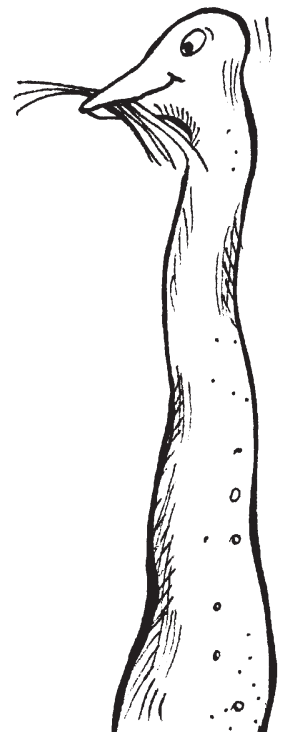




Dinosaurs

by **Clare Renner**



Each integrated unit contains:

- 6 pages of teaching notes in an integrated teaching sequence
- 10 practical blackline masters
- National Profile outcomes
- A useful resource list

Dinosaurs

by Clare Renner



LOWER PRIMARY

Learning Area Focus Science

Topic Dinosaurs have always held a fascination for children. This unit centres on the theme of dinosaurs, to capture and build on that interest, and introduces a range of concepts and ideas to tie in with this theme. It looks at when dinosaurs existed, what a fossil is, and the many different kinds of dinosaurs: what they looked like, what they ate, how they protected themselves, and what might have caused their eventual extinction.

National Profile Outcomes

Students will:

- **Science 2.7** Look at relationships between dinosaurs and their natural world. Describe what happens when this relationship is disturbed.
- **Science 2.8** Look at dinosaurs and features that helped them adapt to their lifestyle.
- **Science 2.9** Compare similarities and differences between individual dinosaurs.
- **Science 2.15** Identify groups of dinosaurs by clustering individual characteristics and drawing conclusions about them.
- **Science 2.17** Describe how scientists have found out about dinosaurs through understanding the way that fossils are formed.
- **Technology 2.3, 2.4** Design a dinosaur puppet. Make the puppet using a range of materials and tools, and compare the finished product with the design.
- **English 2.1** Interact with teacher and peers during class discussion and activities structured around dinosaurs.
- **English 2.8a and b** With guidance, gather and sort information for a dinosaur project.
- **Mathematics 2.19** Compare the length and size of dinosaurs by using different units.
- **Arts 2.3, 2.8, 2.13, 2.18** Plan and present a performance based on work on dinosaurs.

Resources

Picture books and junior fiction

Tony Bradman, *Dilly and his Swamp Lizard*, (Dilly the Dinosaur Series) Mammoth.

Joanna Cole, *The Magic School Bus: In the Time of the Dinosaurs*, Scholastic.

Terrence Dicks, *The Littlest Dinosaur*, Hamish Hamilton.

Helen Piers, *Long Neck and Thunderfoot*, Penguin.

John Watson, *We're The Noisy Dinosaurs*, Crash, Bang, Wallop, Heinemann.

Margaret Wild, *My Dearest Dinosaur*, Ashton Scholastic.

Terri Wiltshire, *The Tale of Bronty Brontosaurus*, Kingfisher.

Plays

Jill Morris, *Almost A Dinosaur*, Sydney Currency Press.

Poetry

Jack Prelutsky, *Tyrannosaurus Was A Beast: Dinosaur Poems*, Julia McRae Books.

Videos

Dinosaurs, Dorling Kindersley – Roadshow Entertainment.

Web sites

www.ucmp.berkeley.edu/diapsids/dinolinks.html

Dinosaurs

Teaching Notes

Introduction

Dinosaur Discussion

Read to the class a story or an extract from a book about dinosaurs. Ask what they know about dinosaurs. Find out which dinosaurs everyone is familiar with. Ask questions such as: Do you know when dinosaurs were living? Were there dinosaurs in Australia? Do you know what happened to dinosaurs? What is your favourite dinosaur? Why is this one your favourite?

List different dinosaurs on a large sheet of paper, pin it up and add to it as the unit progresses.

Language activities

Make a list of new dinosaur-related words that students will be learning (e.g. extinct, evolution, prehistoric). Discuss their meanings and add to the list as different words come up.

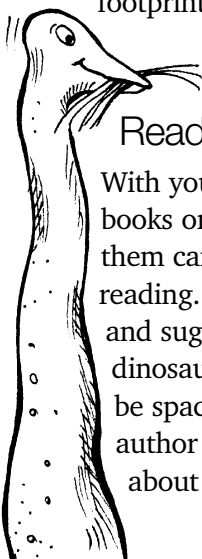
Look at the spelling of dinosaur and the letter combination AU. Find other words using these letters that are pronounced in the same way, such as August, naughty, audience. Compare the pronunciation with the pronunciation of AU in words like Australia and auction.

Dinosaur table

Prepare a dinosaur table. Gather together a range of books on dinosaurs, models of different dinosaurs, fossils of any kind and pictures of footprints. Encourage students to bring in their own contributions as the unit progresses.

Reading log

With your students, look at some of the books on the table. Explain that some of them can be used for independent reading. Give students a prepared sheet and suggest they keep a log of all dinosaur books they read. There should be space to write down the book title, author and what they think of and feel about the book.



Finding out about dinosaurs

Time line

Dinosaurs first lived about 228 million years ago, and became extinct around 65 million years ago, so they were on Earth for about 163 million years. People have only existed for about 2 million years.

Lower primary students will not comprehend these time spans, so create a time line, showing time periods. Draw a horizontal line on the board and mark off 23 equal sections, each one representing ten million years. Mark off the first sixteen and a half sections (for dinosaurs). Mark off the last fifth of the last section (for people). The gap in between marks the time after the end of the dinosaurs and the beginning of humankind.

