Name _____ Class _____ Date _____

The Most Intelligent Mammal

Pre-Lab Discussion

Mammals have the most highly developed brain of all animals. This enables them to perform a wide range of complicated behaviors.

Some of a mammal's behaviors are unlearned. This means that the mammal is capable of performing the behavior without being taught. Unlearned behaviors include reflexes and instincts. Reflexes are simple, quick, automatic responses—jerking away from contact with a hot object, for example. Instincts are inborn behavioral patterns that can be modified very little, if at all. A spider's web-building, a crane's courtship dance, and a newborn mammal's suckling are examples of instincts.

Many of a mammal's behaviors are learned, or acquired through experience. Because mammals have a large, highly sophisticated cerebrum—the part of the brain involved with learning, memory, and thinking—they are capable of performing a wide array of learned behaviors. Some examples of learned behaviors in humans include habits and solving visual or word problems. The most advanced type of learned behavior is known as insight learning, or reasoning. Reasoning is the ability to apply previous learning to a totally new situation. Reasoning is rare in animals other than primates and is found most often in humans, which are the most intelligent of all mammals.

In this investigation, you will study learned and unlearned human behavior.

Problem

Which types of human behaviors are unlearned and which are learned? What roles do reflexes, conditioned responses, habits, trial-and-error learning, and reasoning play in human behavior?

Materials *(per pair of students)*

Paper
Pencil
Clock or watch with second hand

Procedure

Part A. Reflexes

1. A reflex is a simple, automatic response to a stimulus. A reflex usually involves only part of the body. Working with a partner, you will alternate as subject and helper while you test two human reflexes. You will record the responses in Data Table 1.
2. Close your eyes and cover them with your hands. At the end of one minute, remove your hands and open your eyes while your partner watches your eyes closely. Record the response in Data Table 1.

3. Stand with your side to a wall. Hold your arm down at your side and slightly away from your body. Tightly press the back of your hand against the wall until your shoulder begins to ache. After one minute, step away from the wall while still holding your arm stiff. Record the response in Data Table 1.

Part B. Conditioned Responses

1. Read the following instructions to your partner: "Each time I say 'Write,' I want you to make a tally mark on a sheet of paper. Then place your pencil in position to make the next mark."
2. Give the command to write several times in succession. For most of the commands, hit your pencil on the desk at the same time that you say the word "Write."
3. Occasionally, hit your pencil on the desk but do not give the command to write. Try this several times. Answer question 1 in Observations.

Part C. Habits

1. Divide a sheet of lined paper in half lengthwise. Label one column "Normal Hand." Label the other column "Other Hand." Now use your normal writing hand to write your name as many times as you can in 30 seconds. Follow the same procedure in the second column using your other hand. Answer questions 2 and 3 in Observations.
2. Dictate the following passage to your partner while he or she writes it down. Dictate at a fairly rapid pace. "Habits are often useful in allowing routine activities to be carried out quickly. But most of us have some habits that we would like to break. Breaking a habit is not a simple thing to do."
3. Dictate the same passage again, but this time instruct your partner not to cross any *t*'s or dot any *i*'s. Answer question 4 in Observations.

Part D. Trial-and-Error Learning

1. Trial-and-error learning begins when an animal associates certain responses with favorable or unfavorable consequences. The animal then tries to repeat those behaviors that led to favorable results.
2. Find out how quickly you can successfully complete a path through Maze 1 in Figure 1 in Observations. Use a pencil to mark your path and have your partner time you. Record the time needed to complete Maze 1 in Data Table 2.
3. Complete the rest of the mazes in succession, timing each one as you go. Cover each completed maze as you finish so that you cannot look back at the completed mazes. Record your results in Data Table 2. Graph your results on the graph in Observations.

Part E. Reasoning

1. Reasoning is a type of learning that involves thinking, judgment, and memory. Reasoning enables humans to solve new problems without resorting to trial and error.
2. Use your ability to reason to solve the following problems.
   a. There are four separate, equal-sized boxes. Inside each box there are two separate small boxes. Inside each of the small boxes there are three even smaller boxes. Answer question 5 in Observations.

b. Figure 2 in Observations represents nine bears in a square enclosure at the zoo. Build two more square enclosures within this one so that each bear is in a pen by itself. Draw the borders of the two new enclosures directly on Figure 2.

c. There are five girls: Maureen, Sue, Jill, Robin, and Pam. They are standing in a row, but not necessarily in the order named. Neither Maureen nor Sue is next to Robin. Neither Sue nor Maureen is next to Pam. Neither Robin nor Sue is next to Jill. Pam is just to the right of Jill. Name the girls from left to right. Answer question 6 in Observations.

