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## Some Aspects of Teaching Species Diversity in and out of schools in Hungary

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### Abstract

Nowadays young students are among the most significant target groups who need to gain experience from the world that currently exist around them in order to acquire knowledge about the up-to-date environmental and nature conservation matters, especially about the issue of biodiversity as the basis of our existence. But do we teach them what is around them in the science lessons? In many cases, the drastic decline in biodiversity might even result from that young generation does not always have access to sufficient and up-to-date information merely from textbooks. However, experience with the immediate environment and the active involvement of the wildlife provided by the schools would be irreplaceable. This article summarizes the results of a survey, which was filled up by 800 Hungarian science teachers. The results provide insight into their opinion and habits regarding going out to nature while teaching. The analysis extends to several diversity matters such as examining the school garden or trees nearby. The current article was written as part of a research on the effect of light pollution on wildlife, biodiversity in particular and supported by the project EFOP 3.6.2-16-2017-00014.

*Keywords:* teaching biodiversity; school yards; school gardens; natural science; Biology teachers; species diversity

### 1. Introduction

The three most acute components of the unsustainability problem areas these days are climate change, soil degradation and the rapid decline of biological diversity. (Mika & Pajtkókné Tari, 2015) Although the third critical area, the biodiversity loss essentially results from overharvesting, poaching, the destruction and degradation of habitats, or climate change, (Slingenberg et al., 2009; Barnosky et al., 2011) some substantive causes in many instances may lie simply in the quality and content of the education in all types of schools and in higher education (Pénzesné 2017) as it is also decisive how the topic of biodiversity appears in the framework curricula in grades 10, 11, and 12 in secondary schools. (Nagy, 2018) Greater species diversity knowledge might ensure natural sustainability for all (Miteva et al., 2012) and so I was highly inspired to study the actual teaching methods related to this form of diversity In Hungary. Do teachers have a chance to organize learning in the natural environment? Do

they even make use of the possibility that is given? Basic questions like these were asked to draw an outline of the main aspects of raising awareness about the current species diversity teaching methods in Hungarian educational institutions. My hypothesis was that Biology teachers pay little attention to teaching species diversity outside the classroom.

## ***2. The Data and methods of the survey***

The main objective of this questionnaire was to examine the most significant aspects of Biology teaching today in Hungary. The survey was anonymous, and on-line. The link of survey was sent to the participants by the methodological group leader from an official database. Background data were the subjects taught by them, the number of years since they have been taught and the place where the respondents teach. The measurement was made with stratified random sampling, using google form. The questionnaire was short and easy to follow, with 30 questions. The first three and the last questions were open, while the rest were alternative closed-ended ones except for five questions, which were closed questions requiring rating. (Lengyelne, 2014) All relevant questions of the questionnaire are presented in the Results section below. Data were processed by Excel software. (Tóthné, 2013) and my basic hypothesis was that they pay little attention to teaching species diversity outside the classroom.

## ***3. The Results***

In the course of this analysis I got 800 answers in two months between May and June, 2017. A year earlier in 2016 the secondary vocational training in Hungary has drastically changed, which led to school type and name transformations. Hereinafter, I will use the names valid from 2016. The proportion of respondents surveyed by the types of the high school they teach is shown in Table 1.

Table 1. Respondent distribution by high school type, Hungary, 2016

Interviewed Biology teachers	%
Teaching in a secondary grammar school	17
Teaching in a secondary school	15
Teaching in a vocational school	1

It can be clearly seen that, primary school teachers sent the most answers (68%), while secondary schools (15%) and secondary grammar schools (17%) represented the secondary grading institutions in relatively high numbers.

The representative segmented sampling units were primary school (301) and high school Biology teachers (142) teachers respectively, altogether 443 items from the 800 items, 357 interviewees teach other natural science subjects (e.g. Physics or Chemistry) or the school level and type were uncertainly determinable. (Falus et al., 2004)

According to the answers of the two basic segmented categories, primary and secondary, education, the following questions were highlighted in the survey:

### 3.1. Question 3. How long have you been teaching science subjects?

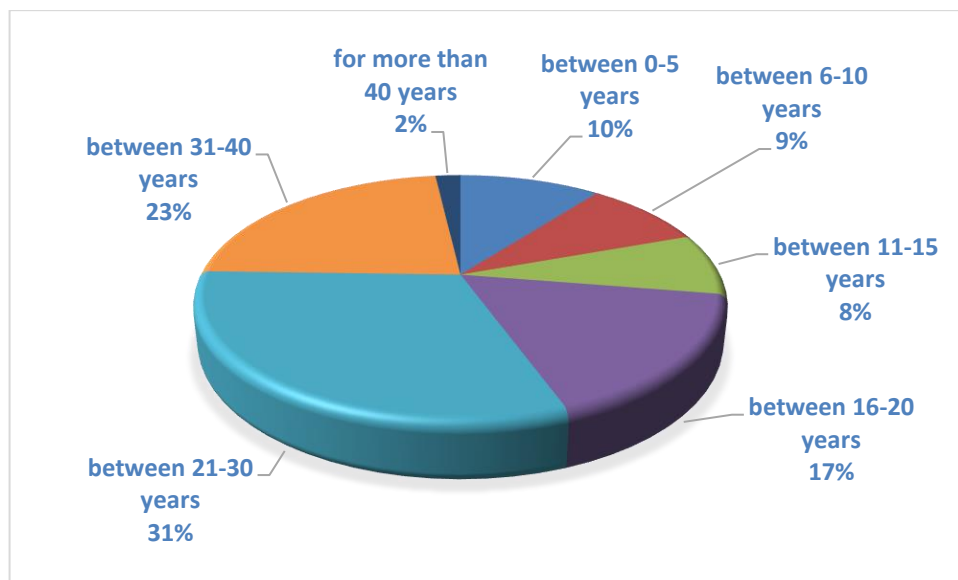


Fig. 1. The teaching experience of respondents. Answers to Question 3. *How long have you been teaching science subjects?* ( $n=443$ )

Figure 1 represents that the participants of the bulk sample are mostly experienced teachers who have been teaching basically for 21-30 years (31%) or 31-40 years (23%) and only some teachers stated that they had been teaching only for a few years.

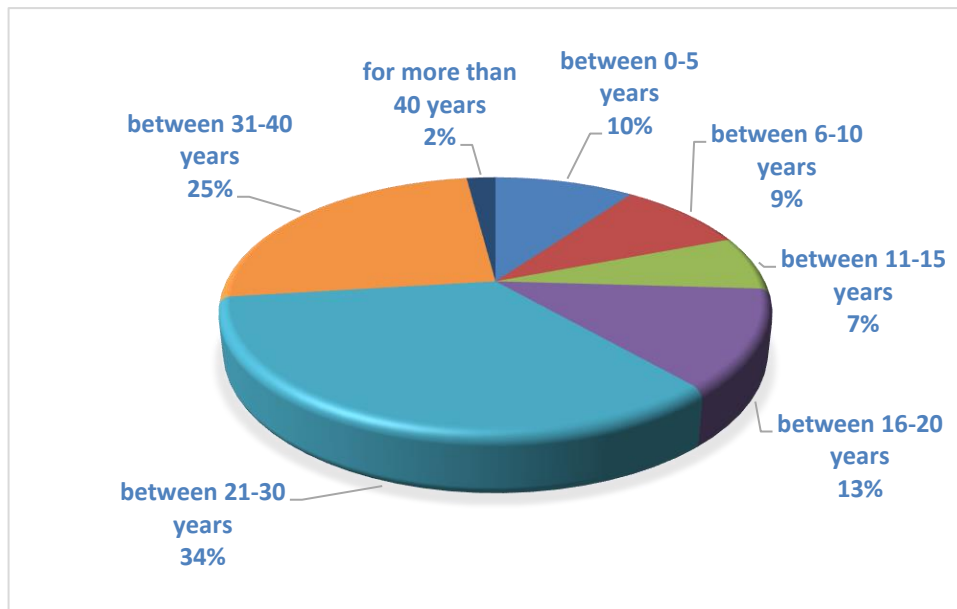


Fig. 2. The teaching experience of the Hungarian primary school teacher respondents. Answers to Question 3. *How long have you been teaching science subjects?* (n=301)

In primary education as Fig. 2. indicates, almost the same can be experienced, namely most teachers between the ages of 31-40 occur.