Students are likely to want to know how we know so much about dinosaurs when they have been dead for 65 million years. Explain that most of the information we have comes from fossils.

How fossils are formed

Most information about dinosaurs comes from fossilised bones, teeth, footprints, droppings, eggs and plant life.

When a dinosaur died, the body would decay until only the skeleton was left. Sometimes these bones were covered by mud or sand which was moved by water or wind. Oxygen was shut out, so the decay process stopped and gradually, over thousands of years, the sediment built up on top of the bones was compressed and hardened into layers of rock. Only the strongest bones and teeth would survive the weight of these rocks.

Explain sediment by getting students to place soil and water together in a lidded jar. Shake the jar and when the soil settles, show them the sediment. Examine it to see if there are different layers within the sedimented soil.

Show students some examples of fossil shells or plants. **BLM 1** tells a story about the formation and discovery of a dinosaur fossil, but the sentences are out of order. Have students put the sentences in the right order to tell the story.



Dinosaur footprints

Dinosaurs left footprints when they walked across muddy lakes or sea shores. Sometimes the mud then dried out in the sun, and the imprint was preserved.

Try mixing some thick mud on a tray and ask a student to make a hand or footprint. When the mud dries, compare this to some pictures of dinosaur footprints. **BLM 2** shows different dinosaur footprints. Point out that dinosaurs have differently shaped feet and numbers of toes. Have students measure the length and width of each footprint on the page.

Rocks and fossils

Explain to students that scientists can tell how old fossils are by the sort of rocks they are found in. Explain the difference between:

- **sedimentary rocks** (rocks formed by the deposit and compression of sediment, e.g. sandstone or limestone)
- **igneous rocks** (rocks formed when melted rock from inside the Earth cools, e.g. lava or pumice from volcanoes), and
- **metamorphic rocks** (all metamorphic rocks began as igneous or sedimentary rocks, but heat and water and the pressures of the Earth's crust have changed them into a different form, e.g. marble or quartz).

Bring in examples of each kind of rock on different days, and introduce them separately before comparing them. Emphasise different textures rather than different names. Compare the sizes of rocks and weigh different types of the same size to see if metamorphic rocks weigh more than igneous, for example. Encourage students to bring in rocks, and help students sort them into the different categories.

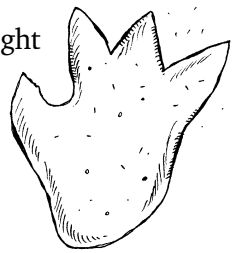
Putting the puzzle together

Explain to students how scientists worked out what dinosaurs looked like by collecting fossil bones and assembling them, using their knowledge of other animals. Discuss mistakes that have been made (e.g. when Gideon Mantell found the Iguanodon in 1825, he thought it had a horn on its head. The 'horn' later was found to be the dinosaur's thumb).

Ask students to cut out the bones on **BLM 3** and glue them together on coloured paper in the way they think the dinosaurs bones would go.

New discovery

Ask students to imagine that a new set of dinosaur footprints has been discovered. Have students work in pairs; one is the person who discovered the footprints and the other is a television reporter. Each pair can pretend to do a television interview for the rest of the class. Discuss with students what sort of questions they might ask, e.g. How did you come to be in the place where you found the footprints? What did they feel when they first saw the footprints? How will the footprints be protected?



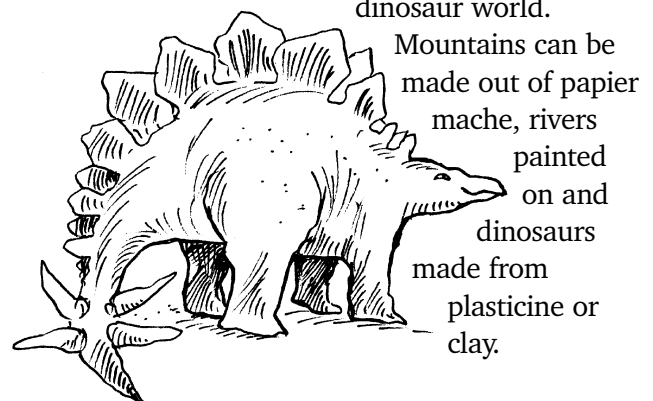
The world of the dinosaurs

What did the world look like when dinosaurs were alive?

Explain to students that the climate was generally milder and more tropical than it is today. Mountains were lower and the land was flatter. There were no flowering plants around until the end of the dinosaurs' time on earth, but there was a lot of green vegetation, in particular ferns, palm trees and conifers.

Pin large sheets of paper around the walls and ask students to paint a background of green, leafy plants, trees and a sunny, blue sky. When this is dry, suggest students paste on pictures of dinosaurs that they have cut out from magazines or photocopied and coloured in. Some students might like to draw their own dinosaurs to paste on to the mural.

Alternatively, you could place a large flat board on a table and have students make a model of a dinosaur world.



Lifestyles

Feeding Explain that most dinosaurs were either meat eaters or plant eaters and their bodies and teeth were adapted to this. Collect pictures of dinosaurs so students can see the different body shapes and tooth types of dinosaurs.

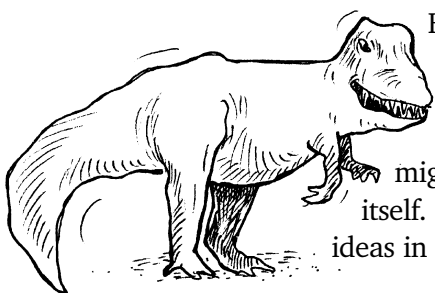
Make a chart on a large piece of paper, listing the different characteristics of carnivorous and herbivorous dinosaurs.

