I WANT TO BE A PALAEONTOLOGIST!

Museum Learning Kit

Government of South Australia

SOUTH AUSTRALIAN MUSEUM

About this Resource

This kit is a play-based introduction to the science of palaeontology, with a focus on Australian megafauna and Ediacaran fossils (ee-dee-ack-ran). The kit includes objects from the South Australian Museum's education collection to inspire young students. The session comes with a comprehensive guide but can be adapted to meet the induvial needs of your group. This lesson can be stand alone, but we would love to see you visit the Museum to see our wonderful collection of megafauna and other fossils. You can make a booking via the South Australian Museum website.

Please help us care for the objects in this kit. Encourage students to handle them gently and understand that they are special items from the Museum. If any damage does occur, please let us know at education@samuseum.sa.gov.au

Aims and Outcomes

Museum learning kits aim to extend and enrich children's learning through opportunities to initiate, investigate, manipulate and experiment with a vast array of resources and materials to develop the concepts, skills and flexible mindsets that underpin STEM based learning in the early years. Aligned with the Early Years Learning Frameworks (EYLF), this kit aims to:

- include strategies to support and further develop the concepts of Belonging, Being and Becoming, as children form their own identities and understandings of the world.
- implement the principles and strategies that foster considerate, supportive and respectful relationships and partnerships, to assist all children in achieving learning outcomes.
- plan and facilitate a myriad of activities to assist children in achieving the endorsed learning outcomes:
  Outcome 1: Children have a strong sense of identity
  Outcome 2: Children are connected with and contribute to their world
  Outcome 3: Children have a strong sense of wellbeing
  Outcome 4: Children are confident and involved learners
  Outcome 5: Children are effective communicators
- deliver a range of learning experiences that are enjoyable, relevant, authentic, and meaningful, enticing active participation, igniting interest and curiosity, and developing a love of learning.
- create a play-based learning space where children can discover new or existing areas of interests, manipulate materials, test concepts, and explore ideas.
- develop science-based process skills (Observing, Comparing' Classifying, Measuring, Communicating, Inferring, Predicting).
- actively connect knowledge and ideas to tools, in order to design, invent, build, test, modify and produce a product or solution.
- practise creative and critical thinking, explore resources and materials, engage in real-life applications and solutions to connect their thinking to actions, and transfer their understanding.
- broaden problem-solving abilities, critical thinking, reasoning, and application of mathematical concepts.
- enhance the foundations of early years literacy and numeracy, language learning and communication skills.
- create opportunities to play and discover independently and/or collaboratively.
- to encourage dispositions that promote lifelong learning.

Session Format

The following is a suggested session format for delivering the content in the learning kit.

Teachers will have their own pedagogy and style of facilitating sessions. Please adopt and adapt the session or elements of this plan to suit your style and skill set. This session is not only designed to be fun, engaging, meaningful and relevant to the visiting children, but for the facilitator too!

Set up the activity stations before you start. It can be useful to cover these with a sheet or cloth, so students do not see them before the activity time starts.

Teacher led – Approximately 20 minutes

Guided Activity Stations – Approximately 30 minutes

Re-group and conclusion – 5-10 minutes

Kit Contents

Provocation Box

- Museum archive box
- Museum fossil specimens and replicas
- Toy dinosaur
- Magnifying glass
- Paintbrush
- Pattern blocks

Activity Station 1 – Investigation Station

- Fossils and models from the provocation box
- Specimens from the South Australian Museum
- Magnifying glasses

Activity Station 2 – Dinosaur Dig

- Paintbrushes
- Animal figurines
- Plastic tweezers

*** Sites will need to provide their own kinetic sand or an alternative material such as uncooked rice for this station.*

Activity Station 3 – Pattern Block Dinosaurs

- Dinosaur Pattern block templates
- Pattern blocks

Activity Station 4 – Trace Fossils

- Box of shells
- Playdough (Note that playdough contains gluten)
- Natural found objects from the playground be added to this station – it could be valuable for students to collect these themselves prior to the session.

Activity Stations – Guides for Educators

Activity Station 1 – Investigation Station

Place the objects from the South Australian Museum on a table with magnifying glasses. For students to explore.

Activity Station 2 – Dinosaur Dig

Bury dinosaur figurines in kinetic sand or another material such as uncooked rice or lentils. Students can use tweezers and paintbrushes to uncover the figurines, excavating them like a palaeontologist.

Activity Station 3 – Pattern Block Dinosaurs

Students can use the blocks to replicate dinosaur shapes shown on the cards.

