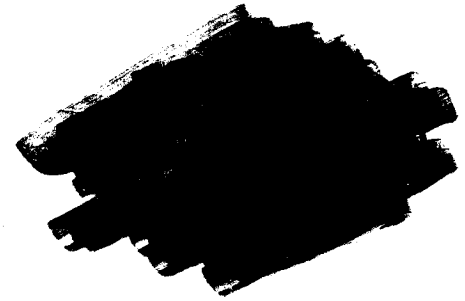


DINOSAUR DISCOVERY

Teacher's Manual



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A product of Jacaranda Software

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General information

The *Dinosaur Discovery* package contains the following:
a floppy disk;
a Teacher's Guide;
5 copies of the explorer's journal or diary;
a set of 6 black line masters: an opening page for the students' log, an illustration and note-taking page for the log, a grid for plotting a map of the main screen, a grid for plotting Stegosaurus Straits, a screen print master (for T-shirts, etc.), and a *Dinosaur Discovery* certificate.

Note:

1. The diary and the black line masters may be copied for student use only within the educational institution for which they have been purchased; in these circumstances no payment for copying is required by the copyright holder.
2. Please make a backup copy of this disk and put the original in a safe place. You are permitted to make one backup copy for use in your institution. **Any attempt to distribute copies of this disk outside your institution will be viewed as a serious breach of copyright and will result in legal proceedings being initiated against the individual(s) involved and their employer.**

Aim of the program

Dinosaur Discovery is a problem-solving and experiential learning activity that requires a number of reading skills to be applied to a game. Children will need to

- read and comprehend text in a variety of forms.
- discriminate between fact and fiction,
- take notes for later use,
- find main ideas,
- check cross-references,
- read tables of information, and
- make logical deductions.

Students should develop skills in

- reading comprehension (factual and inferential),
- selecting main ideas,
- problem solving, and
- decision making.

About the program

A group of children has the task of finding their way about an area that contains a number of elements essential for the hatching of a dinosaur's egg. The only clues that players have are in a diary left by the scientist who made the original discovery. It is not intended that they should be successful at their first or even second attempt. With each attempt, players should build up their experience of the micro-world created for the game and, by solving the problems in the game, eventually succeed. A number of random elements are built into the game. These are interrelated so that students must visit most parts of the map each time they play the game.

The game begins with the players having to decide which items or tools to take with them from the shed. (The shed can be revisited if an error in judgment is made.) To leave the shed the players must solve a word puzzle that contains words selected from those used in the game. When they first leave the shed, only the part of the map around the shed is displayed. The map is gradually added to as the players explore the environment. After selecting a direction, players will move to the next activity.

The instructions for each section are displayed at the beginning of the activity. Players will have to follow instructions, comprehend information on the screen, and solve problems in each section. They must live with the consequences of their decisions for the rest of the game.

A map of the area appears on page 6.

The diary is vital!

The explorer's diary or journal provides general information about the environment of the game from which the game's goal can

be inferred. By reading the diary, players will be able to relate the scientist's activities to what they are doing and plan their approach to the game. They will need to search for relevant details, take notes of important facts, determine the main ideas and produce a flowchart of the activities that take place. **If students do not read the diary, there will be little purpose to their activity.** Lacking the information it contains, students will make unnecessary and frustrating errors, some of which will end the game. The diary may be used as part of the reading resources in the classroom and/or as a basis for creative writing, before, during or after the game.

The black line masters

Taking notes

When reading information, it is essential first to identify what is relevant and then to take notes. Players will not be able to remember all that is required, especially as they are not expected to succeed at the first attempt and will have to start again at a later date. Information recorded in the log will be the basis for future plans to complete the game. Hence the importance of taking notes — researching will be demonstrated practically and children should be encouraged to continue the process when working on other projects.

Use of the map grids

As the game progresses, children can build up a map of the game environment and the sea voyage. This will help them to plan and will prove a valuable spatial relationship exercise. This can be related to the maps that were drawn by explorers of the unknown oceans and lands of the New World.

Use of T-shirt and certificate masters

These could be used as a reward for those that have attempted the game and succeeded. This may motivate other children to progress through the reading activities in the game.

Prerequisite understanding

This program emphasises the use of various reading skills in various activities and some reading ability is assumed. Children should also be able to

- start the program,
- know the location of the arrow (cursor) keys and the space bar, and
- enter text and press the RETURN key when they see the — symbol.

The game is not intended to teach children to read, but rather to practise some of the higher skills of reading and demonstrate to children the importance of being able to read for information.

Time required to use this program

Players should not expect to succeed at their first try; it may take a number of attempts before they succeed. The game could be played in a number of 30-minute sessions spread over a number of days, or even weeks. (For notes on saving the game, see page 22.) The program is sufficiently complex and variable to maintain interest for a considerable period of time. It could form the basis for an extended theme, provided teachers plan learning activities that exploit the possibilities offered by the locations in the game.

Teacher involvement

The teacher's role is to prepare students to begin the game and to facilitate extension activities that reinforce and build on the learning gained in the game. It is recommended that teachers do *not* provide specific help to children who are actually working at the computer. All the instructions are included in the game and the children are likely to learn more by making mistakes and correcting them. Experiential learning will *not* take place if the children are handed solutions or are prevented from making mistakes.