- Meat eaters had sharp, pointed teeth, sharp claws to pierce tough skin and heavy skulls to use as battering rams.
- Plant eaters had either small teeth or large, flat, grinding teeth and some had beak-like mouths. Dinosaurs with long necks (so they could easily reach into the trees) were all herbivores.

Have students complete **BLM 4**.

Protection Ask students to help you list the ways dinosaurs protected themselves. Like animals today, they used many different methods to suit their size and natures. They used:

- their speed — dinosaurs that ran fastest were smaller ones which stood upright on two long, strong hind legs (e.g. *Dryosaurus*).
- their size — *Seismosaurus* was over 36 metres long and weighed up to 130 tonnes.
- their fierce natures and sharp teeth (*Tyrannosaurus Rex*).
- their body covering — *Stegosaurus* had small, weak teeth but most scientists believe that the rows of armour plating on its back were for protection. It had four big spikes at the end of its tail to attack with if necessary.
- their colour — nobody knows for sure what colour dinosaurs were. Scientists have made guesses based on the colours of reptiles today. Many reptiles camouflage themselves with the colour and texture of their skin (e.g. lizards and crocodiles). Scientists believe this is the way many dinosaurs protected themselves.



Have students look at the pictures in **BLM 5** and suggest how each dinosaur might have protected itself. Have them write their ideas in the space provided.

Breeding Dinosaurs laid hard-shelled eggs in mud or sand hollows and covered them with vegetation. Whole nests of fossilised dinosaur eggs have been found fossilised, still with the dinosaur embryos inside. Ask students which animals lay eggs now (e.g. hens and other birds, crocodiles). Some species of dinosaur would leave eggs to hatch by themselves, whereas others would protect the young hatchlings until they were old enough to fend for themselves.

Begin a story for students in which they find a dinosaur egg in the garden. Ask them to think about what it could look like, and how they might feel. Have them write a story telling you what happened after they found the egg.

Different dinosaurs

Explain to students that although we think about the dinosaurs as a single group, there were actually lots of different sorts of dinosaurs.

Scientists have grouped them under seven headings.

- **Theropods** – all two-legged dinosaurs which were carnivores (e.g. *Tyrannosaurus Rex*).
- **Sauropods** – gigantic plant eating dinosaurs (e.g. *Diplodocus*).
- **Ornithopods** – plant eating dinosaurs which walked on two legs (e.g. *Hadrosaurs*).
- **Ceratopsians** – horned dinosaurs (e.g. *Triceratops*).
- **Stegosaurus** – dinosaurs which had plated armour (e.g. *Stegosaurus*).
- **Ankylosaurs** – included armoured dinosaurs which were not like *Stegosaurus*.
- **Pachycephalosaurs** – dinosaurs which had particularly thick skulls.

Show students how to make a booklet with eight blank pages. Have them write *Dinosaurs* on the front cover and decorate it. **BLM 6** lists the seven main groups of dinosaurs, with pictures of what each group looked like. Have students cut the different sections out and stick one on each page of their booklet. As different dinosaurs are introduced, students can write the name of the dinosaur under the appropriate page heading, classifying it under a particular group.

Measuring up

It can be difficult to imagine the size of some of the larger dinosaurs, but this activity should help. Choose a large dinosaur with a simple shape (e.g. brachiosaurus [25 metres] or stegosaurus [9 metres]). Using thick chalk, draw the outline in the schoolyard.

Ask students to pace out the length and width of the dinosaur. Students could also measure out the perimeter of the dinosaur with string, and for contrast use the same procedure on the outline of a student.

Research project

Have students choose a dinosaur they find interesting for a research project. Either individually or in pairs, students need to find out as much as they can about their particular dinosaur (e.g. where it came from, whether it was a meat or plant eater, when it lived, what it looked like, how it protected itself). Have students use **BLM 7** as a guide to gathering information under particular headings. Students can present their information as a booklet or on a poster

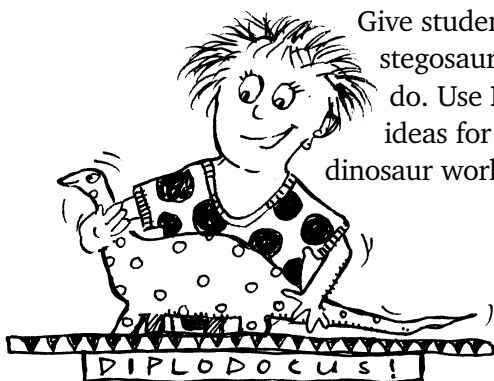
Have students present the project to the class towards the end of the unit.

Dinosaur collage

All dinosaurs were different but some were particularly interesting in terms of the texture of their skins. There were dinosaurs with webbed fingers, armour plated skins, spiked frills or thick knobbly skins.

Collect a range of appropriate collage materials such as material scraps, sequins for scales, beads for eyes etc, and have students create a textured picture of a dinosaur.

Dinosaur maths



Give students some stegosaurus sums to do. Use **BLM 8** for ideas for different dinosaur work sheets.

Skipping game

Encourage students to extend the number of different dinosaurs they know by making up a skipping rhyme for them to use. For example:

Dinosaur, dinosaur, skipping slow.
How many dinosaurs do I know?

Dinosaur, dinosaur, skipping fast.
How many dinosaurs will I last?

Stegosaurus, Brontosaurus, Tyrannosaurus,
Supersaurus...

(These rhymes can also be used for handclapping games.)

