should be placed on mathematics textbooks (Ball & Cohen, 1996; Pratama & Retnawati, 2018; Sidenvall, Lithner, & Jäder, 2014; Semerci, 2004; Semerci & Semerci, 2004).

Primary School Mathematics Curriculum (2018) has a perspective that centers the students and places importance on conceptual understanding, and aims to enable students to solve and pose problems related to daily life by developing a self-confident approach to mathematical problems by developing a positive attitude towards mathematics with the experience of students in learning mathematics. Problem posing is one of the important issues in mathematics education as well. There are many reasons as to why problem posing is important. It is seen that problem posing activities provide several benefits to both teachers and students (Kılıç, 2014). Students who manage to pose problems increase sympathy, fear decreases, and do not raise problems in their eyes (Altun, 2001). In many of the studies, it has been pointed out that problem posing is at the center of mathematical activities and an important component of mathematics curriculum (Cai & Jiang, 2017; Christou, et. al., 2005; Lin, 2004; NCTM, 2000; Silver, 1994; Silver & Cai, 2005; Singer, Ellerton, & Cai, 2013, Winograd, 1991). Problem posing is handling the problem solving in another way and it is very important in this respect (Çarkçı, 2016).

The ability to pose problems gives students the ability to teach mathematical reasoning, to explore mathematical situations, and to express mathematical situations properly verbally or in writing (Akay, Soybaş, & Argün, 2006). Stoyanova (1997, 2003) considers problem posing in three different ways and they are free, semi-structured and structured. The first of these expects students to pose a problem about a subject without giving details in posing free problems. In cases of free problem posing, no problem is provided to the students. The second one, namely the semi-structured problem posing, students pose a new problem using the provided information, events or situations. The last one, namely in structured problem posing situations, the student is expected to pose a similar problem from any problem situation. Problem posing is considered an important component in the nature of mathematical thinking because it provides mathematical reasoning (Akay, Soybaş, & Argün, 2006; Cai, 2003; Kilpatric, 1987) and is a good way to identify students' different perspectives and how they think (Cai, 2003). It enables teachers to gain insight regarding understanding of the students' comprehension of mathematical concepts and processes (English, 1997). Problem posing is an effective assessment tool as well, since it enables students to think mathematically (Lin, 2004; Rosli, Goldsby, & Capraro, 2013; Silver & Cai, 2005). Problem posing activities develop students' conceptual thinking, reasoning and mathematical skills and increase their interest and curiosity (NCTM, 2000), as well as encouraging their creativity by supporting them to develop new solutions to problems (Silver, 1997; Silver & Cai, 2005) and improving students' attitude towards mathematics (Silver, 1994; Winograd, 1991).

The problem posing points out that when student poses a problem that includes relationships in a problem solved previously, the student has comprehended the relationships in that problem (Çarkçı, 2016). At the same time, it is seen that problem posing plays a major role in the development and success of problem solving skills among students (Akay, 2006; Cai, 1998; Cai & Hwang, 2002; Cankoy ve Darbaz, 2010; English, 1998; Kalaycı, 2014; Kılıç, 2011; Nuha, Waluya, & Junaedi, 2017; Rosli, Capraro, & Capraro, 2014; Silver, 1994; Silver & Cai, 1996; Suarsana, Lestari, & Mertasari, 2019; Turhan ve Güven, 2014). It positively affects problem posing based problem solving instruction's success in understanding the problem (Cankoy & Darbaz, 2010; Silver & Cai, 1996). At the same time, it can be said that students who are trained with problem posing based mathematics teaching are more effective in problem solving success since they

exhibit much better problem solving performance than students who are trained in mathematics based on problem solving (Cai, 2003; Cankoy & Darbaz, 2010).

Since this study covers elementary school level, it is seen that there are many researches in this field when the studies at elementary school level regarding mathematics textbooks are examined (Alajmi, 2012; Artut & Ildırı, 2013; Bulut & Tertemiz, 2013; Cai & Jiang, 2017; Çakır, 2009; Dayak, 1998; Fan & Zhu, 2007; Güngör, 2014; Ildırı, 2009; Işık, 2008; İzmirligil, 2008; Jiang & Cai, 2014; Kaban-Sarıkıyak, 2006; Kalaycı, 2014; Karakelleoğlu, 2007; Kaya & Azar, 2010; Köse & Tanışlı, 2011; Li, 2000; Pratama & Retnawati, 2018; Semerci, 2004; Semerci ve Semerci, 2004; Sidenvall, Lithner, & Jäder, 2014; Singh & Hoon, 2010; Taşdemir, 2011; Tertemiz, Özkan, Çoban-Sural, & Ünlütürk-Akçakın, 2015; Toluk & Olkun, 2002; Usta, 2018; Yan & Lianghuo, 2006). When we look at the researches examining the problem posing activities in the textbooks, Cai & Jiang (2017) have examined five elementary mathematics textbooks used in the US and China. Cai & Jiang (2017) examined textbooks in two countries according to their grade levels, content, and distribution by topic, types of problem posing and designs. Their distribution by grade levels and subjects is very unstable. It is concluded that there are more problem posing activities in the numbers and operations field than in the fields of algebra, geometry and measurement. Another country comparison was made by Jiang and Cai (2014). They examined 131 problem-solving activities in books used in China and 60 in books in America. They concluded that problem-posing activities were not sufficient. When we examine studies conducted in Turkey, it is seen that Kalaycı (2014) has examined problem posing activities in mathematics textbooks of elementary and secondary schools in 2012-2013 and 2013-2014 school years and opinions of teachers, Işık (2010) has examined the mathematics textbooks of the 4th, 5th and 6th grades in elementary education and Ev-Çimen & Yıldız (2017) have examined the mathematics textbooks in secondary schools used in 2016-2017 school year.

As it is seen, there is no study in Turkey examining problem posing activities in the elementary mathematics textbooks in 2017-2018 and 2018-2019 school years yet. The purpose of this research based on this gap in the field is to examine the problem posing activities in elementary mathematics textbooks offered by Ministry of National Education in the last two years. For this purpose, it was aimed to examine the existence of problem posing activities in the textbooks, and to examine the existing activities according to years, grade level, learning areas, sub-learning areas, problem posing types and the answers to the following questions were sought.

1. How are the problems posing activities in the elementary mathematics books in 1st, 2nd, 3rd and 4th grade?
2. What are the activities in the books on the basis of years, learning areas, sub-learning areas, problem types?

METHODS

The research was planned according to qualitative research and structured according to content analysis, which is one of the qualitative research techniques. “Qualitative research can be defined as a research in which qualitative data collection methods such observation, interview and document analysis are used and a qualitative process for setting forth the perceptions and events in a realistic and holistic way is followed” (Yıldırım & Şimşek, 2006, p.39). “The data summarized and interpreted by descriptive analysis are subjected to a deeper process in content analysis and concepts and themes that cannot be noticed by a descriptive approach are discovered as a result of this analysis” (Yıldırım & Şimşek, 2006, p.227). Since content analysis is an analysis of concepts and themes that cannot be noticed, as it is seen, this method is believed to

be appropriate for examining problem posing activities in elementary mathematics books. It is thought that the research model supports the research problem since the general purpose of the research is to examine the problem posing activities in primary school textbooks.

Research Group

In the research, books approved by the Ministry of National Education to be used in elementary schools in 2017-2018 and 2018-2019 school years have been utilized. Ten mathematics textbooks prepared by the Ministry of National Education and private publishers have been examined within the scope of the research. The criterion sampling method has been used in the research. The basic understanding in this sampling method is to identify situations that provide certain predetermined criteria (Baltacı, 2018; Yıldırım & Şimşek, 2006). Yıldırım & Şimşek (2006) point out that the criterion or criteria mentioned can be determined by the researcher(s). Therefore criterias on the basis of year, grade, learning areas, sub-learning areas, problem types have been determined and the activities found in the mathematics textbooks in Turkey last two years have been examined.

