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Are pre-service teachers able to answer children's questions about the natural sciences? The characterisation of questions by children and students of the Early Childhood Education degree

Jerónimo Torres-Porras[1], Jorge Alcántara-Manzanares[2]

1 Specific Didactics Department, School of Education Sciences, University of Cordoba, Cordoba, Spain. ORCID ID https://orcid.org/0000-0003-1900-7870
2 Specific Didactics Department, School of Education Sciences, University of Cordoba, Cordoba, Spain. ORCID ID https://orcid.org/0000-0003-2482-1615

ABSTRACT
It is essential that students in education degrees reach scientific competence, but for this, it would be necessary to know the questions raised by schoolchildren about natural sciences, to be able to work from their interests and confront the pre-service teachers with these questions, as well as to know the interests of the university students themselves. In this research, a case study has compiled questions about natural sciences that pre-school students ask, and they have been compared with those made by pre-service teachers. The results show that the questions are similar in terms of subject matter and complexity and that only some are investigable questions. In addition, university students are not able to answer children's questions with their own knowledge, which implies the need to work more on science in the study plans of Education degrees and help them devise strategies to work them.

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Introduction

Science is present in many aspects of people's daily lives, and knowledge of it helps people understand the world in which they live. Wherever we look there are natural processes that we can be curious about, which is why scientific literacy is so important, and should begin at an early age (Alcántara Manzanares, 2017). The reality, however, is that students' scientific competence is limited (OECD, 2016), and there is an urgent need to bolster the teaching of science at schools (COSCE, 2011).

In schools, more attention and time are usually dedicated to science after age six, while in early childhood education the sciences receive less attention (Mantzicopoulos, Patrick & Samarapungavan, 2008). However, early childhood education is a key period in children's development, laying the foundations for their subsequent development of skills. In fact, it has been found in 15-year-old students that those who received early childhood education posted better results in the PISA report (OECD, 2011).

The need for teachers, including pre-school educators, to work on science, is evident, for which they must be trained, starting at university (Luehmann, 2007). Currently, the science curriculum being covered at schools at these ages does not adequately develop scientific reasoning or positive attitudes towards science in girls and boys (Domenech, de Pro Bueno & Solbes, 2016), as teachers approach science in a way more focused on content, rather than on the process of reasoning and actually doing science, which leads to a lack of motivation and of confidence in their abilities (Siry, 2013; Spektor-Levy, Kesner & Mevarec, 2013).

Pre-school children are very observant, they have an "inquisitive nature, constantly asking questions about the world around them" (Ong et al., 2016), and from an early age have the ability to learn through observation and to make inductive inferences based on facts (Gopnik et al., 2004; Xu & García, 2008). As Tonucci (1995) observes, "if there is children's thought, there is a children's scientific thought too", and schools should not suppress this innate curiosity and observational capacity, but rather use it to guide learning (Eshach & Fried, 2005).

It is necessary to work with contents that resonate with children's realities, ones that may motivate them, as García-Carmona, Criado and Cañal (2014) explain: "The ideas and previous experiences of schoolchildren must be the starting point to guide the learning process". Thus, in Education degree programmes, it is necessary to cover children's interests. Therefore, it is necessary to know what questions children pose related to science. In fact, some authors suggest that the curriculum should be revised based on students' interests (Gallas, 1995; Rudduck & Flutter, 2000). There are differences in the number of questions that children ask at school relative to those they ask at home, because they learn that school is a place where they answer more questions than they ask (Cazden, 2001; Michaels, O'Connor, & Resnick, 2007; Tizard & Hughes, 1984). Anyway, teachers can find a compendium of questions posed by children and answered by scientists in Vermond and Ogawa (2019) and Vermond and Ogawa (2021).

In addition, it is necessary to take into account the questions of university students studying for degrees in Education, in science classes, as considering their interests may influence their attitudes and efforts towards the sciences and therefore, effective learning (Dawson, 2000; Osborne, Duschl & Fairbrother, 2002).