Prehistoric poetry

Read students some poetry based on dinosaurs, and ask them to write a poem of their own. Have a class brainstorming session to create a list of dinosaur adjectives, and write the list up on the board. Use **BLM 9** to encourage students to think of alliterative adjectives to go with dinosaur names (e.g. *As terrible as a Tyrannosaurus Rex*).

Dinosaur performance

Dance

Work on a prehistoric dance routine. Find appropriate music and ask students to think about how the different prehistoric animals would have moved. Talk to them about the ominous tread of the Tyrannosaurus, the gliding motion of the pteranodons with their 7-metre wing span, and the slithering, crawling movements of the early crocodiles.

Puppets

Suggest to students that they make a range of dinosaur puppets and perform a play. Help them design simple glove puppets.

Puppets can be made by cutting out a pattern from scrap material. Alternatively, students can decorate old socks or mittens with eyes and one or two dinosaur features (e.g. big teeth for Tyrannosaurus Rex, armour plates for Stegosaurus).

Dinosaur masks

Use paper plates and punch two holes in the sides for elastic. Find the right place for each student's eyes and help them cut out eye and mouth holes. Students can then decorate the masks, giving them any dinosaur-like features they want.

Play

Find a suitable play (see Resource list) or help students to write their own simple script. Either students can act the play out themselves using their masks for costumes, or they can use their puppets and put on a puppet play. They might like to perform the play to parents at the end of the unit.

What happened to the dinosaurs?

Something happened to wipe out the dinosaurs and nobody knows whether this took a few days or thousands of years. There are different theories to explain this. Three theories explaining this are climate change, volcanic eruptions and meteorites.

Climate change

Explain to students how climate patterns change very slowly unless there is a disaster. Discuss weather patterns and how we are used to particular weather patterns occurring in different parts of the world. Ask students what might have happened to dinosaurs if the weather had got gradually colder. Brainstorm a range of ideas and make a list on the board.

Volcanic eruptions

Explain to students how massive volcanic eruptions could have caused climate changes and the destruction of dinosaurs' food source. To make a model volcano, cut the top off a large plastic drink bottle and three-quarters fill it with vinegar and a few drops of red food dye.

Build up plasticine or papier mache around the bottle into the shape of a mountain. When the class is ready, pour a tablespoon of bicarbonate of soda into the open top of the bottle and the volcano will erupt.

Meteorites

The most popular explanation for the extinction of dinosaurs is the impact with the Earth of a huge meteorite. Explain that meteorites are lumps of rock or metal that fall from space. Show students pictures of craters caused by meteorites. Tell students that, although the meteorite itself would do some damage, the real problem would have been caused by the gigantic cloud of dust that blocked out the sun for months or even years. Explain to students that a sudden drop in temperature could have killed off much of the plant life that the herbivorous dinosaurs used as food.

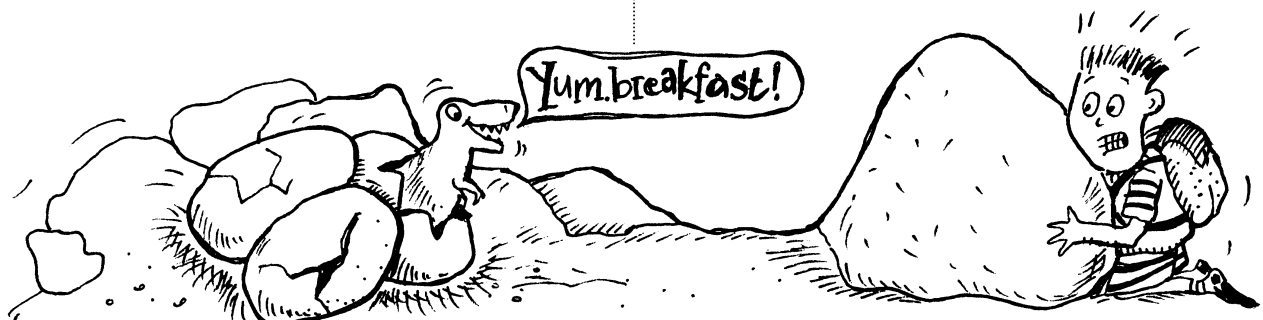
Excursions and visitors

- Contact a museum to see if they have a section on dinosaurs and other prehistoric animals.
- Keep an eye open for any special exhibitions.
- Find out if there are any dinosaur footprints within excursion distance for students to visit.
- Consider asking an expert in this field to visit your school to answer students' questions.

Dinosaur day

Celebrate the end of this unit of work by holding a Dinosaur Day. Organised activities in the morning might include a review of the unit with students, or reading a dinosaur story together. **BLM 10** is a dinosaur quiz for students to do.

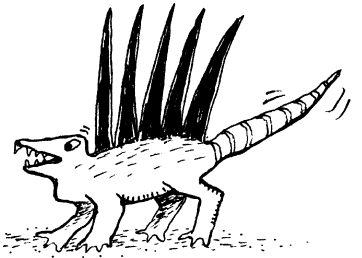
In the afternoon you could invite parents along to listen to the projects being presented and look at the artwork displayed. Students could perform the dance or play that they practised earlier on in the term.





Name: Date:

Dinosaur fossils



Put these sentences in the right order and you will be able to tell the story of a dinosaur fossil.

- Millions of years ago an old dinosaur lay down on a river bank and died.
- One day someone saw the dinosaur bones in the rock and was very excited.
- The river flooded and the dinosaur bones were covered in mud washed up by the river.
- All the bones were sorted and put together in the shape of the dinosaur.
- The dinosaur gradually became a skeleton.
- The rock was eroded or worn away over millions of years.
- Scientists chipped the bones from the rock and cleaned them.
- After many years the mud turned into rock and the bones into fossils.

