



## RESEARCH

## Student knowledge about the use of animals in scientific research

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### Abstract

Although the media has currently presented information on Bioethics, it is still poorly explored in school environments. Based on this, we decided to check the knowledge and ideas of students from two schools in the City of Rio de Janeiro. A questionnaire was applied and the students could comment on the theme “use of animals in scientific research”. After analyzing the data, we verified that the students’ knowledge is fragmented and that little of this knowledge seems to have been constructed in the school. However, the students showed interest in the subject, although some of them had no clear opinion about it. Our results show that the teacher who is aware of his role becomes an instrument for the formation of critical citizens, and that the reflection of the students about Bioethics is still not encouraged enough, which can negatively influence decision-making in society.

**Keywords:** Education primary and secondary. Bioethical issues. Animal experimentation.

### Resumo

#### Percepção de estudantes sobre pesquisas científicas com animais

Embora informações relativas à bioética sejam frequentemente veiculadas na mídia, são ainda pouco exploradas no ambiente escolar. Partindo dessa premissa, procurou-se verificar conhecimentos e ideias de grupo de educandos de duas escolas do Rio de Janeiro por meio de questionário em que puderam se posicionar sobre a temática “uso de animais em pesquisas”. Após análise dos dados, verificou-se que o conhecimento dos alunos é fragmentado e que pouco parece ter sido construído em ambiente escolar. Contudo, os alunos demonstraram interesse, ainda que parte deles não tivesse opinião formada sobre o tema. Os resultados mostram que o docente consciente de seu papel se torna instrumento para a formação de cidadãos críticos, e que a reflexão dos alunos sobre a bioética é ainda pouco estimulada, o que pode influenciar negativamente as tomadas de decisão em sociedade.

**Palavras-chave:** Ensino fundamental e médio. Temas bioéticos. Experimentação animal.

### Resumen

#### Percepción de estudiantes sobre las investigaciones científicas con animales

Aunque las informaciones relativas a la bioética aparecen con frecuencia en los medios de comunicación, son aún poco exploradas en el entorno escolar. Partiendo de esta premissa, se trató de verificar el conocimiento y las ideas de un grupo de estudiantes de dos escuelas de Río de Janeiro, por medio de un cuestionario en el que pudieron posicionarse sobre el tema “uso de animales en la investigación científica”. Luego del análisis de datos, se pudo constatar que el conocimiento de los estudiantes es fragmentado y que poco parece haber sido construido en el entorno escolar. Sin embargo, los estudiantes han mostrado interés, aunque parte de ellos no tuviese una opinión formada sobre el tema. Los resultados muestran que el docente consciente de su papel se convierte en un instrumento para la formación de ciudadanos críticos, y que la reflexión de los estudiantes sobre la bioética es todavía poco estimulada, lo que puede influir negativamente en la toma de decisiones en la sociedad.

**Palabras clave:** Educación primaria y secundaria. Discusiones bioéticas. Experimentación animal.

Declararam não haver conflito de interesse.

There are several definitions for the term “ethics”, often confused with “moral”. The latter refers to the values, principles and customs of a particular people, accepted as correct or good. Ethics, in turn, deals with the study of these behaviors, the vision of right or wrong stipulated by existing social systems, but does not consider moral concepts. For this reason it is defined as the “science of morality”<sup>1</sup>. Bioethics is the branch of ethics that studies issues pertaining to human life and health<sup>2</sup>.

The emergence of bioethics as a field of research and teaching is recent. In recent decades, with biotechnological innovations - which have contributed significantly to the life sciences - the need to reflect on scientific research and institutional practices involving life from the perspective of ethics has arisen. In other words, new moral dilemmas arising from the production and application of knowledge about human life motivated social movements and theoretical debates that contributed decisively to consolidate bioethics. Feelings of hope and fear regarding research with embryos, animals and medicines provide spaces for reflection on the information disclosed and its implications.