Table 1 shows the information about which publishing houses the elementary mathematics textbooks examined in the research belong to in each grade level according to years, and the abbreviations used in the research. When the abbreviations are examined, it is seen that $MEB1_{2017\text{-}2018}$ indicates the 1st grade book of the National Ministry of Education used in 2017-2018 school year and $B2_{2018\text{-}2019}$ indicates, with the first letter of the name of a private publishing, the 2nd grade book used in 2018-2019 school year.

Table 1. *Textbooks examined in the research*

Year	Grade	Publishings	Abbreviations
2017-2018	1	National Ministry of Education	$MEB1_{2017\text{-}2018}$
	2	Private	$A2_{2017\text{-}2018}$
	3	Private	$B3_{2017\text{-}2018}$
	3	National Ministry of Education	$MEB3_{2017\text{-}2018}$
	4	Private	$Y4_{2017\text{-}2018}$
2018-2019	1	Private	$M1_{2018\text{-}2019}$
	2	Private	$B2_{2018\text{-}2019}$
	2	National Ministry of Education	$MEB2_{2018\text{-}2019}$
	3	Private	$A3_{2018\text{-}2019}$
	4	Private	$A4_{2018\text{-}2019}$

Data Analysis

In the research, content analysis has been used to analyze the problem posing activities in elementary mathematics textbooks in depth. Before starting content analysis, mathematics books have been carefully examined by the researcher for the content analysis process. In the research, problem posing types offered by Stoyanova (1997, 2003) have been taken as a base during the classification of activities in elementary mathematics books. In addition, situations created by Ev-Çimen & Yıldız (2017) through taking Stoyanova & Ellerton (1996) as reference, which they have used during the examination of problem posing activities found in secondary school mathematics textbooks have been utilized. The content analysis process of the research has been examined by the researcher through considering these types of problems. In addition, the opinions of an expert

who was a mathematics teacher have been asked and the final decision has been made in line with the expert opinions.

The structured, semi-structured and free (unstructured) problem posing types have been taken as base in the classification of activities. General framework for problem posing types is as follows.

FIGURE 1. *General framework for problem posing types (Ev-Çimen & Yıldız, 2017, p.385 conveying from Stoyanova & Ellerton, 1996).*

The mathematics books at each grade level have been examined separately according to their years and whether the problem posing activities exist, their distribution according to learning areas and sub-learning areas, the types of problem posing and their numbers have been examined. The situations related to the problem posing types created by the researcher through taking the problem posing types used by Ev-Çimen & Yıldız (2017) in their researches as reference are given in Table 2 below.

Table 2. *Problem posing types*

FREE PROBLEM POSING ACTIVITY (F)
Problem Posing-Free Criteria: The student is asked to posing a problem without giving any data and without limitation.
STRUCTURED PROBLEM POSING ACTIVITY (SP)
A Similar Problem Posing: The student is given a problem. The student is asked to posing another problem similar to this problem.
SEMI-STRUCTURED PROBLEM POSING ACTIVITY (SSP)
Problem posing in accord with the givens
Problem posing in accord with the picture and the givens
Problem posing by using the information in the picture
Problem posing using givens in the picture
Problem posing in accord with the given operation
Problem posing in accord with the information given in the table
Problem posing in accord with the graphic
Problem posing in which the givens, desired and answer are given
SEMI-STRUCTURED PROBLEM POSING ACTIVITY (SSP)
Problem posing in which the givens and the desired is given
Problem posing in which the given and answer are given
Problem posing by completing problem sentence through writing the missing information
Problem posing by problem writing through placing the givens in the problem sentence
Problem posing through writing the appropriate question sentences
Problem posing by using the previous problem information
Problem posing in accord with the same rule
Problem posing with verbal text gap-filling

RESULTS

Number of problem posing in elementary mathematics textbooks offered by the ministry to be used in last two years have been examined and included in the finding after being divided into grade levels. The findings on the question "how are the problem posing activities in elementary mathematics books in 1st, 2nd, 3rd and 4th grade?" are as follows:

Findings on Textbooks in First Grade

Looking at the textbooks in first grade in the 2017-2018 and 2018-2019 school years of $MEB1_{2017\text{-}2018}$ and $M1_{2018\text{-}2019}$, it is seen that there is no problem posing activity.

Findings on Textbooks in Second Grade

3 second grade textbooks approved by the Ministry and used as textbooks in schools in the 2017-2018 and 2018-2019 school years have been examined and the findings are given below.

Table 3. *$A2_{2017\text{-}2018}$ textbook problem posing activities*

Learning Area	Sub- Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations	**Addition Operation in Natural Numbers**	SSP	Problem posing in accord with the givens	2	11
		SSP	Problem posing in which the givens and the desired is given	3	
		SSP	Problem posing in accord with the picture and the givens	1	
		SP	Problem posing similar to the previous problem	1	
		SSP	Problem posing in accord with the given operation	1	
	Addition and Subtraction Operation in Natural Numbers	SSP	Problem posing in accord with the givens	2	
		SP	Problem posing similar to the previous problem	1	
Measurement	**Length Measurement**	F	Problem writing related to subject	1	1
Total number of problem posing				12	

When the $A2_{2017\text{-}2018}$ Textbook is examined, it is seen that there are 8 problem posing activities (Problem posing in accord with the givens - in which the givens and the desired is given

- in accord with the picture and the givens - similar to the previous problem - in accord with the given operation) in the *'Addition Operation in Natural Numbers'* sub-learning area of learning area and there are 3 problem posing activities (Problem posing in accord with givens - similar to the previous problem) in the *'Addition and Subtraction Operation in Natural Numbers'* sub-learning area of the *"Numbers and Operations"* learning area. In the *'Length Measurement'* sub-learning area of the *"Measurement"* learning area only 1 problem posing activity (Problem writing related to subject) has been seen. There are 11 problem posing activities in the *"Numbers and Operations"* learning area and 1 problem posing activity in the *"Measurement"* learning area. Looking at the activity types, it should be remarked that there are 2 structured (SP), 9 semi-structured (SSP), and only 1 free (F) problem posing activity. Below is a sample except from the problem posing activities in $A2_{2017\text{-}2018}$ (See Figure 2).

Pose a problem that necessitates addition operation in accord with the givens above.

Problem

FIGURE 2. *Numbers and Operations*- Problem posing *activity in accord with the picture and the givens*

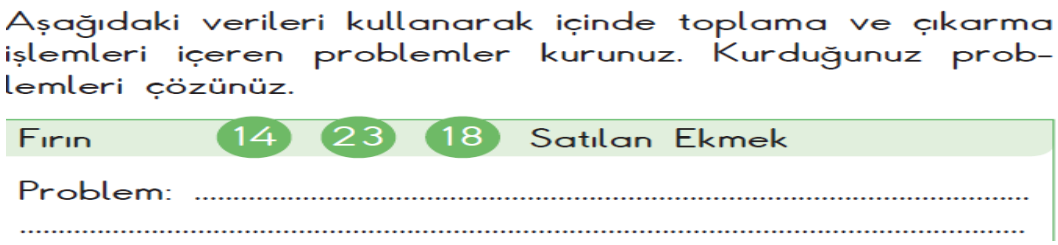
It is seen that there are some values along with the picture in the problem posing activity given in Figure 2 above and students are expected to pose a problem in accord with these givens (Page 111). As it is seen, both picture and data are provided to the students to pose problems.

