

# LESSON 1:

## Introduction to Animal Research

### INTRODUCTION

*Lesson One* is made up of two activities. In the first activity, students begin a unit-long written conversation (Chalk Talk) in which they explore and share their thoughts and ideas about animal research by silently responding to statements, pictures, and questions posted on the classroom walls. The posters remain on the classroom walls throughout the unit and are revisited by students in Lessons 1, 3, and 5 of the unit. This provides teachers with a formative assessment of students' understandings about animal research and humans' uses of animals.

In the second activity, students explore a number of human activities which result in animal deaths: raising animals for food, hunting, abandoning animals in shelters (which results in euthanasia), using animals in scientific research, driving on U.S. roads and highways. Students predict the number of animals impacted by each activity and then compare their predictions to actual numbers. In addition, students take a closer look at animals used only for scientific research and make predictions about what types and how many animals are used for this purpose. Lastly, students consider any possible benefits and supervision for each category.

### KEY CONCEPTS

- It is important that students' perceptions about the use of animals in research be aired in a respectful manner.
- Human activities impact the lives of animals in many ways.
- The number of animals euthanized in the course of scientific research each year is a very small fraction of the number of animals killed each year by humans for various other reasons.
- The ways in which lives of animals are impacted by humans vary in their level of benefit to humans, and are subject to various types and levels of supervision and regulation.

### LEARNING OBJECTIVES

#### **Students will know:**

- The number of animals used in research in comparison with other uses.

#### **Students will be able to:**

- Discuss the relationship between humans and other animals across a spectrum.
- Address their preconceptions about the use of animals in biomedical research.
- Consider the differing amounts of benefits and regulations pertaining to the many ways humans use animals.

### CLASS TIME

One to two class periods of 50 minutes each and one night homework time.

### COMMON MISCONCEPTIONS ABOUT ANIMAL RESEARCH

- Dogs, cats, and monkeys are the most commonly used animals.
- Research animals are often kept in a state of suffering and pain.

Vocabulary words used in each lesson are in **bold**. Definitions can be found at the end of each lesson and in a Master Glossary found in the Appendix.

## MATERIALS

Materials	Quantity
<b>Activity One: Silent Chalk Talk</b>	
Teacher Resource 1.1— <i>Silent Chalk Talk Posters</i>	1
Teacher Resource 1.2— <i>Silent Chalk Talk Rules of Participation</i>	1
Large pieces of butcher paper or easel pad paper	6
<b>Activity Two: Animal Use Activity</b>	
Scissors	1 per student
Glue sticks, rubber cement, or tape	1 per student
Student Handout 1.1— <i>Predicting the Numbers: All Animal Uses</i>	1 per student
Student Handout 1.2— <i>Predicting the Numbers: Scientific Research</i>	1 per student
Student Handout 1.3— <i>Animal Research: The Need for Middle Ground</i>	1 per student
Teacher Resource 1.3— <i>Predicting the Numbers</i>	1

An accompanying PowerPoint presentation can be found at <http://nwabr.org>. The slides contain graphics used to represent the proportion of animals killed by human activities. This information can also be found in Teacher Resource 1.3—*Predicting the Numbers*.

## NOTE TO THE TEACHER

It is especially important to foster a safe classroom atmosphere when discussing issues about which students may have differing views and strong feelings. The ethical issues that arise may involve conflicting moral choices. Please review or create classroom discussion ground rules ('norms') before proceeding. Instructions for doing this can be found in the *Appendix*.

## FRAMING THE LESSON

Research using animals is not done in a vacuum—it is one piece of a larger process that includes basic science research involving chemistry and biology, cell and tissue cultures, computer imaging, human clinical trials, safety testing, and more. If teachers would like a resource to show how research with animals fits into the larger picture, a good online activity can be found at the website listed below. Of the ten steps listed in this game, *Lesson One* focuses only on the animal research step.

### Understanding Animal Research: The Shuffle

[http://www.understandinganimalresearch.org.uk/learning\\_centre/interactives/the\\_shuffle](http://www.understandinganimalresearch.org.uk/learning_centre/interactives/the_shuffle)

## TEACHER PREPARATION

- Create the six posters shown in Teacher Resource 1.1—*Silent Chalk Talk Posters* using large sheets of butcher paper or easel pads. Be sure to leave enough space for students to add their comments over a number of days.
- Place the posters around the room, leaving space for students to congregate and write on the posters.
- Make copies of Student Handouts. Student Handout 1.1 and Student Handout 1.2 should be copied single-sided so that students can cut out the Animal Uses Cards.

## PROCEDURE

### ACTIVITY ONE: SILENT CHALK TALK

#### Teacher Background:

In this activity, students explore and share their thoughts and ideas about animal research by silently responding in writing to statements, questions, and pictures posted on the classroom walls. Because the conversation is in written (silent) form, conversation cannot deteriorate into shouting matches, all students are given an equal voice, and students feel safe to express their true thoughts and feelings.

The posters can remain up around the room for the duration of the unit, or teachers may choose to roll them out when needed for each class. Some subsequent lessons will begin by allowing time for students to record their personal thoughts and ideas as well as discuss the more sensitive nature of the topic in a safe manner.

This activity allows for evolution of thought and can be used as a formative assessment for the unit.

#### Instructions:

1. Tell students that the class is beginning a unit of study about the science and ethics of animal research. To begin, students will be able to share their preliminary ideas and thoughts through silent discussion. Students will then consider the many ways in which the lives of animals are impacted by humans.
2. Place the *Silent Chalk Talk Posters* around the room. Before letting the students respond, read through each poster with students and ask for clarifying questions. Be careful to not discuss any opinion or give any information that may change students' responses; merely ensure that they understand what the questions or statement is addressing. It is important to leave this as vague as possible to allow for students to identify their own preconceived notions and/or misconceptions and to allow for evolution of thought throughout the lessons.
3. Post and review rules of participation from Teacher Resource 1.2—*Silent Chalk Talk Rules of Participation*.
4. Provide the same color marker for each poster so that responses are as anonymous as possible. If possible, use the same color marker on each day, and then change the color of marker on subsequent days. This will allow teachers and students to see an evolution of thought over time.
5. Give students ten to fifteen minutes to contribute to each poster a minimum of two times. Encourage students to respond at least one time to the primary comment on the poster, but if they have trouble doing so they may only respond to other students comments.
6. Explain to students that they will be using these posters to continue a conversation over the next few days (Days 1, 3, and 5 of the unit) but are not to discuss it outside of class.
7. Assure students they will be having a culminating conversation on the last day of the unit and it is important that they do not engage in talking about the posters before then to allow for the richest conversation possible.