Activity Station 4 – Trace Fossils

Students can create trace fossils by gently pushing the shells into the playdough, making an impression. Try adding sticks, leaves, gumnuts and other materials found in the playground to bring nature into this activity. Fossils are evidence of life, so choose biological objects such as sticks and leaves over rocks and pebbles. Students could also try pressing their fingers or hands into the play dough to see the impression it makes. Footprint fossils like this have been found by palaeontologists.

Session Plan

Acknowledgement of Country

"Good morning/afternoon everyone. today we would like to acknowledge Kaurna Country."*

"Here is the land, here is the sky.

Here are my friends and here am I.

We thank the Kaurna people for the land on which we play and learn.

Hands up, hands down

We're on Kaurna ground."

**Use appropriate term for the country you are learning on.*

Introduction: Provocation Box

A provocation is an open-ended resource, which evokes a response from children, stimulating curiosity and a desire to actively engage in conversations and activities, to further explore interests and ideas. Provocations can inspire creativity, initiative, imagination, understanding and future thinkings.

With students seated on the mat area, knock on the box – put your ear to the lid, build excitement and anticipation for what could be inside…

Start with the Ediacaran fossil specimen… "Hmmm I wonder what this could be? Perhaps it is a phone from a long, long time ago? Ah-ha, maybe this (pointing to the impression) is how you turn it on? (Exaggerate efforts to turn the 'phone' on) No that doesn't seem to work but it does feel very interesting – please wiggle your fingers (demonstrate) if you would like to feel it." Share with those who are wiggling their fingers and allow a minute or two for the children to share ideas as to what the specimen could be.

Refer back to the box and reveal the 3D printed Genyornis foot skeleton. "Wow! I wonder what this might be? Do you think it is a comb for my hair…? A pirate's rake ….? Hmmmm interesting… I wonder if there are any other clues in my box…"

Check the archive box prop again. Reveal and share the photo of the Wonambi skeleton, the photo of Diprotodon and lastly the replica dinosaur toy.

Look carefully at the five items you have revealed, ask the children if they can tell you anything about the items – what they see/looks like/could be… shared and collective thinking is always welcomed, so please celebrate their ideas, knowledge and willingness to 'chat'!

"Hmmm, now that I am looking at these items altogether, I think they are animals or early life forms from a very, very long time ago. A Palaeontologist is someone who studies ancient life. Because ancient life was a very long time ago, Palaeontologists look for fossils. Fossils tell stories about dinosaurs and megafauna (Giant animals), prehistoric plants and other early life forms."

"Ohhh, (referring back to the Ediacaran fossil specimen) so this isn't a button on a phone, this is a trace fossil – an early form of life that left an impression in the rock. Palaeontologists can investigate this impression to understand what it is, where it lived and how long ago. Some life forms look very different to the animals and plants we have today. But other animals and plants look quite similar, just like this picture of Diprotodon ... lots of people think it looks like an ENORMOUS wombat, and this picture of Procoptodon, well, I think we might already know what it looks like, and this foot skeleton which is HUGE is the same shape as a chicken, even though it belongs to Genyornis – a huge bird that lived in Australia many, many years ago! The fossils studied by Palaeontologists might be impressions in rocks, or footprints discovered near an old dry riverbed, or teeth and bones buried in a cave, but every discovery tells us what our planet was like long ago, and how life on Earth has changed."

"Wowee, Palaeontologists have a very interesting and important job.

I know a song called 'Palaeontologist, What Do You Do?' and I'd like to sing it with you."

Palaeontologist, What Do You Do?

(Tune: "Mary had a Little Lamb")

"Palaeontologist, what do you do?
What do you do? What do you do?
I find and study fossils,
So I can tell a story for you!

Palaeontologist, what do you use?
What do you use? What do you use?
I use hammers, chisels and brushes,
Because I am looking for clues!

Palaeontologist, what do you see?
What do you see? What do you see?
I see teeth, bones and footprints,
I see how life used to be!

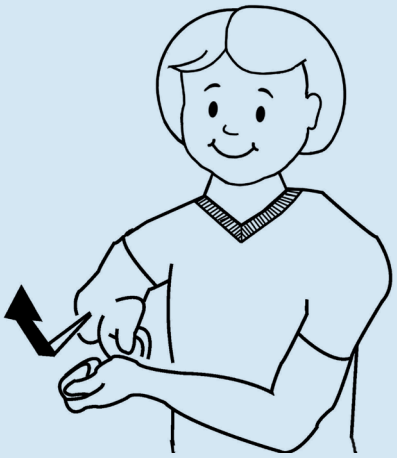
Palaeontologist, what do you find?
What do you find? What do you find?
I find clues about the Earth's past,
I find the secrets of ancient life."