Table 4. *$B2_{2018\text{-}2019}$ textbook problem posing activities*

Learning Area	Sub- Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations	**Addition Operation in Natural Numbers**	SSP	Problem posing in accord with the givens	2	6
		SSP	Problem posing in accord with the information given in the table	1	
		SSP	Problem posing in accord with the picture and the givens	1	
	Addition and Subtraction Operation in Natural Numbers	SSP	Problem posing in accord with the givens	2	
Total number of problem posing				6	

When the $B2_{2018\text{-}2019}$ Textbook is examined, it is seen in Table 4 that there are total of 6 problem posing activities, 4 of them are (Problem posing in which the givens are given - in accord with the information given in the table - by using the picture and information) in the *'Addition Operation in Natural Numbers'* sub-learning area of learning area and 2 of them (Problem posing in which the givens are given) in the *'Addition and Subtraction Operation in Natural Numbers'* sub-learning area of the *"Numbers and Operations"* learning area. Looking at the activity types, all of 6

activities are semi-structured (SSP) problem posing activities. Below is a sample excerpt from the problem posing activities in $B2_{2018\text{-}2019}$ (See Figure 3).



Translate: Use the following data to pose problems that include addition and subtraction. Solve your problems.

Bakery 14 23 18 Bread for sale

Problem……

FIGURE 3. *Numbers and Operations- Problem posing by using the given information*

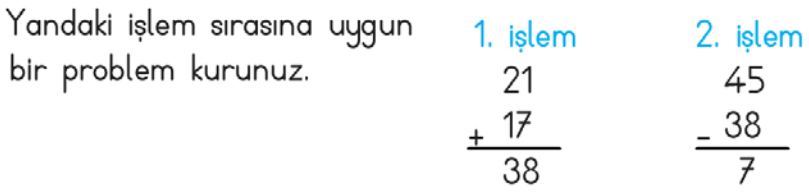
In the problem posing activity where the information given in Figure 3 above is used, the students are expected to pose a problem in accord with these given (Page 138).

Table 5. *$MEB2_{2018\text{-}2019}$ textbook problem posing activities*

Learning Area	Sub- Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations	**Addition Operation in Natural Numbers**	SSP	Problem posing in accord with the picture and the givens	1	9
		SSP	Problem posing with verbal text gap-filling	1	
		SSP	Problem posing in accord with the givens	3	
		SSP	Problem posing in accord with the given operation	1	
Numbers and Operations	**Addition and Subtraction Operation in Natural Numbers**	SSP	Problem posing in accord with the givens	3	
Measurement	**Our Money**	SSP	Problem posing using givens in the picture	1	1
Total number of problem posing				10	

When the $MEB2_{2018\text{-}2019}$Textbook is examined, it is seen in Table 4 that there are total of 10 problem posing activities, 6 of them are (Problem posing in accord with the picture and givens - with verbal text gap-filling - where given information is used - in accord with the given operation sequence) in the *'Addition Operation in Natural Numbers'* sub-learning area of and 3 of them (Problem posing where given information is used) in the *'Addition and Subtraction Operation in Natural Numbers'* sub-learning area of the *"Numbers and Operations"* learning area. There is also the activity of posing a problem in the sub-learning area of '*our money' (*Problem posing using givens in the picture). It is seen that there are 10 problem posing activities in the

book all of which are semi-structured. Below is a sample excerpt from the problem posing activities in $MEB2_{2018\text{-}2019}$ (See Figure 4).



Translation: Pose a problem according to the procedure.

FIGURE 4. *Numbers and Operations- Problem posing in accord with the given operation sequence.*

In the problem posing activity in accord with the operation sequence given in Figure 4 above, the students are expected to pose a problem considering this operation sequence (Page 100).

Findings on Textbooks in Third Grade

3 third grade textbooks approved by the Ministry and used as textbooks in schools in the 2017-2018 and 2018-2019 school years have been examined and the findings are given below.

Table 6. *$B3_{2017\text{-}2018}$ textbook problem posing activities*

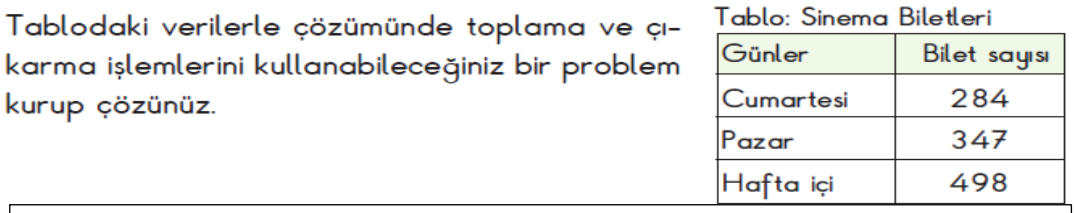
Learning Area	Sub-Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations	**Addition Operation in Natural Numbers**	SSP	Problem posing in accord with the information given in the table	5	
		SSP	Problem posing in which the givens, desired and answer are given	1	
		SSP	Problem posing in accord with the given operation	1	
		SSP	Problem posing in accord with the givens	2	
	Addition and Subtraction Operation in Natural Numbers	SSP	Problem posing by completing problem sentence through writing the missing information	2	42
		SSP	Problem posing by problem writing through placing the givens in the problem sentence	1	
		SSP	Problem posing in accord with the given operation	5	
		SSP	Problem posing in accord with the picture and the givens	3	
		SSP	Problem posing through writing the appropriate question sentences	3	
		SSP	Problem posing in accord with the information given in the table	2	
		SSP	Problem posing in which the givens and the desired is given	1	

Table 6. *Continued*		SSP	Problem posing in accord with the givens	5
	Subtraction Operation in Natural Numbers	SP	Problem posing similar to the previous problem	1
	Multiplication and Subtraction Operation	SSP	Problem posing in accord with the information given in the table	2
		SSP	Problem posing in accord with the given operation	1
	Multiplication and Division Operation in Natural Numbers	SSP	Problem posing in accord with the given operation	1
	Multiplication Operation in Natural Numbers	SSP	Problem posing in accord with the picture and the givens	2
		SSP	Problem posing in accord with the given operation	1
	Division Operation in Natural Numbers	SSP	Problem posing in accord with the picture and the givens	1
		SSP	Problem posing in accord with the given operation	1
	Operations with Fractions	SSP	Problem posing in accord with the givens	1
Meas.	**Length Measurement**	SSP	Problem posing in accord with the givens	10
		SSP	Problem posing by completing the problem sentence in which the givens are given	1
		SSP	Problem posing in accord with the given operation	2
		SSP	Problem posing in accord with the information given in the table	1
	Time Measurement	SSP	Problem posing in accord with the givens	3
		SSP	Problem posing by completing the problem sentence in which the givens are given	1
	Liquid Measurement	SSP	Problem posing in accord with the givens	2
		SSP	Problem posing in accord with the picture and the givens	2
		SP	Problem posing similar to the previous problem	1

Table 6. *Continued*	SSP	Problem posing in accord with the given operation	2
Weighing	SSP	Problem posing in accord with the information given in the table	1
	SP	Problem posing similar to the previous problem	1
	SSP	Problem posing in accord with the givens	1
Total number of problem posing			70

When the $B3_{2017\text{-}2018}$ Textbook is examined, it is seen that there are total of 42 problem posing activities in this learning area, 9 of them are (Problem solving with the givens in the table – in which the givens, desired and answer are given – in which the operations are given – in which the givens are given) in the *'Addition Operation in Natural Numbers'* sub-learning area, 22 of them are (Problem posing by completing problem sentence through writing the missing information – by problem writing through placing the givens in the problem sentence – in which the operations are given – in accord with picture and givens – through writing the appropriate question sentences – from the information in the table – in which the given and desired is given – from the information) in the *'Addition and Subtraction Operation in Natural Numbers'* sub-learning area, 1 of them is (Problem posing similar to the previous problem) in the *'Subtraction Operation in Natural Numbers'* sub-learning area, 3 of them are (Problem posing with the information in the table – in which the operations are given) in the *'Multiplication and Subtraction Operation in Natural Numbers'* sub-learning area, 1 of them is (Problem posing in which the operations are given) in the *'Multiplication and Division Operation in Natural Numbers'* sub-learning area, 3 of them are (Problem posing with information on picture – in which operations are given) in the *'Multiplication Operation in Natural Numbers'* sub-learning area, 2 of them are (Problem posing in accord with picture and givens – in which the operations are given) in the *'Division Operation in Natural Numbers'* and one of them is (Problem posing related to given statements) in the 'Operations with Fractions' sub-learning area of the *"Numbers and Operations"* learning area.