Observations

Data Table 1

Stimulus	Response
Light	
Pressure on arm muscle	

1. What happened when you hit the pencil on the desk but did not give the command to write?

_____

_____

2. How many times did you write your name with your normal writing hand?

_____

3. How many times did you write your name with your other hand?

_____

4. How many times did you cross *t*'s or dot *i*'s in the second passage?

_____

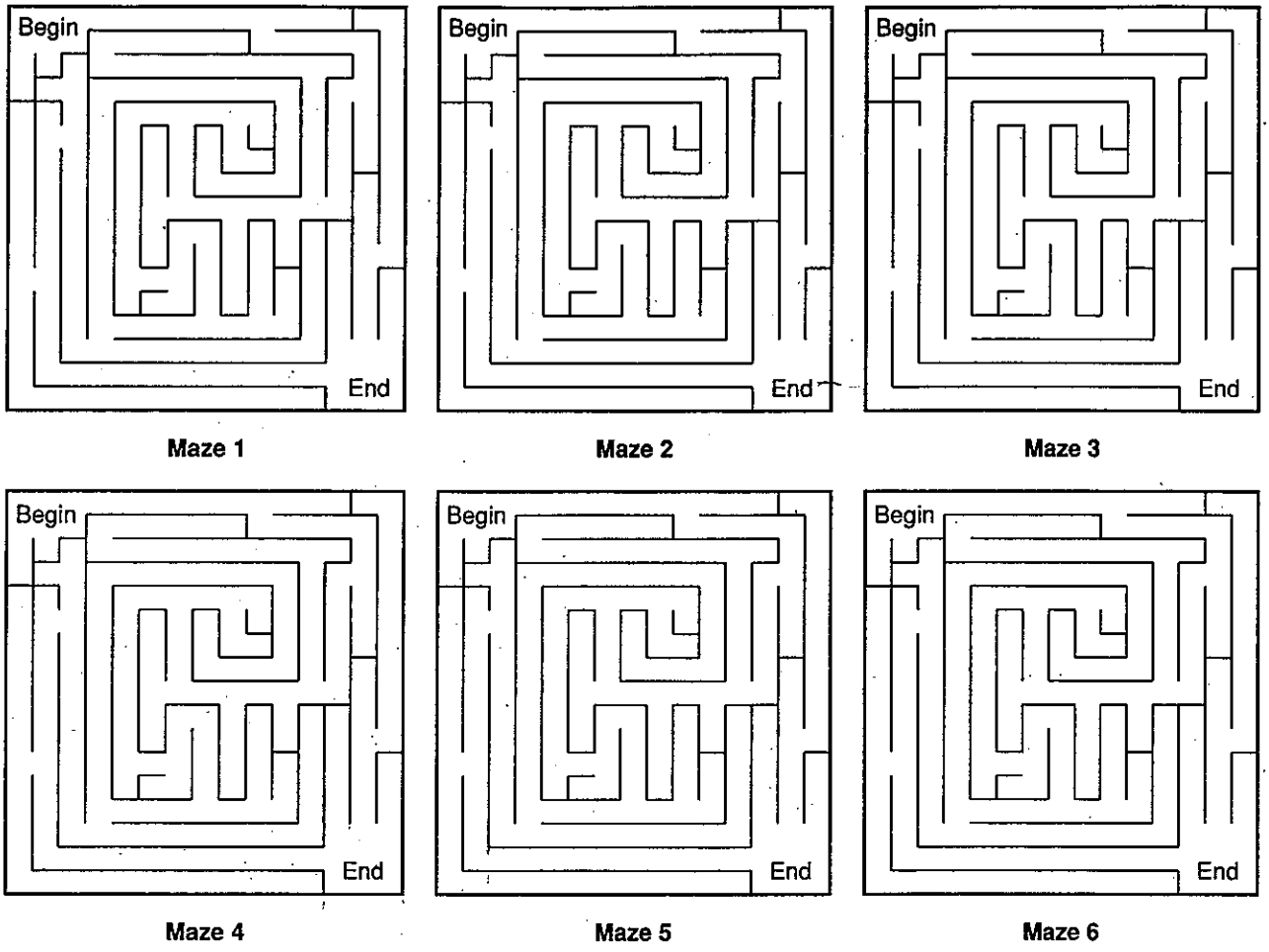

Figure 1

Data Table 2

Maze Number	Time (sec)
1	
2	
3	
4	
5	
6	

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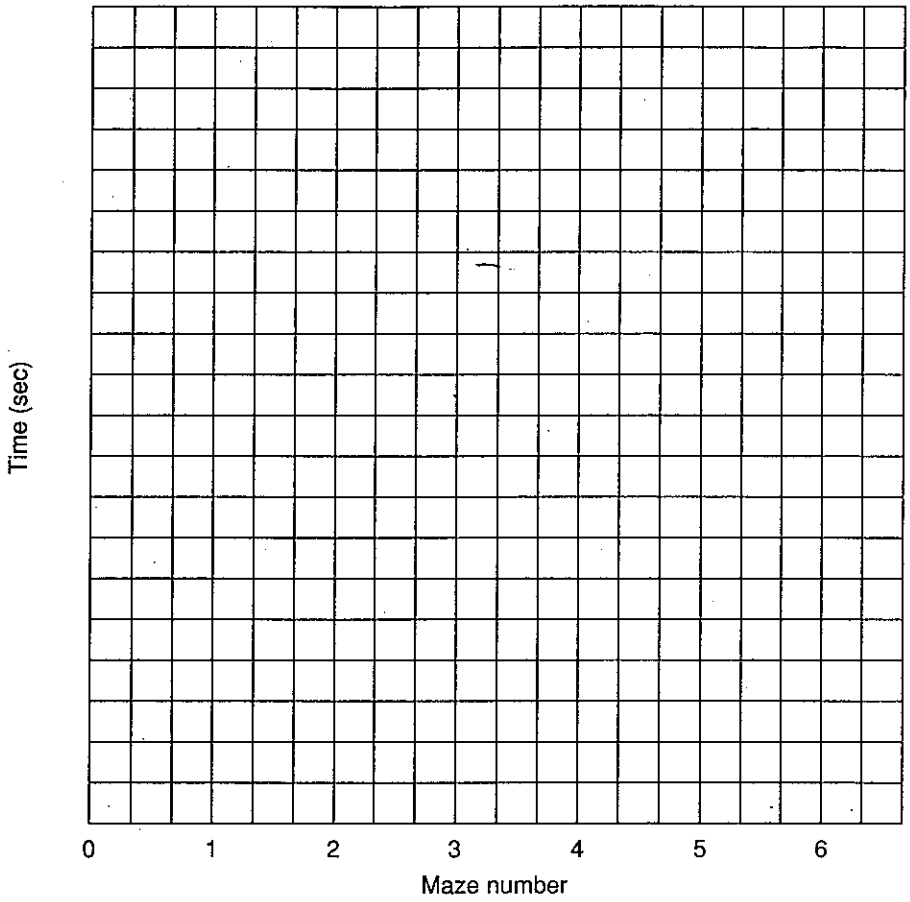
Graph



5. What is the total number of boxes? _____

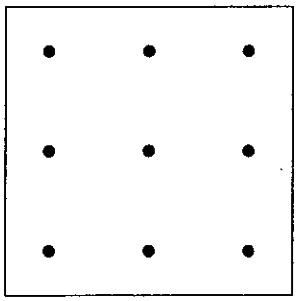


Figure 2

6. Name the girls from left to right: _____

Analysis and Conclusions

1. Name three other reflexes in humans. _____

_____

2. How are reflexes useful to humans? _____

_____

3. Is a reflex a learned or an unlearned behavior? _____

_____

4. Were you able to condition or "fool" your partner into always making a mark on the paper when you hit your pencil on the desk but did not give the command to write? Explain why you think you were or were not able to do so. _____

_____

_____

5. Is the response to the pencil tap a learned or an unlearned behavior?

_____

6. Why did a difference exist in the number of times you could write your name with your normal writing hand and with your other hand? _____

_____

7. What would you have to do to make your signature written by both hands the same?