Points regarding classroom use

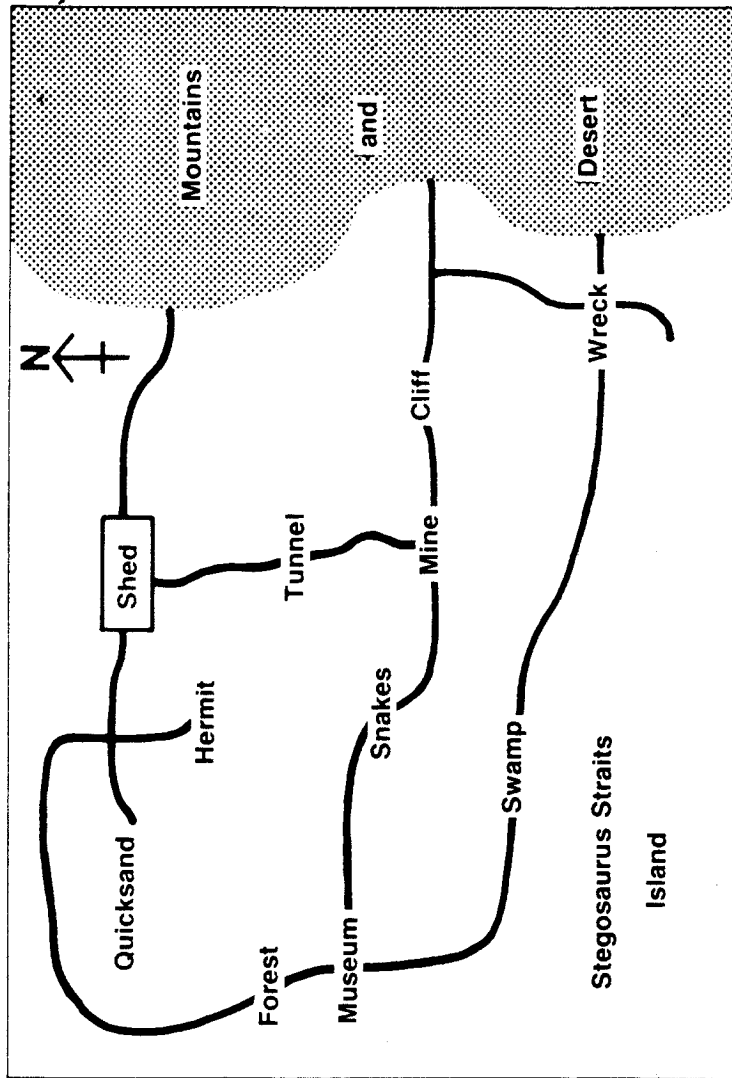
The game may be played by one person but it is more beneficial if it is played by a small group. Players talk to each other, clarify their ideas and improve their communication skills — precise details must be given to finish many of the activities; in this way children learn from each other.

Because players need to discuss decisions, the computer should be located where it will not disrupt the rest of the class. If it is placed in a back corner of the room facing the back wall with a low screen around it, the teacher can observe what is going on while moving around the class and the children seated in the classroom will not be distracted by the computer.

A game may be saved at any point, but preferably after finishing an activity. To save a game the ESCAPE key is pressed and the computer will automatically save the game. It will tell the players the number of the game it saved. The player(s) **must** write this down in their log so that they can restart from their last position. Players should not tell others their number and should not try to use any other game number when they restart a game. This is pointless because players may land in a part of the game they know nothing about, and they certainly won't know the correct information.

There is no student guide. The diary is, and should remain, the **only** clue that the children have on what the game is all about. Teachers should not produce their own student guide, nor should a map of the game be supplied, as this would prevent children deducing, inferring and predicting what will happen.

All the players should be given a log to keep track of information. The grids should be made available so that they can record their progress for use in later attempts. The value of previous experience is thus demonstrated and players should be encouraged to use this approach in other school work.



Note: This map should not be copied for students.

Activities in detail

The diagram on page 6 shows all the locations in *Dinosaur Discovery* as they will gradually appear on the main game screen.

The sub-sections that follow give details of each location. All new games start at the shed and so details of this are given first. Similarly, most games will finish with the voyage across Stegosaurus Straits and on to the island, and so details of the straits and the island are at the end. Since the other locations can be visited in almost any order, they are listed alphabetically after the shed.

Shed

PART A

Objective

To select a number of relevant objects from a list of objects found in the shed.

Educational aims

- To provoke discussion on the purpose of *Dinosaur Discovery*.
- To develop decision-making processes.
- To make the individual or group develop some form of "yardstick" to measure the worth of an item.
- To act as a source of data to be recorded in the log.

About the activity

A list of six items is displayed in a diagram of a shed. The student may select up to five items or leave without taking any. Since one thing must be left behind, students must decide which items are likely to be most useful. When students have finished making a selection, they enter "L" to leave the shed and this sends them into part B of the shed activity.

Extension activities

- Set up some other cases involving problems of selection. Relate to problems in mathematics where there may not be enough data or too much. (There are some classical decision-making activities available which depend on this technique of limiting the number of items to be taken from a group; e.g., *Lost in the Desert* or *Desert Survival*.)

- (b) Observe the decision-making activities of the group and use them to select leaders.
- (c) Identify communication problems between members of a group and discuss them with the children.
- (d) Use as a basis for discussion on how decisions are made and ways of improving the decision-making process. Relate to government.

PART B

Objective

To locate words contained in a grid of letters. (A list of words is provided.)

Educational aims

- (a) To increase a child's visual perception.
- (b) To develop the use of patterning.
- (c) To give practice in comparison.
- (d) To provide an incentive to develop a search technique.
- (e) To provide familiarisation with the use of the arrow keys. (The use of these keys is necessary in other activities.)
- (f) To familiarise the students with vocabulary that occurs in other activities.
- (g) To reinforce the spelling of a set of associated words.

About the activity

A grid of letters is displayed together with a list of words down the right margin. Students move the cursor over the letters forming the words using the arrow keys. The letters of the words are highlighted as the cursor moves over them. The cursor will not move onto any wrong letters and hence every group eventually must succeed in this first activity. When all the words have been highlighted, players exit the shed and have a choice of travelling east, south, west or back into the shed. At the same time, a portion of the map is revealed to them. As students explore the game, more of the map is revealed to them.

Extension activities

- (a) Children could make their own word mazes from lists of spelling or vocabulary words.

- (b) Scramblegrams could be made for use by the children. There are computer programs available to make these.
- (c) Discuss a search technique for finding your way through a maze. This could be tried out with pencil and paper using small mazes or by marking a maze on the floor and walking around it using floor turtles with sensors in a small cardboard maze.
- (d) Discuss the meaning of the words used in the maze.
- (e) Use Wonder Word puzzles to reinforce the idea of searching for a word among distractors. Use words from class lists.
- (f) Children construct and exchange crosswords.

Cliff

Objective

To put a set of words into alphabetical order.

Educational aims

- (a) To sort words into alphabetical order.
- (b) To reinforce vocabulary used throughout the program.
- (c) To reinforce the spelling of a set of associated words.
- (d) To provide decision making in selecting the appropriate tool for the activity.