### ACTIVITY TWO: ANIMAL USE ACTIVITY

#### Teacher Background:

Many resources that educate about the need for animals in **biomedical research** focus on the many benefits that this research has provided over time—vaccines for polio, smallpox, measles, and mumps; surgical techniques; treatments for leukemia and other cancers; development of antibiotics, insulin, and much more. Many students, however, are ultimately—rightly so—concerned about the wellbeing of the animals involved. For this reason, the first lesson confronts the many human actions that result in animal deaths. Some discussion of benefits to humans as a result of the animal deaths is involved, as well as a direct look into the amount of pain and suffering an animal might experience as well as any regulations that might affect animal welfare.

#### Part I: How Do Humans Use Animals?

8. Explore the many relationships students have with other animals through a short discussion. Discuss ways humans use animals as a food, clothing, and labor resource along with their use as pets, as entertainment, recreation, and scientific research.
9. Explain to students that the following activity looks directly at actions that may make students uncomfortable—ways in which human activities lead to animal deaths.
10. Have students consider for a short moment some of the human activities that lead to animal deaths.
11. Make a list on the board. The list should include:
  - Animals hunted for food/sport/wildlife management.
  - Animals euthanized in shelters.
  - Animals raised for food.
  - Animals killed by motorists on the roads.
  - Animals used in medical research.

12. Students will likely have differing views on whether humans **should** or **should not** engage in activities that result in animal deaths.
13. The field of **ethics** helps us to work through difficult questions in a systematic, rational way. Ethical questions around the use of animals include:
- Does the benefit of using an animal in any way outweigh the moral cost of taking an animal's life?
  - How shall we treat each other and other living things?
  - Is bringing about the greatest good for the greatest number the right thing to do?
  - What are our duties towards other living things?
  - What are our duties to people with cancer? Spinal cord injury? Diabetes?
  - Should animal interests be considered equal to those of humans? Does this pertain to all animals?
14. Tell students that the field of ethics helps us, as a society, to determine the best course of action in the face of conflicting choices. Throughout this unit, students will learn more about ethical perspectives in animal research as well as rules and regulations applying to the **humane treatment** of animals.

## Part II: Predicting the Numbers

15. The activity continues by addressing possible student misconceptions concerning the number of animals killed and used in scientific research compared to other ways animal deaths are caused by humans. In addition, the misconception of how many **non-human primates** are used relative to other research animals is also explored. The goal is to put the numbers in perspective so students have an informed view of the impact of several types of human activity on the lives of other animals.
16. Pass out Student Handout 1.1—*Predicting the Numbers: All Animal Uses*. Students may work in pairs. Follow the directions on the Student Handout.
17. When all students have completed their predictions, conduct a discussion about their answers and why they chose them. Poll each group about their predictions and ask student groups with the highest and lowest predicted numbers to explain how and why they chose those numbers. This will build interest in the actual numbers given to students in the next step.
18. Show students the actual data using overhead or PowerPoint slides. Students should record the actual data in the appropriate column on their handouts. The data can also be found on Teacher Resource 1.3—*Predicting the Numbers*, and below:
- |  |      |
|--|------|
| Hunting:                                   | 2%   |
| Dogs and cats euthanized at shelters:      | 0.1% |
| Livestock and poultry killed for food:     | 94%  |
| Animals killed by motorists:               | 4%   |
| Animals euthanized for scientific research | 0.3% |
- If students ask, explain that the total does not exactly equal 100% because the larger numbers have been rounded to the nearest whole number. For example, actual numbers for livestock and poultry killed for food is slightly under 94% but has been rounded up for ease of use.**
19. As you go through each category, ask students to share their reactions to the data and their role in contributing to the numbers presented. End the discussion by focusing on the number of animals killed by scientific research compared to the number euthanized at animal shelters. Connect to the idea that although these numbers are small in comparison to the others, the lives of all of these animals are important and need to be treated with respect.
20. Pass out Student Handout 1.2—*Predicting the Numbers: Scientific Research*. Students may work in pairs. Follow the directions on the Student Handout.
21. Again, after students have completed their predictions, conduct a discussion about students' answers and why they chose them. Have a few students justify their predictions.
22. Show students the actual data using overhead or PowerPoint slides. Students should record the actual data in the appropriate column on their handouts. The data can also be found on Teacher Resource 1.3—*Predicting the Numbers*, and below:
- |                                  |                           |
|----------------------------------|---------------------------|
| Mice and rats:                   | 90% euthanized            |
| Non-human primates:              | 0.25% used and euthanized |
| Other <b>vertebrate</b> species: | 10% euthanized            |

23. As you go through each category, ask students to share their reactions to the data and their role in contributing to the numbers presented. Emphasize that because of their lifespan and importance to research, **primates** may not be killed at the end of a study, but are used for multiple studies. Therefore the number given on the graph represents the number of non-human primates both used and killed during an average year. After euthanasia, most primate bodies are also used for further research using cells, tissues, and organs.

### Part III: Benefits and Regulations

24. Refer students to Student Handout 1.1—*Predicting the Numbers: All Animal Uses* and ask if the activities listed seem equally worthy of the animal's life. Do some lead to a greater benefit than others? Why?

25. Ask students to brainstorm any **regulatory oversight** (supervision, laws, or rules) that influences how much pain or suffering an animal might experience before or at the time of death. Again, are all activities equally regulated?

