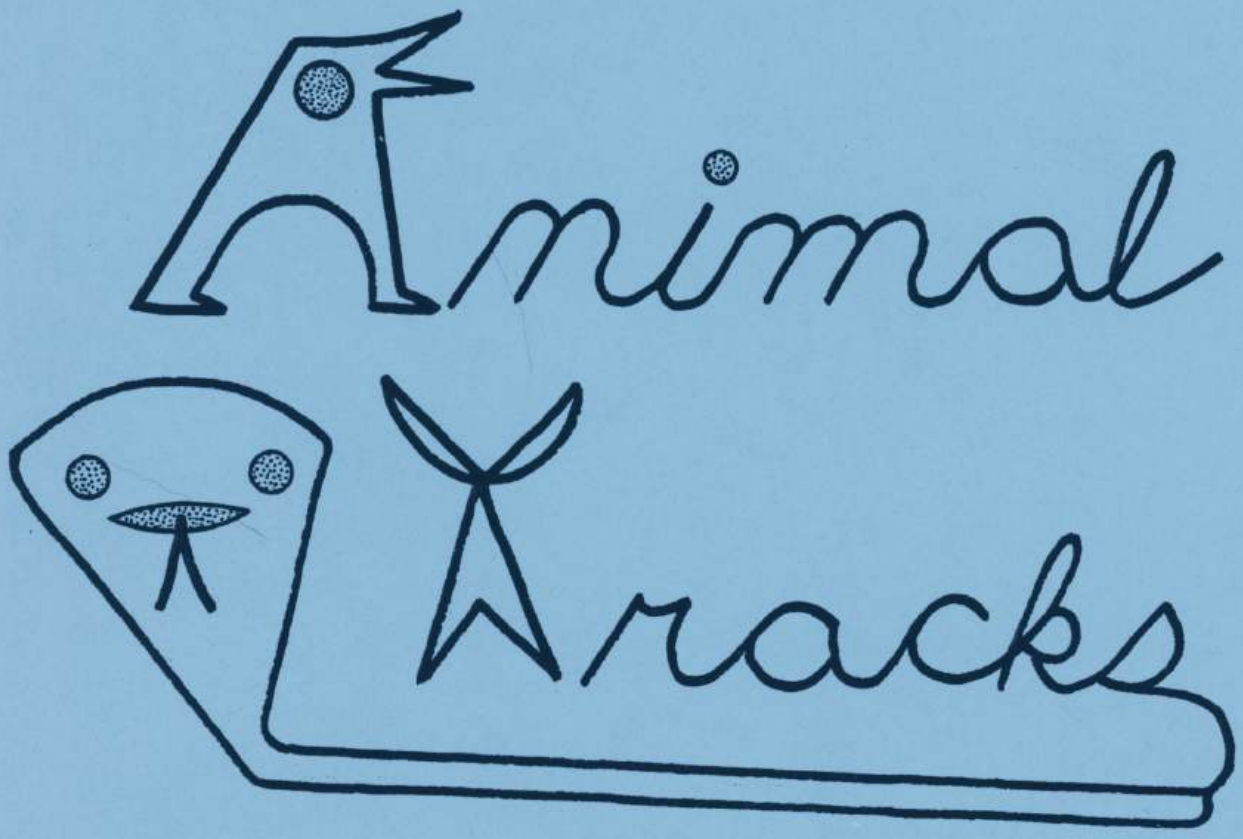


by Jeff Bloom

ANIMAL TRACKS

a biology, problem solving game

by

Jeff Bloom

Acknowledgements

It is impossible to thank all the people who have had valuable input into this project. However, I would like to especially thank Dr. Barbara Sadowski for her initial push and her continued help and encouragement. Without the optimizing program of Mr. Ken Ismert, the graphics would not have been possible. His advice throughout the project was invaluable. I would like to extend many thanks and heart-felt appreciation to Drs. Valeria Amburgey, Richard Duschl, Renee Clift, Dell Felder, David Jameson, and Torgny Vigerstad for their most valuable criticisms, suggestions, and encouragement. Of course, special appreciation goes to my wife, Barbara Burman, for her limitless patience, ongoing encouragement, many hours of proofreading, and valuable suggestions and comments. To all those nameless persons who discovered many "bugs" and other mistakes, I extend my heartiest thanks.