_____

8. Is a habit a learned or an unlearned behavior? _____

_____

9. Did any learning take place in Part D of this investigation? Give evidence to support your answer. _____

_____

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Critical Thinking and Application

1. How is the blinking response a protective reflex? _____

2. Describe three conditioned reflexes that you exhibit while at school.

3. How might you go about breaking yourself of a particular habit? _____

4. Describe three situations in which you learned through trial and error.

5. Describe two situations in which the ability to reason was useful to you.

Going Further

1. Design and conduct an experiment to show how distractions, such as noise, television, or music, affect the time it takes to learn a short poem or solve an arithmetic problem. Construct a data table to record your results.
2. Cover Columns B, C, and D of the table on page 430 with a piece of paper. Study the words in Column A for one minute. Then write down as many words as you can remember. Record your score. Follow the same procedure for Column B, then C, and then D.

A	B	C	D
Zop	House	Purple	Sally
Wab	Tree	Gold	and
Dod	Shoe	Red	Bob
Jav	Sock	Blue	went
Cug	Dog	Yellow	to
Sor	Floor	Green	the
Duz	Rock	Orange	football
Tig	Father	Black	game
Wek	Candy	White	last
Foy	Picture	Pink	night

Which column was easiest to remember? How do you explain the difference in your ability to learn the words in each column? How can this experiment help you in studying?