"I know another song I'd like to share with you and this song has some actions. I'd really like it if you could do the actions with me as I sing the song. The actions look like this … "

Demonstrate at least two, if not all of the selected Auslan signs. Repeat the actions slowly so the children have the opportunity to watch, try and practise.

Below are Auslan signs to support 'Digging deep'. Auslan is the Australian Sign Language.

Encourage the children and families to copy you as you sign.



Dig

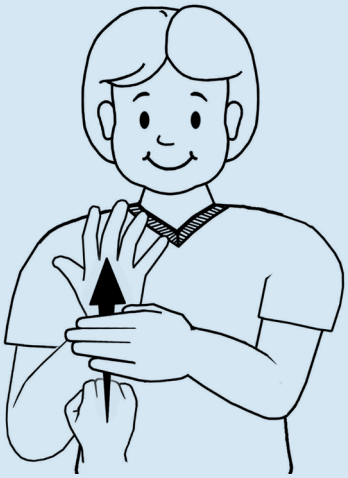
Hold both hands in a fist shape; tuck thumbs inside the fist so pointer fingers hook around the thumbs; hands one behind the other slightly to your side and angled downwards. Move hands down together and then upwards, in a 'digging' motion.

https://signplanet.net/sign/408

Land

Hold both hands flat, palms down, next to each other and in front of you; simultaneously move hands outwards.

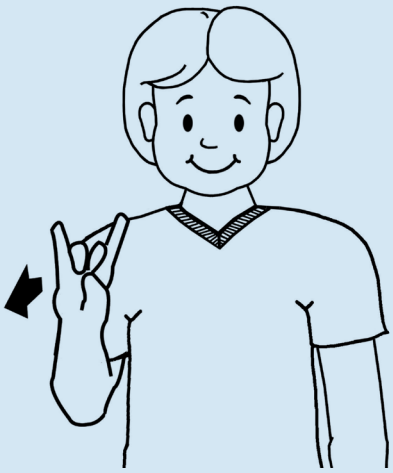
https://signplanet.net/sign/1076



Plant

Place one arm a short distance in front of body, in a horizontal position with hand flat, fingers extended, palm faces chest. Hold other hand below the flat hand; fingers closed together and pointing upwards. Move this hand up behind the flat hand and spread fingers apart as hand emerges.

https://signplanet.net/sign/459



Animal

Hold pointer and little fingers upwards, whilst thumb, middle and ring fingers close together; move hand in a forwards direction.

https://signplanet.net/sign/7

Earth

Start with flat hands, palms down, thumbs tucked under, fingers pointing forwards and pointer fingers touching. Simultaneously move hands apart and downwards in an arc, so that hands finish with palms facing upwards and pinky fingers touching.

https://signplanet.net/sign/294

"Fantastic! Now you know the actions, please join in. Ready...?"

Digging Deep

(Tune: "Twinkle, Twinkle, Little Star")

Digging deep in ancient land. (Auslan - Dig, Auslan – Land)
Fossils hidden by rocks and sand.
Uncovering secrets from long ago,
About plants and animals we did not know (Auslan - Plant, Auslan – Animal)
Discovering a world that used to be,
The amazing story of Earth's history. (Auslan - Earth)

You may wish to sing and perform this song again.

Holding the toy dinosaur replica from the box, tell the students…

"Palaeontologists have discovered a lot of information about dinosaurs, which is super cool. Unfortunately dinosaurs are extinct, so they do not live in our world anymore. These discoveries help us to understand when, where and how dinosaurs lived, what they ate and what they looked like when they were alive. Let's all stand up as tall as we can, standing up on tippy toes and reaching for the sky, just like a Brachiosaurus. Now wave your arms from side to side, wiggle your hips and shake your legs, like Anklosaurus. Now please follow my lead as we move to 'Dinosaur Dinosaur, Turn Around'.

Dinosaur, Dinosaur Turn Around

(Tune: "Teddy Bear, Teddy Bear")

Match actions to the words

"Dinosaur, dinosaur, turn around,
Dinosaur, dinosaur, stomp on the ground.
Dinosaur, dinosaur, show your claws,
Dinosaur, dinosaur, snap your jaws.
Dinosaur, dinosaur, reach up high,
Dinosaur, dinosaur, wink one eye.
Dinosaur, dinosaur, touch your nose,
Dinosaur, dinosaur, tap your toes.
Dinosaur, dinosaur, pat your knees,
Dinosaur, dinosaur, take a bow, please."