The first reports of animal use in scientific experiments date back to Ancient Rome<sup>3</sup>, but the practice only became more intensive in the 19<sup>th</sup> century<sup>4</sup>. With the expansion of knowledge from animal experiments, questions about the stance of the human beings concerning its use also grew in numbers. This line of reasoning contributed to the emergence of the term “bioethics,” which, according to Potter<sup>5</sup>, would be a bridge of sorts between science and the humanities. Reich<sup>6</sup>, for example, treats the subject as one of the areas of knowledge that requires multidisciplinary reflection on the limits of human performance in relation to nonhuman animals. Singer<sup>7,8</sup>, in turn, creates polemic about the subject by questioning the pain and suffering of animals in scientific research.

The growth of bioethics has accompanied the increased speed of information exchange between scientists and between academia and society. Despite the many works that focus on the subject, to this day there are many divergences regarding the use of animals in scientific research. Another point that fueled the debate was the insertion of bioethics as a discipline in many undergraduate courses and the formation of committees in several research institutions.

In the face of many discussions about animal experiments, several countries felt pressured to

regulate research on animal ethics. In most cases, it was not a question of banning scientific research on animals, but of regulating their use. Thus, in 1978 the *Universal Declaration of the Rights of Animals* was proclaimed by the United Nations Educational, Scientific and Cultural Organization (UNESCO), one of the most important steps in the recognition of the importance of living beings, aiming at an ever more ethical human behavior<sup>9</sup>.

In Brazil, the rules of animal experimentation follow international precepts. Law 6,638/1979, called the “Law of Vivisection”<sup>10</sup>, established norms for the didactic-scientific practice of animal vivisection and gave other related provisions. This law was revoked by Law 11,794/2008<sup>11</sup>, which regulates subsection VII of paragraph 1 of article 255 of Federal Constitution<sup>12</sup> and establishes procedures for the scientific use of animals. According to this law, any institution legally established in the national territory that creates or uses animals for teaching and research should require accreditation to carry out these activities and formalize the establishment of an Ethics Committee.

Complementing Law 11.794/2008, which met the expectations of the scientific community, Decree 6,899/2009<sup>13</sup> was promulgated<sup>13</sup>, regulating the creation and use of animals in teaching or scientific research activities in the country. In its article 41, the decree creates the Register of Institutions for the Scientific Use of Animals, a database that brings together institutions and researchers conducting studies involving animal experimentation, as well as experimental and pedagogical protocols. It is to this system that institutions that create or use animals for teaching and research must submit applications for accreditation.

In the state of Rio de Janeiro, Law 3,900/2002<sup>14</sup> establishes the State Code for the Protection of Animals. In the capital of that state, Decree 19,432/2001<sup>15</sup>, based on article 32 of Federal Law 9,605/1998<sup>16</sup>, prohibits vivisection and experimental surgical practices in municipal establishments when there is alternative technology for experimentation. At the time, this decree raised several debates between the scientific community and the local society, which was publicly called upon to reflect on the subject for the first time, since many authors consider that the decree equates the practice of scientific experiments to acts of abuse and bad when there is alternative technology.

In 2005, UNESCO published the *Universal Declaration on Bioethics and Human Rights*, article 23 of which deals with education, training and

information on bioethics, highlighting: In order to promote the principles set out in this Declaration and to achieve a better understanding of the ethical implications of scientific and technological developments, in particular for young people, States should endeavour to foster education and training in bioethics at all levels as well as to encourage information and knowledge dissemination programmes about bioethics<sup>17</sup>.

The Brazilian National Curriculum Parameters (“Parâmetros Curriculares Nacionais” - PCN)<sup>18</sup>, as well as the Education Guidelines and Bases Act (Lei de Diretrizes e Bases da Educação)<sup>19</sup>, understand that the individual in training must be prepared to become a critical and ethical citizen. But for citizens to have a critical view, it is necessary that they know the subject they want to analyze. Most Brazilian high school textbooks do not contain a chapter devoted to bioethics. The theme is usually treated in complementary texts or as part of other content, leaving at the teacher’s discretion to deepen the debate, which, according to the work of Silva<sup>20</sup>, does not always happen.