Table of Contents

Introduction

"Animal Tracks" is a biology, problem solving game. It involves students in inductive reasoning and biological concepts in a way that is both challenging and enjoyable. The goal is to determine the type of animal described by a series of clues. Thought provoking clues and high resolution graphics of each animal combine to produce a motivating and multifaceted learning game.

It is designed for high school biology courses, but could be used with younger or older students depending upon the characteristics of the specific audience. The conceptual content and terminology are primarily drawn from high school textbooks.

Conceptual Framework

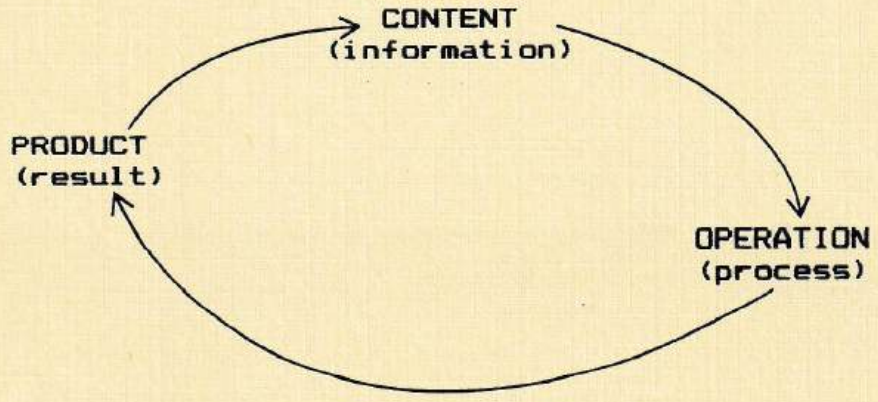
"Animal Tracks" is designed to affect student learning in three areas: (1) problem solving, (2) biological concepts, and (3) psycho-social domain.

Problem Solving

In the literature on problem solving, two basic types of problems are identified: well-structured problems and poorly structured problems. Well-structured problems are characterized by the availability of all the information needed to solve the problem and by the presence of a pre-existing algorithm or problem solving method. Poorly structured problems have neither of these characteristics. These two types of problems are actually ideal ends of a continuum. Most problems encountered in life are of the non-well-structured type. The majority of these can be referred to as semi-structured problems. "Animal Tracks" falls into the latter category. It is neither completely open-ended nor highly structured. The six possible clues offer enough information to solve the problem. However, the clues are rather obscure. The student is required to cognitively manipulate the information. The way in which this is done is left entirely up to the student. There is no particular algorithm for finding the solution.

The format of the game affects the way in which the student works with the information in the clues. It is expected that students will use an inductive method. However, the specific processes used may vary depending on the particular learning or cognitive style of the students.

According to Guilford's Structure-of-the-Intellect model, there are three aspects of thinking: (1) content, (2) operation, and (3) product. Content is the raw material, the type of information to be manipulated. The operations are the thinking processes that do the manipulation. The product is the result of the thinking processes. In "Animal Tracks" this model takes on a dynamic cyclical nature. The product of one or more clues (contents) can become the content for further processing.



The specific content involved is primarily semantic, words and ideas. The clues are verbal phrases that represent specific biological concepts or ideas. The potential operations, according to Guilford's scheme, are cognition, memory, evaluation, convergent production, and, possibly, divergent production. The products may fall into the categories of units, classes, relations, systems, transformations, and implications. The following chart delineates some of the specific processes within the category of operations and definitions of the types of products that are possible within the scope of "Animal Tracks."

OPERATIONS	PRODUCTS
cognition - recognizing - comprehending - comparing - contrasting - analyzing - extrapolating - classifying - relating - differentiating - interpreting - inferring - organizing	units - specific or isolated items of information - concrete or literal examples
memory - recalling - storing	classes - set of items of information - grouped by underlying conception or by common properties
evaluation - decision-making - judging	relations - meaningful connections between items of information
convergent production - generating the one best answer	systems - structured complexes of interrelated parts
divergent production - generating a number of possible answers	transformations - redefined or modified information
	implications - broad extrapolations of of information: expectations, predictions, etc.

The students are not expected to be involved in all of the above processes and products. However, it is expected that students will utilize many of the processes and generate a number of these products while involved in "Animal Tracks."