For example, **animals killed on the roadways** in the U.S. benefit humans only by allowing us to drive on long stretches of open road. There are few rules and regulations pertaining to animals killed or injured on the road, although construction engineers may consider the migration patterns of animals when constructing certain roads. After being hit, animals may suffer before dying.

**Animals used for food** are of great benefit to humans, supplying a substantial amount of caloric and protein intake for the majority of Americans. This is an arguable position, however, from the **vegetarian** or **vegan** viewpoint. The care and use of food animals is regulated by the Humane Slaughter Act. In most states, animals must be "rendered insensible to pain" in the slaughter process.

**Animal research** has benefitted humans tremendously through medical advances such as the elimination of smallpox, rabies, polio, measles, the advancement of surgical procedures, and treatments for heart disease, cancer, diabetes, leukemia, and other diseases. Animal research and resulting euthanasia is conducted under stringent regulations. Animals also benefit from veterinarian vaccines and treatments made available through animal research.

**Ninety-three percent of animals used in research either do not experience pain or are given drugs to relieve pain during research.**

**Hunting.** Hunting can benefit humans by providing food and animal products to people. Hunting is also used to thin overpopulated species and manage wildlife. The number and species of animals, hunting season and equipment type is controlled through the sale of hunting licenses, which is regulated by each state's department of fish and game. Regulations vary from state to state, and many states require hunter education classes that emphasize safety and may teach about humane hunting practices.

**Animal shelters.** Euthanizing excess dogs and cats in shelters is of questionable benefit, except perhaps for dogs found to be dangerous. Regulation of animal shelters varies from state to state; most states require pets to be licensed, which can aid in the return of an animal picked up or turned in to animal control officials. Most shelters follow the American Veterinary Medical Association's guidelines on humane euthanasia. The number of animals euthanized in shelters has been substantially reduced over the past decades due to successful spay and neuter campaigns.

26. Draw a large graph on the board with four quadrants. Label the x-axis "Benefits to Humans." Label the y-axis "Rules and Regulations." Tell students that the purpose of this exercise is to **map out general trends**, not graph distinct data points. Students may have differing views on the benefits of each category and may not be overly familiar with the rules and regulations for each category. As such, challenge students to help you plot the general quadrant for each of the following categories on the graph:

- Animals killed by hunting.
- Animals euthanized at shelters.
- Animals killed by motorists.
- Animals killed for food.
- Animals euthanized for scientific research.

27. Discuss the graph that the class completed together. Which animal uses are highly beneficial to humans? Which animal uses have few regulations associated with them?

28. Tell students that if they were graphing the relative percentages for each animal use and used one inch to represent the number of animals used in medical research, the line representing animals killed for food would be over two stories high.

## CLOSURE

29. Teachers should emphasize that the goal of this lesson is not to downplay the importance of animals, especially primates, used in research just because the numbers are so small in proportion of the total number of animals killed each year due to human activity. Each animal is valuable and worthy of respect; high ethical standards about their use and care need to be, and are, applied. Also point out that the numbers used for these uses are estimates that vary slightly year to year.
30. Let students know that, as part of the unit assessment, they will be asked to identify their own personal involvement and choices they make pertaining to animal research and other uses of animals. In looking at the graph, ask students to think about where their interest in animal welfare might lie.

## HOMEWORK

- In the next lesson, students will be asked to consider three principles that guide the humane use of animals in research. Known as the “3 Rs,” students will see how methods that use **Replacement, Reduction, and Refinement** are widely used in animal research.
- Distribute copies of Student Handout 1.1—*Animal Research: The Need for Middle Ground* for students to read as homework. This is an adapted version of an editorial by Richard Smith of the British Medical Journal.
- Some students may have difficulty with the reading level of the editorial. Support these students by using a guided reading strategy such as Think/Share/Advise/Revise (TSAR).
  - a. **Think:** First, have students individually read each paragraph. Ask students to make a T-Chart in their journal or on a separate piece of paper, recording in the left-hand column “Ideas from Text” and the right-hand column “Questions I have about Ideas.”
  - b. **Share:** Have students find a partner and share their thinking by reading aloud each column of their T-Charts.
  - c. **Advise:** After each pair has shared their T-Charts with each other, allow time for them to provide alternative explanations or suggestions about the questions they had about the text.
  - d. **Revise:** Challenge each pair to work together to agree on a common understanding of the reading and to record this new understanding in their journal or on a piece of paper. If they are still confused or unclear about some portions of the reading, encourage students to seek clarification from another pair, or from the teacher.
- As an alternative to reading Student Handout 1.1—*Animal Research: The Need for Middle Ground*, students can find information on the 3 Rs at the following websites:

### Understanding Animal Research

[http://www.understandinganimalresearch.org.uk/page/download\\_document/?document\\_id=4](http://www.understandinganimalresearch.org.uk/page/download_document/?document_id=4)

### Animal Ethics Infolink: 3 Rs

<http://www.animaethics.org.au/three-rs>

### NC3Rs: What are the 3 Rs?

<http://www.nc3rs.org.uk/page.asp?id=7>

## EXTENSION

- Have students graph the actual data rather than showing them the graphs. Compare their work to their predictions.

## GLOSSARY

**Bioethics:** A subfield of ethics applied to the life sciences. It helps us, as a society, make decisions about how to best gain and use scientific knowledge in the fields of biology, biotechnology and medicine.

**Biomedical Research:** Research that supports the field of medicine, including clinical trials with animals and humans to study the safety and efficacy of new drugs, treatments, techniques, or devices.

**Ethics:** A field of study that looks at the moral basis of human behavior and attempts to determine the best course of action in the face of conflicting choices.

**Euthanasia:** The practice of ending an animal's life while minimizing pain, distress and anxiety prior to loss of consciousness. Most often accomplished through the administration of drugs.

**Humane treatment:** Treating animals with a high degree of respect and care.

**Non-human primate:** Members of the order Primates, not including humans.

**Primate:** Members of the order Primates, which includes anthropoids (monkeys and apes—which includes humans) and prosimians (galagos, lemurs, lorises, and tarsiers).