Considering that bioethics emerges as a discipline that challenges pedagogy, due to its multidisciplinary trait, it would be expected that a great deal of recent work would have been dedicated to the subject. However, according to the review by Razera and Nardi<sup>21</sup>, research in science education in Brazil until 2006 did not include the theme of “ethics and the construction of values”. Among the papers that analyze education in bioethics in primary and secondary education in Brazil, the most important are Messias, Anjos and Rosito<sup>22</sup>, Pereira e Sánchez<sup>23</sup> and Marques and Moraes Filho<sup>24</sup>, who focused specifically on issues related to bioethics in secondary education.

The study by Silva and Krasilchik<sup>25</sup> investigates subjects considered relevant by science and biology graduates to elicit ethical discussions and reports their main difficulties in dealing with these topics in the classroom. The published works that have been proposed to investigate the knowledge of students about bioethics refer mainly to students of higher education and teacher training for sciences and biology<sup>20,26,27</sup>.

Based on the observation of the importance of presenting and discussing the theme “bioethics” in basic education as part of a process focused on the development of values for the exercise of citizenship, this work aims to analyze the knowledge of a group of high school students from public and private schools of the municipality

of Rio de Janeiro on some concepts of bioethics, highlighting the students’ positioning on animal research and its applications.

## Methods

This is a cross-cut study, performed through a questionnaire answered anonymously. The questionnaire (annex) was structured with ten objective questions (depending on the answer provided, some requested complement) and a discursive question (optional). The study was carried out in two high schools, being one public and one private, both located in the Colégio neighborhood, in the city of Rio de Janeiro/RJ, Brazil.

The questionnaire was applied in May 2010 in the private school, in three classes, one in each of the first, second and third years. In October of the same year the questionnaire was used in the public school, in two classes of the first year, two classes of the second year and a class of the third year, totaling five classes. With the consent of the school administration, the questionnaire was applied in the school environment. Before this phase, the questions were presented to the classes with a brief explanation of the research objectives. Following the agreement we had made, the participants remained anonymous. After completing the questionnaire in all classes, there was an informal conversation, in which the students had the opportunity to present their opinions on the topic and on the research that was being performed.

## Results

The study had 148 participants, half of these being of each sex, distributed according to Table 1. Of the total participants, 14% were between 14 and 15 years old, 48% were between 16 and 17 years old and 38% were 18 years or older.

**Table 1.** Sample of students in the private and the public schools included in the study, by High School year.

Year	Private School	Public School	Total
1 <sup>st</sup> year	28	23	51
2 <sup>nd</sup> year	26	26	52
3 <sup>rd</sup> year	19	26	45
Total	73	75	148

Most of the students surveyed (86%) said they had heard or read about the use of animals in scientific research (Table 2). In the public school there were more students who answered that they were not aware of these studies (23%), almost five times more than in the private one (5%). The remaining students indicated the means by which they obtained the information, which in general was in the following descending order of citations: television, internet, school, and newspapers and magazines.

**Table 2.** Sources of information about scientific research with animals

	Private School (n=73)	Public school (n=75)	Total (n=148)
<b>Have you heard or read about research with animals?</b>			
Yes	95%	77%	86%
No	5%	23%	14%
<b>Where?</b>			
School	19%	19%	18%
Internet	29%	17%	22%
Newspapers and magazines	21%	14%	17%
TV	31%	50%	43%
Other sources	0%	0%	0%

When asked about the introduction of “animal research” in the classroom, 35% of the respondents answered that the subject had not been addressed in any way, and 65% said it had. On the other hand, when asked if any activity on the subject was ever held in the school (debates, seminars and lectures), 22% of private school students and 48% of public school students confirmed the information. Those who answered that they had contact with the subject in the classroom (65%) report that the activities happened in the second half of elementary school and in the early years of high school, in science and biology classes.