From the perspective of Piagetian psychology, the nature of this game encourages students to function at the level of formal operations. At this stage, assumptions are used in the process of generating hypotheses, which are expressed as propositions. The hypotheses are tested, which, in this case, may be viewed as confirming or rejecting hypotheses with the information in two or more

Conceptual Framework

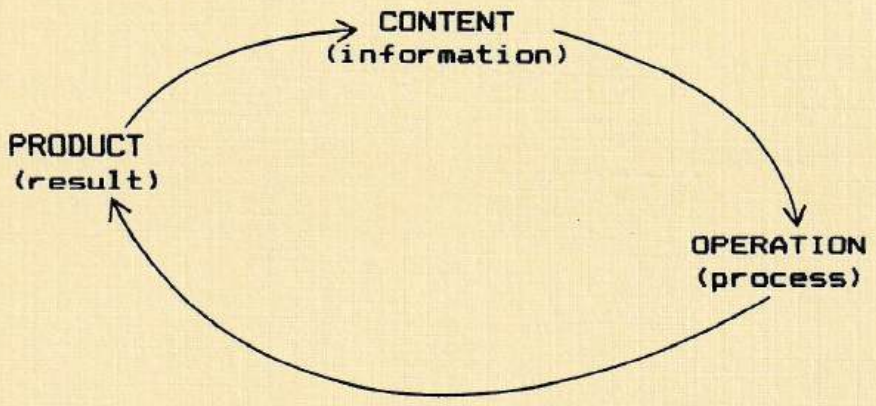
"Animal Tracks" is designed to affect student learning in three areas: (1) problem solving, (2) biological concepts, and (3) psycho-social domain.

Problem Solving

In the literature on problem solving, two basic types of problems are identified: well-structured problems and poorly structured problems. Well-structured problems are characterized by the availability of all the information needed to solve the problem and by the presence of a pre-existing algorithm or problem solving method. Poorly structured problems have neither of these characteristics. These two types of problems are actually ideal ends of a continuum. Most problems encountered in life are of the non-well-structured type. The majority of these can be referred to as semi-structured problems. "Animal Tracks" falls into the latter category. It is neither completely open-ended nor highly structured. The six possible clues offer enough information to solve the problem. However, the clues are rather obscure. The student is required to cognitively manipulate the information. The way in which this is done is left entirely up to the student. There is no particular algorithm for finding the solution.

The format of the game affects the way in which the student works with the information in the clues. It is expected that students will use an inductive method. However, the specific processes used may vary depending on the particular learning or cognitive style of the students.

According to Guilford's Structure-of-the-Intellect model, there are three aspects of thinking: (1) content, (2) operation, and (3) product. Content is the raw material, the type of information to be manipulated. The operations are the thinking processes that do the manipulation. The product is the result of the thinking processes. In "Animal Tracks" this model takes on a dynamic cyclical nature. The product of one or more clues (contents) can become the content for further processing.



clues. In addition, the format and content of "Animal Tracks" requires students to think about relationships, make transformations, and critically evaluate the evidence presented and the products of their own thinking.

Biological Concepts

The animals in "Animal Tracks" are, for the most part, common knowledge. Scientific names are not accepted. Because of the difficulty of identifying a unique Genus or species from a set of five or six clues, the names reflect more general categories. Depending upon the version of the game, the animal names are descriptive of higher levels of taxonomy (Family, Order, Class, or, possibly, Phylum).

As with effective problem solving, this game requires a certain familiarity with the biological content. In particular, students need to be familiar with the terminology and basic concepts of anatomy, physiology, reproduction and development, ecology, behavior, and taxonomy. The clues present one or two items of information, which only require recognition on the part of the student. Further recall of associated concepts is helpful in making appropriate connections.

The clues in the game appear in six categories: (1) food, (2) air, (3) water, (4) reproduction, (5) protection, and (6) behavior/ecology. Each of these categories represents an essential aspect of the way in which animals must be adapted for survival as both individuals and species.

The focus of "Animal Tracks" is to prompt students to make connections between biological concepts in the context of taxonomy, but from an ecological adaptation perspective. Typically, biology textbooks present taxonomy by describing the anatomy, physiology, and life cycles of a representative organism in each phylum or class. This material is the foundation for making connections between structure and function, function and behavior, and function and position in the ecosystem (the specific ecosystem can be identified, as well). In essence, the student can paint a picture of the animal's environment and behavior from the clues.