"The work of Palaeontologists has also helped us to learn about Australia's Megafauna – these were very large animals that lived thousands of years ago, just like Genyornis, Procoptodon and Diprotodon … (Show pictures/specimens from the prop box)… the next song is called 'Megafauna' and again there are lots of actions for you to do if you'd like to join in! We need to stand up for the start of this song." Please stand up and wait for the children who are joining in, to stand with you.

Megafauna

(Tune: "Frère Jacques")

Match actions to the words

"Gen-y-or-nis, Gen-y-or-nis
Run, run, run … run, run, run (Fast running on the spot)
Di-pro-to-don, Di-pro-to-don
Stomp, stomp, stomp, … stomp, stomp, stomp. (Big stomping feet)

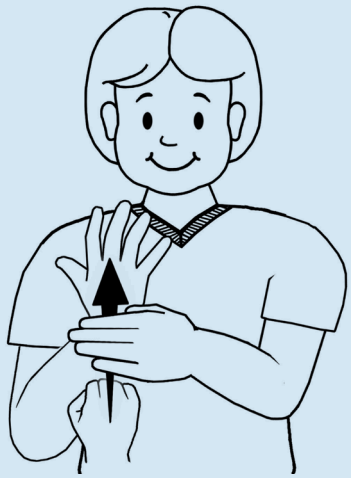
Phas-co-lo-nus, Phas-co-lo-nus
Dig dig dig … dig dig dig. (Auslan – Dig)
Pro-cop-to-don, Pro-cop-to-don
Jump, jump, jump … jump, jump, jump. (Big jumps on the spot)

Mega-lan-ia, Mega-lan-ia
Shuffle, shuffle, shuffle …. shuffle, shuffle, shuffle (Crawl on belly)
Thy-la-co-leo, Thy-la-co-leo
Climb, climb, climb… climb, climb, climb. (Hands climbing one above the next)

Old Wo-nam-bi, old Wo-nam-bi
Slither, slither, slither…. Slither, slither, slither. (Wiggle movement with arm)
Amazing Megafauna, amazing Megafauna
Bye, bye, bye … bye, bye, bye." (Waving 'goodbye')

"AMAZING! Thank you for joining in with that song. Let's come down on our knees now; we're going to move them slightly apart and sit on the heels of our feet…" (try to make a 'V' shape between your knees and feet, as this position leads into a restful yoga pose before the Activity Stations start)

"Palaeontologists love finding out about ancient life. Something that is ancient, means it is from a long time ago … (please demonstrate the Auslan sign for 'ancient')… Please do this action with me, it means 'ancient'." (Sign Auslan for 'ancient' a couple of times, allowing everyone to participate).



Ancient/A long time ago

Hold both hands in front of the body, just above shoulder height. Hands flat, palms towards the face, fingers straight, thumbs up. Circle hands backwards, one behind the other, three-four times.

https://signplanet.net/sign/514

Fossils like this (refer to the fossil specimen from the Provocation prop box) are, as far as we know, some of the most ancient forms of life. This is an impression of a multicellular organism that existed on Earth millions of years ago. Fossils like this showed how early forms of life were made in different shapes and interesting patterns, they look very different to the animals and plants that live in our world today, and their movement, if they were not attached to the seafloor, seemed to include gliding, floating and burrowing as they lived in the shallow waters of the sea, not on land.

So let's pretend we are one of the ancient fossils. Staying on our knees, we are going to lower our backs down so we can rest our foreheads on the floor, and reach our arms out in front of us, keeping our arms and hands on the floor too. We are just going to stay here for a few moments, keeping very quiet and still…"

Hold this pose for maybe 10–15 seconds before lifting your head and sitting back on the mat, and asking the children to do the same. Again, please acknowledge and celebrate everybody's participation during this group time.

Refer back to the Provocation archive box prop.

"I wonder what else is in here today?"

Slowly with a quizzical/thoughtful expression, reveal a magnifying glass, a paintbrush and a torch, a cardboard building block, some coloured pattern blocks and a dinosaur skull.

"Oh I know what these things are, they are some of the things you will be using during our learning activities today."

Briefly outline the activties at each Activity Station.

"Station 1 is our Investigation Station. Here you will find various specimens to investigate with magnifying glasses and photographs showcasing the South Australian Museum's Megafauna and Ediacaran Galleries."