About the activity

Players must first select the appropriate item for the activity from the items they are carrying. If they don't have the item or don't select the item then they cannot carry out the activity.

Players are presented with a list of words that have to be put into alphabetical order. As the words are put into order, a figure ascends or descends the cliff according to the direction of travel. When the list is in order, players may proceed.

Extension activities

- (a) Use of dictionary.
- (b) General sorting activities involving seriation, e.g. rat, cat, horse, tree (largest to smallest, slowest to fastest, etc.).

Desert

Objective

To find the (hidden) tombstone in the desert.

Educational aims

- To reinforce knowledge of the four cardinal points of the compass.
- To practise estimating distances using a map scale.
- To develop problem solving (search techniques).
- To relate information on one map to another map.
- To prompt the recording of relevant information.
- To provide a cross-reference to other activities.

About the activity

The tombstone is hidden in the eastern desert and will only show up when players are within 3 km of it. They must work out a method of searching the desert efficiently or they will spend a good deal of time wandering around. To move, students indicate a compass direction and a distance (estimated from a scale shown on the map). When the tombstone is found, players must navigate right up to it before the letters on it are displayed. The information is needed on the island. (It is the combination for the lock on the door of the laboratory.)

Extension activities

- Playground or classroom games where a "director" gives verbal directions to a blindfolded child who tries to navigate an obstacle course or draw a mystery picture on the blackboard. **Such activities are good precursors to the use of LOGO in the classroom.**
- Children prepare and exchange "treasure maps" on grid paper with written directions on how to find the mystery location, either in terms of cardinal directions, number or letter coordinate systems, descriptive passages or mixtures of all three.
- Relate to *Moving Into Maps* or other atlas work.

Forest

Objective

To decode a word using a substitution code.

Educational aims

- To compare items of information.
- To search for patterns.
- To use decoding skills.
- To select appropriate tools for a job.

About the activity

Students select an appropriate tool from the items they are carrying to get through the forest. If the selection is correct, they are presented with the key to a simple transcription code and are required to decode one word. When the word is decoded, players may pass through the magic creepers blocking the way through the forest.

Extension activities

- Other codes may be developed by children and exchanged.
- Groups could develop a "coding machine" of their own design and compete to produce an "uncrackable" code.
- Part of the development of computers grew from the need to crack codes — check on the history of the ENIGMA machine.
- Look at other aspects of coding: morse code, semaphore code, flag code, ASCII code and binary code.
- Research history to find some of the roles played by codes in shaping the destiny of the world.

Some useful references follow:

- Beal, George. *Codes, Ciphers and Secret Writing*. London: Hamlyn, 1973.
- Bielewicz, Julian A. *Secret Language*. Sydney: Holt, Rinehart and Winston, 1976.
- Norman, Bruce. *Secret Warfare — The Battle of Codes and Cyphers*. London: Wren, 1973.
- Sarnoff, J., and Ruffins, R. *The Code and Cipher Book*. New York: Charles Scribner, 1975.
- Zim, Herbert S. *Codes and Secret Writing*. London: Pan, 1971.

Famous codes can be found in literature, e.g., Edgar Allan Poe's *The Gold Bug* and Jules Verne's *Voyage to the Centre of the Earth*.

Hermit

Objective

To gather essential information from the hermit.

Educational aims

- To derive the essential content of textual information.
- To differentiate between factual information and beliefs.
- To record relevant information in the log.

About the activity

Students read screens containing information vital to the success of *Dinosaur Discovery*.

Extension activities

- Teacher or children write mystery stories in which clues are disguised or need to be inferred (these could be of the two minute mystery type). Stories could be collected and published as part of a process writing program.
- General activities on precis writing using selected extracts from the diary or reading program.
- Comparing reference sources in terms of their authority. Link with library research skills when there is conflicting information in books.
- Dramatise the situation with the hermit changing the information he gives each time. The class has to listen to the conversation between the hermit and an explorer and note clues.

Mine

Objective

To retrieve an egg and a crystal from the mine.

Educational aims

- To develop the concept of building the whole from the part.
- To develop direction-finding skills.

- To develop problem-solving ability.
- To practise selection of relevant information.
- To practise exploratory mapping.
- To demonstrate the value of recording information.
- To have children infer and predict results.

About the activity

This module tries to create a realistic picture of the inside of a mine. The student can only see a small portion of the intricate tunnel and moves around the maze-like structure using the arrow keys.

The object of the exercise is to recover an egg and a crystal, each of a specific colour. Previous information (in the museum) will determine which coloured objects to choose. With some ingenuity children can dispose of the wrong egg, but they must leave the mine to dispose of wrongly coloured crystals.

Extension activities

- Draw a map of the tunnel giving the positions of objects in order to facilitate the game.
- Make a three-dimensional model of the mine as an art or craft activity.
- Have one child who can see the screen issue instructions to another child who uses the keyboard but who can't see the screen. Look at the communication process and discuss the results.

Note: The mine has a number of random sections, hence not all maps will be the same.

Museum

Objective

To locate and select important information relevant to the success of the eventual hatching of the egg.

Educational aims

- To read for a specific purpose.
- To skim the text to locate key words and main ideas.
- To select titles relevant to a subject.
- To know word meanings.

- (e) To record relevant information in a log
- (f) To compare facts and beliefs.
- (g) To note visual clues, i.e. the date.
- (h) To use an alphabetical index of book titles.
- (i) To check cross-references between books.

About the activity

In this module, students will be aware that they need to collect specific information. A selection of book titles is presented for viewing. Students select as many of the texts as they wish to read. Most of the information is available from other sources; only three texts contain information that is unavailable elsewhere. The student will need to infer from titles which books are necessary.

Within the texts, students will be able to locate some information from tables, a map and lists.

They will also need to check the facts in the books against the hermit's beliefs re tide times. (See also the diary.)

The date is displayed on a calendar in the museum — this is the only place it can be found.

Extension activities

- (a) Discussion of book titles (compare titles of stories and novels with those of reference books), what information may be within the book and then investigate what is in it.
- (b) Use tables of information as a basis for a writing activity in which students expand the data into a factual account.
- (c) In science, provide sets of tables from which children can draw real inferences.
- (d) Checking the integrity of the source authority.
- (e) Research skills — use of catalogue system.

Quicksand

Objectives

To find a word given the number of missing letters.