Asking questions is considered an essential skill for the development of scientific competence (Cañal, 2007; National Research Council, 2000; Osborne, 2014; Shepardson & Pizzini, 1991). Teachers may ask good questions, ones that encourage reasoning and the search for answers (Cruz-Guzmán, García-Carmona & Criado, 2017; Martí, 2012), while also prompting students to question the world in which they live, and to look for answers to their questions (Veglia, 2012). Scientific education should bolster children's capacity to ask questions (Roca, Márquez & Sanmartí, 2013). Some strategies for students to ask better questions are to provide exploratory (hands-on) activities (Aguiar, Mortimer, & Scott, 2010; Lin, Hong, & Cheng, 2009), teacher-led experiments, field trips or real-world data collection (Stokhof, De Vries, Martens & Bastiaens, 2017), train students in taxonomy of questions and using group learning contexts (Kaya & Temiz, 2018) and when teachers acknowledge and appreciate questions (Stokhof et al., 2017).

Therefore, questions are the basis of scientific reasoning and constitute the foundation of investigation. Teachers, then, should not quash curiosity with final answers, but rather show students the way, designing learning activities so that it is they themselves who look for the answers (Torres-Porras, 2021). These questions can play an important role in the Science teaching-learning process (Chin & Osborne, 2008).

Teachers should be competent at generating learning situations, and these skills should be acquired at university (Mir & Ferrer, 2014; Adu-Gyamfi, 2020). Thus, it is up to Education degree programmes to promote activities that expose young children to the sciences and stimulate interest in them. But to work science in education degrees, it would be necessary to know the questions that schoolchildren ask about natural sciences, their subject matter and their complexity, as well as the capacities that university students have to address these questions.

Aims

The aims of this work are to establish an example of the types of questions about the experimental sciences that may be asked by both children and by pupils studying for an Early

Childhood Education degree, to characterise and compare them, and to determine the latter students' ability to respond to children's questions. The research questions would be: Are the questions of schoolchildren and pre-service teachers similar in terms of subject matter, complexity or investigable? Are pre-service teachers capable of answering children's questions? As a hypothesis we could say that the university students' questions will be more complex, investigable, and about other issues than those of the children and that they will know how to correctly answer most of these questions.

Methods

The methodology followed can be divided into different phases: (1) Establishing an example of science-related questions that may be asked by children; (2) a compilation of science-related questions asked by pre-service teachers; (3) classification and analysis of all the questions; (4) obtaining and analysing the undergraduate students' answers to the children's questions.

In the first phase, a case study was carried out on the natural sciences-related questions posed by two siblings: a boy at four, five and six years of age; and a girl at age six. We chose the case study because the objective was to collect questions for children that they asked spontaneously in their lives without guidance of the teachers, since this methodology allows an intensive study of a particular unit (Gerring, 2004). Their parents wrote down each logical question about the sciences that they asked at any time, either in conversations or directly after observing a natural process. That is, questions that arose spontaneously on topics that interested them. The important thing about this aspect is that the questions collected here are ones that were posed in their daily lives, questions that they asked with total candour, which made it possible to document their curiosity after exploring the world in which they live. In total, 29 questions were recorded.

The second phase of this work was completed in the Teaching the Natural and Social Sciences in Early Childhood Education course, for third grade Early Childhood Education students at the University of Cordoba (Spain). We worked with two groups of 64 and 56 students, (for a total of 120) corresponding with the students of two different classrooms for the subject mentioned above. At the beginning of the course pre-service teachers were urged to ask questions about the natural sciences by observing the environment around them, the world in which they live, since knowing their questions, and taking them into consideration during the course, could boost their motivation. They were asked to post, in a few days, a question about the natural sciences individually on the Moodle virtual teaching platform, and several class sessions began with the students being asked to present their questions, and the answers being discussed in class. A total of 101 questions were collected from 84 female students and four male students, as some asked more than one question.

In the third phase, the questions were classified based on three factors: the subject; its complexity; and the type of question (investigable or non- investigable).

Regarding the subject, in four groups, in the case of the questions by the boy and the girl in early childhood education; and in six groups for the questions by the pre-service teachers. In both cases the categories were established a posteriori, according to the topic they presented.