"There are paintbrushes and tweezers at Station 2. The tweezers are tools for digging out the buried dinosaurs; paintbrushes can be used to brush off animals as they come out of the sand."

"There are pattern blocks and dinosaur pictures at Station 3. Try to build the dinosaurs using the different shapes."

"At Station 4 you can create trace fossils by gently pushing shells and other natural objects into the playdough, making an impression".

Ask for four or five volunteers to start with the Dinosaur Dig, where they use paintbrushes to discover toys hidden beneath the sand.

Have other groups start with Pattern Block Dinosaurs, Trace Fossils and at the Investigation Station.

Aim for students to rotate through at least three Activity Stations. (Approx 8-10 minutes per station).

After about 30 minutes rotating though the Activity Stations, it will be time to pack up.

Once students are back on the floor, bring the session to an end with deep breathing and yoga exercises:

Sunrise and Sunset Breathing

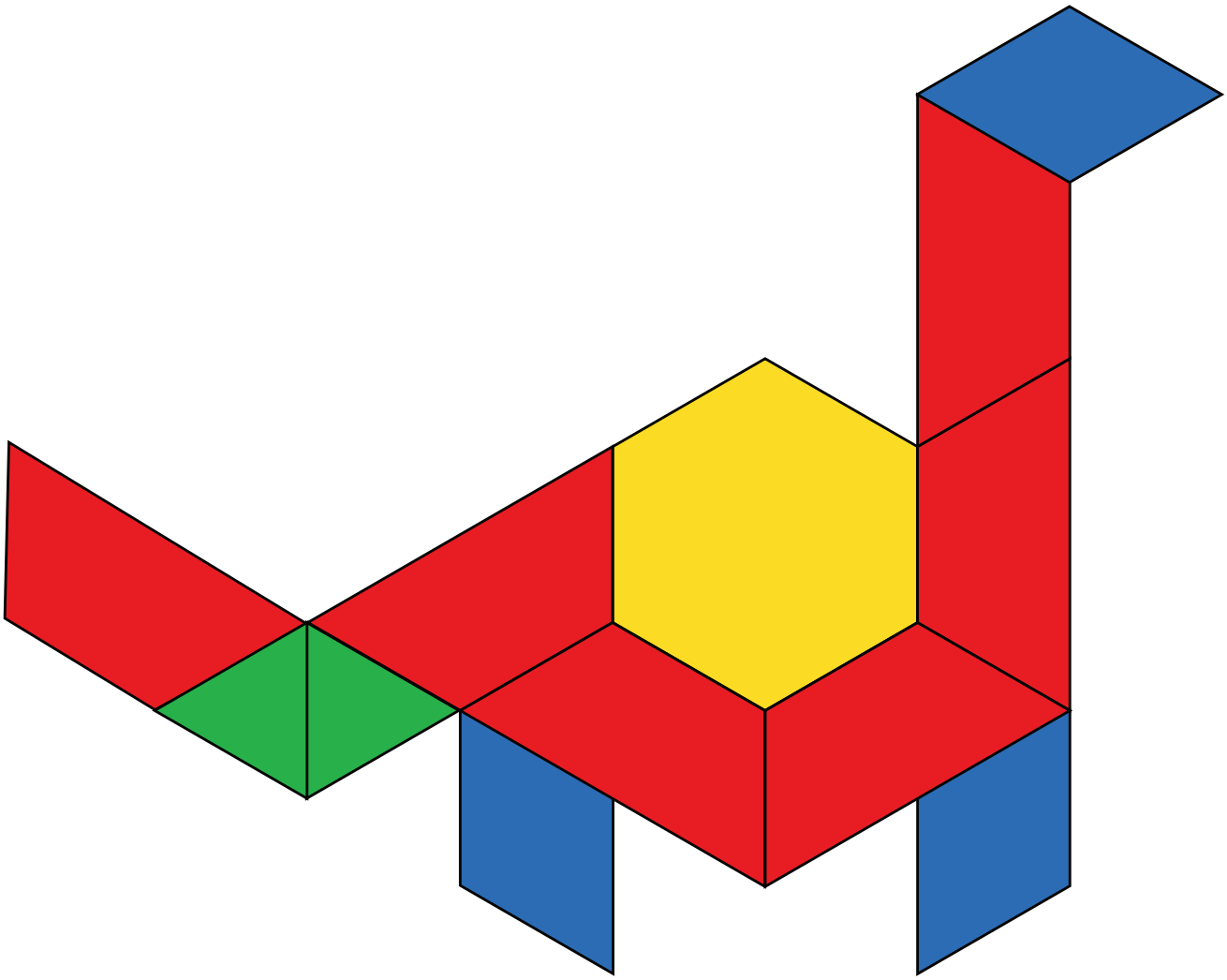
- Sit comfortably with enough space around you to extend your arms out to the side and above your head.
- Start with one arm by your side and the other arm reaching above your head.
- Slowly raise the arm by your side to meet the arm above your head. As you raise this arm, take a deep breath in…the sun rises.
- Once the arms reach each other, and the palms of the hands touch, lower the other hand down to the other side as you slowly release your breath…the sun sets.
- Repeat this breathing exercise but in reverse, so the arm that was lowered on the exhale (the sunset), is now the arm that rises on the inhale (the sunrise).
- This breathing is slow and intentional.
- Repeat four times, leading left to right and then right to left, before shaking out your arms and allowing them to rest by your sides or in your lap.