Asked about which animals are used in scientific research, most of the students reported rats (31%). There was no substantial difference between the students’ responses from the public network and the private network. When asked about the pain and suffering of animals and their welfare, most of the students answered that they did not know about the treatment of animals in the surveys (in the public school, 87% versus 74% in the private school). The scientist who carried out animal research was considered “cold” by 38% of the students, “careful” by 24%, “inhuman” in 19%

of responses and “humane” in 15% (the remaining 4% did not want to comment). In this question, the difference between the schools was that 46% of students in the private network considered the scientist cold, compared to 31% in the public network, which also considered him inhuman (21%), compared to 16% of the private network.

As for the issue of whether animals suffer or feel pain, 58% of respondents said they believe animals suffer, even though most have previously responded that they did not have knowledge about how animals are treated. Regarding the importance of animal research, it is verified that 39% of the students agree to the use of the animals in scientific research, very close to the number of students who are against it (37%). In addition, it should be noted that 48% of students in the private network responded that they disagree to this use in research. Another fact worth mentioning is the fact that 24% of the total number of students state that they have no opinion on the subject.

Regarding the benefit provided by animal research on humans, the majority (52%) stated that they did not know. The students who said they knew about these positive aspects were further asked what these would be, being indicated in greater number “production of new vaccines and medicines” (n = 24) and “cure for diseases” (n = 18). Most of the students (91%) did not know any law that protects animals used in scientific research, and cited mainly biology (69%) and chemistry (24%) as the research areas that most perform these experiments.

Finally, space was provided so that students could write their considerations about the use of animals in scientific research if they so wished. Only 35% of the students (n = 51) answered, being 43% of the students in the public school and 27% in the private school. The various responses obtained involved the following types of comments:

*“Animal research is very good for humans and the search for cure of diseases” (n = 17);*

*“I am against animal research, because they promote pain and suffering to animals” (n = 15);*

*“Animal research is important for scientific progress” (n = 9);*

*“Research should be done with humans, not with animals” (n = 5);*

*“It is better to test on animals than on humans” (n = 5).*

## Discussion

The results of this study show that the students involved have prior knowledge of the subject matter, although fragmented. The individualized analysis of the schools allows verifying more previous knowledge among the students from the private network. Most of the information comes from the media, especially from television and the internet. The school, as a source of information on bioethics, did not overcome any of these options.

The potential of the media, especially television and, more recently, of social networks, is notorious for transmitting information. By addressing topics related to bioethics, it can lead the population to get to know the subject better, playing the role of informing and educating the citizen. However, it is imperative that this placement be done consciously and critically, since the influence of the media in society is not exclusively positive, there is a sensationalist side.

The significant number of respondents who pointed out “rats” (31%) as the type of animal used in research is not surprising because, since their younger years, students have seen scientific research associated with laboratory mice in movies, drawings and even comic books. Information on ongoing research in which rodents are cited several times in the animal test phase also reaches the population.

In second place were the monkeys (12%), followed by the sheep (10%). About the latter group, it is worth noting that in 1996 Dolly, the first sheep cloned from adult cells, was born, which provoked intense discussions and made this experiment known worldwide. Rabbits were also pointed out in 10% of the answers - some students had information that the cosmetics industry uses rabbits for testing products. The remaining students pointed out other types of animals.

It can be said that 80% of the experimental animals are rodents, and that another 10% are fish, amphibians, reptiles and birds. A third group comprises rabbits, goats, pigs and, to a lesser extent, dogs, cats and some species of monkeys<sup>28</sup>. Currently, between 75 and 100 million vertebrates are used per year in scientific research<sup>29</sup>. Despite major scientific advances, the quantity of animals slaughtered is still much criticized, although many criticisms stem from ignorance about the process of knowledge production.