The methodology followed for the classification of the questions according to their complexity, both those from the boy and girl, and those from the undergraduate students, was carried out by modifying the categories used by Keeling, Polacek and Ingram (2009), which were initially based on Marbach-Ad and Sokolove (2000). They established categories from 0-5; the first two categories (0-1) have been maintained. Category 2 referred to questions that can be asked and answered in the laboratory, so it was not used. And, as the authors themselves observe, their categories 3 and 4 contain elements important for science, so they have been combined into a single category, the last (5) remaining the most complex.

Therefore, four categories of questions were established:

- Category 0. Not well grounded. Questions that do not make logical sense, are based on a substantive error, are too general to be meaningful, or are not relevant. Example: Why does the Judas Tree have pink leaves? (In reality, it is the flowers that are pink).

- Category 1. Definition. Questions about a simple definition or expected piece of knowledge. Example: What do we breathe?
- Category 2. Connection, application, mechanism. Questions are included whose answers centre on a functional, evolutionary or process explanation; questions that seek additional descriptive information about phenomena, and those that show simple connections to other knowledge or applications. Example: How does snow form?
- Category 3. Hypothesis or prediction. Questions that reveal extended thinking and information integration which often include a prediction or a hypothesis. These questions are sometimes preceded by an expression of perceived paradox, or somewhat disconcerting. Example: If the function of nipples is to breastfeed babies, why do men have nipples, if they are not biologically adapted for this?

First, the two evaluators agreed on the four categories and classified questions present in Baram-Tsabari and Yarden (2005), discussing these questions' proper correspondence to each category, to reach a consensus. Subsequently, they independently classified all the questions, mixed randomly in the same matrix (29 for children, and 101 for degree students) to categorise them independently of educational stage. The questions that have a scientific answer, but were not correctly formulated, were considered valid and were classified in one of the categories. For example: Why are bees so important for all plants in general? (When they are important for some angiosperms, but not for all plants).

To assess reliability among the evaluators, the Kendall coefficient of concordance was calculated, which takes into account that these are ordinal categories. Of the 130 questions categorised, the percentage of concordance between the two evaluators was 74.62%. The results present significant values ($W = 0.82$; $df = 129$; $p < 0.001$), which indicates that the concordance of the evaluators is not due to chance, and the Kendall coefficient of concordance shows a high degree of agreement between the evaluators, as in most cases of non-concordance the selected categories were contiguous.

The questions in which there was no concordance were reassessed, this time together, until reaching an agreement for that 25.38% of questions in which there was no concordance in the classification in order to, in this way, classify all the questions into one of the categories.

The questions were also classified based on whether they were investigable questions; that is, whether they could be answered by taking and analysing data, as they address something specific that can be tested (Chin & Kayalvizhi, 2002; Ferrés-Gurt, 2017; Kelsey & Steel, 2001). An example of an investigable question would be: Where do flies come from? A non-verifiable one, meanwhile, would be: How do birds fly? The latter is more general, and different studies would be needed to clarify it.

The two evaluators classified all the questions and, to assess reliability, Cohen's Kappa coefficient was calculated, which is more suitable for two evaluators. The results show a 93.08% concordance with significant values; that is, not due to chance ($k = 0.27$; $Z = 3.21$; $p < 0.001$), though the degree of agreement is reduced. The questions in which there was no concordance were reassessed jointly, reaching a consensus.

In the fourth phase, the questionnaire was distributed with the 29 children's questions to each of the university students. They had to answer all the questions with their own knowledge. Subsequently, the number of correct answers for each question was determined.

The STATISTICA 8.0 (Statsoft Inc., Tulsa, Oklahoma, USA) and Microsoft Excel programs were used to carry out statistical analyses and produce graphs.

Results and Discussion

The results can be structured in two sections, the first focused on the first research question that tries to determine if there are differences between the characteristics of the questions of both study groups; and a second section that refers to the second research question on the capacity of pre-service teachers to answer questions from schoolchildren.

Characteristics of the questions of both study groups

A total of 29 questions about the natural sciences from the boy and girl, posed at ages four, five and six (Appendix I) were compiled, as starting at age four girls and boys can ask questions and speculate (Kohlhauf, Rutke & Neuhaus, 2011). The undergraduate students asked 101 questions (Appendix II).