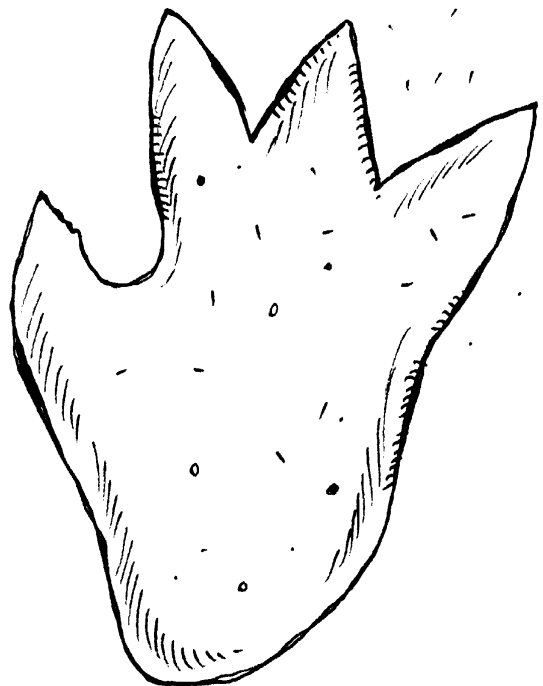
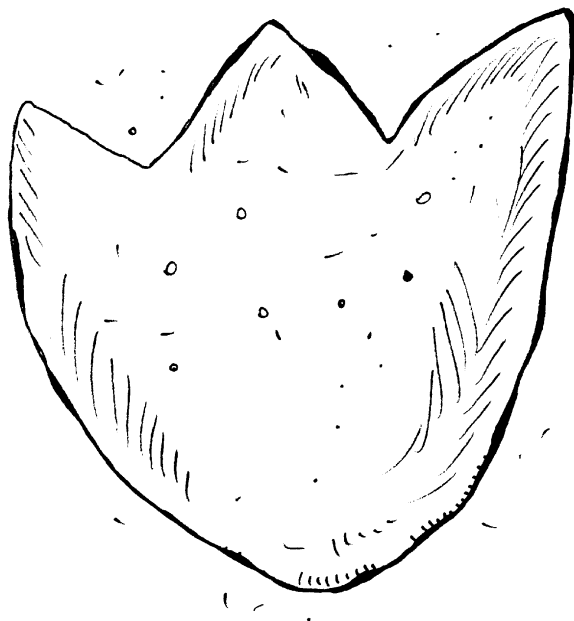
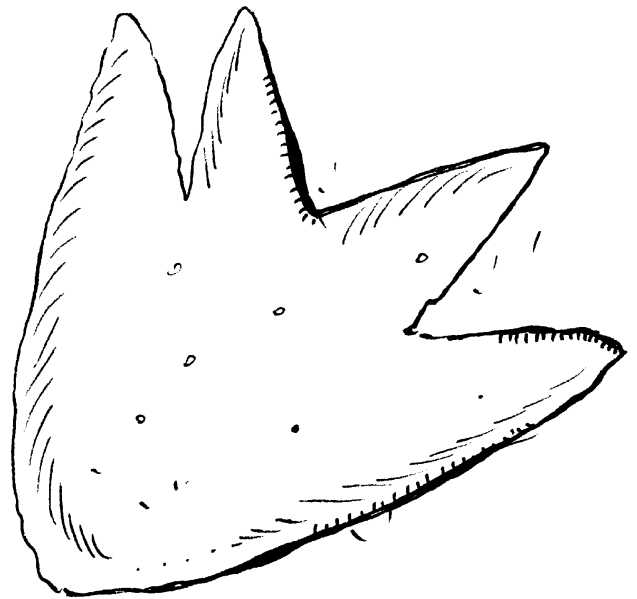


Name: Date:

Dinosaur footprints

Here are some drawings of dinosaur footprints. See how some dinosaurs have three toes and some have four. Some footprints are wide and short and others are long and narrow.

Use your ruler or a centimetre measure and see how many centimetres long and wide each print is. Make sure you measure from the longest and the widest point of the footprint.