Despite criticism, in the 2013 revision of the *Helsinki Declaration*<sup>30</sup> the World Medical Association

ratified the use of animals in biomedical research, considering it indispensable for the progress of medicine, subject to the rules of good treatment and well-being of living things used<sup>29,30</sup>.

Most of the students (80%) answered that they did not know about the treatment of the animals in these surveys; the students in the public network had a higher percentage of negative responses (87%) compared to those in the private network (74%). The result was absolutely consistent with reality, since the population does not yet have information about the subject, having little or no access to this type of knowledge.

Institutions such as the network of Research Ethics Committees establish rules for the use of animals in trials. An example is the Brazilian College of Animal Experimentation (“Colégio Brasileiro de Experimentação Animal”) which, in collaboration with the Association for the Assessment and Accreditation of Laboratory Animal Care, has published the “Handbook on Care and Uses of Laboratory Animals” (“Manual sobre cuidados e usos de animais de laboratório”)<sup>31</sup>. However, these institutions restrict disclosure to the scientific environment and do not make these standards and parameters widely available to society as a whole.

Most respondents (57%) considered scientists as cold and inhuman for using animals in research, and only 39% considered them to be careful and humane. Until recently, the scientist was seen as the benefactor of mankind. However, today he is often pointed out as a cold and calculating professional, without feelings. This perspective may be misleading, since it is hard to imagine that a scientist who conscientiously conducts his work would have any “pleasure” in mistreating animals.

This corroborates the position that it is necessary for scientists, through their representative institutions, such as scientific associations and academies of sciences, to promote awareness-raising campaigns to disseminate science and its methods<sup>28</sup>. It is equally relevant to propose debates on research that indicates the waste of animals and movements to reduce their use in research<sup>28</sup>, in order to maintain the support of public opinion for this activity essential to progress and that, as such, should be recognized by society.

Whether to agree or not with performing these surveys, in the general context, 39% of participants were in favor of them and 37% were against. These numbers allow us to observe that there is equivalence in the results, probably due

to indecision or lack of opinion due to the highly fragmented knowledge.

Animal experimentation has followed two basic strands: to expand knowledge about animals, in order to apply this knowledge to their own health and well-being; and more frequently when using animals as models for the subsequent application of the knowledge generated in favor of the human species, especially in the area of health<sup>31</sup>. When asked about the benefits brought to mankind by scientific research, 52% answered that they did not know them, and 48% said they had knowledge on the subject. Students from both schools mentioned curing diseases and producing vaccines and medicines as benefits, in that order. It is possible to consider that all responses are related to the use of animals in the biomedical and pharmaceutical area (cure and prevention of diseases).

In one of the questions, 91% of the students claimed to be ignorant of any law that defends animals. Many Brazilian laws are not known by society for two reasons: the disinterest of the population itself - a pattern sometimes formed from an early age, which leads the individual to believe that the laws are an issue that is not his or her responsibility - and lack of publicity and encouragement to know them and demand that they be fulfilled. Animal protection laws are disseminated to the scientific community, but are still poorly disseminated to society. This is aggravated by the alarmism of some groups, who often publish misleading or inaccurate information in social networks in an irresponsible way.

Regarding the areas associated with animal research, the most significant responses were biology (69%) and chemistry (24%). As the subject is related to animals, the association with biology is almost inevitable, as it is an area in which students study subjects related to nature; yet, the mention of chemistry was surprising, and may be related to the research of the pharmaceutical industry. As the last question was open and optional, most students preferred not to give an opinion (65%). By analyzing schools individually, students in the public network gave more opinions (43%) than those in the private network (27%). Overall, we observed sensitization with animal welfare in the responses.