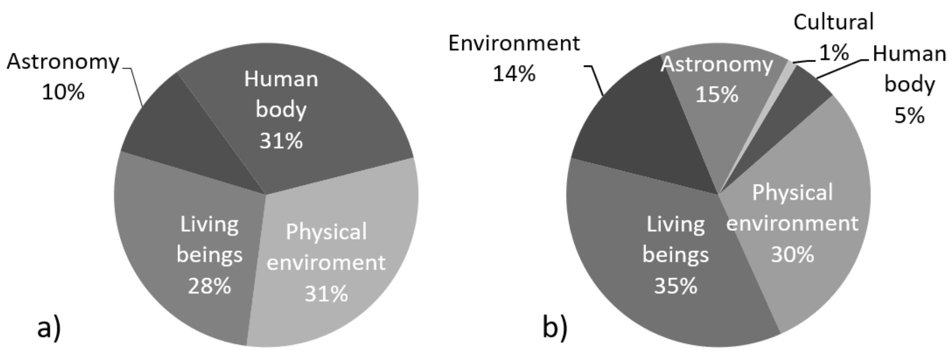
These questions can be classified, according to the topic on which they centre, into different categories, four for the children's: physical environment, the human body, living beings and astronomy; and into six for the questions by pre-service teachers adding environmental and cultural questions to the previous ones.

The percentages in the case of children's questions are distributed mainly between questions concerning the human body, the physical environment and living beings with a smaller proportion of questions related to astronomy (Figure 1a). That is, they are questions about things found in the everyday lives of boys and girls trying to understand the world around them, as well as the functioning of their own bodies.

Among the subjects touched on by the pre-service teachers, living beings and questions related to the physical environment stand out with a lower percentage related to astronomy, as in children's questions. However, questions about the human body fell to just 5% (Figure 1b). In addition, anecdotally, there was a cultural question and 14% of questions were about the environment and its problems, which suggests that this is an aspect of importance to the undergraduate students not detected in the children's questions. We can affirm that there are some differences between the subjects of both study groups, but at the same time they clearly coincide in others.

Figure 1

Subjects of the children's questions (a) and those of the pre-service teachers (b)

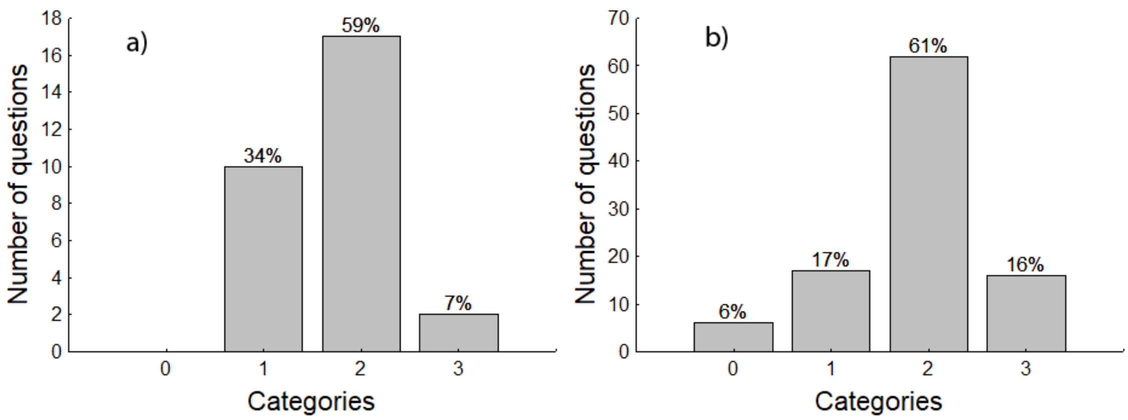


Classifying the questions according to their complexity in the established categories, we find that the children's fall between categories 1-3, with a higher percentage in category 2; that is, questions about a process. But some also corresponded to category 3, which is the highest, reflecting reasoning about aspects of reality, this thinking revealing a detection of non-concordance with what is observed (Figure 2a). There are no questions in category 0 due to the fact that, as mentioned with regards to the methodology, those that did not make sense were discarded.