Educational aims

- (a) To apply spelling rules.
- (b) To use deductive reasoning.
- (c) To relate to past experiences.

About the activity

A figure is caught in quicksand and can be released by finding all the missing letters. For each letter missed the figure sinks further into the quicksand.

Extension activities

- (a) Discuss the construction of words. Develop a plan of attack for hangman games that is dependent on vowel-consonant relationships.
- (b) Do a letter count for several paragraphs. Construct a tally sheet and graph the results. Group the letters by vowels and consonants, sorted by frequency. Use this information to play hangman, perhaps with words from the spelling list, and note any improvement.

Table 1: Expected frequency of letter occurrences in English

Letter	Expected frequency (%)	≈frequency per 1000 characters
E	13	130
T	9	90
A, O	8	80
N	7	70
I, R	6.5	65
S, H	6	60
D	4	40
L	3.5	35
C, U, M	3	30
F, P, Y	2	20
W, G, B	1.5	15
V	1	10
K, X, J	0.5	5
Q, Z	0.2	2
Space	Frequency varies according to word length in the range 10–20%	100–200

Note: An A4 typewritten page holds 3500–4000 characters.

- (c) Write a story or play about being caught in quicksand.

Snakes

Objective

Decoding anagrams.

Educational aims

- To provide a spelling activity based on words relevant to the program.
- To develop decoding skills.

About the activity

Students attempt to unscramble three anagrams presented to them. The entry of any wrong letter is not accepted and the letters must be entered in correct order. Hence children gradually build up the word from left to right, by trial and error if necessary, until they recognise the word. As each anagram is solved, one of the anagram letters disappears.

Extension activities

- Teacher or children write anagrams of spelling/vocab lists.
- Games based on the principles of Boggle or Scrabble, based on the spelling lists (i.e. the word cubes or tiles limited to the letters found in a subset of the spelling or vocab list).
- Coded phrase or message activities with anagrams -- children could develop an "algorithm" for creating the anagrams (first letter exchanged with last, then second with last, then fourth with second, etc.).
- Look at the structure of words in terms of the relationship between consonants and vowels and develop a method of attack for decoding anagrams.

Swamp

Objective

To find your way through a maze.

Educational aims

- To teach children to look ahead.
- To solve problems by backtracking.
- To develop a search pattern.

- To develop a maze-solving strategy.
- To improve hand-eye coordination.

About the activity

Students must guide a cursor through a maze using the arrow keys. Passing through the maze allows the students to continue in the same direction; otherwise they must go back.

Extension activities

- Art activity -- students draw their own mazes -- use of compasses, set squares, protractors and other appropriate aids.
- Try 3D computer-generated maze programs.
- Research history -- Hampton Court Maze, the Labyrinth of Minotaur.
- Write directions to traverse a simple maze. By reading these aloud, it should be possible to guide a blindfolded student through the maze.
- Students develop a flowchart/algorithm to solve any maze.

Tunnel

Objective

To guide the cursor through a randomly generated tunnel system.

Educational aims

- To improve hand-eye coordination.
- To train the eye to look ahead.

About the activity

A randomised tunnel shape is drawn and the student has to guide the cursor through the tunnel. This activity is to provide a game to act as a motivator. The number of bumps and time taken could be recorded in the log for comparison with later attempts or with other students' attempts.

Extension activities

- Write a story about being lost in a tunnel.
- Introduction to speleology.
- One child watching the screen instructs an operator who can only see the keys (i.e. reverse the monitor).

- (d) Keep a class list of results and from these produce a tally sheet. Use this information to draw a graph and draw conclusions between speed of traversing compared with the number of bumps.

Note: The conclusions from item (d) of the extension results will not be statistically correct as the tunnels are different in each game, but the general inference can be drawn that too much speed often results in more collisions.

Wreck

Objective

To acquire a sea chart needed for negotiating Stegosaurus Straits on the way to the island.

Educational aims

- (a) To develop decision making (choosing appropriate tools).
- (b) To develop divergent thinking by choosing alternatives.

About the activity

Inside the wreck is an old sea-chest that holds a sea chart which is essential for finding the way across to the island. The students must open the chest and take the chart.

Extension activities

- (a) Match tools with appropriate activities: rope — climbing; axe — cutting; etc.
- (b) Discuss importance of maps.
- (c) Discuss various types of maps and charts.
- (d) Draw a pirate treasure map in art. "Age" the surface, roll the map into a tube and singe the edges with a candle to give it an "authentic" look.

Straits

Objective

To guide the boat through a series of obstacles on the way to the island.

Educational aims

- (a) To improve hand-eye coordination.
- (b) To deduce the resultant direction (caused by the current).
- (c) To plan a map route.
- (d) To develop the concepts of chronological order and cyclic order.
- (e) To develop mapping skills — map the straits on to a photocopy of the black line master.
- (f) To make reference to previously recorded information.
- (g) To read tables of information.

About the activity

The students select the departure time for the crossing from the tide tables (inside the back cover of the diary). The student steers the row-boat past rocks, etc. to the island. Currents will cause the boat to move on its own until it passes out of the current.

Success is almost impossible if the tide is not right.

Extension activities

- (a) Children could design their own simple charts on grid paper with "current zones" and a starting point and objective. They could exchange charts.
- (b) The tide chart could be used as the basis of time problems in maths, e.g. "How far apart were the high tides of July 15?" or "Estimate the time of low tide on July 3."
- (c) A study of tides, navigation, etc. could be made in science and social studies.
- (d) If players failed, discuss the reason or reasons for failure, particularly if related to not knowing the date and crossing information.

Island

Objective

To hatch an egg.

Educational aims

- (a) To relate previously recorded information to a current query.
- (b) To collate recorded information.
- (c) To enter information using alphanumeric order.

- (d) To cross-reference information.
- (e) To follow a set of instructions.

About the activity

Once on the island, you have to supply relevant information necessary for activating a machine that eventually incubates and hatches the egg.

A surprise awaits the student who has been successful in acquiring the correct information.

The wrong information fed into the machine will cause unexpected results.

Extension activities

- (a) Alphabetical order/numerical order.
- (b) Search through records for necessary information.
- (c) Construct a fantasy machine as an art activity and perhaps introduce the art of Escher.