Psycho-social Domain

The play of "Animal Tracks" moves at a students pace. Each clue is selected by the student, who can then spend as much time thinking as is necessary. The option to pass or guess after each clue, along with the pace of the game, allows the student the opportunity to relax and, at the same time, to become emersed in the challenge of figuring out the animal in question.

Playing the game without direct teacher supervision (at the computer) gives students the opportunity to take further risks. They may hazard guesses to test their

hypotheses without feeling the pressure to perform for the teacher. In this context, students are in control of the game, which can affect their sense of freedom to explore, their motivation, and their confidence.

As a group effort (of two or three students), "Animal Tracks" can take on a whole new dimension. The literature on student to student interaction and group process indicates increased learning, as well as, many benefits in the realm of social skills. Students are able to play off each others' ideas, which can stimulate thinking in a variety of directions. By working with others, students benefit by having to communicate their ideas clearly and structure their arguments effectively.

Playing the Game

Getting started in "Animal Tracks" is quite easy. Clear instructions and error messages allow for simple operation. It is recommended that each student read the "Information" and "Instructions" sections from the Main Menu before proceeding with the game (see Appendices A and B). These sections describe the background information on the biological content, animal names, scoring, and the play of the game.

"Animal Tracks" starts when the computer is turned on (or when the disk is booted).

1. Insert the disk into drive A.
2. Turn on computer (if already ON, type PR#6 and press RETURN or press CONTROL-OPEN APPLE-RESET on an Apple IIe).
3. Two graphics title pages appear for about five seconds each.
4. Main Menu appears:

MENU

1) INFORMATION

2) INSTRUCTIONS

3) GAME

4) END

PRESS THE NUMBER OF YOUR SELECTION

5. Pressing 1 and 2 accesses several pages of background information and instructions.
6. Press C to continue reading the next page.
7. Press B to reread a previous page.
8. Press M to exit the section and return to the Main Menu.
9. Press 3 on Main Menu to start the game.
10. After approximately 10 seconds, the computer requests the user to enter his/her name. Only uppercase letters or numbers are allowed. Press RETURN when name is entered correctly.
11. The next message requests the number of animals to be guessed. In this version, that is a number between 1 and 10. Press RETURN when number is entered correctly.

12. Clue Menu appears:

SELECT THE TYPE OF CLUE YOU WANT:

1) FOOD

2) AIR

3) WATER

4) REPRODUCTION

5) PROTECTION

<PRESS THE NUMBER OF YOUR SELECTION>

13. Pressing 1 through 5 results in a clue based on that category. The following screen would appear for number 1:

FOOD CLUE:

clue phrase...

DO YOU WANT TO GUESS (G) OR PASS (P)?
PRESS <G> OR <P> ONLY.

14. Pressing <P> returns the user to the clue menu (step 12).
15. Pressing <G> adds a line to the page (as seen in step 13):

WHAT'S YOUR GUESS?

16. Enter your guess then press RETURN. If you change your mind, press RETURN.
17. If all five clues have been seen and the animal has not been determined, a sixth clue appears: ECOLOGY/BEHAVIOR CLUE.
18. There is no option to pass after seeing this clue. If a guess cannot be made, press RETURN.
19. After all six clues or after the animal has been correctly guessed, a high resolution picture of the animal appears with the name labelled at the top of the screen.
20. Pressing the SPACE BAR brings up a message indicating the score (percentage) and a rating (adjective descriptor). Press SPACE BAR to continue.
21. After a good luck message, the clue menu

appears for the next animal. If it is the last animal, a scoring wrap-up appears. The scores for each animal appear, along with an average score and a descriptive rating.

22. After the last animal and scoring wrap-up are seen, the program returns to the main menu.

Important Points To Keep In Mind

1. All animals are one word.

2. Spelling must be correct to be accepted.

3. Spelling is checked on the first three letters. If the first three match, a chance is given to correct the spelling.

4. Plurals should be avoided. If the plural is achieved by the simple addition of an "s," the name is accepted.

5. Uppercase letters must be used at all times. If a lowercase letter is entered, an error message will appear indicating that the CAPS LOCK key needs to be pressed. The game continues normally after this message screen.