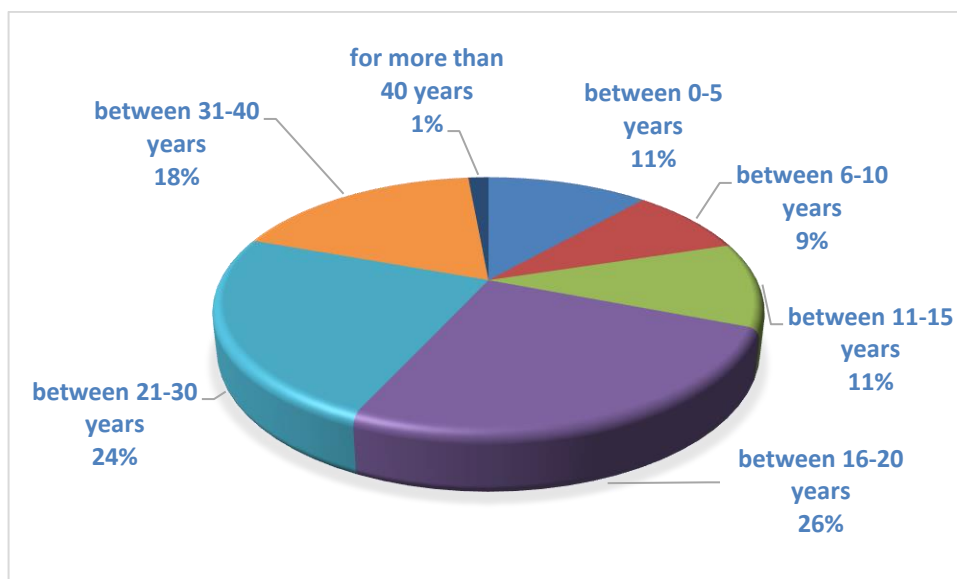


Fig. 3. The teaching experience of the Hungarian secondary school teacher respondents. Answers to Question 3. *How long have you been teaching science subjects?* (n= 142)

As Fig. 3. indicates in secondary education the rate seems a little bit different from primary education. Here the most respondents have less than 20 years of experience and the rate of those who have been teaching more than 40 years is only 1%.

3.2. *Question 4. Does the institution where you teach have a yard? and Question 5. Are there science classes in the yard of the institution?*

Table 2. Teachers' yard use during the science lessons (n=443)

Teachers whose institution has a yard	432
The number of teachers holding science classes in the school yard	241

Table 3. Yard use in primary schools during the science lessons (n=301)

Teachers whose institution has a yard	294
The number of teachers holding science classes in the school yard	181

Table 4. Yard use in secondary schools during the science lessons (n=142)

Teachers whose institution has a yard	138
The number of teachers holding science classes in the school yard	60

In general, 55,8% of the teachers, who have a school yard, do use it for scientific educational purposes, too (Table 2). 61,6% of Hungarian primary school teachers and 43,5% of secondary school teachers hold education activities there. In primary schools the percentage is higher but according to the chi-square test, there is no correlation between whether someone teaches in elementary school or not and whether he or she holds a class in the yard or not. (Chi-square test probability: 0.5676473656, Yates correction probability: 0.8151939962)

3.3. *Question 6. Does the institution where you teach have a garden? and Question 7. Are there science classes in the garden of the institution?*

Table 5. Teachers' garden use during the science lessons (n=443)

Teachers whose institution has a garden	138
The number of teachers holding science classes in the school yard	100

Table 6. Garden use in primary schools during the science lessons (n=301)

Teachers whose institution has a garden	97
The number of teachers holding science classes in the school garden	76

Table 7. Garden use in secondary schools during the science lessons (n=142)

Teachers whose institution has a garden	41
The number of teachers holding science classes in the school garden	24

Here, far fewer teachers stated that there was a garden, but a much higher proportion of the classes were held in the garden. So, where there is a garden, 72.5% of teachers hold science classes there. (Table 5)

3.4. *Question 8. Is there an old tree around the institution where you teach? and Question 9. If there is an old tree around the institution, will it be visited for study purposes as part of science classes?*

Table 8. Nearby-old-tree visiting during the science lessons (n=443)

There is an old tree nearby	284
The nearby old tree is visited for studying	182

Table 9. Nearby-old-tree visiting in primary schools during the science lessons (n=301)

There is an old tree nearby	194
The nearby old tree is visited for studying	140

Table 10. Nearby-old-tree visiting in secondary schools during the science lessons (n=142)

There is an old tree nearby	90
The nearby old tree is visited for studying	42

If there is an old tree around the institution where Hungarian teachers work 64,1% of the entire sample, 72,2% of the primary school participants and 46,7% of the secondary school teachers visit that for studying purposes as part of science classes. Here, as well, activity is highest in primary schools.