Regarding the complexity categories of the questions posed by pre-service teachers, the highest percentage was classified into category 2; that is, those that centre on a functional explanation or a process (Figure 2b). With lower and almost similar percentages, there were questions corresponding to both category 1 (definition) and category 3 (hypothesis or prediction), with a small percentage of null questions, from category 0, or questions that were not well grounded. If we compare the complexity of the children's questions and those from the pre-service teachers, we cannot find significant differences (U Mann-Whitney test; $U = 1249$; $Z = -1.20$; $p = 0.22$), the opposite of the initially proposed hypothesis, although the undergraduate students had the highest percentage of questions falling in categories 2 and 3.

Figure 2

Complexity categories of questions asked by children (a) and pre-service teachers (b)



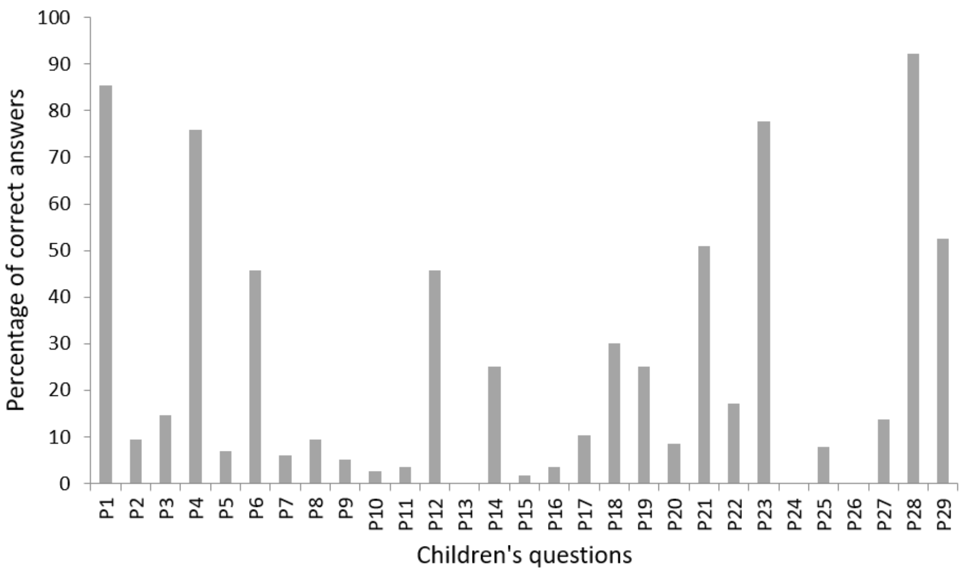
Finally, with respect to the classification as investigable or non-investigable questions, only five (17.2%) from the children could be considered investigable, which can be done through data collection. Among the pre-service teachers, only four (4%) were investigable questions, such that there are differences between the two groups ($X^2(1) = 4.867$; $p = 0.027$).

Pre-service teachers' capacity to respond to children's questions

The pre-service teachers answered the children's questions, and the percentage of correct answers to each question is shown in Figure 3, with a high variability depending on the question, ranging from 92.2% of correct answers to no correct answer, with an average of 25.1%. If we establish quartiles according to the percentage of correct answers, 69% of the questions fell in the first quartile (0-25% correct answers); 10.3% in the second quartile (25-50%); 6.9% in the third quartile (50-75% correct) and 13.8% in the fourth quartile (75-100%), indicating the complexity of the questions to be answered by the undergraduate students without seeking information. Also, clearly there is need to work more on undergraduate students' scientific competence, a requisite of which they themselves are aware.

Figure 3

Percentage of correct answers by pre-service teachers to each of the 29 children's questions (N = 116)



In accord with the four subjects into which we had classified the children's questions, we did not find significant differences in the percentages of correct answers based on subject (Kruskal-Wallis test = 3.2; p = 0.3). Neither were there any significant differences between complexity categories (Kruskal-Wallis test = 5.7; p = 0.057).