It is seen that in Table 5 there are total of 28 problem posing activities in this learning area, 14 of them are (Problem posing by completing the problem sentence in which the givens are given - in which the operations are given - from the information - with the information in the table) in the *'Length Measurement'* sub-learning area, 4 of them are (Problem posing by completing the problem sentence in which the givens are given - from the information) in the *'Time Measurement'* sub-learning area, 7 of them are (Problem posing in accord with picture and givens - similar to the previous problem - where the given operations are used - from the information) in the *'Liquid Measurement'* sub-learning area and 3 of them are (Problem posing from the information in the table - similar to the previous problem - from the information) in the *'Weighing'* sub-learning area of the *"Measurement"* learning area. Among the total of 70 activities found in this textbook, which is at the third grade level, only 3 of them are structured (SP), the remaining 67 are consisting of semi-structured (SSP) problem posing activities. Below is a sample excerpt from the problem posing activities in $B3_{2017\text{-}2018}$ (See Figure 5).



Translate: Posing a problem where you can use addition and subtraction to solve the data

Table: Cinema tickets

Days	Number of tickets
Saturday	284
Sunday	347
Weekdays	498

FIGURE 5. *Numbers and* Operations- Problem posing with the information in the table

The students are expected to pose problems by using the information in the table given in Figure 5 above (Page 111).

Table 7. *MEB3$_{2017-2018}$ textbook problem posing activities*

Learning Area	Sub- Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations	**Addition Operation in Natural Numbers**	SSP	Problem posing in accord with the information given in the table	3	30
		SSP	Problem posing using givens in the picture	5	
		SSP	Problem posing in accord with the givens	1	
		SP	Problem posing similar to the previous problem	1	
		SSP	Problem posing in accord with the graphic	1	
	Addition and Subtraction Operation in Natural Numbers	SSP	Problem posing in accord with the givens	6	
		SSP	Problem posing in accord with the given operation	1	
		SSP	Problem posing in accord with the information given in the table	1	
		SSP	Problem posing in which the given and answer are given	1	
		SSP	Problem posing in which the givens and the desired is given	2	
	Subtraction Operation in Natural Numbers	SSP	Problem posing in accord with the givens	2	
	Multiplication Operation in Natural Numbers	SSP	Problem posing in accord with the givens	3	

Table 7. *Continued*		SSP	Problem posing in accord with the given operation	1	
	Division Operation in Natural Numbers	SSP	Problem posing by using the information in the picture	1	
		SSP	Problem posing in accord with the given operation	1	
Meas.	**Length Measurement**	SSP	Problem posing by using the information in the picture	8	20
		SSP	Problem posing in which there are givens and desired	1	
		SSP	Problem posing in accord with the information given in the table	1	
	Time Measurement	SSP	Problem posing in accord with the givens	3	
	Weighing	SSP	Problem posing in accord with the givens	4	
	Liquid Measurement	SSP	Problem posing in accord with the givens	3	
Total number of problem posing				50	

In the MEB3$_{2017\text{-}2018}$ Textbook, there are total of 30 problem posing activities, 11 of them are (Problem posing by using givens in the table - using givens in the picture - using given information - using givens in the graphic - similar to the previous problem) in the *'Addition Operation in Natural Numbers'* sub-learning area, 11 of them are (Problem posing in which there are givens and desired - in which givens and the answer are given - in which the operations are given - by using the givens - by using the givens in the table) in the *'Additions and Subtraction Operation in Natural Numbers'* sub-learning area, 2 of them are (Problem posing by using the given information) in the *'Subtraction Operation in Natural Numbers'* sub-learning area, 4 of them are (Problem posing by using the information - in which the operation is given) in the *'Multiplication Operation in Natural Numbers'* sub-learning area and 2 of them are (Problem posing by using the information in the picture - in which the operation is given) in the *'Division Operation in Natural Numbers'* sub-learning area of the *"Numbers and Operations"* learning area. There are total of 20 problem posing activities in this learning area, 10 of them are (Problem posing in which there are givens and desired - by using the information in the picture - by using the givens in the table) in the *'Length Measurement'* sub-learning area, 3 of them are (Problem posing by using the information) in the *'Time Measurement'* sub-learning area, four of them are (Problem posing by using the information) in the *'Weighing'* sub-learning area, 3 of them are (Problem posing by using the date) in the *'Liquid Measurement'* sub-learning area of the *"Measurement"* learning area. Among the total of 50 problem posing activities included in the book, only 1 of them is structured (SP) and the remaining 49 were asked to be in semi-structured (SSP) form problem posing. Below is a sample excerpt from the problem posing activities in MEB$_{2017\text{-}2018}$ (See Figure 6).

6) Resimde verilenleri kullanarak bir problem kurunuz ve çözünüz.

Translation: Posing and solve a problem using the data in the picture

Ceren's house……189 m……park……242 m…… school.

FIGURE 6. *Numbers and Operations*- Problem posing by using the information in the picture

In Figure 6 above, students are expected to write a problem using pictures (Page 43).

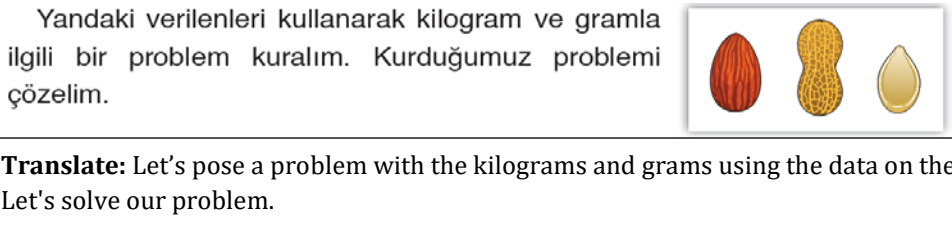
Table 8. *A3$_{2018\text{-}2019}$ textbook problem posing activities*

Learning Area	Sub- Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations		SSP	Problem posing in accord with the picture and the givens	2	21
	Addition Operation in Natural Numbers	SSP	Problem posing by using the previous problem information	2	
		SSP	Problem posing in accord with the givens in the table	1	
		SSP	Problem posing in accord with the givens	2	
		SSP	Problem posing in accord with the graphic	2	
	Addition and Subtraction Operation in Natural Numbers	SSP	Problem posing in accord with the givens	1	
		SSP	Problem posing in accord with the graphic	3	
	Multiplication Operation in Natural Numbers	SSP	Problem posing in accord with the givens	3	
	Division Operation in Natural Numbers	SSP	Problem posing using givens in the picture	3	
		SSP	Problem posing by using the previous problem information	1	
		SSP	Problem posing in accord with the givens	1	

Table 8. *Continued*

Meas.	**Our Money**	SSP	Problem posing by using the information in the picture	3	9
		SSP	Problem posing by using the previous problem information	2	
	Weighing	SSP	Problem posing using givens in the picture	2	
		SSP	Problem posing by using the previous problem information	1	
	Length Measurement	SSP	Problem posing by using the information in the picture	1	
Total number of problem posing				30	