The notion of animal welfare emerged prior to the discussion of animal rights, and is understood as the defense of the use of animals in a humane way to avoid unnecessary pain, suffering and cruelty<sup>27</sup>. This

awareness is fundamental because it demonstrates that students care somehow with the abusive use of animals in research. In this issue the students also stressed the importance of animal research in favor of human beings, mainly in the area of health, probably as a result of the dissemination of the subject in the media.

The importance of anticipating the teaching of bioethics to basic education, especially in high school, is currently being discussed. On the other hand, it can be noted that science education at this level has not produced satisfactory results in terms of preparing learners for decision-making. It is in this context that the importance of investing in the initial training of science and biology teachers is placed<sup>25</sup>.

In general, teachers of basic education in all areas cited by the National Curriculum Parameters (PCN) need to have minimal knowledge on the subject. At one point, the PCN mention that interdisciplinarity and contextualization were proposed as pedagogical structuring principles of the curriculum to meet what the law establishes regarding the competences of intellectual autonomy and critical thinking, understanding of the scientific and technological foundations of the productive processes and association between theory and practice. In the present study the difference was not significant between the two schools, since in general the answers were equivalent.

In the PCN, the areas of knowledge are divided into three. One of them is Natural Sciences, Mathematics and their Technologies, in which learning implies understanding and using scientific knowledge to explain the functioning of the world, as well as to plan, execute, evaluate and intervene in reality.

The teacher, as an instrument of this learning, can work as the PCN suggest. What is perceived is that their lack of a reflexive attitude towards scientific knowledge can be a consequence of the method learned during their training, focused mainly on the transmission of content<sup>27</sup>. Another point that deserves attention is its distancing from events in the scientific community and in relation to bioethics, despite the growing channels of communication and dissemination that have been emerging in recent years.

For Canivez<sup>32</sup>, bioethics, with its interdisciplinary character, can become a rich methodological instrument in the teaching of scientific disciplines, since it interconnects with

several other knowledge. As cultural changes involve a long period of learning, we agree that the debate on animal experimentation should be introduced in science education in its first levels of education<sup>33</sup>.

The two schools analyzed in our study have didactic material from all disciplines, including biology, which can and should be used as support by the teacher, thus creating an opportunity to discuss the subject of animal science research in high school.

Despite the potential of the textbook, the work of Jácome, Carneiro and Louzada-Silva<sup>34</sup> show that there are few references to bioethics, research ethics and legislation in the biology books of the National Program of Didactic Book for High School (“Programa Nacional do Livro Didático para o Ensino Médio”, PNLEM) 2012. This had already been noticed in the analysis by Conceição<sup>35</sup> on the textbooks of the 2009 PNLEM

In other words, it is desirable that in the long term the reflections of the field of bioethics be inserted in the works and that, until this happens, teachers increase the efforts to create spaces of discussion on the subject. This is because *the textbooks are still too primitive for the transmission of the more specific contents and technical character of Biology (...) [and] the reflections about bioethics are infrequent when compared to other contents*<sup>36</sup>.

### Final considerations

The science-society binomial brings important implications for the teaching of science. With education focused on active citizenship, which stimulates argumentation, it provides conditions for students to have what Canivez called *a taste and habit for discussion*<sup>37</sup>. This discussion, in turn, helps the understanding and awareness of historical, political and socioeconomic aspects of controversial issues. It also stimulates critical vision and can promote creative solutions to the problems currently faced by society.

The regulation of the use of animals in scientific experiments is still the subject of much debate, since it refers to the anthropocentric construction of the world, to the way humans use the animals and the social bases on which these ways are built. Discussing the theme is one of the possibilities available to high school teachers to facilitate bioethical reflection. From then on, social practices can also be contextualized and challenged not only

from the point of view of the human species, but also on a more comprehensive level, referring to life and sustainability on the planet<sup>38</sup>.