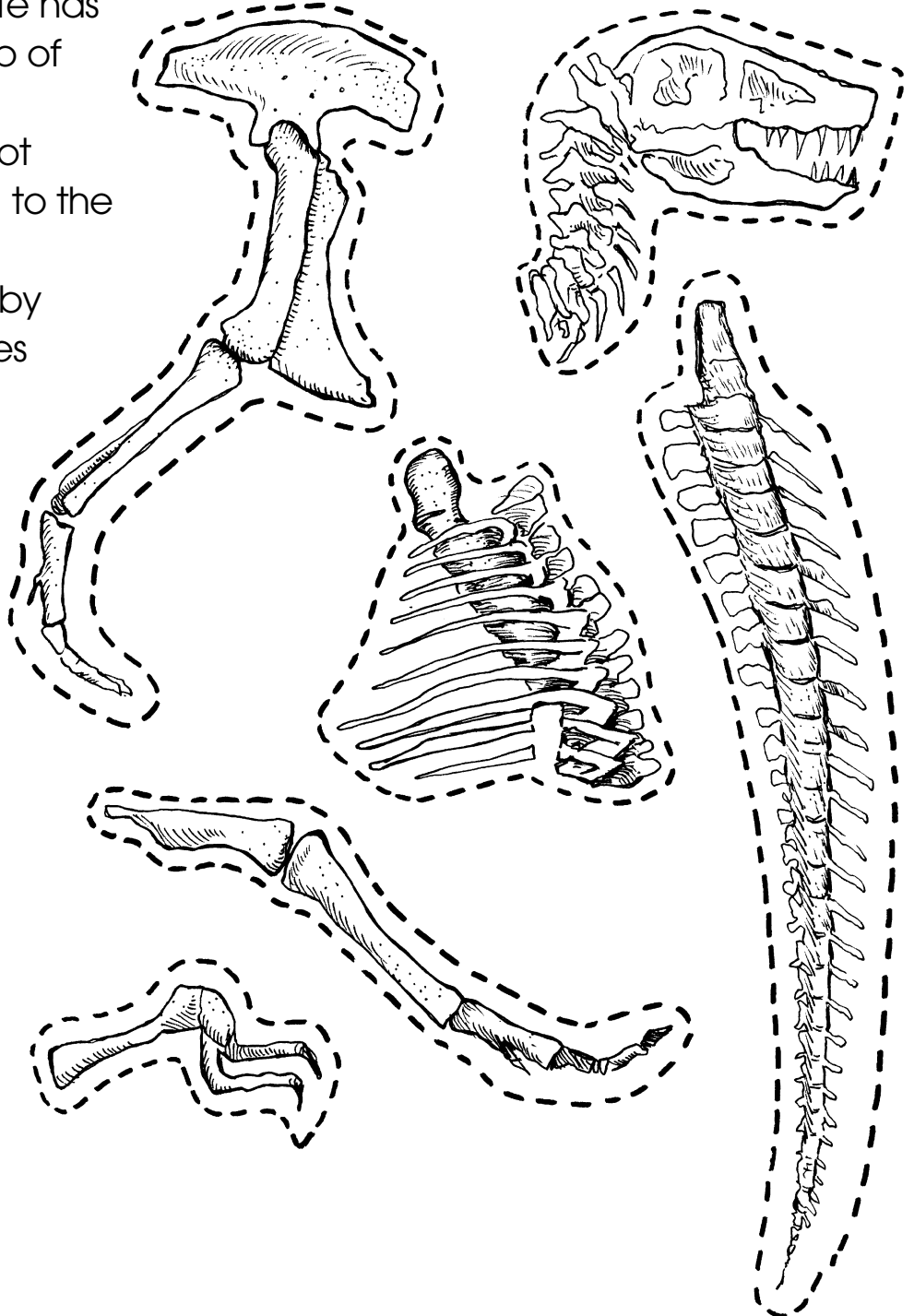




Name: Date:

Dinosaur dig

Professor Bonaparte has discovered a heap of fossilised dinosaur bones, but she's not sure if they belong to the same dinosaur. Can you help her by cutting these bones out and sticking them together in the right position?