Yoga – Diplodocus Pose

- Start on your hands and knees.
- Stretch you left leg behind you and extend your right arm in front of you – really stretch from your fingertips to your toes, for about four slow breaths.
- Change arms and legs, extending your right leg and left arm - again really stretching from end to end, whilst taking four slow breaths.
- Repeat this stretch on both sides again if time permits.

Dinosaur pattern block cards

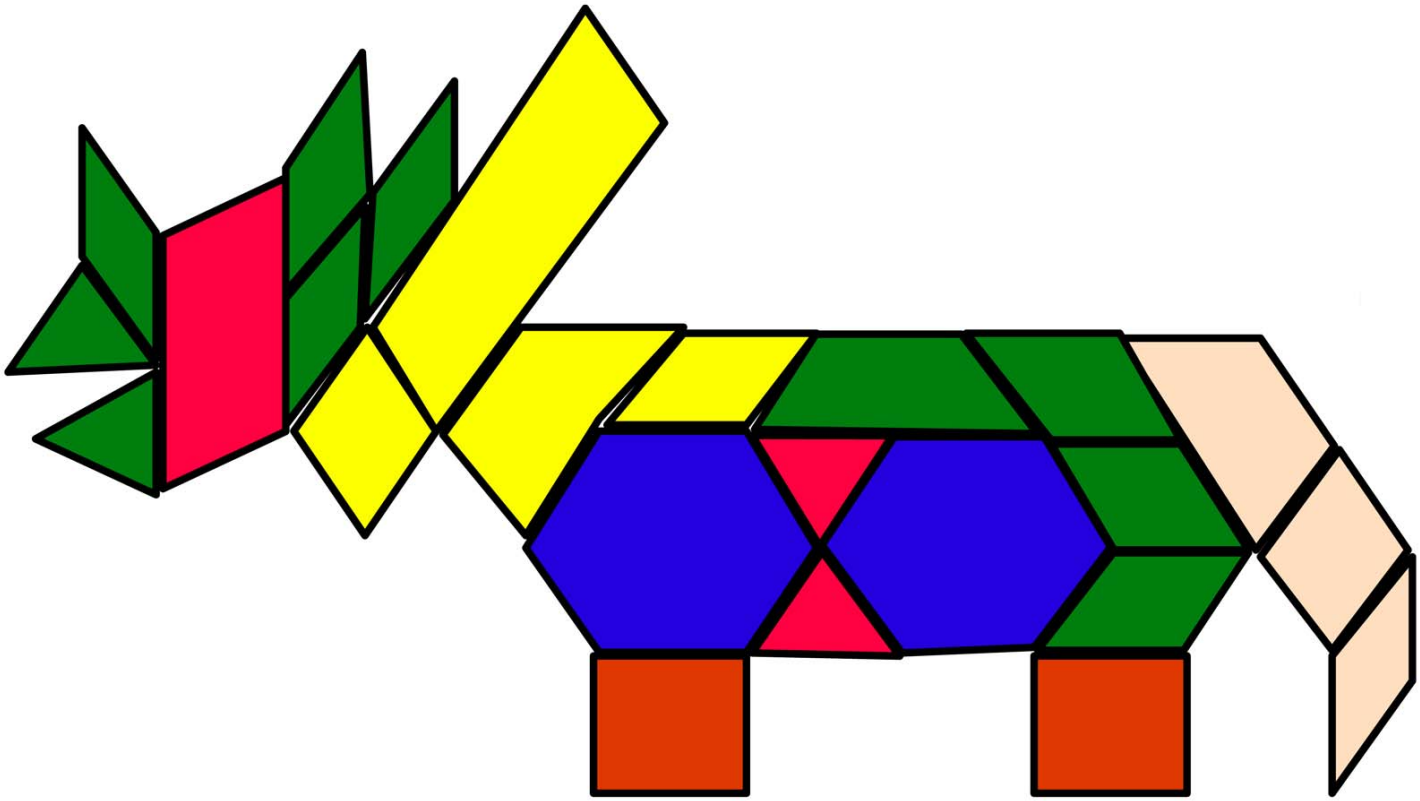
Dinosaur



Activity sources – https://classplayground.com/pattern-blocks/
https://aussiechildcarenetwork.com.au/printables/shapes-worksheets/dinosaur-pattern-blocks

Dinosaur pattern block cards

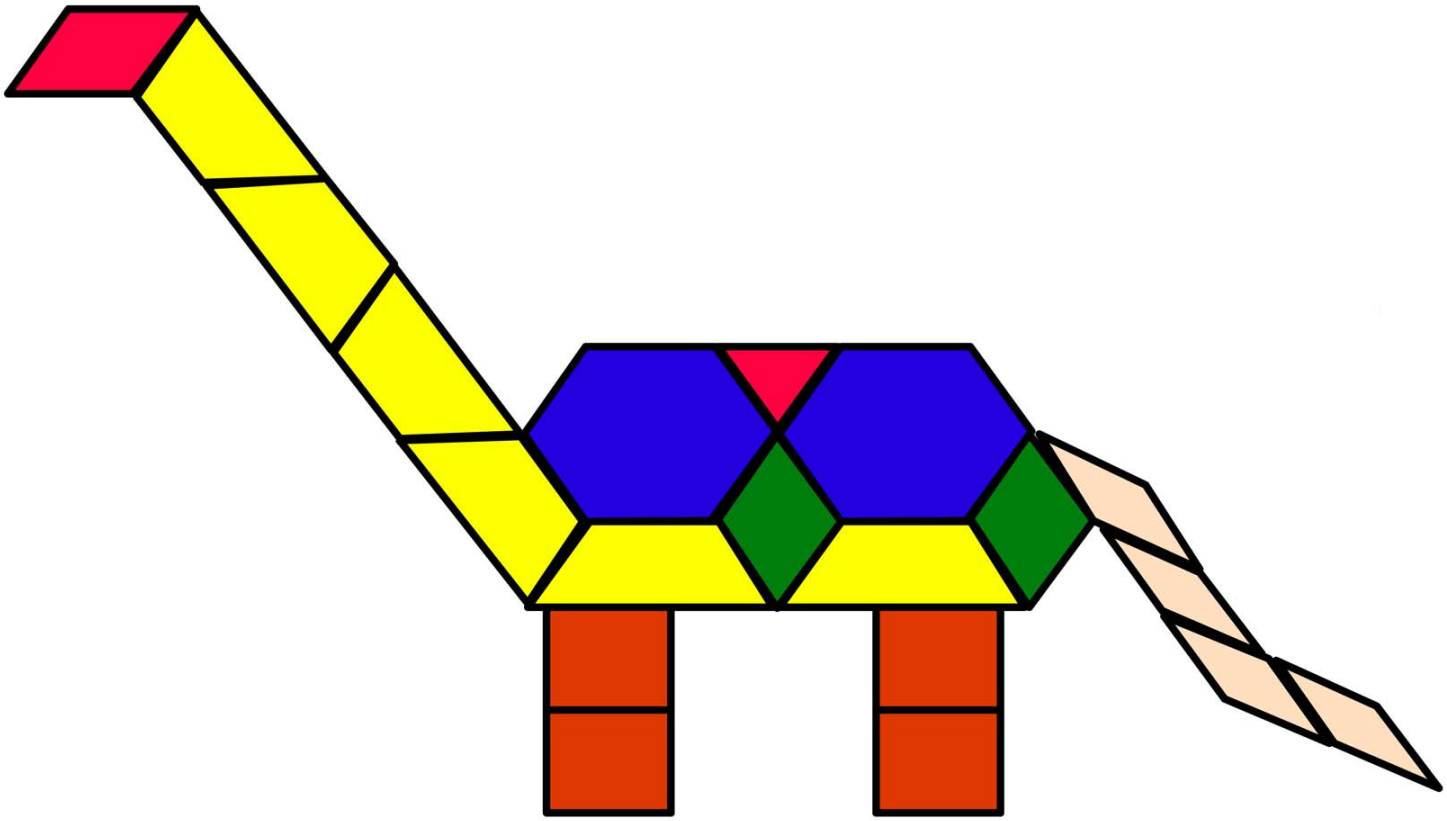
Triceratops



Activity sources – https://classplayground.com/pattern-blocks/
https://aussiechildcarenetwork.com.au/printables/shapes-worksheets/dinosaur-pattern-blocks