**Regulatory oversight:** The amount of supervision given by an authoritative body over an activity (i.e. the existence of laws, rules or regulations imposed by governments or institutions).

**Reduction:** One of the 3 Rs of animal research proposed by Russell and Burch. Reduction means using the fewest number of animals possible in a research project to gain statistically significant results.

**Refinement:** One of the 3 Rs of animal research proposed by Russell and Burch. Refinement means using any technique or procedure that decreases the suffering, or enriches the life of, an animal used in research.

**Replacement:** One of the 3 Rs of animal research proposed by Russell and Burch. Replacement means replacing conscious, living vertebrates with cell or tissue cultures, computer models, and/or less developed animal species.

**Vegetarian:** A diet that avoids the consumption of animal meat, such as red meat, poultry, fin fish, and shellfish.

**Vegan:** A diet that avoids the consumption of all animal products, including milk, eggs, and honey. A vegan lifestyle may also include avoiding the purchase of products made from animals, including leather and wool.

**Vertebrate:** An animal with a vertebral column (backbone).

## NOTES ON DATA SOURCES

**Hunting:** Statistics include birds, small mammals, and large game. No fish are included. Compiled from: the Fund for Animals, U.S. Fish and Wildlife Service, state wildlife agencies, and In Defense of Animals.

**Research:** Accounts for vertebrates used in research, including mice and rats. Compiled from Speaking of Research and Alternatives to Animal Use in Research, Testing, and Education.

**Food:** Livestock and poultry only. Compiled from National Agricultural Statistics Service, United Poultry Concerns/ USDA's National Agricultural Statistics Service, and Speaking of Research.

**Euthanized:** The number of dogs and cats euthanized in shelters is difficult to ascertain, as shelters are only now being asked to track and report this data. Numbers compiled from *Use of Dogs and Cats in Research*, National Academies Press.

**Motorist-Killed:** Number from an article in the *Wall Street Journal* in 2002 (see source information, below).

## SOURCES

American Veterinary Medical Association

[http://www.avma.org/issues/animal\\_welfare/euthanasia.pdf](http://www.avma.org/issues/animal_welfare/euthanasia.pdf)

In Defense of Animals

<http://www.idausa.org/facts/hunting.html>.

Humane Society of the United States

[http://www.humanesociety.org/animal\\_community/resources/qa/common\\_questions\\_on\\_shelters.html](http://www.humanesociety.org/animal_community/resources/qa/common_questions_on_shelters.html).

"In the Headlights: As Man and Beast Clash on Highways, Both Sides Lose."

*Wall Street Journal*, August 1, 2002. Page A1.

National Agricultural Statistics Service

<http://www.nass.usda.gov/>.

National Research Council Committee on Scientific and Humane Issues in the Use of Random Source Dogs and Cats in Research. *Use of Dogs and Cats in Research: Public Perception and Evolution of Laws and Guidelines*. Washington DC: National Academies Press, 2009.

<http://www.ncbi.nlm.nih.gov/books/NBK32668/>.

Speaking of Research

<http://speakingofresearch.com/facts/statistics/>.

United Poultry Concerns/USDA's National Agricultural Statistics Service

[http://www.upc-online.org/slaughter/2000slaughter\\_stats.html](http://www.upc-online.org/slaughter/2000slaughter_stats.html).

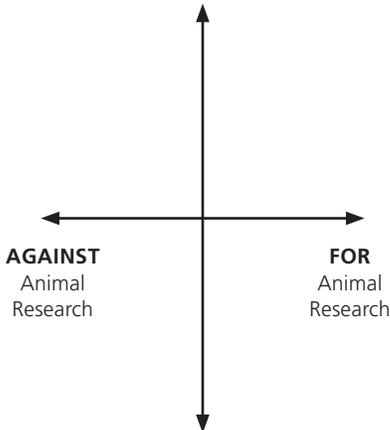
U.S. Congress, Office of Technology Assessment. *Alternatives to Animal Use in Research, Testing, and Education*. Washington DC: U.S. Government Printing Office, OTA-BA-273, February 1986.

[http://govinfo.library.unt.edu/ota/Ota\\_3/DATA/1986/8601.PDF](http://govinfo.library.unt.edu/ota/Ota_3/DATA/1986/8601.PDF).

# TEACHER RESOURCE 1.1

## Silent Chalk Talk Posters

These posters should be re-created on large pieces of butcher paper to allow ample room for student discussion and thought development. If possible, use a different color marker for each day.

<p><b>A person who conducts animal research is...</b></p>	<p><b>What is animal research?</b></p>	<p><b>How are a person's views of animals influenced by his/her upbringing, religion, and culture?</b></p>
<p><b>What should the rules be for conducting research with animals?</b></p>	<p></p> <p><b>What does this image say to you?</b> (See <i>Appendix</i> for larger image)</p>	<p>I know <b>A LOT</b> about this topic</p>  <p>I know a <b>LITTLE</b> about this topic</p> <p>(Have students plot their own position/knowledge point using a different class color each day).</p>