In the A3$_{2018\text{-}2019}$ Textbook, it is seen that there are total of 21 problem posing activities, 9 of them are (Problem posing in accord with the picture and givens - in accord with the given graphic - by using the previous problem information - by using the information given in the table - by using the givens) in the *'Addition Operation in Natural Numbers'* sub-learning area, 4 of them are (Problem posing in accord with the graphic - by using the givens) in the *'Addition and Subtraction Operation in Natural Numbers'* sub-learning area, 3 of them are (Problem posing by using the givens) in the *'Multiplication Operation in Natural Numbers'* sub-learning area, 5 of them are (Problem posing using givens in the picture- by using the previous problem information - by using the givens) in the *'Division Operation in Natural Numbers'* sub-learning area of the *"Numbers and Operations"*. There are total of 9 problem posing activities in this learning area, 5 of them are (Problem posing by using the picture and information - by using the previous problem information) in the *'Our Money'* sub-learning area, 3 of them are (Problem posing using givens in the picture- by using the previous problem information) in the *'Weighing'* sub-learning area, 1 of them is (Problem posing related to information in the picture) in the *'Length Measurement'* sub-learning area of the *"Measurement"* learning area. It is also seen that all of the 30 problem posing activities in the book are semi-structured (SSP) problem posing activities. Below is a sample excerpt from the problem posing activities in A3$_{2018\text{-}2019}$ (See Figure 7).



Translate: Let's pose a problem with the kilograms and grams using the data on the right. Let's solve our problem.

FIGURE 7. *Measurement*- Problem posing using givens in the picture

In the problem posing activity by using the visuals in the Figure 7 above, students are expected to write a problem in which the given visuals are used (Page 193).

Findings on Textbooks in Fourth Grade

2 fourth grade textbooks approved by the Ministry and used as textbooks in schools in the 2017-2018 and 2018-2019 school years have been examined and the findings are given below.

Table 9. *$Y4_{2017\text{-}2018}$ textbook problem posing activities*

Learning Area	Sub-Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations	**Addition Operation in Natural Numbers**	SSP	Problem posing in accord with the givens	1	22
	Subtraction Operation in Natural Numbers	SP	Problem posing similar to the previous problem	1	
		SSP	Problem posing in accord with the givens	2	
		SSP	Problem posing in accord with the givens in the table	1	
		SSP	Problem posing in accord with the same rule	1	
	Addition and Subtraction Operation in Natural Numbers	SSP	Problem posing in accord with the givens	2	
	Multiplication and Addition Operation in Natural Numbers	SSP	Problem posing in accord with the givens	1	
		SP	Problem posing similar to the previous problem	2	
	Division Operation in Natural Numbers	SSP	Problem posing in which the givens and the desired is given	1	
		SSP	Problem posing in accord with the givens	2	
		SP	Problem posing similar to the previous problem	1	
		SSP	Problem posing in accord with the picture and givens	2	
	Operations with Fractions	SSP	Problem posing in accord with the picture and givens	1	
		SSP	Problem posing in accord with the givens	1	
		SP	Problem posing similar to the previous problem	3	

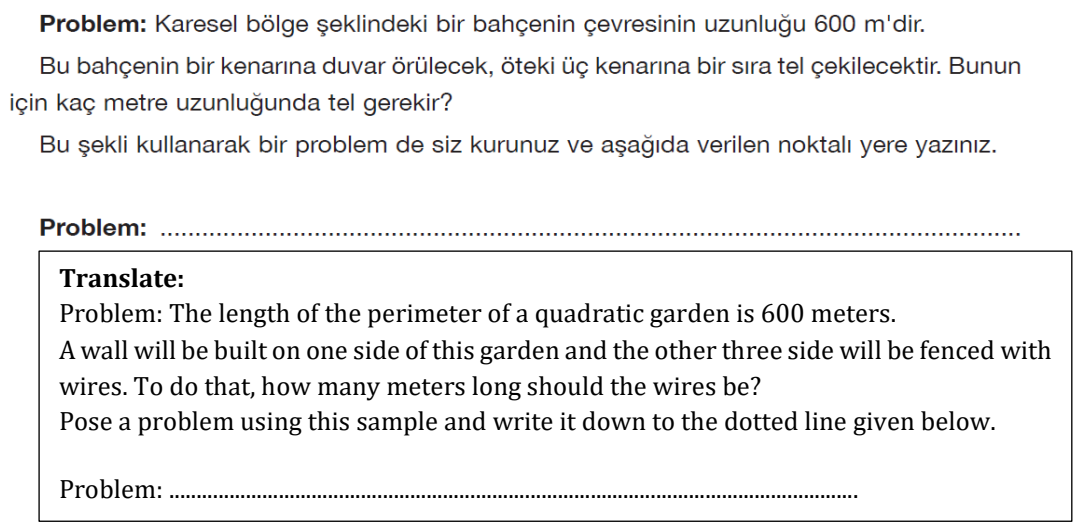
Table 9. *Continued*

Geometry	**Geometryc Solids and Figures**	SSP	Problem posing in accord with the givens	2	2
Measurement	**Length Measurement**	SP	Problem posing similar to the previous problem	1	
	Perimeter Measurement	SSP	Problem posing in accord with the givens	5	
		SP	Problem posing similar to the previous problem	1	
	Weight	SSP	Problem posing in accord with the givens	3	18
		SP	Problem posing similar to the previous problem	1	
	Liquid Measurement	SSP	Problem posing in accord with the givens	2	
		SP	Problem posing similar to the previous problem	1	
	Time Measurement	SSP	Problem posing using givens in the picture	1	
		SSP	Problem posing in accord with the givens in the table	3	
Data Processing	**Data Collection and Assessment**	SP	Problem posing similar to the previous problem	2	10
		SSP	Problem posing in accord with the graphic	2	
		SSP	Problem posing in accord with the givens	6	
Total number of problem posing				52	

In the $Y4_{2017\text{-}2018}$ Textbook, it is seen that there are total of 22 problem posing activities, 2 of them are (Problem posing by using the information - similar to the previous problem) in the *'Addition Operation in Natural Numbers'* sub-learning area, 4 of them are (Problem posing by using the information - in accord with the givens in the table - with the same rule) in the *'Subtraction Operation in Natural Numbers'* sub-learning area, 2 of them are (Problem posing by using the information) in the *'Addition and Subtraction Operation in Natural Numbers'* sub-learning area, 3 of them are (Problem posing by using the information - similar to the previous problem) in the *'Multiplication and Addition Operation in Natural Numbers'* sub-learning area, 6 of them are (Problem posing in which givens and desired are given - by using the information - similar to the previous problem - in accord with the picture and givens) in the *'Division Operation in Natural Numbers'* sub-learning area, 5 of them are (Problem posing in accord with the picture and givens - by using the information - similar to the previous problem) in the *'Operations with Fractions'* of the *"Numbers and Operations"* learning area.

There 2 (Problem posing by using the information) in the *'Geometric Solids and Figures'* sub-learning area of the *"Geometry"* learning area. There are total of 18 problem posing activities in this learning area, 4 of them are (Problem posing similar to the previous problem - by using the information) in the *'Length Measurement'* sub-learning area, 3 of them are (Problem posing similar to the previous problem - by using the information) in the *'Perimeter Measurement'* sub-learning area, 6 of them are (Problem posing similar to the previous problem - by using the information) in the *'Weighing'* sub-learning area, 3 of them are (Problem posing similar to the

previous problem - by using the information) in the *'Liquid Measurement'* sub-learning area, 4 of them are (Problem posing by using the picture - in accord with the givens in the table) in the *'Time Measurement'* sub-learning area of the *"Measurement"* learning area. Lastly, there are 10 activities (Problem posing similar to the previous problem - in accord with the given graphic - by using the information) in the *'Data Collection and Assessment'* sub-learning area of the *"Data Processing"* learning area. Among the total of 52 problem posing activities, 13 of them are given structured (SP) and 39 of them are given semi-structured (SSP). Below is a sample excerpt from the problem posing activities in $Y4_{2017\text{-}2018}$ (See Figure 8).