6. Alternate correct answers are accepted in some cases.

7. Animals are selected randomly and are not repeated within any one game sequence.

Application to the Biology Curriculum

"Animal Tracks" can be used in a variety of ways in the biology classroom. Many of the potential uses will arise from each teacher's own creativity and specific needs. However, the following are a few ideas with which to start.

1. As a review:
   - after a unit on the taxonomy of animals
   - after an ecology unit

2. As practice in problem solving:
   - stimulates inductive reasoning

3. As enrichment:
   - gets students involved in higher levels of thinking (application, analysis, synthesis)
   - provides an opportunity to manipulate biological concepts

4. As group work:
   - affects the social skills of the students
   - increases learning
   - stimulates group problem solving

5. As individual work:
   - for those who finish work early
   - practice in manipulating concepts

6. As pre- or post-laboratory work:
   - allows specific knowledge to be applied to a the context of an animal's life history
   - stimulates thinking in terms of structure and function relationships

APPENDIX A

page 1

INFORMATION

THE OBJECT OF "ANIMAL TRACKS" IS TO DERIVE THE NAME OF AN ANIMAL FROM A SET OF SIX POSSIBLE CLUES. THE FIRST 5 CLUES CAN BE SELECTED IN ANY ORDER FROM THE FOLLOWING CATEGORIES:

1) FOOD
2) AIR
3) WATER
4) REPRODUCTION
5) PROTECTION

<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 2

EACH CLUE DESCRIBES SOME ASPECT OF THE WAY THE ANIMAL IS ADAPTED FOR SURVIVAL IN TERMS OF THE CATEGORY SELECTED. THE CLUE MAY REFER TO THE PHYSIOLOGY, ANATOMY, BEHAVIOR, OR ECOLOGY OF THE ANIMAL IN QUESTION. FOR EXAMPLE, A FOOD CLUE COULD DESCRIBE TEETH, DIGESTION, HUNTING BEHAVIOR, OR A POSITION IN THE ECOSYSTEM.

<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 3

A SIXTH CLUE APPEARS ONLY AFTER THE FIRST FIVE CLUES HAVE BEEN SEEN. IT PROVIDES FURTHER INFORMATION ON THE HABITAT AND BEHAVIOR OF THE ANIMAL

IN QUESTION. THIS CLUE IS INCLUDED

AS EXTRA HELP IF THE CORRECT ANSWER

HAS NOT YET BEEN DETERMINED.
<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 4 THE ANIMALS ARE REFERRED TO BY

THEIR COMMON NAMES (NOT SCIENTIFIC

NAMES). DEPENDING UPON THE ANIMAL,

THE NAME CORRESPONDS TO THE LEVEL OF

FAMILY, ORDER, CLASS, OR, POSSIBLY,

PHYLUM (NOT GENUS OR SPECIE). FOR

EXAMPLE, "FISH" IS TOO GENERAL AND

"RED SNAPPER" IS TOO SPECIFIC, BUT

"SNAPPER" IS CORRECT. FOR THE MOST

PART, THE NAMES APPEAR AS ONE WORD.
<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 5

*** PLEASE BE SURE TO READ THE ***

*** INSTRUCTIONS ***

<C>ONTINUE, <B>ACK PAGE, <M>ENU

APPENDIX B

page 1

INSTRUCTIONS

AFTER SELECTING THE NUMBER OF ANIMALS YOU WANT TO ATTEMPT, A CLUE MENU WILL APPEAR. THERE ARE A TOTAL OF 6 CLUES FOR EACH ANIMAL. EACH CLUE MAY BE SEEN ONLY ONCE. HOWEVER, THE CLUES MAY BE SELECTED IN any ORDER, EXCEPT FOR THE SIXTH CLUE WHICH APPEARS ONLY AFTER THE FIFTH CLUE.

<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 2

WHEN EACH OF THE FIRST FIVE CLUES APPEARS, YOU HAVE THE OPTION OF PASSING TO THE NEXT CLUE OR GUESSING BY PRESSING <P> OR <G>.

BE SURE TO PRESS <G> BEFORE GUESSING. PRESSING <P> (PASSING) ALLOWS YOU SELECT ANOTHER CLUE. AFTER THE SIXTH CLUE PRESS THE <RETURN> KEY TO PASS.