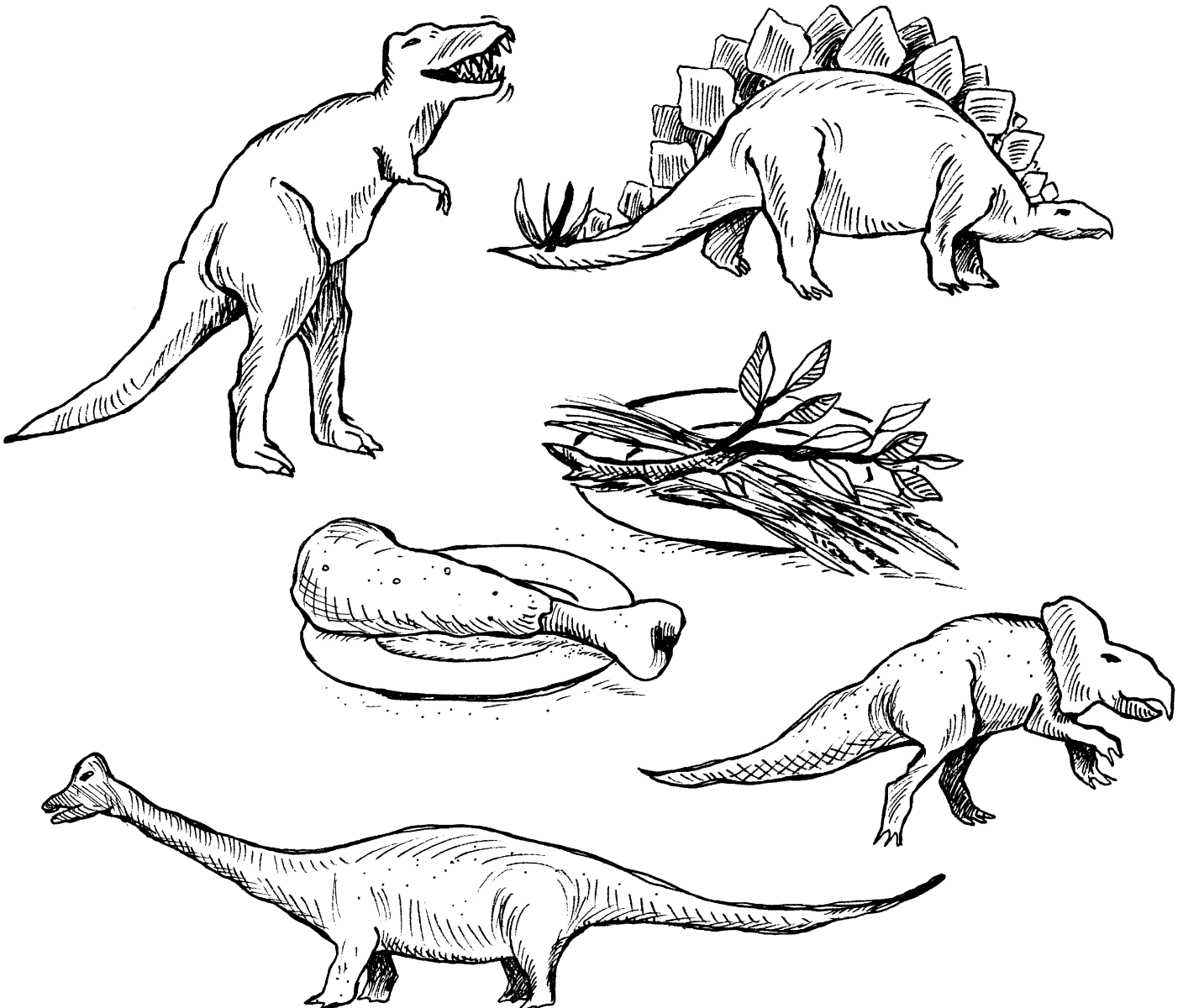




Name: Date:

Carnivore or herbivore?

Meat eating dinosaurs had long, sharp pointed teeth. Plant eaters had either very small teeth or larger teeth with flat edges and some had beak-like mouths. Plant eaters also often had long necks to reach into the trees. Look carefully at these four dinosaurs and draw an arrow from each one to the food you think it might have eaten.

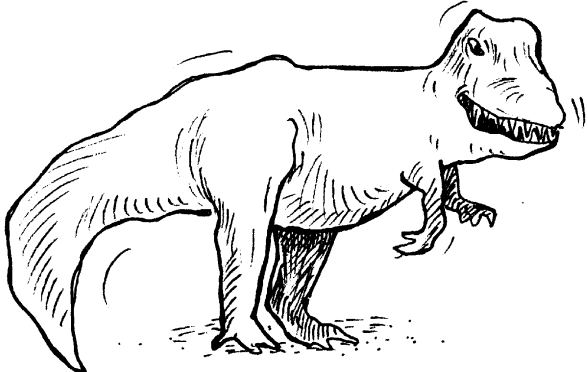




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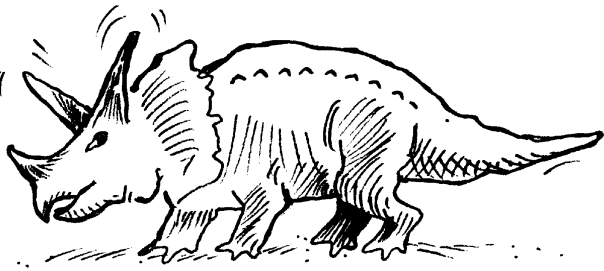
How do these dinosaurs protect themselves?

Look at these four dinosaurs. They would all have defended themselves in different ways. What would these have been? Write your answer underneath each dinosaur.




Tyrannosaurus Rex

.....



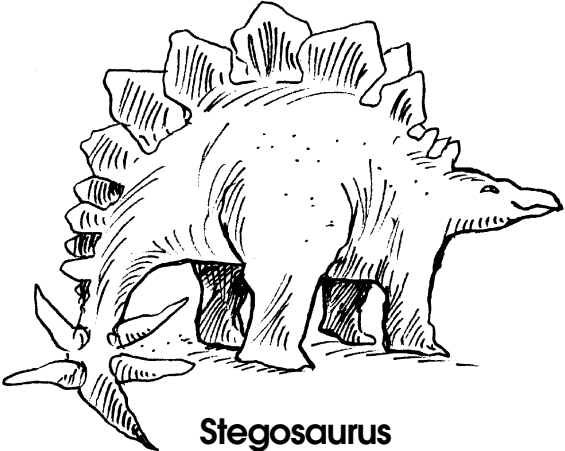
Triceratops

.....



Lesothosaurus

.....



Stegosaurus

.....



Name: Date:

Dinosaur groups

Here are seven types of dinosaur. All dinosaurs will go under one of these headings. Cut them out and stick one on each page of your book. Make a list of dinosaurs that fit under each heading.

THERAPODS
2-legged meat eater
(e.g. Tyrannosaurus)

ORNITHOPODS
plant eating dinosaur;
walks on 2 legs (e.g.
Iguanodon, Hadrosaurs)

CERATOPSIANS
horned plant eater
(e.g. Triceratops)

STEGOSAURS
plant eating dinosaur
with armour plating
(e.g. Stegosaurus)

ANKYLOSAURS
armoured dinosaur,
not looking like Stegosaurus

PACHYCEPHALOSAURS
thick-skulled dinosaur
(e.g. Pachycephalosaurus)



SAUROPODS gigantic plant eater (e.g. Diplodocus)





Name: Date:

Dinosaur project

When you are doing a project it's sometimes hard to know where to start. If you answer these questions, you can use them to help you organise your information.



1. Which dinosaur are you studying?
2. When did your dinosaur live?
3. How big is your dinosaur?
4. How much does your dinosaur weigh?
5. How fast does your dinosaur move?
6. How did your dinosaur protect itself from attack?
7. Was your dinosaur a meat eater or a plant eater?
How can you tell?
8. How did your dinosaur reproduce?
9. Have you got a picture of your dinosaur?
10. What other information do you have about your dinosaur?