Conclusions

This article shows an example of the science-related questions that children may ask in their day-to-day lives, as well as questions from pre-service teachers for an Early Childhood Education degree with most of the subjects similar and similar degree of complexity, although with differences in the percentage of investigable questions, highlighting the fact that pre-service teachers are not capable of answering most of the children's questions. In both cases, they centre on the physical environment and on living beings. Kelemen, Callanan, Casler and Pérez-Granados (2005) found that children asked more about biological and social phenomena than other subjects, coinciding with Baram-Tsabari and Yarden (2005). In addition, among children's questions there is a considerable percentage about the human body, and some about astronomy, while among university students the percentage of questions about the human body is lower, and environmental questions become more frequent.

Regarding the complexity of the questions, in both cases connection, application and mechanism questions predominate; that is, those that focus on a functional, evolutionary or process explanation, seeking additional descriptive information about phenomena. This is important, as these are not simply questions whose answers are definitions. Rather, they are very interesting questions that make it possible to tackle the science behind them from a motivational perspective, and to work on complex processes that require additional effort. As such, they should be recognised as good questions.

It should be taken into account that most of the questions studied, both the children's and those posed by the pre-service teachers, are not investigable (Chin & Kayalvizhi, 2002; Kelsey & Steel, 2001), which may be normal when starting an open and autonomous study (Ferrés-Gurt, 2017). In this case, which did not involve carrying out a research project, it is to be expected that most of the questions relate to information, and research cannot be undertaken based on them, as a great number of different investigations would be necessary to answer them. However, after the collection of questions asked by the pre-service teachers, the teaching staff might have them reflect on the types of question posed, and what a research question is, and they could be guided towards the posing of investigable questions that allow for research in the classroom (Ferrés-Gurt, 2017).

It has been shown that the questions posed by young children are complex ones those pre-service teachers are not able to answer with their own knowledge, which reveals the need to work more on science in Education degree curricula. The reality is that future teachers and even elementary school teachers have a low self-efficacy in teaching science (Greenfield et al., 2009), they may have limited scientific knowledge and generally lack a strong understanding of science and often have had few or negative science experiences (Appleton, 2006; Lederman, 1992). It might be impressed upon future teachers that the important thing is not only to know the answers to questions, but also to know how to prepare activities that foster searching for answers, and that these activities may include experimentation. That is, we must not stifle the innate curiosity of children by just offering the answer, but rather take the opportunity to prepare activities that are intended to be guides in the search for answers (Bahar & Aksüt, 2020). In fact, in the wake of this study, in the course we now have an activity that consists of the pre-service teachers studying for the Early Childhood Education degree, in pairs, completing a task in which they respond to one of the children's questions, but also design activities to work towards the answer in class. The results are then shared with all their classmates.

Giving the undergraduate students the chance to ask their own questions about the natural sciences also allows them to contribute to the course, to be the protagonists of the work done in the classroom, and to guide the teaching-learning process; and it gives the teachers of the course the opportunity to proceed based on the students' interests, relating them to what is worked in the classroom.

Working on science in pre-school education is essential to promote scientific literacy, and questions constitute an essential tool for the promotion of science. Asking other questions, or oneself, allows students to review their current knowledge, and promotes critical and creative thinking (Van Zee et al., 2001). It is a fundamental skill expected of scientifically literate citizens, and pre-schoolers' asking of questions can play a vital role in their cognitive development (Chouinard, Harris & Maratsos, 2007; Ronfard, Zambrana, Hermansen & Kelemen, 2018).

Knowing the science-related questions that children in early childhood education ask is essential to be able to proceed based on their interests, so as to guide the learning process (García-Carmona, Criado & Cañal, 2014). Work on this can begin at university, exposing undergraduate students to these interests.

As lines to pursue in the future, young children's science-related questions could be collected and compared to those in this article, as the questions gathered here were posed outside the classroom, in their daily lives. As such, they are questions they asked with total candour, which made it possible to document the questions they had over the course of several years exploring the world in which they live. On the other hand, understanding sources of variation in future teachers' approaches to responding to children's scientific questions can be used to shape professional development programs and bachelor degree curricula (Haber et al., 2021).