Operating instructions

Getting started on the Apple

1. There are two disks supplied in the Apple version: a start-up disk, which must be run first, and the program disk. Put the start-up disk in drive 1. (If you have dual disk drives, put the program disk in drive 2.)
2. Switch on the monitor.
3. Switch on the computer.
4. If using dual disk drives, proceed to step 5; otherwise remove the start-up disk when the red light goes off. Insert the program disk, shut the door of the disk drive and press the space bar.
5. Once the title screen has appeared, press the SPACE BAR to start the program.

Getting started on the BBC

1. Switch on the monitor.
2. Switch on the computer.
3. Put the *Dinosaur Discovery* disk in the disk drive and shut the drive door.
4. Hold down the SHIFT key and press the BREAK key; then release the BREAK key *before* taking your finger off the SHIFT key.
5. Once the title screen has appeared, press the SPACE BAR to start the program.

Getting started on the Microbee

1. Turn on the monitor.
2. Turn on the computer.
3. Put the master disk into the disk drive (label side up). If you have a dual disk drive, put it into the one with the light on.
4. Type BASIC and then press the RETURN key. Wait until the computer beeps.

5. Take out the master disk and insert the *Dinosaur Discovery* disk (label side up) in the same drive.
6. Type RUN "DINO" and press the RETURN key.

Noises?

The volume of the sound effects is set during the opening sequence of the game.

Saving a game

You may save a game in progress at any time by pressing ESCAPE and following the instructions on the screen. (The best time to save a game is while the map is showing — see "Points regarding classroom use", page 5.)

To restart the saved game, follow the "Getting started" instructions and choose to "Continue a saved game".

Utility program

This package includes a utility program for printing extra copies of the Stegosaurus Straits tide tables and erasing the file of saved games should this become necessary.

To run the program, make sure that, if required, the printer is connected and switched on and follow the instructions appropriate to your computer:

Apple

1. Put the start-up disk in drive 1 and turn on the monitor and computer in the usual way.
2. While the red light on the disk drive is glowing, hold down the "U" key.
3. Make your choice from the menu when it appears.

BBC

1. With the computer and monitor switched on, put the disk in drive 0, type CHAIN "UTILITY", and press RETURN.
2. Make your choice from the menu when it appears.

Microbee

1. With BASIC loaded, put the program disk in the drive on which the red light is glowing, type RUN "UTILITY" and press RETURN.
2. Make your choice from the menu when it appears.

In conclusion

The Jacaranda Software philosophy is as follows:

- students should control the computer, not vice versa;
- computers should not demand "right answers" — they should demonstrate the effects of every decision;
- computers do not replace teachers, blackboards, playgrounds or books — they complement them;
- computers should support and extend what we are doing in the classroom. Teachers should be able to use them to do things that are not otherwise possible or practical.

Extension activities

Art

- (a) Screen print T-shirts from the master for those who have played the game. Perhaps these should be reserved for successful players.
- (b) Make a diorama or three-dimensional model of each activity.
- (c) Paint a mural depicting as many of the activities as possible. Possible resource: Brown, Michelle. *Fun to Know About Dinosaurs*. London: Armada Books, 1978.

Science

- (a) Make crystals (e.g. sugar or sodium chloride).
- (b) Make "fossils" from clay. (Resource: Hutton, Deane, and Morrison, Rob. *What Happens When ... ? Expressways*. Level 7. Brisbane: The Jacaranda Press, 1984.)
- (c) Hatch a real egg.
- (d) Research on dinosaurs (for those who aren't already "dinosaur freaks").
- (e) Find and draw examples of animals' and birds' footprints. How could such prints become fossilised?
- (f) Research and discuss navigation and navigation aids, both historical and modern.
- (g) How do oars work? What causes tides? What factors can alter coastlines and the ocean bottom?

Social studies

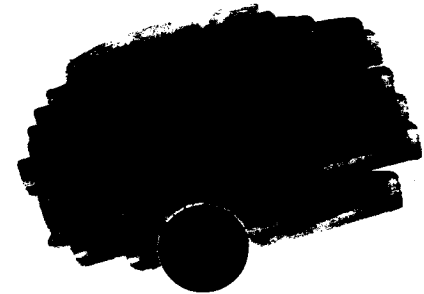
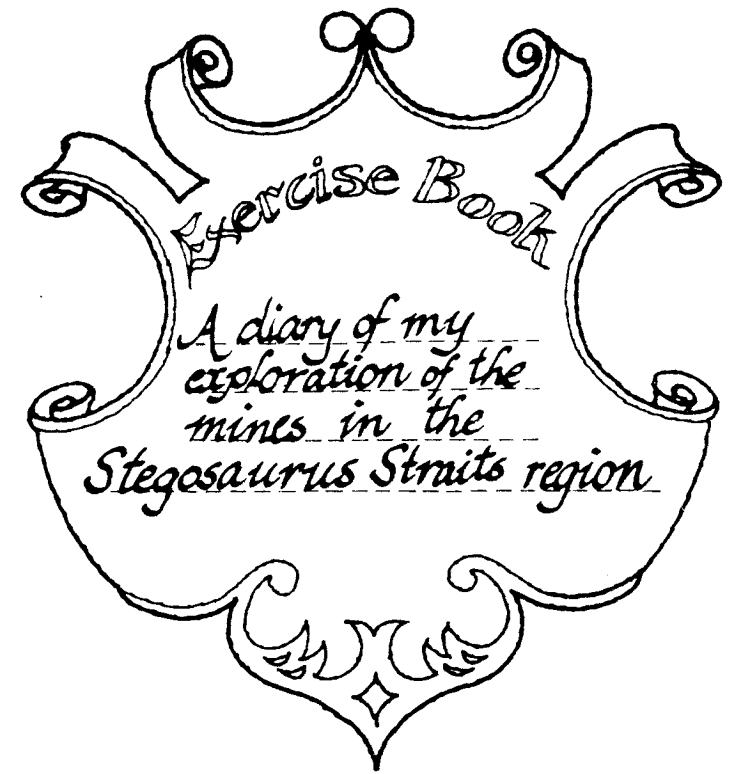
- (a) Set up a maze with room dividers or cardboard and have children carry out some exploratory mapping.
- (b) Make a grid map of the classroom or part of the school ground.
- (c) Relate events to experiences of real explorers, e.g. Burke and Wills, Leichhardt, discovery of the Lascaux cave paintings.
- (d) Make a scale model of the area covered by the map. A 1200 x 900 mm sheet of hardboard is an ideal size for a group of 4 to 6 to work on using clay, papier-mâché and paint.