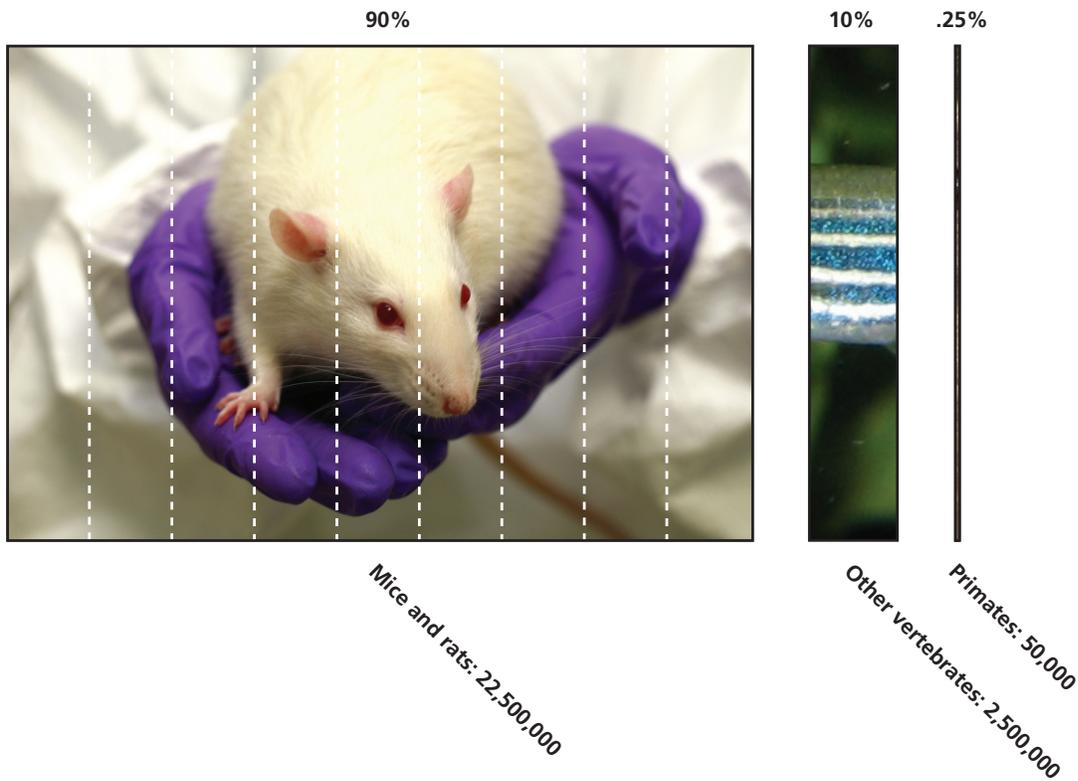
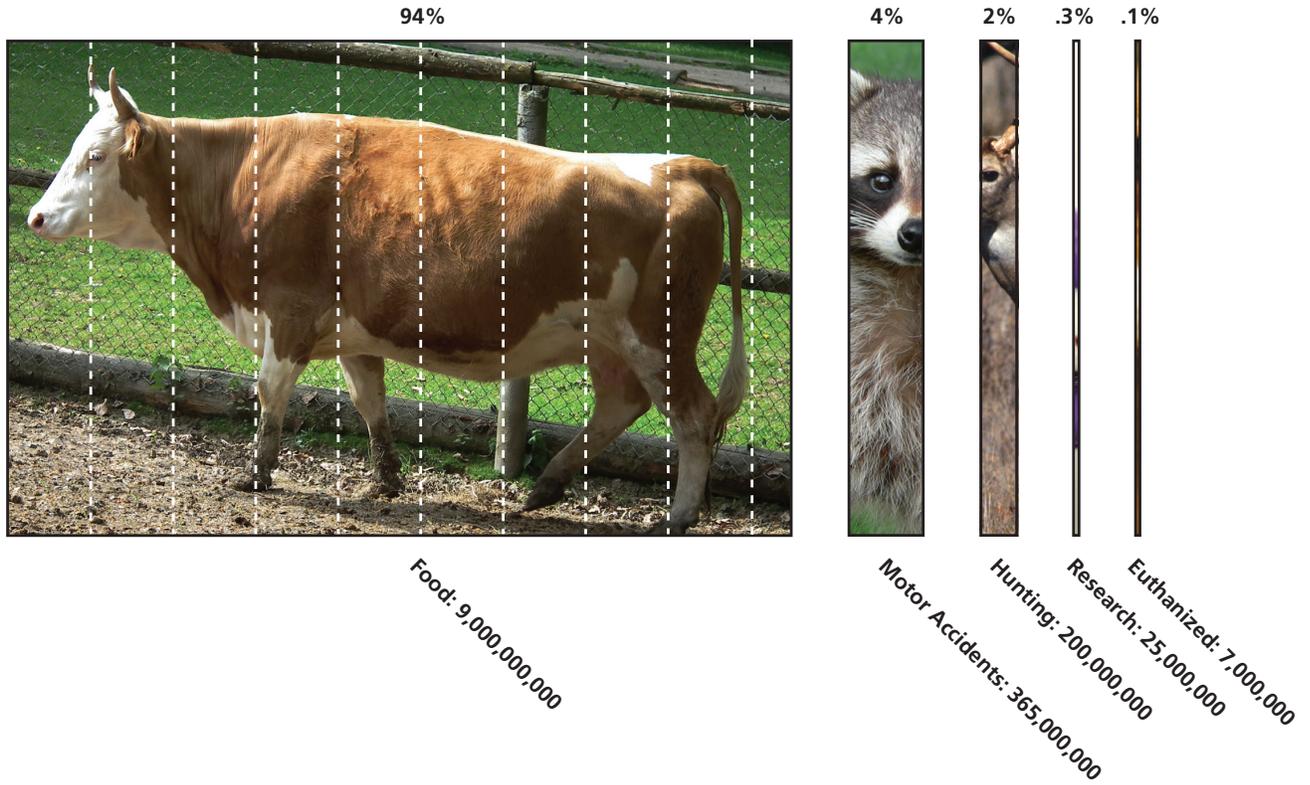


- 1. Respond to the main comment anywhere on the poster you would like.**
- 2. Respond to others by drawing an arrow from their comment to yours.**
- 3. Keep all responses respectful and school-appropriate.**
- 4. If you agree with a comment add an exclamation point (!) or star (\*).**
- 5. If you disagree with something that someone said, explain why you disagree, using appropriate language.**
- 6. Do not cross out or write over anyone else's comments.**
- 7. Pictures are completely permissible; just keep them appropriate.**
- 8. NO TALKING!**



# TEACHER RESOURCE 1.3

## Predicting the Numbers



Cow – Credit: Wikimedia, [http://commons.wikimedia.org/wiki/File:Tierpark\\_Bretten\\_Hinterw%C3%A4lder\\_Rind.JPG](http://commons.wikimedia.org/wiki/File:Tierpark_Bretten_Hinterw%C3%A4lder_Rind.JPG)