3.5. *Question 10. Is there a bird feeder around the institution where you teach? and Question 11. If there is a bird feeder in the vicinity of the institution, is it visited for study purposes as part of science classes?*

Table 11. Nearby bird feeder visiting during the science lessons (n=443)

There is a bird feeder nearby	329
The nearby bird feeder is visited for studying	253

Table 12. Nearby bird feeder visiting in primary schools during the science lessons (n=301)

There is a bird feeder nearby	250
The nearby old tree is visited for studying	212

Table 13. Nearby bird feeder visiting in secondary schools during the science lessons (n=142)

There is an old tree nearby	79
The nearby old tree is visited for studying	41

If there is a bird feeder around the institution where Hungarian teachers work 76,9% of the entire sample, 84,8% of the primary school participants and 51,9% of the secondary school members visit for studying purposes as part of science classes. Here, as well, activity is higher in primary schools.

3.6. *Question 12. Is there a forest close to the institution? and Question 13. If there is a nearby forest, is it visited for studying purposes as part of the science classes?*

Table 14. Nearby forest visiting during the science lessons (n=443)

There is a forest nearby	208
The nearby forest is visited for studying	153

Table 15. Nearby bird feeder visiting in primary schools during the science lessons (n=301)

There is a forest nearby	150
The nearby forest is visited for studying	113

Table 16. Nearby forest visiting in secondary schools during the science lessons (n=142)

There is a forest nearby	58
The nearby forest is visited for studying	40

If there is a forest around the institution where Hungarian Biology teachers work 73,6% of the entire sample, 75,3% of the primary school participants and 69% of the secondary school members visit that for studying purposes as part of science classes. Here, as well, activity is highest in primary schools, but the difference is less.

3.7. *Question 14. Is there a park close to the institution? and Question 15. If there is a nearby park in the vicinity of the institution, is it visited for studying purposes as part of the science classes?*

Table 17. Nearby park visiting during the science lessons (n=443)

There is a park nearby	297
The nearby park is visited for studying	208

Table 18. Nearby park visiting in primary schools during the science lessons (n=301)

There is a park nearby	190
The nearby park is visited for studying	142

Table 19. Nearby park visiting in secondary schools during the science lessons (n=142)

There is a park nearby	107
The nearby park is visited for studying	65

If there is a park around the institution where Hungarian teachers work 70% of the entire sample, 75,3% of the primary school participants, which is the same as forests, and 60,7% of the secondary school members visit for studying purposes as part of science classes. Here, as well, activity is higher in primary schools, but the difference is less.