<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 3

SCORING

1) EACH ANIMAL IS WORTH 100 POINTS

2) "PASS" = MINUS 2.5%

3) WRONG GUESS = MINUS 5%

4) WRONG GUESS OR PASS ON 6TH CLUE

= MINUS 25%

LOWEST POSSIBLE SCORE = 50%

5 PASSES WITH THE CORRECT ANSWER

AFTER SIXTH CLUE = 88% (VERY GOOD)
<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 4

HINT: "PASS" TO SEE SEVERAL CLUES IF

YOU ARE NOT SURE OF THE ANSWER

*** BE CAREFUL OF YOU SPELLING ***

*** TRY TO AVOID PLURALS ***

PLEASE BE SURE TO READ

*** THE "INFORMATION" SECTION ***

IF YOU HAVE NOT ALREADY DONE SO
<C>ONTINUE, <B>ACK PAGE, <M>ENU

page 5

!!!!!!!!!!!!!!!! GOOD LUCK!!!!!

...AND HAVE FUN !!!!!!!!!!

<C>ONTINUE, <B>ACK PAGE, <M>ENU

APPENDIX C

"Animal Tracks" Animals, Alternate Answers, and Clues

Animal	Alternate Answer	Clues
Sponge	-	FOOD.....food digested in food vacuoles of specialized cells and then passed on to other cells
		AIR.....flagella of cells circulate dissolved oxygen
		WATER.....each cell regulates its own water balance
		REPRODUCTION..asexual (budding or fragmentation) or sexual
		PROTECTION....skeletal bristles (spicules) and not very edible
		ECOLOGY/BEH...sessile and offers protection for other small animals
Jellyfish		FOOD.....digestion begins in gastric cavity and is completed in food vacuoles of cells in radial canal system
		AIR.....dissolved oxygen is absorbed directly by cells
		WATER.....limited cellular osmo-regulation -> are usually considered to be osmoconformers
		REPRODUCTION..reproduce both sexually and asexually within each life cycle

		PROTECTION....venomous nematocysts and translucent to transparent body
		ECOLOGY/BEH...non-pursuing carnivores that are only sensitive to light/touch/chemicals/balance
Squid	Octopus	FOOD.....captures prey with arms and eats with beak-like jaw
		AIR.....one pair of elongated gills
		WATER.....osmoregulatory mechanisms maintain ionic balance
		REPRODUCTION..dioecious
		PROTECTION....mechanism for sudden and rapid escape and the release of a dark secretion
		ECOLOGY/BEH...highly developed eyes and nervous system with correspondingly complex behavior
Spider		FOOD.....carnivorous trappers or hunters
		AIR.....spiracles and book lungs
		WATER.....exoskeleton prevents evaporation
		REPRODUCTION..complex mating behavior that's often fatal to males
		PROTECTION....2 or more pairs of simple eyes & chemo- and mechano-receptors
		ECOLOGY/BEH...important insect population controllers

Shark	Dogfish	FOOD.....parallel rows of sharp teeth
		AIR.....cartilagenous gill arches and 5 to 6 gill slits
		WATER.....Drinks and excretes very little...but has a high urea content in blood and tissues
		REPRODUCTION..oviparous or ovoviviparous or viviparous
		PROTECTION....countershading and tough skin
		ECOLOGY/BEH...mostly top-level carivores and known for their feeding frenzies
Penguin		FOOD.....toothless predator of fish
		AIR.....lungs with reduced air sacs
		WATER.....water from food and excretion of excess salt from glands in head
		REPRODUCTION..colonial nesting sites during mating season
		PROTECTION....densely packed feathers for insulation
		ECOLOGY/BEH...fast and agile swimmers with countershading for added protection
Bat		FOOD.....many catch flying insects
		AIR.....very rapid respiration rate
		WATER.....avoids times of excessive heat and keeps water loss to a minimum