White Rat – Credit: Understanding Animal Research, [http://www.understandinganimalresearch.org.uk/resources/images\\_library/details/226/white\\_rat\\_on\\_purple\\_gloved\\_hands\\_3/](http://www.understandinganimalresearch.org.uk/resources/images_library/details/226/white_rat_on_purple_gloved_hands_3/)



# STUDENT HANDOUT 1.1

## Predicting the Numbers: All Animal Uses

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

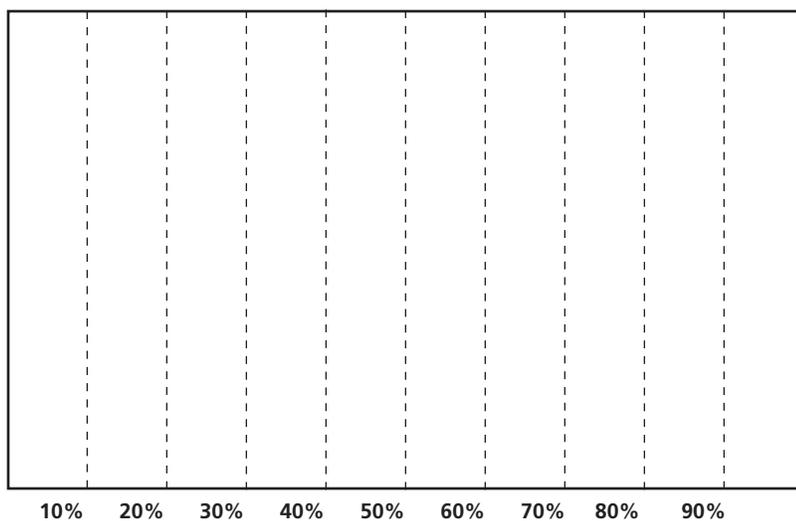
1. Cut out the 3 x 5 inch animal cards on the next few pages. Each card represents a group of animals killed annually by humans in the United States for a certain purpose or in a certain way.
2. Put the cards in order, going from the card you think represents the **most** number of animals killed to the card you think represents the **least** number of animals killed.
3. Predict the **percentage** (out of 100) that you think accounts for each use. For example, what percentage of the total number of animals do you think are killed due to food production? 50%? 80%? 99%? Write your predictions in the Prediction column in the following table.

Animal Uses	Prediction (%)	Actual (%)
Hunting		
Dogs and cats euthanized or abandoned at animal shelters		
Livestock and poultry used for food		
Animals killed by motorists		
Animals used for scientific research		
<b>Total</b>	<b>100%</b>	<b>100%</b>

4. In two or three sentences, justify your predictions. Why did you choose these percentages? What evidence do you have to support your predictions?

- The Set 1 box below represents 100% of the animals killed annually by humans in the United States. Each dotted line represents an increment of 10%.
  - According to your above predictions, cut that percentage from each animal card. The animal cards have lines representing 10% increments to guide you. (You do not have to use 10% increments, you may use smaller percentages.)
  - Glue your predicted percentages to the card. When you are done, the whole card should be covered, representing 100%.
  - When finished mapping your predictions, write down the actual percentages given to you by your teacher.
- 
- What surprised you about the actual percentages? In two or three sentences, reflect on the differences between your predictions and the actual percentages.

### Set 1: Animals Killed Each Year Due to Human Activity



## HUNTING



White-tailed deer. Credit: Scott Bauer, USDA. Wikimedia, [http://commons.wikimedia.org/wiki/File:White-tailed\\_deer.jpg](http://commons.wikimedia.org/wiki/File:White-tailed_deer.jpg)

## DOGS & CATS EUTHANIZED



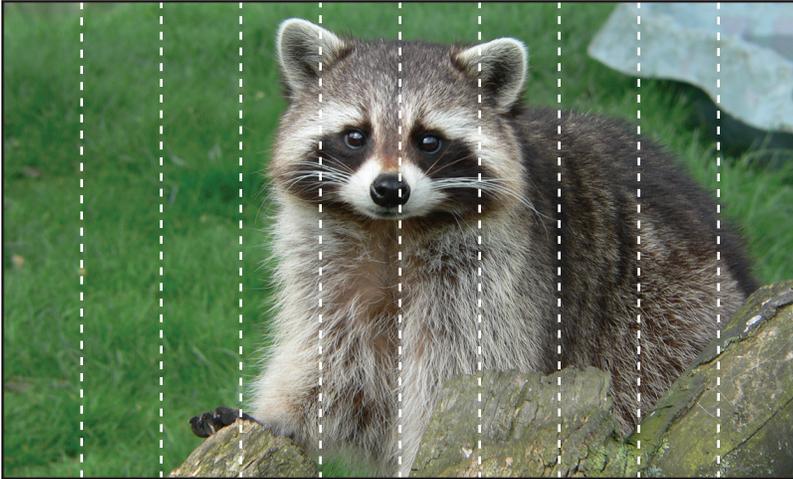
Credit: Wikimedia, [http://upload.wikimedia.org/wikipedia/commons/3/3e/Street\\_dog\\_-yellow.jpg](http://upload.wikimedia.org/wikipedia/commons/3/3e/Street_dog_-yellow.jpg)