3.8. Question 16. Do you consider the examples of living matters, used in science education, suitable?

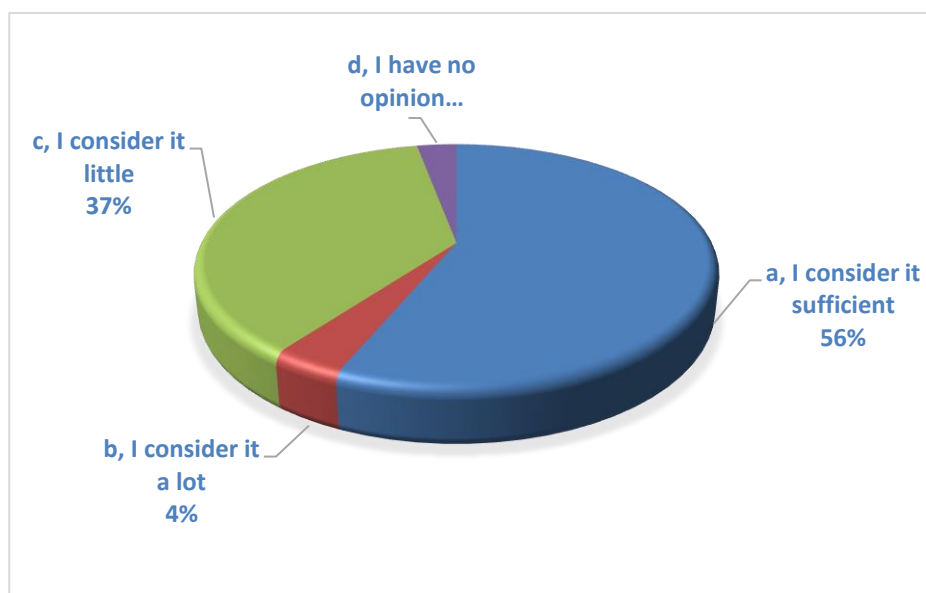


Fig. 4. The teaching experience of the Hungarian primary school teacher respondents. Answers to Question 16. Do you consider the examples of living matters, used in science education, suitable? (n=443)



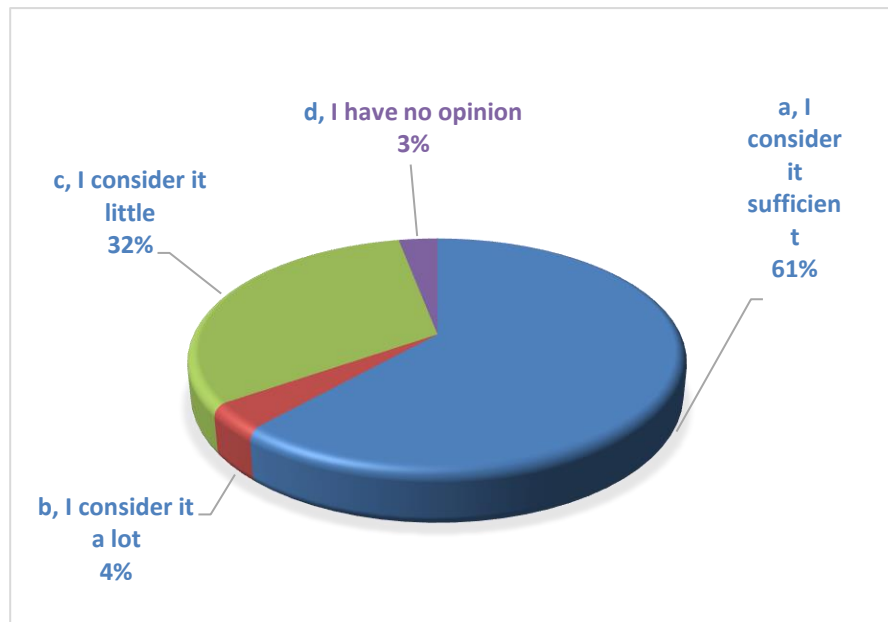


Fig. 5. The teaching experience of the Hungarian primary school teacher respondents. Answers to Question 16. *Do you consider the examples of living matters, used in science education, suitable?* (n=301)

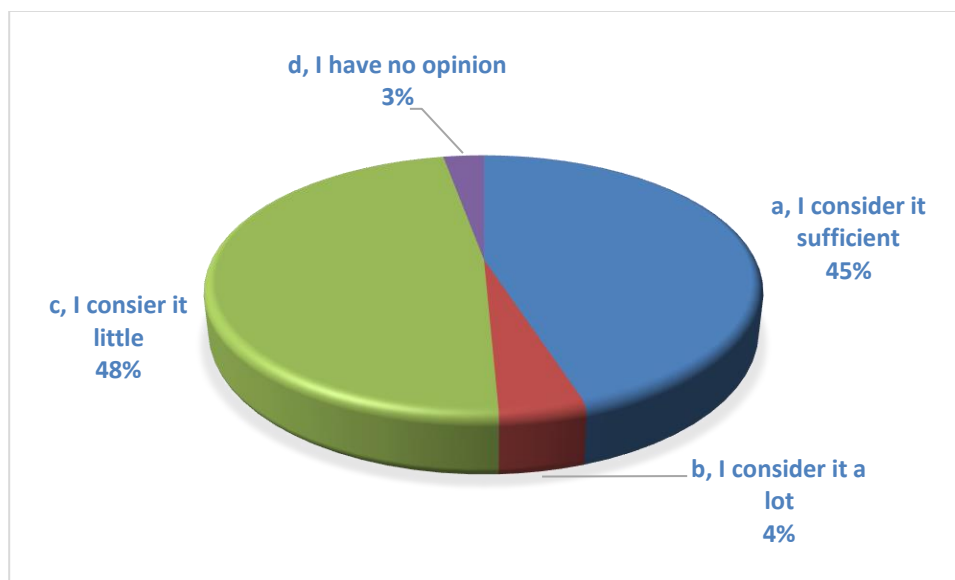


Fig. 6. The teaching experience of the Hungarian primary school teacher respondents. Answers to Question 16. *Do you consider the examples of living matters, used in science education, suitable?* (n=142)

None of the segmented groups consider the examples of living beings, used in science education too much (a lot 4% in both cases), both groups say that the examples are rather little (32% or 48%) or suitable (61% or 45%).