We can conclude, then, that questions are fundamental to the teaching of science, and that those studying for an Early Childhood Education degree must know and reflect on possible questions, both their own and children's, to assume their limitations and to be able to develop strategies that make it possible to promote positive attitudes towards science in the classroom. Therefore, it is necessary to work in the education grades with questions from schoolchildren, so that they know the methodology to follow and take advantage of those questions to redirect their lessons.

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Appendix

Questions about the natural sciences posed by children at different ages. In parentheses, complexity categories (0: not well grounded; 1: definition; 2: mechanism; 3: hypothesis). Investigable Questions (IQ).

Four years	**Five years**
1. Where does saliva come from? (1)	18. How are islands held up? (1)
2. Where did the first parents come from? (2)	19. How do waves form? (2)
3. Why is the planet round and not square? (1)	20. How does a seed form? And a flower? (2)
4. How does food become poop? (2)	21. How does snow form? (2)
5. Why do we have 5 fingers? (2)	22. Does the Earth attract air? (1)
6. Where do flies come from? (1) IQ	23. How were the planets and stars formed? That is, everything. (2)
7. Where does the wind come from? (2)	24. Where did the first plants come from? What about before there were seeds? (2)
8. Why don't the clouds fall? (2)	25. What are the stars made of? (1)
9. How do we grow? (2)	**Six Years**
10. How do birds fly? (2)	26. Why does everything that is born die? (2)
11. Why does the sun shine? (2)	27. Why does it hail sometimes even when it is not cold? (3)
12. Is a voice air? (1) IQ	28. What do we breathe? What do we release when breathing? (1)
13. How do wounds heal? (2)	29. Where does the oxygen in the air come from? (1) IQ
14. How do plants grow, if we don't see them grow? (3) IQ	
15. What is saliva for? (1) IQ	
16. Why does a flower produce a tomato? (2)	
17. Why do ants and butterflies come out during the day, and deer and wild boar at night? 2)	

Questions asked by the pre-service teachers. In parentheses, complexity categories (0: not well grounded; 1: definition; 2: mechanism; 3: hypothesis). Investigable Questions (IQ).

1	Why are bees so important for all plants in general? (1)	51	Why does the Moon exert such a strong force on the tides, if it is smaller than the Earth? (3)
2	How has the environment become like it is today? Environment - human being relationship. (2)	52	How does climate change influence our way of life? (2)
3	Why does the Moon affect the tides? (1)	53	If global warming increases, and more and more animals in the world die ... would other types of animals appear, with mutations occurring, or would humans be left alone? (3)
4	Why is seawater salty? (2)	54	Why do ladybugs have black spots? (2)
5	How do stars get into the sky? (0)	55	Why is there a meteor shower in August, and not at another time of the year? (2)
6	What role do cockroaches play, and why did they survive the meteorite that killed the dinosaurs? (0)	56	How do carnivorous plants digest food? (2)