## LIVESTOCK & POULTRY KILLED FOR FOOD



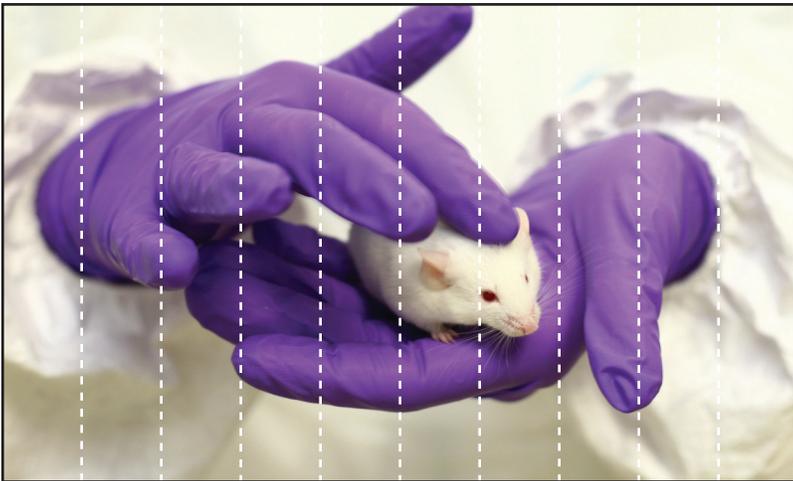
Credit: Wikimedia, [http://commons.wikimedia.org/wiki/File:Tierpark\\_Bretten\\_Hinterw%C3%A4lder\\_Rind.JPG](http://commons.wikimedia.org/wiki/File:Tierpark_Bretten_Hinterw%C3%A4lder_Rind.JPG)

## ANIMALS KILLED BY MOTORISTS



Credit: Harlequeen, Wikimedia, [http://commons.wikimedia.org/wiki/File:Raccoon\\_Cute\\_Pose.jpg](http://commons.wikimedia.org/wiki/File:Raccoon_Cute_Pose.jpg)

## ANIMALS USED FOR RESEARCH



(all vertebrate species combined)

Credit: Understanding Animal Research, [http://www.understandinganimalresearch.org.uk/resources/images\\_library/details/198/white\\_mouse\\_in\\_purple\\_gloved\\_hands/](http://www.understandinganimalresearch.org.uk/resources/images_library/details/198/white_mouse_in_purple_gloved_hands/)

# STUDENT HANDOUT 1.2

## Predicting the Numbers: Scientific Research

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

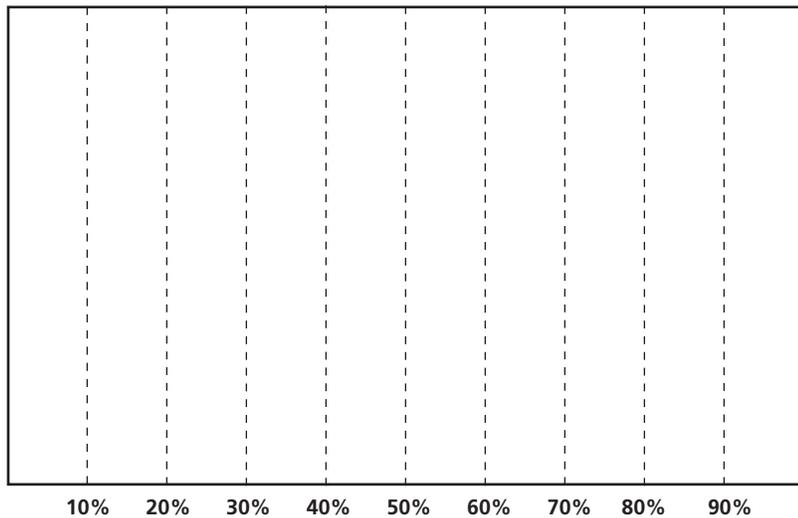
1. Cut out the 3 x 5 inch animal cards on the next few pages. Each card represents a group of animals killed or used annually by humans in the United States for **scientific research only**.
2. Put the cards in order, going from the card you think represents the **largest** number of animals used or killed, to the card you think represents the **smallest** number of animals used or killed.
3. Predict the **percentage** (out of 100) that you think accounts for each use. For example, what percentage of the total number of animals used in scientific research is mice and rats? What percentage is primates? Write your predictions in the Prediction column in the following table.

Animal Used in Scientific Research	Prediction (%)	Actual (%)
Mice and rats		
Non-human primates		
Other vertebrate species		
<b>Total</b>	<b>100%</b>	<b>100%</b>

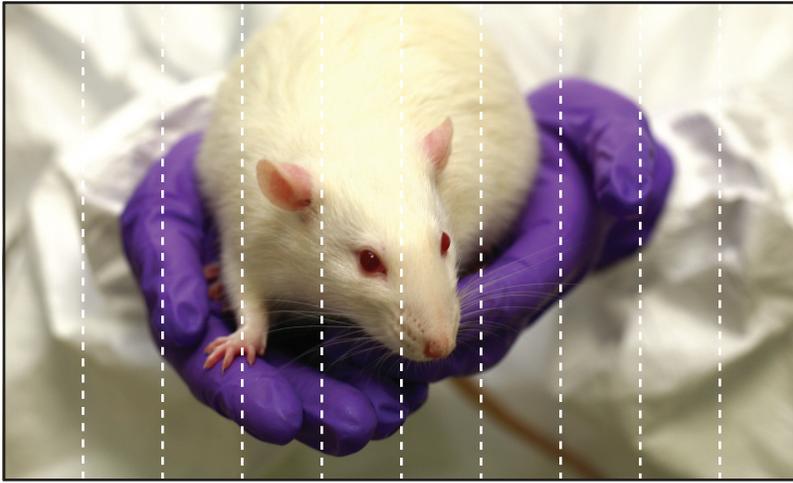
4. In two or three sentences, justify your predictions. Why did you choose these percentages? What evidence do you have to support your predictions?

5. The Set 2 box below represents 100% of the animals killed or used annually by humans in the U.S. for scientific research. Each dotted line represents an increment of 10%.
  6. According to your above predictions, cut that percentage from each animal card. The animal cards have lines representing 10% increments to guide you. (You do not have to use 10% increments, you may use smaller percentages.)
  7. Glue your predicted percentages to the card. When you are done, the whole card should be covered, representing 100%.
  8. When you finish graphing your predictions, write down the actual percentages given to you by your teacher.
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9. What surprised you about the actual percentages? In two or three sentences, reflect on the differences between your predictions and the actual percentages.