		REPRODUCTION..2 mammary glands and 1 1 to 2 young
		PROTECTION....partly hair covered body and most have large ears
		ECOLOGY/BEH...hibernation-like state diurnally (during day-light hours)
Armadillo		FOOD.....feeds mostly on insects with peglike teeth and long tongue
		AIR.....lungs and nostrils
		WATER.....drinks from streams and ponds
		REPRODUCTION..always gives birth to 4 young of the same sex
		PROTECTION....armored plates and jumps straight up when startled
		ECOLOGY/BEH...mostly nocturnal
Frog		FOOD.....carnivorous with extensible tongue
		AIR.....moist skin and lungs without diaphragm as adults
		WATER.....skin is readily permeable to water
		REPRODUCTION..males' vocalizations used in mating rituals
		PROTECTION....camouflage and strong posterior legs
		ECOLOGY/BEH...adults live in and out (but always near) water
Dolphin	Porpoise Whale	FOOD.....row of sharp and cylindrical teeth on each jaw

AIR.....'nostrils' located on dorsal surface of head

WATER.....drinks very little - gets water from food

REPRODUCTION..gives birth to 1 young which is nursed with mammary glands

PROTECTION....fast and agile swimmers

ECOLOGY/BEH...frequently travel in large groups - intricate vocal communication

Literature

Biological Content

Ballard, W. W. (1964). Comparative Anatomy and Embryology. New York: Ronald Press.

Blair, W. F., et al. (1957). Vertebrates of the United States. New York: McGraw-Hill.

Curtis, H. (1972). Invitation to Biology. New York: Worth Publishers.

Johnson, W. H., Delanney, L. E., Williams, E. C., & Cole, T. A. (1977). Principles of Zoology. New York: Holt, Rinehart and Winston.

Keeton, W. T. (1967). Biological Science. New York: W. W. Norton.

Krogh, A. (1965). Osmotic Regulation in Aquatic Animals. New York: Dover.

Lagler, K. F., Bardach, J. E., & Miller, R. R. (1962). Ichthyology. New York: John Wiley & Sons.

Meglitsch, P. A. (1967). Invertebrate Zoology. New York: Oxford University Press.

Nicol, J. A. C. (1968). The Biology of Marine Animals. London: Pitman & Sons.

Odum, E. P. (1971). Fundamentals of Ecology. Philadelphia: W. B. Saunders.

Orians, G. H. (1969). The Study of Life: An Introduction to Biology. Boston: Allyn and Bacon.

Otto, J. H., Towle, A., & Madnick, M. E. (1977). Modern Biology. New York: Holt, Rinehart and Winston.

Palmer, E. L. 1949. Fieldbook of Natural History. New York: McGraw-Hill.

Peterson Field Guide Series. Boston: Hougton Mifflin.

Storer, T. I. & Usinger, R. L. (1957). General Zoology. New York: McGraw-Hill.

Educational Theory:

Beard, R. M. (1969). An Outline of Piaget's Developmental Psychology for Students and Teachers. New York: Basic Books.

Frederiksen, N. (1984). Implications of cognitive theory for instruction in problem solving. Review of Educational Research, 54(3), 363 - 407.

Macdonald Educational. (1972). With Objectives in Mind: Guide to Science 5/13. London: Schools Council Publications.

Michael, W. B. (1977). Cognitive and affective components of creativity in mathematics and the physical sciences. In: J. C. Stanley, W. C. George, and C. H. Solano (eds.). The Gifted and the Creative. Baltimore, MD: Johns Hopkins University Press, pp. 141 - 172.

2337 Wroxton Rd.
Houston, TX 77005
May 21, 1985

Mr. Peter Cochran, Vice President
HRM Software
175 Tompkins Ave.
Pleasantville, NY 10570

Dear Mr. Cochran:

Thank you for your prompt reply concerning "Animal Tracks." I have enclosed a copy of the program on a diskette, along with the user documentation. The program, as you are receiving it, is the generic or pilot version. Ten animals are included. They represent samples of both vertebrates and invertebrates. As I mentioned in my previous letter, many different versions are possible. Some could focus on vertebrates, invertebrates, or specific phyla, while others could focus on zoo field trip preparation or on animals common to specific regions.

Please take note of my new address which will be effective as of June 1st. The new phone number will be (713) 524-4033.

As of yet I have not submitted "Animal Tracks" to any other publishers. I do have other query letters out, but have not received any replies at this time. However, I have ranked HRM Software as my first choice in publishers. I hope you find "Animal Tracks" to be a valuable addition to your selection of software.