7	What are clouds made of? (1)	57	Why is seawater salty? (2)
8	Why is the sky blue? (2)	58	Why are weeds rooted out, and why are they weeds? (1)
9	Where are trees "born"? (1)	59	Why do lightning and thunder occur, and sound like they do? (2)
10	What is their growth process? (2) IQ	60	Why does it rain when the clouds are grey and not when they are white? (3)
11	We belong to *Homo Sapiens*; might there be a species superior to ours? (0)	61	Why do waves always reach the beach in a straight line? (2)
12	Why do leaves fall in the autumn? (2)	62	When can the branches of a golden pothos be cut? (1)
13	Why are the stars only seen at night? (2)	63	Do carnivorous plants eat living things to feed themselves, or just to defend themselves? (3)
14	What is the reason for the accelerated increase in global warming in recent years? (2)	64	During a lunar eclipse, why does the moon change colour? (2)
15	During the day, why can we sometimes see the Sun and the Moon in the sky at the same time? (3)	65	Science tells us that the stars are different colours; blue, brown ... If this is true, why do they all look white to us? (3)
16	Why does a rainbow appear on some sunny days with rain, but not on others? (3)	66	Why are there people with eyes of different colours? (2)
17	How can make society aware of the severity of global warming, the habitat changes of some animals, and extreme, lasting temperatures? (2)	67	Would there be any difference on our planet if the continents had never separated? (3)
18	Why do we attract flies so much? (1)	68	Why does the Judas Tree have pink leaves? (0)
19	How does nature affect my mood? (2)	69	Why is it that some stones are round, and others are not? (2)
20	If the function of nipples is to breastfeed babies, why do men have nipples if they are not biologically adapted to do so? (3)	70	How did everything start? (2)
21	If everything that our Universe encompasses, including the stars, is in the air, why doesn't it all fall? (0)	71	What are the circles that we see inside tree trunks, and how do they form? (2)
22	Why are there pines in cemeteries and not another type of tree? (2)	72	Why does the sea's water look blue? (2)
23	Why don't we realise the importance of the environment, and keep throwing garbage in parks and forests, when this now receives so much media attention? (3)	73	Why does the sun shine? (2)
24	If vegetation continues to be deforested or burned, what effect does it have on the land? And, if the consequences of these activities are	74	How can we reduce the use of plastics, and how can we promote in early childhood classrooms? (2)

	negative, what measures should governments take? (2)		
25	Why does the temperature drop at higher altitudes? (2)	75	Why is the existence of parks and gardens in the urban environment so important? (2)
26	Why does the tide come in and out, and vary from one day to the next, in such short time periods? (2)	76	How do bees get oriented? (2)
27	Why can fireflies be seen in the dark? (1)	77	Do night frosts affect the size of plants' leaves? Why? (2) IQ
28	Why is that, as we grow up, we appreciate nature less? (2)	78	Why is snow white? (2)
29	How do plants sometimes grew between street slabs, even when there is no earth or anything? (3) IQ	79	Why do snails have slime? (1)
30	When a bug goes into a log and dries it out, what is the process behind its drying? (2)	80	Why do flowers have different colours? (2)
31	Where do cacti keep water? (1)	81	Why is sea water salty and river water not? (3)
32	Why do silkworms only eat mulberry leaves? (1)	82	Why does the rainbow have colours? (2)
33	Is there a specific surface area of green zones (parks, gardens...) per meter of urbanised property? (1)	83	Why do thunderstorms happen? (2)
34	Do fish sleep? (1)	84	Why do leaves change colour in the autumn? (2)
35	Why do they say that ants are so strong? (1)	85	How do hurricanes happen? (2)
36	Why is the Tinto River reddish? (2)	86	Why are there plants that grow more than others? (which are larger) (2)
37	Who or what created the first star in the universe? (2)	87	Why does the force of gravity exist? (2)
38	Why are birds not electrocuted when they perch on high-voltage cables? (3) IQ	88	Is it true what they say about donkeys being born on full moons? (0)
39	Could something happen that changes the laws of physics, or are they immutable? (3)	89	Why are there exactly four seasons a year? (2)
40	How do ants know where food is? (2)	90	Why do tree roots widen and destroy streets and foundations? (1)
41	How and why do we age? (2)	91	Why is the sky blue? (2)
42	Why does nature influence bird habitats? (2)	92	Where does rainwater come from? (2)
43	Why does the male seahorse carry the eggs? (3)	93	Why does the greenhouse effect occur? (2)
44	How much water is there in the sea? (1)	94	Why does the sea leave traces of foam on the sand? (2)
45	Why is it salty? (2)	95	Why is water transparent? (2)

46	Why do we forget dreams easily? (2)	96	What makes the planets rotate on the same plane? (2)
47	What came first, the hen or the egg? (2)	97	How does the air arise? (2)
48	Why do sunflowers turn "looking" at the sun? (2)	98	What would happen if the poles collapsed? (2)
4.9	How much time is necessary for a beach to form? (1)	99	Why did the Big Bang happen? (2)
50	Why are some animals oviparous and others viviparous instead of being all the same? (3)	100	Why does pollution affect the ozone layer so much? (2)
		101	Why do tree leaves dry? (2)