**Set 2: Animals Used/Killed in Scientific Research**

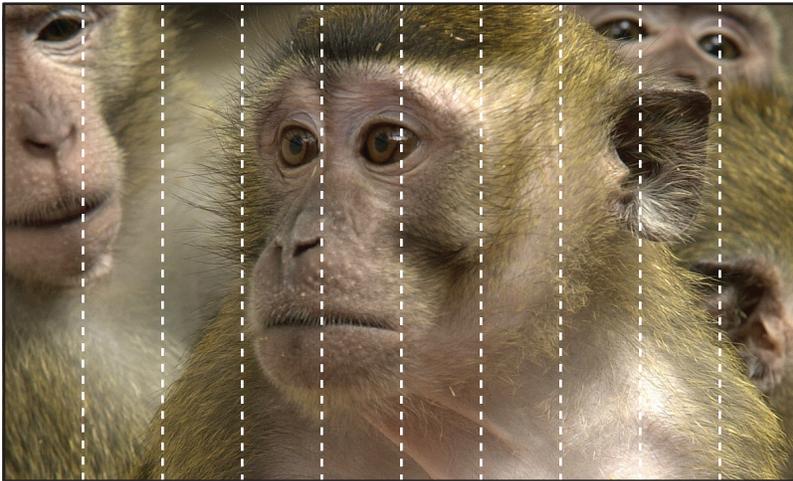


## MICE & RATS



Credit: Understanding Animal Research, [http://www.understandinganimalresearch.org.uk/resources/images\\_library/details/226/white\\_rat\\_on\\_purple\\_gloved\\_hands\\_3/](http://www.understandinganimalresearch.org.uk/resources/images_library/details/226/white_rat_on_purple_gloved_hands_3/)

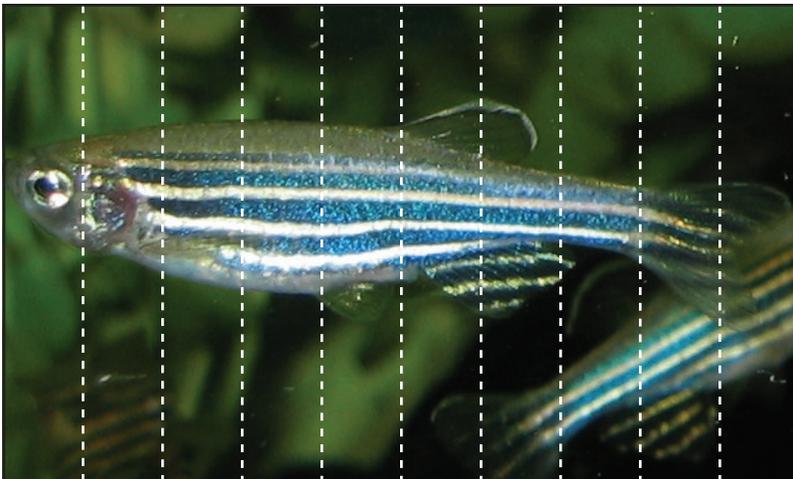
## NON-HUMAN PRIMATES



(For non-human primates, consider both use and death during research since they are long-lived and death is often not the end-point of the research).

Credit: Understanding Animal Research, [http://www.understandinganimalresearch.org.uk/resources/images\\_library/details/65/macaque\\_trio\\_close\\_up/](http://www.understandinganimalresearch.org.uk/resources/images_library/details/65/macaque_trio_close_up/)

## OTHER VERTEBRATE SPECIES



Credit: Wikimedia, <http://commons.wikimedia.org/wiki/File:Zebrafisch.jpg>



# STUDENT HANDOUT 1.3

## Animal Research: The Need for a Middle Ground

Abridged from an article written by Richard Smith,  
Editor of the *British Medical Journal*.

### Let's promote the 3 Rs of animal research: replacement, reduction, and refinement.

Many countries suffer from oversimplified debates on important issues like drugs, crime and punishment, genetically modified foods, and animal research. Are you for or against? Sign here. Yet none of these issues is moved forward by such "for-or-against" arguments. The debate on animal research currently features, on one side, people in masks using every tactic (including illegal and violent ones) to close down animal research institutes pitted against the other side of intimidated scientists arguing that no progress can be made in treating serious human diseases without animal research. We need more understanding of the complexities of animal research and a greater concentration on where we agree.

Can any of us imagine a world where animals were not used for food, clothing, or transport, where we had no pets, where rats and other vermin were not controlled, and where an ape, or even a fly, was regarded as the moral equal of the Archbishop of Canterbury? Most of us can't, and many people accept the need for some animal research. Yet most of us would not tolerate a world where animals had no rights and could be exploited for whatever cause. We thus have to find some middle ground in our relationship with animals, and a world that tries to afford more rights to men and women will probably also try to give more to animals.

The arguments over animal research are so polarized because the two sides have completely different ways of thinking. Opponents of research are concerned primarily with the **rights and suffering of animals**, whereas supporters are interested in **preventing and treating disease**. We need ways to promote agreement rather than disagreement, and the 3 Rs of animal research—replacement, reduction, and refinement—can do just that. They were first proposed by scientists William Russell and Rex Burch in 1959. The 3 Rs are:

- **Replacement:** Replacing conscious, living vertebrates with cell or tissue cultures, computer models, and/or less-developed animal species.
- **Reduction:** Using the fewest number of animals possible in a research project to gain statistically significant results.
- **Refinement:** Using any technique or procedure that decreases the suffering, or enriches the life of, an animal used in research.

Most animal research policy and practices are based on the 3 Rs. They start with the assumption that there will be animal research but are open to the possibility that science might advance to a point where it would no longer be necessary. The beauty of the 3 Rs is that they provide a way for all parties to work together to advance the cause of both animals and humans. Nothing will be gained by forcing laboratories to close or by oversimplifying the debate.

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Adapted from: Richard Smith. "Animal Research: The Need for Middle Ground." *British Medical Journal* BMJ. 2001 February 3; 322(7281): 248–249. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1119509/>.