I am very interested in working with you in the future and am looking forward to hearing from you again.

Sincerely,

Jeff Bloom

APPENDIX A

page 1

INFORMATION

THE OBJECT OF "ANIMAL TRACKS" IS TO DERIVE THE NAME OF AN ANIMAL FROM A SET OF SIX POSSIBLE CLUES. THE FIRST 5 CLUES CAN BE SELECTED IN ANY ORDER FROM THE FOLLOWING CATEGORIES:

1) FOOD
2) AIR
3) WATER
4) REPRODUCTION
5) PROTECTION

page 2 EACH CLUE DESCRIBES SOME ASPECT OF THE WAY THE ANIMAL IS ADAPTED FOR SURVIVAL IN TERMS OF THE CATEGORY SELECTED. THE CLUE MAY REFER TO THE PHYSIOLOGY, ANATOMY, BEHAVIOR, OR ECOLOGY OF THE ANIMAL IN QUESTION. FOR EXAMPLE, A FOOD CLUE COULD DESCRIBE TEETH, DIGESTION, HUNTING BEHAVIOR, OR A POSITION IN THE ECOSYSTEM.

page 3 A SIXTH CLUE APPEARS ONLY AFTER THE FIRST FIVE CLUES HAVE BEEN SEEN. IT PROVIDES FURTHER INFORMATION ON THE HABITAT AND BEHAVIOR OF THE ANIMAL

IN QUESTION. THIS CLUE IS INCLUDED AS EXTRA HELP IF THE CORRECT ANSWER HAS NOT YET BEEN DETERMINED.

page 4 THE ANIMALS ARE REFERRED TO BY THEIR COMMON NAMES (NOT SCIENTIFIC NAMES). DEPENDING UPON THE ANIMAL, THE NAME CORRESPONDS TO THE LEVEL OF FAMILY, ORDER, CLASS, OR, POSSIBLY, PHYLUM (NOT GENUS OR SPECIE). FOR EXAMPLE, "FISH" IS TOO GENERAL AND "RED SNAPPER" IS TOO SPECIFIC, BUT "SNAPPER" IS CORRECT. FOR THE MOST PART, THE NAMES APPEAR AS ONE WORD.

page 5

*** PLEASE BE SURE TO READ THE ***

*** INSTRUCTIONS ***

APPENDIX B

page 1

INSTRUCTIONS

AFTER SELECTING THE NUMBER OF ANIMALS YOU WANT TO ATTEMPT, A CLUE MENU WILL APPEAR. THERE ARE A TOTAL OF 6 CLUES FOR EACH ANIMAL. EACH CLUE MAY BE SEEN ONLY ONCE. HOWEVER, THE CLUES MAY BE SELECTED IN ANY ORDER, EXCEPT FOR THE SIXTH CLUE WHICH APPEARS ONLY AFTER THE FIFTH CLUE.

page 2

WHEN EACH OF THE FIRST FIVE CLUES APPEARS, YOU HAVE THE OPTION OF PASSING TO THE NEXT CLUE OR GUESSING BY PRESSING <P> OR <G>.
BE SURE TO PRESS <G> BEFORE GUESSING. PRESSING <P> (PASSING) ALLOWS YOU SELECT ANOTHER CLUE. AFTER THE SIXTH CLUE PRESS THE <RETURN> KEY TO PASS.

page 3

SCORING

1) EACH ANIMAL IS WORTH 100 POINTS
2) "PASS" = MINUS 2.5%
3) WRONG GUESS = MINUS 5%
4) WRONG GUESS OR PASS ON 6TH CLUE

= MINUS 25%

LOWEST POSSIBLE SCORE = 50%

5 PASSES WITH THE CORRECT ANSWER

AFTER SIXTH CLUE = 88% (VERY GOOD)

page 4

HINT: "PASS" TO SEE SEVERAL CLUES IF YOU ARE NOT SURE OF THE ANSWER

*** BE CAREFUL OF YOU SPELLING ***

*** TRY TO AVOID PLURALS ***

PLEASE BE SURE TO READ

*** THE "INFORMATION" SECTION ***

IF YOU HAVE NOT ALREADY DONE SO

page 5

!!!!!!!!!!!!!!!! GOOD LUCK!!!!!

...AND HAVE FUN !!!!!!!!!!