Problem: Karesel bölge şeklindeki bir bahçenin çevresinin uzunluğu 600 m'dir.

Bu bahçenin bir kenarına duvar örülecek, öteki üç kenarına bir sıra tel çekilecektir. Bunun için kaç metre uzunluğunda tel gerekir?

Bu şekli kullanarak bir problem de siz kurunuz ve aşağıda verilen noktalı yere yazınız.

Problem: .....

Translate:
Problem: The length of the perimeter of a quadratic garden is 600 meters.
A wall will be built on one side of this garden and the other three side will be fenced with wires. To do that, how many meters long should the wires be?
Pose a problem using this sample and write it down to the dotted line given below.

Problem: .....

FIGURE 8. *Measurement- Problem posing similar to the previous problem*

In the problem posing activity similar to the previous problem in the Figure 8 above, students are expected to write a problem similar to the previous problem (Page 173).

Table 10. *$A4_{2018\text{-}2019}$ textbook problem posing activities*

Learning Area	Sub- Learning Area	Type of Problem Posing	Activity	Number of Problem Posing	Total Number of Activity
Numbers and Operations	**Addition Operation in Natural Numbers**	SSP	Problem posing in accord with the picture and givens	1	
		SSP	Problem posing in accord with the givens	1	
	Addition and Subtraction Operation in Natural Numbers	SSP	Problem posing in accord with the givens in the table	1	
		SSP	Problem posing in accord with the picture and givens	1	10
		SSP	Problem posing in accord with the givens	1	
	Multiplication Operation in Natural Numbers	SSP	Problem posing in accord with the picture and givens	2	
	Division Operation in Natural Numbers	SSP	Problem posing in accord with the picture and givens	2	
		SSP	Problem posing in accord with the given operation	1	

Table 10. *Continued*

Data Processing	**Data Collection and Assessment**	SSP	Problem posing in accord with the graphic	5	5
	Time Measurement	SSP	Problem posing in accord with the picture and givens	2	9
	Perimeter Measurement	SSP	Problem posing in accord with the picture and givens	3	
	Weighing	SSP	Problem posing in accord with the picture and givens	1	
	Liquid Measurement	SSP	Problem posing in accord with the picture and givens	2	
		SSP	Problem posing in accord with the givens	1	
Total number of problem posing				24	

In the $A4_{2018\text{-}2019}$ Textbook, there are total of 10 activities in this learning area, 2 of them are (Problem posing in accord with the picture and givens - by using the givens) in the *'Addition Operation in Natural Numbers'* sub-learning area, 3 of them are (Problem posing by using the givens in the table - in accord with the picture and givens - by using the givens) in the *'Addition and Subtraction Operation in Natural Numbers'* sub-learning area, 2 of them are (Problem posing in accord with the picture and givens) in the *'Multiplication Operation in Natural Numbers'* sub-learning area, 3 of them are (Problem posing by using the givens in the visual - in accord with the picture and givens - in accord with the solution) in the *'Division Operation in Natural Numbers'* sub-learning area of the *"Numbers and Operations"* learning area. There are 5 activities (Problem posing in accord with the given graphic) in the *'Data Collection and Assessment'* sub-learning area of the *"Data Processing"* learning area. In this book, there are total of 9 activities in this learning area, 2 of them are (Problem posing in accord with the picture and givens) in the *'Time Measurement'* sub-learning area, 3 of them are (Problem posing by using the givens in the visual) in the *'Perimeter Measurement'* sub-learning area, 1 of them is (Problem posing by using the givens in the visual) in the *'Weighing'* sub-learning area, 3 of them (Problem posing by using the givens in the visual - by using the givens) in the *'Liquid Measurement'* sub-learning area of the *"Measurement"* learning area. All of the 24 activities in the book are just semi-structure problem posing (SSP) activities. Below are samples excerpt from the problem posing activities in $A4_{2018\text{-}2019}$ (See Figure 9, Figure 10).

Sample: The clothing types and their numbers sold in one day in a store are specified in the figure graphic near. Pose a problem in accord with the figure graphic. Draw the problem you have posed.

According to figure graphic, 20 pullovers, 15 pants and 25 shirts were sold in the store in one day. Pose a problem accordingly.

Problem: If same sales are made in the store every day, how many clothings in total will be sold in 3 days?

Draw the problem you have posed.

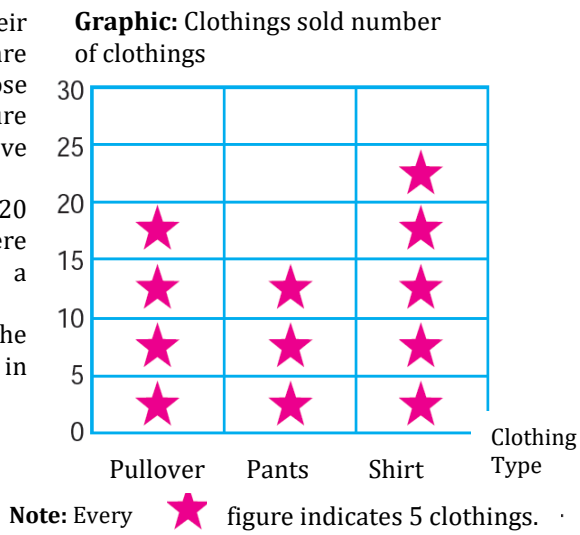
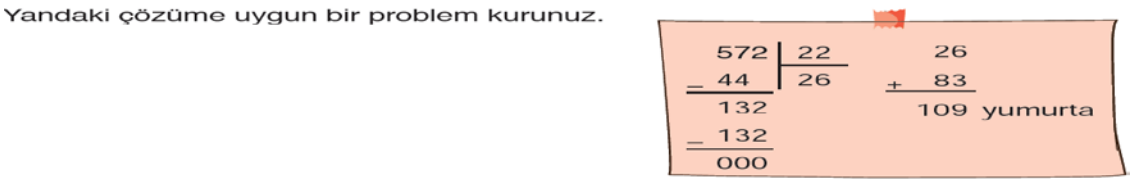


FIGURE 9. *Data Processing - Problem posing in accord with the given graphic*

In the problem posing activity in accord with the given graphic in the Figure 9 above, students are expected to write a problem by using given information in the graphic (Page 175).



Translate: Please pose a problem according to the solution.

FIGURE 10. *Numbers and Operations- Problem posing in accord with the solution*

In the problem posing activity in accord with the solution in the Figure 10 above, students are expected to pose a problem in accord with the solution (Page 120).

Findings on the question "How is the activities in the textbooks on the basis of years, learning areas, sub-learning areas, problem types?" are as follows:

General Findings Related to Problem Posing Activities in the Elementary Textbooks

The findings of the distribution of problem posing activities in the 10 textbooks examined according to years, learning areas and sub-learning areas are given below (Table 11).

When the problem posing activities in the mathematics textbooks examined according to years, it is seen in the Table 10 that in the total of 4 textbooks examined in 2017-2018 school year there are 184 and in the total of 4 books examined in 2018-2019 school year there are 70 problem posing activities. It is noteworthy that the number of problem posing activities in the textbooks used in the 2018-2019 school year at each grade level decreased compared to the books used in the previous year.