Mathematics

- (a) Program a floor turtle to find its way out of a maze constructed on the floor.
- (b) Investigate simple codes and combinations.
- (c) Measure and draw a full-sized dinosaur on the playground, working from a grid superimposed on a scale drawing.
- (d) Display a list of all the problem-solving methods used by the children. (There are about 14 recognised methods.)

Language arts

- (a) Use the scientist's diary or, better still, a student's log as a basis for a story about the adventure.
- (b) Each activity could be written up by different children and the result put together to form a class book with suitable illustrations.
- (c) Organise the class to make a twist-a-plot book based on all or part of the game.
- (d) Small groups of children could be encouraged to write their own adventure story.
- (e) Dramatise all or part of a story, either the explorer's or the children's own.
- (f) Encourage students to discuss how they would tackle another problem-solving adventure.

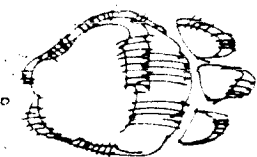


10th June

Today I explored an old coal mine. Nothing of interest there - I will try another mine tomorrow.

11th June

Searched another coal mine today. I found some fossil footprints. (Must check in the museum. It looks like some sort of dinosaur track.)



13th June

I went to town for tools yesterday. I checked the library in the museum for books on dinosaur fossils. I ran into some old miners who told me about some mines to the east where they had seen strange crystals of different colours.

17th June

After a very difficult journey, I finally reached the Arcanjada Mine where the crystals had been seen. I was very tired, so I set up camp early. I'll explore the mine after I have rested for a day or so.

19th June

I took some food and water and started down the main shaft of the mine with my torch. After some careful climbing I reached a drift leading off to the right. This drift led into a maze of tunnels and shafts which will take days to check.

21st June

Today I made a great discovery! I found some very strange objects in a few of the tunnels. They look like eggs - giant eggs! The book about dinosaurs I read in the museum says that there could be eggs buried deep in the earth. This discovery will

make me famous!

22nd June

I have always found crystals and eggs together.

24th June

Today I found a perfect egg. Good colour, with no cracks. I decided to take several of the crystals, too. I carefully wrapped the egg in a blanket, then I put two crystals in the bag. Near disaster!! There was a loud bang as they blew up. Luckily they were small specimens for use with the microscope. I went back for another sample and took only one type of crystal - some of those not far from the egg. I wrapped these crystals in my handkerchief. At last I can get away from this damp, dark mine. I wonder if I can really do it?

26th June

Outside the mine there is a tunnel leading north. I will follow it to see if I can get away from the mine secretly. There have been strangers in the area. I wonder what they are looking for?

27th June

I came along a steep slope in the tunnel and found myself near a shed. It seems to be a long way north of the mine. I must go straight to the museum to read as much as I can about the eggs and crystals. I think someone is watching me. I must be careful.

This could be the greatest discovery of all time.

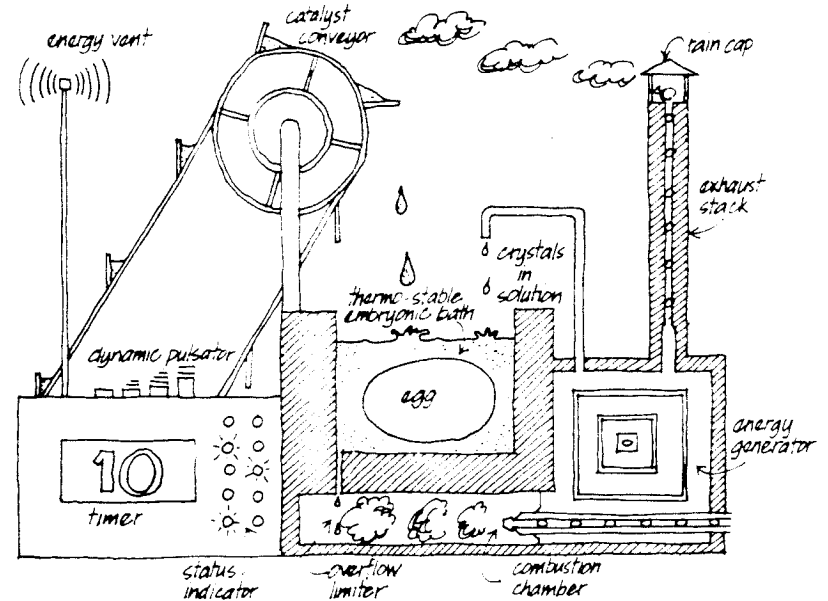
29th June

I have decided to take my discovery away to a deserted island. I have often gone fishing there and slept in the old lighthouse on the island. It is quiet and my secret

will be safe. I need to buy a lot of tools and load them into my Goat.

5th July

I have been working at top speed to set up my secret laboratory. This will become the most famous place on Earth if I am successful. I have almost completed the special incubator. All that is left is to put in the egg and crystals, and see if I am correct. I can't wait until morning.



6th July A terrible thing! A huge explosion almost wrecked the machine. The egg blew up! I am sure the egg was perfect - it must be a problem with the crystals. I'm hurt. I must go and rest.

7th July Hours of work have shown that I should have used crystals of a different colour.

8th July Cleaned up the lab and repaired the incubator. I still feel weak and sore. I locked the lab and went down to the boat. The weather looked stormy and the tide wasn't right, but I have to get back to the mine. I am writing this as it grows dark. The sea is really rough now - I can't write any more. Must reef the sails.

11th July I feel a little better now. The

fisherman who saved me from the sea has been very kind. My boat was a total wreck, but I can not waste time trying to fix it. I must get back to the mine for an egg and crystals. The fisherman thought that he knew the way to the mine, but we seem to have been heading east into a desert.

12th July There are mountains all around us. I haven't been able to find the narrow pass that we came through to this part of the desert. If only I hadn't lost my compass. The sand dunes and the heat haze reduce visibility to just a few kilometres.