3.9. *Question 23. Do you usually use living matter in the science lessons, or do you illustrate it with photos?*

Table 20. use of living matter or presentation in a photograph (n=443)

Illustrate it with photos	255
Use living material in the science lessons	186

57,8% of the Hungarian teachers demonstrate the material with photos and 42,7% uses living matters.

#### 4. *Conclusion*

“The air we breathe, the water we drink and the food we eat all rely on biodiversity, but right now it is in crisis – because of us. It is not surprising since “the presence of the living organisms determines our inner world and affects the smallest resonances of the surrounding environment.” (Nagy, 2017) Seen like that, experts warn, humanity is currently burning “the library of life”. But how can we stop it? (Carrington, 2018) Maybe sustainability education is the only way to solve this problem or obviously to survive. “Each higher organism is richer in information than a Caravaggio painting, a Bach fugue, or any other great work,” wrote Professor Edward Osborne Wilson, often called the “father of biodiversity”, in a seminal paper in 1985. (Wilson, 1985) But “do we give, or could we give the young generation enough to taste the real life of the actual world, attracting their attention to sustainability?” (Nagy, 2020) Or can we get enough information from our Biology textbooks about the living creatures? May the teachers have a chance to expand students’ knowledge about different species diversity, the biodiversity?

My survey was conducted based on that. The surveyed population was the circle of Hungarian teachers, who were asked about their biodiversity, species diversity teaching methods and possibilities. A relatively wide population provided an opportunity for extensive analysis of the data due to the number of evaluable data in the sample and the reliability of the availability. Based on the data obtained for the sample, the following probability statements can be made:

Bringing pupils outside the classrooms for learning purposes is more popular in Hungarian primary schools than in secondary schools. If Science and Biology teachers they have a chance to go outside with the class, they tend to do it, even if it is a park or a nearby forest.

The same is true for nearby old trees and bird feeders, being the representatives of plant and animal species, they would need more of it because the examined Hungarian teachers added

some comments, too and these comments revealed that more illustration would be required under natural conditions.

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#### About Author

Éva Nagy teach English –, Biology and Independent Study in the Neumann János Secondary Grammar School, Eger. She has BSc diplomas in English and Biology teaching (Eger), MSc in Biology (Eger) and MSc in English Teaching (Debrecen). Now she is a Ph.D. student at a Doctoral School of Education of the Eszterházy Károly University, Eger. Her field of research is the role of species diversity in environmental education and environmental awareness - raising.

## Appendix 1



### A természetben történő oktatás fejlesztése

Kedves Kollégánk!

Az alábbi kérdőív kitöltésével segítse kutató munkánkat a természetben történő oktatás fejlesztése kapcsán.

Kérjük legkésőbb 2017. május 24-ig végezze el a kitöltést. Válaszait anonim módon kezeljük.

Üdvözlettel:

Az Eszterházy Károly Egyetem Neveléstudományi Doktori Iskolájának biodiverzitással, azon belül faji diverzitással foglalkozó kutatócsoportja

#### 1. Hol tanít?

(Kérem adja meg a település nevét és azt, hogy milyen típusú iskolában tanít. pl. általános iskola, középiskola ... stb.)

Saját válasz

#### 2. Milyen tantárgyakat tanít?

Saját válasz

3. Hány éve tanít természettudományos tantárgyat?

Saját válasz \_\_\_\_\_

4. Az intézmény, ahol tanít rendelkezik-e udvarral?

Igen

Nem

5. Tartanak-e természettudományos foglalkozásokat az intézmény udvarán?

Igen

Nem

6. Az intézmény ahol tanít rendelkezik-e kerttel?

Igen

Nem

7. Tartanak-e természettudományos foglalkozásokat az intézmény kertjében?

Igen

Nem

8. Van-e öreg fa az intézmény környékén ahol tanít?

Van

Nincs

9. Ha van öreg fa az intézmény környékén, a természettudományos órák keretein belül felkeresik-e azt tanulmányozás céljából?