Table 11. *Total problem posing activities in the books according to years*

	1st Grade Book Total Problem Posing Activity	2nd Grade Book Total Problem Posing Activity	3rd Grade Book Total Problem Posing Activity	4th Grade Book Total Problem Posing Activity	Total
2017-2018	0	12	70 ve 50	52	184
2018-2019	0	6 ve 10	30	24	70

Table 12. *Learning areas the problem posing activities in the books fall into*

	MEB1$_{2017\text{-}2018}$	**M1**$_{2018\text{-}2019}$	**A2**$_{2017\text{-}2018}$	**B2**$_{2018\text{-}2019}$	**MEB2**$_{2018\text{-}2019}$	**B3**$_{2017\text{-}2018}$	**MEB3**$_{2017\text{-}2018}$	**A3**$_{2018\text{-}2019}$	**Y4**$_{2017\text{-}2018}$	**A4**$_{2018\text{-}2019}$
In Program, Total Number of Learning Areas	4	4	4	4	4	4	4	4	4	4
Problem Posing Activities Included in Total Number of Learning Areas	0	0	2	1	2	2	2	2	4	3

Looking at the learning areas that include problem posing activities of 4 learning areas in the mathematics textbooks, Y4$_{2017\text{-}2018}$ book includes activities in all learning areas and MEB1$_{2017\text{-}2018}$ and M1$_{2018\text{-}2019}$ includes none of the activities. When all the books are examined, it is seen that number of learnings in the textbooks of the 2017-2018 school year (f:10) is higher than the number of sub-learnings (f:8) in the textbooks used in the 2018-2019 school year.

Table 13. *Sub-learning areas the problem posing activities in the books fall into*

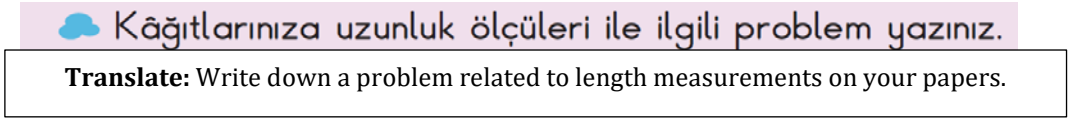
	MEB1$_{2017\text{-}2018}$	**M1**$_{2018\text{-}2019}$	**A2**$_{2017\text{-}2018}$	**B2**$_{2018\text{-}2019}$	**MEB2**$_{2018\text{-}2019}$	**B3**$_{2017\text{-}2018}$	**MEB3**$_{2017\text{-}2018}$	**A3**$_{2018\text{-}2019}$	**Y4**$_{2017\text{-}2018}$	**A4**$_{2018\text{-}2019}$
Total Number of Sub-Learning Areas in the Program	13	13	15	15	15	18	18	18	17	17
Problem Posing Activities Included in Total Number of Sub-learning Areas	0	0	3	2	3	9	8	7	12	9

Looking at the sub-learning areas that include problem posing activities in the mathematics textbooks, Y4$_{2017\text{-}2018}$ book contains the highest number of sub-learning areas with the number of 12 and MEB1$_{2017\text{-}2018}$ and M1$_{2018\text{-}2019}$ books contain none of them. When the situation in all books is examined, it is seen that the numbers of sub-learning in the textbooks used in the 2017-2018 school year (f:32) is higher than the numbers of sub-learning (f:21) in the textbooks used in the 2018-2019 school year.

Table 14. *Problem posing types in the books*

	MEB1$_{2017-2018}$	M1$_{2018-2019}$	A2$_{2017-2018}$	B2$_{2018-2019}$	MEB2$_{2018-2019}$	B3$_{2017-2018}$	MEB3$_{2017-2018}$	A3$_{2018-2019}$	Y4$_{2017-2018}$	A4$_{2018-2019}$
Number of Free Problem Posing	0	0	1	0	0	0	0	0	0	0
Number of Structured Problem Posing	0	0	2	0	0	3	1	0	13	0
Number of Semi-structured Problem Posing	0	0	9	6	10	67	49	30	39	24

When the text books are examined according to their grade levels and the years they are used in, it is seen that there is no problem posing activity at the *first grade* level. In one book examined at the *second grade* level in the 2017-2018 school year, there are 1 free, 2 structured, 9 semi-structured problem posing activities and in two books examined at the second grade level in the 2018-2019 school year, there are total of 16 problem posing activities and all 16 of them are semi-structured problem posing activities. Looking at the books at the *third grade* level, it is seen in Table 14 that in two books examined in the 2017-2018 school year, there are a total of 4 structured and 116 semi-structured problem posing activities, and in one book examined in the 2018-2019 school year, there are only 30 semi-structured problem posing activities. Lastly, according to the *fourth grade* books, in one book examined in the 2017-2018 school year, there are 13 structured and 39 semi-structured problem posing activities, and in one book examined in the 2018-2019 school year there are 24 activity all of which are semi-structured problem posing activities. Below are sample excerpts from the problem posing types in the textbooks (See Figure 11, Figure 12, and Figure 13).



Translate: Write down a problem related to length measurements on your papers.

FIGURE 11. *Free problem posing activity - Measurement - Problem Writing Related to Subject*

In A2$_{2017-2018}$ Figure 11, students were expected to perform free problem posing activities (P301). This activity is included only in the 2nd grade textbook used in 2017-2018 school year among the 10 books examined. Apart from this, this problem posing types are not included in the other books.

Pose a problem in which addition operation is made by using the numbers near and solve it.

Sample Problem

In a parking lot 157 automobile in morning, 203 in afternoon and 346 in evening have parked.
How many automobiles in total have parked throughout the day?

FIGURE 12. *Structured Problem Posing Activity - Numbers and* Operations - Problem posing similar to the previous problem

In MEB3$_{2017\text{-}2018}$ Figure 12, in the problem posing activity similar to the previous problem, students are expected to perform the structured problem posing activity by writing a problem similar to that given in the sample problem (Page 43).

Translate: The pictures show the height of a tree according to the years.

Planted year…… after 2 years……after 6 years

? How to pose a problem with the data in the pictures. Discuss.

FIGURE 13. *Semi-structured Problem Posing Activity - Measurement - Problem posing related to information in the picture*

In A3$_{2018\text{-}2019}$ Figure 13, students were asked to perform the semi-structured problem posing activity by writing a problem using the information in the picture (Page 248).

DISCUSSION and CONCLUSIONS

In Turkey, problem posing studies have begun with the mathematics curriculum renewed in 2005. In the program, it is emphasized that while problem solving skills of the students are developed, problem posing skills should be developed by using mathematical and daily life situations as well (Kılıç, 2011). In the Mathematics Curriculum (2018, p.11) the importance placed on problem solving is specified with the statement "The students will be able to express their thoughts and reasoning easily in the problem solving process and see the deficiencies or gaps in the mathematical reasoning of others". It has been stated in all sub-learning areas as 'Studies for problem posing are also included'. The aim of this research is also to determine the problem posing activities in 10 mathematics textbooks offered by the Ministry of National Education that were used in elementary schools in the last two years, namely 2016-2017 and 2018-2019 school years.

When the first grade textbooks of the 2017-2018 and 2018-2019 school years were examined within the scope of the research, it was seen that there was no problem posing activity. However, in the Mathematics Curriculum (2018), in the 1st grade of the elementary school, there are gains in problem posing both in addition operation in natural numbers and in subtraction operation in natural numbers. Despite that, it is a striking finding that there is no problem posing activity in mathematics textbooks. However, Kalaycı (2014) examined the problem posing activities in the textbooks of the 2012-2013 and 2013-2014 school years in line with the opinions of the teachers and reached to the conclusion that there are 6 semi-structured problem posing activities at the first grade level. As can be seen, it is an important result that the number of problem posing should increase in time, but it has not increased at all, although 3-4 years have passed.