14th July We have been wandering in this desert for three days. Water is low. We're lost. The fisherman has been helping me walk.

16th July Very weak. No water left. I

don't think we can make it.

17th July

My work must not die with me. I have asked the fisherman to remember the code for the combination lock on the laboratory door. I can trust him because he plans to become a hermit, and will not misuse my discovery. I don't know if he will make it out of the desert, so I have asked him to carve the letters of the code on my gravestone

18th July

The professor died last night. I buried him in the desert and carved three letters on his gravestone. That was his last wish, I will retrace my steps and try to find the compass. I'll take this diary and his watch and leave them in the shed he mentioned—that is, if I get out of the desert. I hope that anyone who finds this diary will try to finish his work. It's too hard for me, and I don't want to be famous.

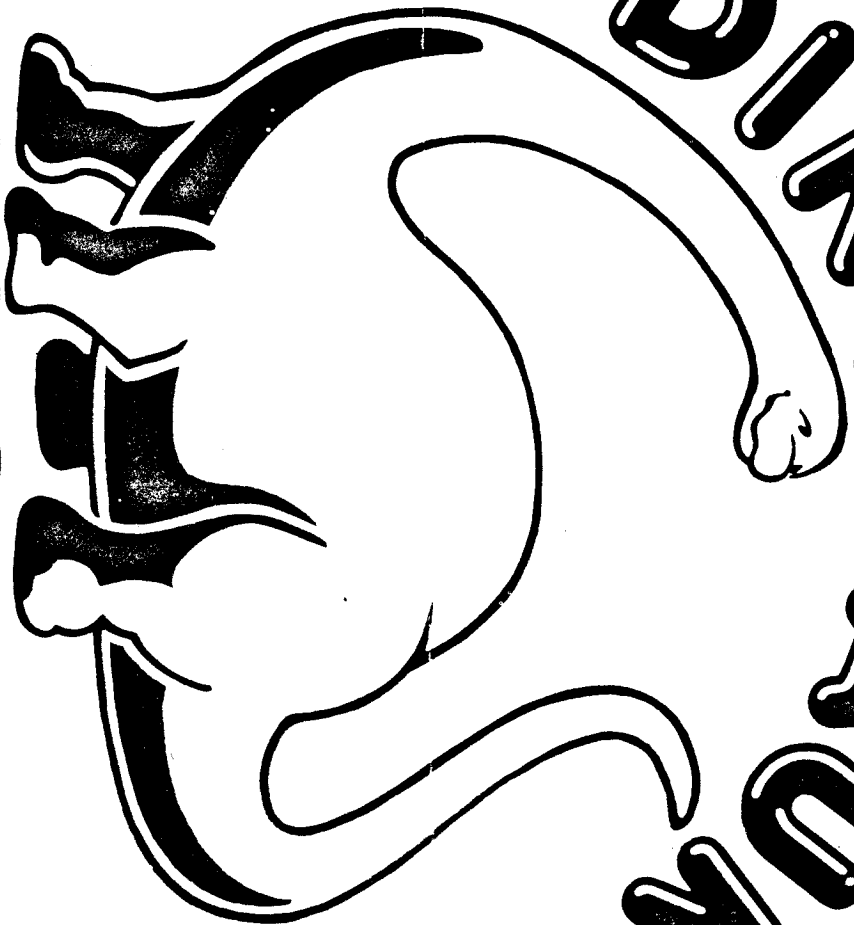
Tide Tables for Stegosaurus Straits

for the month of July

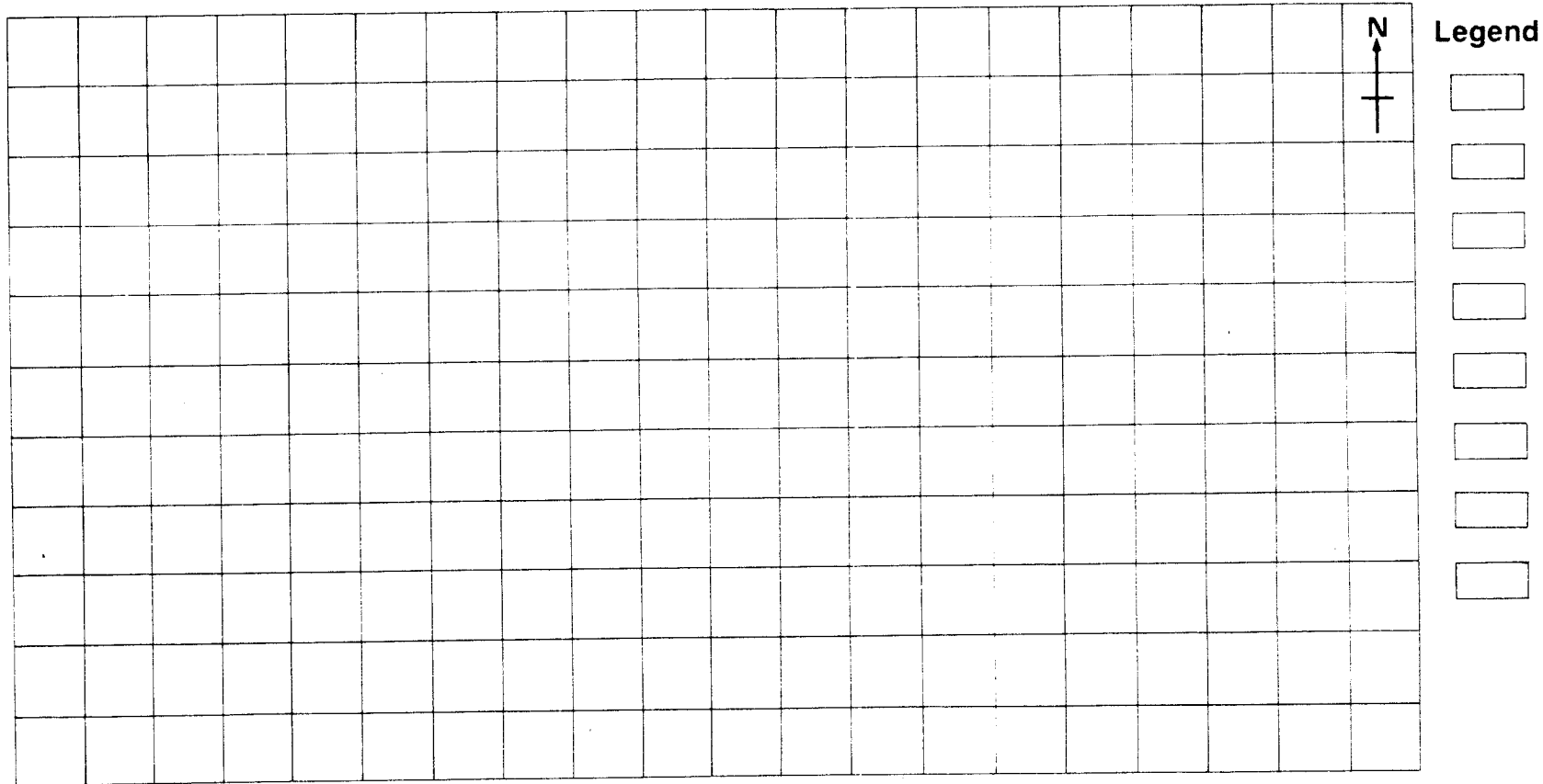
Times of high tides are shown below.