Igen

Nem

10. Van-e madáretető az intézmény területén?

Van

Nincs

11. Ha van madáretető az intézmény környékén, a természettudományos órák keretein belül felkeresik-e azt tanulmányozás céljából?

- Igen
- Nem

12. Van-e az intézményhez közeli erdő?

- Van
- Nincs

13. Ha van közeli erdő az intézmény környékén, a természettudományos órák keretein belül felkeresik-e azt tanulmányozás céljából?

- Igen
- Nem

14. Van-e az intézményhez közel park?

- Van
- Nincs

15. Ha van park az intézmény környékén, a természettudományos órák keretein belül felkeresik-e azt tanulmányozás céljából?

- Igen
- Nem

16. Elégségesnek tartja-e az élőlény példákat, amiket a természettudományos oktatás során használunk?

- a) elégségesnek tartom
- b) soknak tartom
- c) kevésnek tartom
- d) nincs véleményem



17. Rangsorolja, hogy mely állatokat tanítja szívesen az alábbiak közül?

(1. érték: legszívesebben tanítja, 5. érték: legkevésbé tanítja szívesen)

	1.	2.	3.	4.	5.
egzotikus nagy ragadozókat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
erdei ragadozókat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
távoli tájak növényevő állatait	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
házánk növényevő állatait	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
házánk vizeinek állatait	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Rangsorolja, mely növényeket tanítja szívesen az alábbiak közül?

(1. érték: legszívesebben tanítja, 5. érték: legkevésbé tanítja szívesen)

	1.	2.	3.	4.	5.
trópusi esőerdők növényei	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tajga-tundra növényei	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
mediterrán tájak növényei	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
mérsékelt öv növénye	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
házánk növényei	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Milyen gyakran használja a biológia tanítása során mezőgazdaságban termesztett növények példáját?

- a) félévente egyszer
- b) félévente ötször
- c) minden esetben ha példát kell mondani rá
- d) egyszer sem

20. Milyen gyakran használja a biológia tanítása során a tenyésztett állatok példáját?

- a) félévente egyszer
- b) félévente ötször
- c) minden esetben ha példát kell mondani rá
- d) egyszer sem

21. Ha tanulmányi kirándulást szervezne fajok bemutatására, mi jutna eszébe a következő lehetőségek közül? Kérem rangsorolja!

(1. érték: leginkább, 7. érték: legkevésbé)

	1.	2.	3.	4.	5.	6.	7.
erdei séta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
múzeumi állatgyűjtemény	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
állatfarm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tanya	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
udvarház	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
vadaspark	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
állatkert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Szakmailag hogyan tartja hatékonyabbnak az állandó megfigyelést?

- a) egész évben egy konkrét helyen
- b) minden alkalommal máshol

23. Szokott-e élő anyagot használni a természettudományos órákon vagy inkább fotókon illusztrálja?

- a) Élő anyagot használók.
- b) Fotókon mutatom be.

24. Szokott-e a tanulóktól a tananyaghoz kapcsolódó, általuk gyűjtött saját mintákat kérni?

- a) Igen.
- b) Nem.

25. Szokott-e tanulók által készített gyűjteményeket kérni a természettudományos órákra?

- a) Igen.
- b) Nem.

26. A bekért tanulói gyűjteményeket önállóan szokta kiértékelni?

a) Igen.

b) Nem.

27. A bekért tanulói gyűjteményeket a tanulókkal szokta közösen kiértékelni?

a) Igen.

b) Nem.

28. A bekért tanulói gyűjteményeket a tanulók véleménye alapján szokta értékelni?

a) Igen.

b) Nem.

29. Szokta-e érdemjeggyel értékelni a tanulói gyűjteményeket?

a) Igen.

b) Nem.

30. A gyűjtemények értékelésekor rá szokott-e kérdezni, hogy honnan származnak a gyűjtemény elemei?

a) Igen.

b) Nem.

A kérdőívvel kapcsolatos észrevételeit ebben a pontban tudja jelezni. Köszönjük, hogy részt vett a kitöltésben.

Saját válasz \_\_\_\_\_

**Küldés**