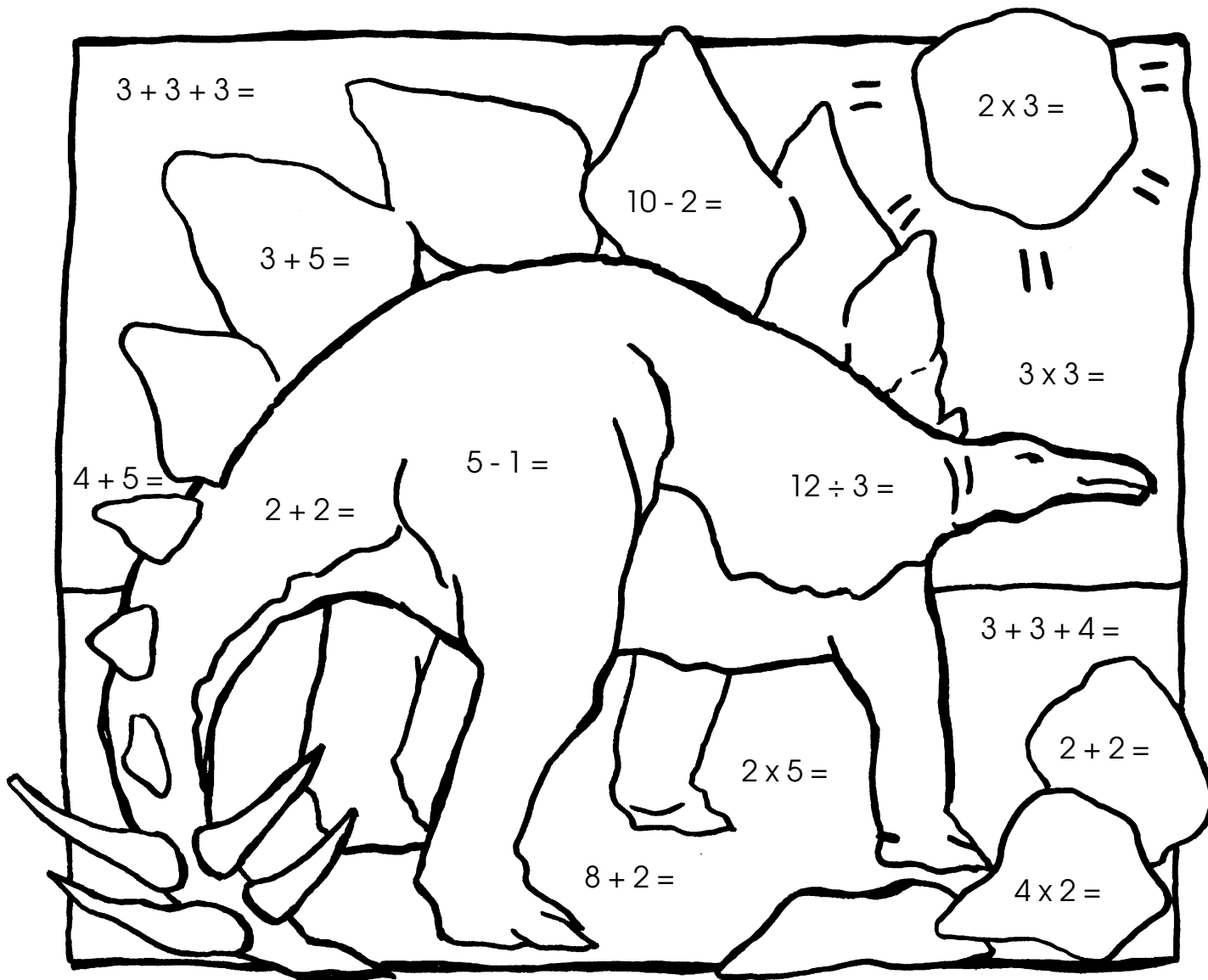


Name: Date:

Stegosaurus sums

Work out the answer to these sums then colour your dinosaur according to the colour code.

Green = 10 Blue = 9 Orange = 4 Black = 8 Yellow = 6





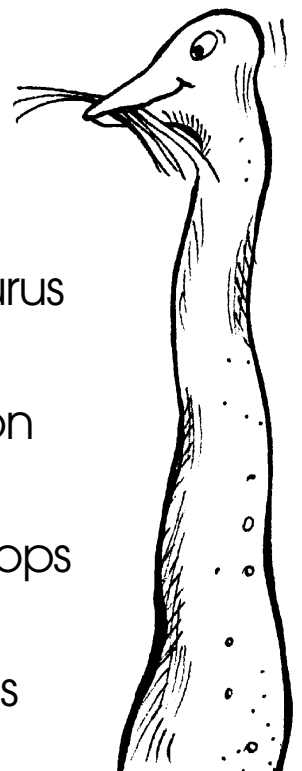
Name: Date:

Describing dinosaurs

Think of an adjective, starting with the same letter as the name of the dinosaur, to describe the following dinosaurs.

Example - as solid as a Stegosaurus

1. As _____ as an Apatosaurus
2. As _____ as a Tyrannosaurus Rex
3. As _____ as a Diplodocus
4. As _____ as a Triceratops
5. As _____ as a Dryosaurus
6. As _____ as a Lesothosaurus
7. As _____ as an Iguanodon
8. As _____ as a Protoceratops
9. As _____ as a Supersaurus





Name: Date:

Dinosaur quiz

You have learned a lot about dinosaurs. Now see how many of these questions you can get right.

1. Did all dinosaurs eat meat?
2. Did dinosaurs like cold weather?
3. Did dinosaurs lay eggs?
4. Did all dinosaurs have sharp teeth?
5. What do we call a living thing that has been preserved in rock for millions of years?
6. What could have caused the dinosaurs to die out?
7. What is the name of a dinosaur who ate only plants?
8. Which was the fiercest dinosaur?
9. Were there dinosaurs in Australia?
10. What is your favourite dinosaur?