Date	High Tides		Date	High Tides	
	a.m.	p.m.		a.m.	p.m.
1	3.40	4.06	17	4.47	5.12
2	4.31	4.56	18	5.38	6.03
3	5.22	5.47	19	6.28	6.54
4	6.12	6.38	20	7.19	7.45
5	7.03	7.29	21	8.10	8.35
6	7.54	8.19	22	9.01	9.26
7	8.45	9.10	23	9.52	10.17
8	9.36	10.01	24	10.42	11.08
9	10.26	10.52	25	11.33	11.58
10	11.17	11.42	26		12.24
11		12.08	27	12.49	1.15
12	12.33	12.59	28	1.40	2.05
13	1.24	1.49	29	2.31	2.56
14	2.15	2.40	30	3.21	3.47
15	3.05	3.31	31	4.12	4.38
16	3.56	4.22			

**DINOSAURS
UP
DISCOVERY**

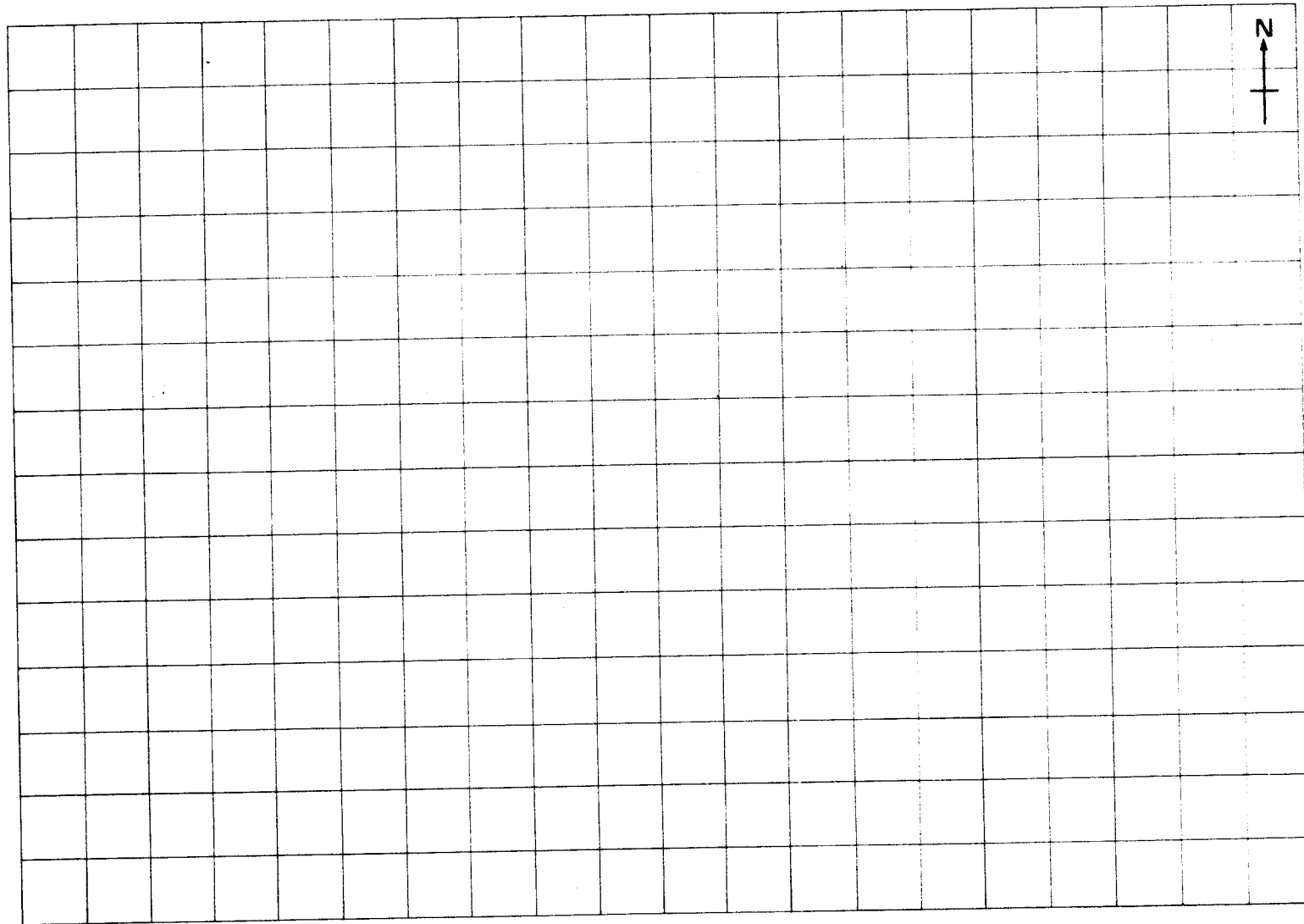


Stegosaurus Straits



Scale:

Cartographer: _____



Legend

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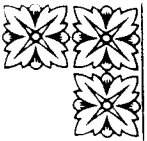
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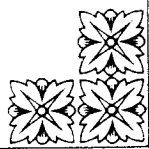
Investigator's notes

Page





This is to certify that



survived

Dinosaur Discovery

on

and hatched...