Problem posing studies in the elementary school mathematics textbooks examined in the research begin in the second grade textbooks. When 3 books used as second grade mathematics textbooks of the last two years were examined, it was found that there are 12 problem posing

activities in 2017-2018 school year and there are total of 16 problem posing activities in two books in 2018-2019 school year. When the used learning areas and sub-learning areas were examined, it was seen that they were insufficient. According to the types of activities, in one book examined in the 2017-2018 school year, there are 1 free, 2 structured, 9 semi-structured problem posing activities and in two books examined in the 2018-2019 school year, there are total of 16 activities all of which are semi-structured problem posing activities. As can be seen, although the problem posing types used vary, the number of them is very low. In 10 books examined within the scope of the research, there was free problem posing activity at the level of this grade level, even if it was only one. As a result, although the number of problem posing types is less, this is the only grade level with diversity.

At the third grade level, three math textbooks approved by the ministry to be used in the last two years were examined. As a result of the studies, the conclusion was reached that there were total of 120 problem posing activities in two books used in 2017-2018 and 30 problem posing activities in one book in 2018-2019. The learning areas (two of the four learning areas were used) and sub-learning areas to which the problem posing activities in the books belong are insufficient. According to the types of activities, in two books examined in the 2017-2018 school year, there are 4 structured and 116 semi-structured problem posing activities, and in one book examined in the 2018-2019 school year, there are 30 activities all of which are semi-structured problem posing activities. As can be seen, free problem posing activity is not included in this grade level books.

Lastly, two books used in fourth grade were examined. According to the analysis, there are 52 problem posing activities in the book used in 2017-2018 and 24 problem posing activities in the book in the 2018-2019 school year. While there are problem posing activities in all four learning areas in the 2017-2018 school year, there are problem posing activities in three of four learning areas in the 2018-2019 school year. As can be seen, when compared with the other grade levels, the conclusion is reached that the fourth grade books are better than books of other grade levels in terms of numbers of learning areas and in terms of using all of the learning areas, even when there are some deficiencies. Another noteworthy result is that when it comes to the sub-learning areas involved in problem posing activities, they are used more than other grade levels. When examined according to activity types, in one book examined in 2017-2018 school year, there are total of 13 structured and 39 semi-structured activities and in one book examined in 2018-2019 school year, there are 24 activities all of which are semi-structured activities. In particular, the number of structured problem posing activities in the textbook used in the 2018-2019 school year is more than the number of activities in 10 books examined. However, the lack of free problem posing activity at this level is also a deficiency. In addition, in the study of 10 secondary school mathematics books in Korea in 2015, it was found that the number of problem-posing was insufficient and it was not evenly distributed according to the subjects like this study (Park, Lee, & Cho, 2019).

Looking at it in terms of years, it is seen that in terms of number of problem posing activities as well as according to learning areas, numbers of sub-learning areas and types included, the 2nd grade textbook used in 2018-2019 schools year are better than they in the textbooks used in 2017-2018 school years. The only difference in examinations according to years was at the 2nd grade level. In all of the other grade levels, in terms the number of problem posing as well as according to learning areas, number of sub-learning areas and types included, the 2017-2018 school year is better than the 2018-2019 school year. In addition, the grade level with the most problem posing activities among the grade levels is the 3rd grade level. And the level that includes all learning areas is the 4th grade mathematic book, which was used in the 2017-2018 school year. At the other levels, it is noteworthy that there are problem posing activities mostly in 2 of the 4 learning areas. While the 'Numbers and Operations' learning area is found in all textbooks, especially the 'Geometry and 'Data Processing' learning area is not found in many of the textbooks. Looking at the problem types in depth, unfortunately in most textbooks, the semi-structured problem posing activity in the 3rd grade mathematics books is more than they are in other levels. It is noteworthy as well that structured problem solving activity is higher in numbers in 4th grade mathematics textbooks than in other grades. While there is no free problem posing

activity in other grade levels, it is found in the 2nd grade, even if it is just one activity. Therefore, the only class level with variety of problem posing types is 2nd Class.

It is not enough to examine the number of problem posing found in mathematics textbooks alone, they should also be examined according to problem posing types used (Cai & Jiang, 2017). In conclusion, in this research, both the number and type of problem posing activities found in elementary mathematics textbooks vary according to years and grade levels. While the number and diversity in types of problem posing were expected to increase in years, this number and diversity is higher in the books used in the previous year. In addition, there are no problem posing activities in the 1st grade books. Since the first steps in problem solving skills are taken at the first grade level, mathematics textbooks deemed appropriate to be used in schools by the Ministry of National Education may therefore not have problem posing activities. It is also noteworthy that there is only one grade level textbook with four learning areas of mathematics. It is believed that having problem posing activity in all learning areas at every grade level will increase the problem posing skills of the students regarding that subject. It is also noteworthy deficiency that the free problem posing activity is only found in one grade level (2nd grade). Cai & Jiang (2017) examined the problem posing activities in five elementary mathematics textbooks used in the US and China, and reached the conclusion that the number of problem posing was low. As a result of the examinations, it is seen that the number of activities related to number and operations are more than the number of activities related to algebra, geometry and measurement. It is seen in the research of Usta (2018), in which he examines problems related to multiplication and division operations in the elementary textbooks in 2017-2018 schools year, as well as in this research that the problem posing activities are found the most in third grade textbooks. While the second grade textbooks do not include any problem related to the problem posing ability, this rate is quite low as 1% in the fourth grade textbooks. Jiang & Cai (2014) examined problem posing activities in elementary school mathematics textbooks used in US and China, and examined the problem posing activity in books used 131 in China and 60 in US. They concluded that there were the most problematic activities related to numbers and transactions. According to the place of problem posing in the curriculum, the activities in the books were not sufficient as in this research.

Kalaycı (2014) has examined the problem posing activities in the textbooks in 2012-2013 and 2013-2014 school years and the conclusion was reached that the problem posing activities were inadequate in line with the opinions of the teachers. At the same time, as a result of the analyses of the books, it was determined that problem posing activities were mostly semi-structured, as it seen in this research. As can be seen, even though the number of problem posing in mathematics textbooks increases over years, it is seen that the problem posing type is again predominantly semi-structured. At the same time, as the level of the book increases in textbooks and workbooks, the diversity in structures of problem posing activities increases as well. In another study, the mathematics textbooks in 4th, 5th and 6th grades of elementary education were examined and it was found out that this strategy has not yet reached the desired prevalence, but they were given more space compared to the previous textbooks (Işık, 2010). Ev-Çimen & Yıldız (2017) have examined the problem posing activities in the secondary school mathematics textbooks used in the 2016-2017 school year and it was found that there was no balanced distribution of problem posing activities in the sub-learning areas similar to this study and there was no book covering all of the learning areas and including all of the problem posing types. Kılıç (2011) has examined how problem posing studies included in the elementary mathematics curriculum and it was seen that the gains related to problem posing has increased as the grade level increased. In parallel with the results of the research, the number of activities was found to be low in the problem posing studies in the elementary textbooks (Fan & Zhu, 2007; Li, 2000) and in the program (Kılıç 2011).

In conclusion, it is believed that inadequeate number of problem posing activities in elementary mathematics textbooks will adversely affect the problem posing activities. Studies on problem posing with students reveal the failure of elementary schools students in problem posing activities (Arıkan & Ünal, 2013; Cai & Hwang, 2002; Cankoy ve Darbaz, 2010; Çarkçı, 2016; Gökkurt, Örnek, Hayat, & Soylu, 2015; Kartal, 2017; Lowrie, 1999). Therefore, attention should

be paid to increase the number of problem posing in textbooks that change every year and especially, to have all kinds of problem posing activities that include all learning areas. Class teachers should not be limited to the activities in the textbooks and should improve themselves regarding this matter. In the research, only mathematics textbooks of the last two years were examined. This is where research remains limited. Expanding the working group according to both the years studied and the criteria for review may be other research topics.

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