The present study, carried out with high school students, shows that the theme “scientific research with animals” has been gaining space and interest among youngsters, although most of them have shown fragmentation of the knowledge related to the subject. Conflicts in the responses were evident, but those related to animal welfare and the comments in the last question showed sensitivity with respect to ethics. Raymundo and Goldim<sup>39</sup> affirm that respect for life dignifies the animal as worthy of ethical considerations, and tolerance brings the possibility of maintaining the experiments, provided they are adequately justified and planned with minimal impact on the lives of the participating animals.

Thinking about the role of the teacher in the construction of the students’ knowledge makes us reflect on the practice of the teacher profession. In the conception of Giordan and Vecchi<sup>40</sup>, the school can no longer limit itself to the transmission of a program of encyclopedic knowledge, temporarily retained by students. It must, first of all, organize and manage the continuous flow of knowledge so that they can be mobilized in solving problems and understanding situations that are part of the current reality. What is being discussed is not the inclusion of bioethics as just another curricular component, but rather that the importance of its teaching as a field of knowledge that complements the education of the student be postulated<sup>22</sup>.

The two schools analyzed did not show significant differences in the results of the questions. The lack of knowledge on the subject is not the sole fault of the educational system, be it public or private, as it also depends on the training of teachers and the type of students who attend and that the schools intend to prepare, among other factors. It is essential to emphasize, however, that developing countries such as Brazil need to invest much more in this type of educational proposal, since, in order to transform a student into a citizen, *the school must act for the construction of an ethical conscience that surpasses national borders*<sup>41</sup>.

Bringing this knowledge to society is vital not only for the development of related scientific areas but also for society itself. Faced with these challenges, the act of exercising critical thinking may be the starting point for society to value the role of the educator.

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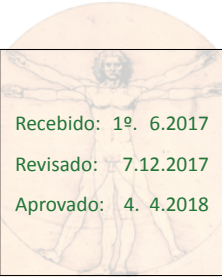
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#### Participation of the authors

Both authors participated from the conception of the study to the production of the manuscript.



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## Anexo

### Questionnaire

Perception and knowledge about the use of animals in scientific research of high school students in Rio de Janeiro / RJ

Age: \_\_\_\_\_ Sex: ( ) M ( ) F

Class: \_\_\_\_\_

**1) Have you heard or read about research with animals??**

( ) No ( ) Yes

Where? ( ) School ( ) Newspapers and Magazines ( ) TV ( ) Internet ( ) Other sources \_\_\_\_\_

**2) Has there ever been a debate, lecture or seminar in your classroom on the subject "animal research"?**

( ) No ( ) Yes

In which years? \_\_\_\_\_

In which subjects? \_\_\_\_\_

**3) You would be able to name what animals are used in scientific research?**

( ) Rats ( ) Dogs ( ) Cats ( ) Hens ( ) Rabbits ( ) Bats ( ) Mosquitoes ( ) Horses ( ) Pigs ( ) Sheep

( ) Monkeys ( ) Goats ( ) Others: \_\_\_\_\_

**4) Do you have knowledge about how animals are treated in research?**

( ) No ( ) Yes

**5) How would you rate the scientist who uses animals in his research?**

( ) Cold ( ) Humane ( ) Inhumane ( ) Careful ( ) Other \_\_\_\_\_

**6) Do you think that all animals used in scientific research suffer or feel pain?**

( ) Yes ( ) No

**7) Do you agree to the use of animals in scientific research? Do you agree to the use of animals in scientific research?**

( ) Yes ( ) No ( ) I do not have an opinion on the subject

**8) Do you know of any advantage provided to man by scientific research?**

( ) Yes. What? \_\_\_\_\_

( ) No

**9) Are you aware of any laws that protect animals used in scientific research?**

( ) Yes ( ) No

**10) Can you tell which research areas use animals for experimentation?**

( ) Math ( ) Physics ( ) Chemistry ( ) Biology ( ) Geography ( ) History

( ) Other: \_\_\_\_\_

**11) If you wish, leave your opinion here about the use of animals in scientific research.**

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