Dinosaur pattern block cards

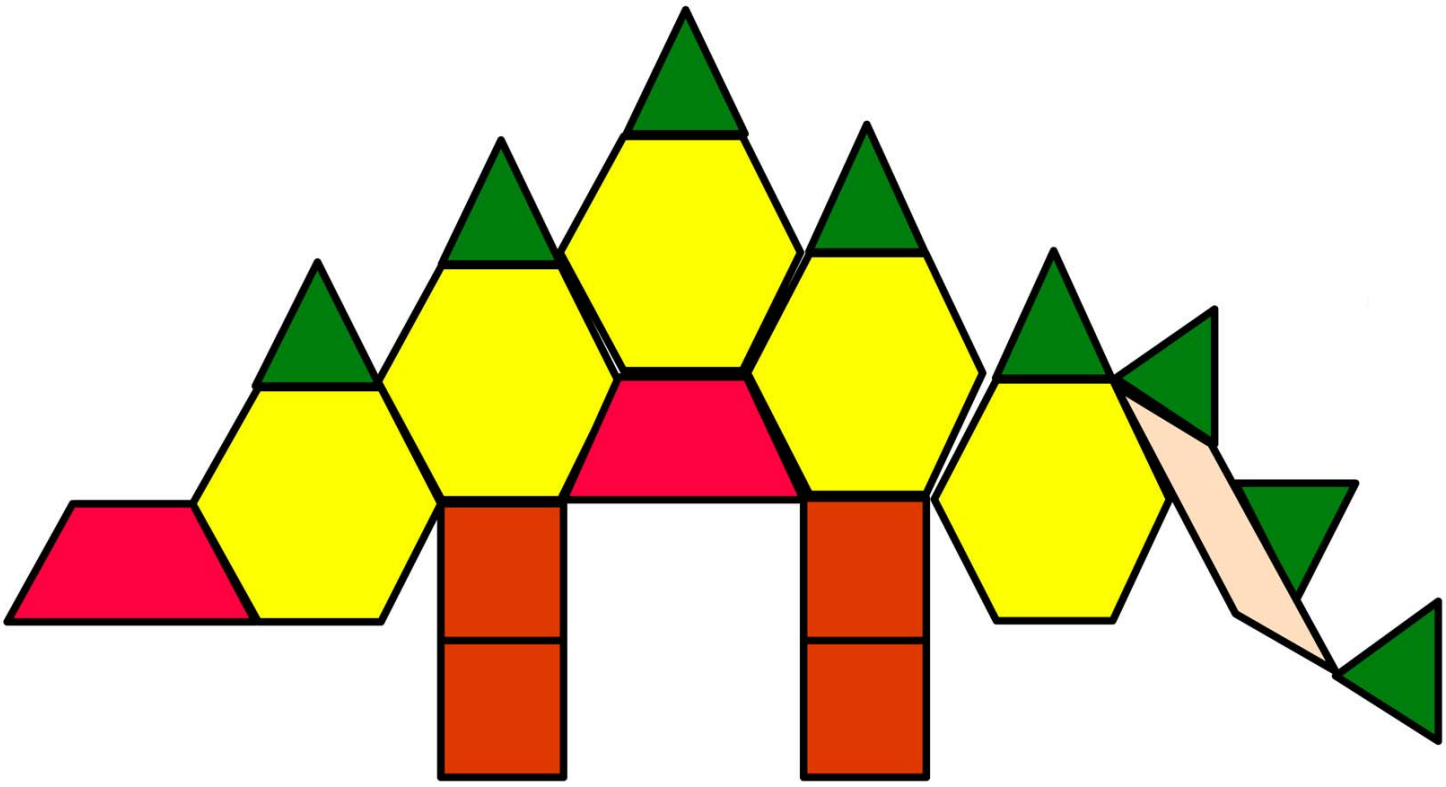
Apatosaurus



Activity sources – https://classplayground.com/pattern-blocks/
https://aussiechildcarenetwork.com.au/printables/shapes-worksheets/dinosaur-pattern-blocks

Dinosaur pattern block cards

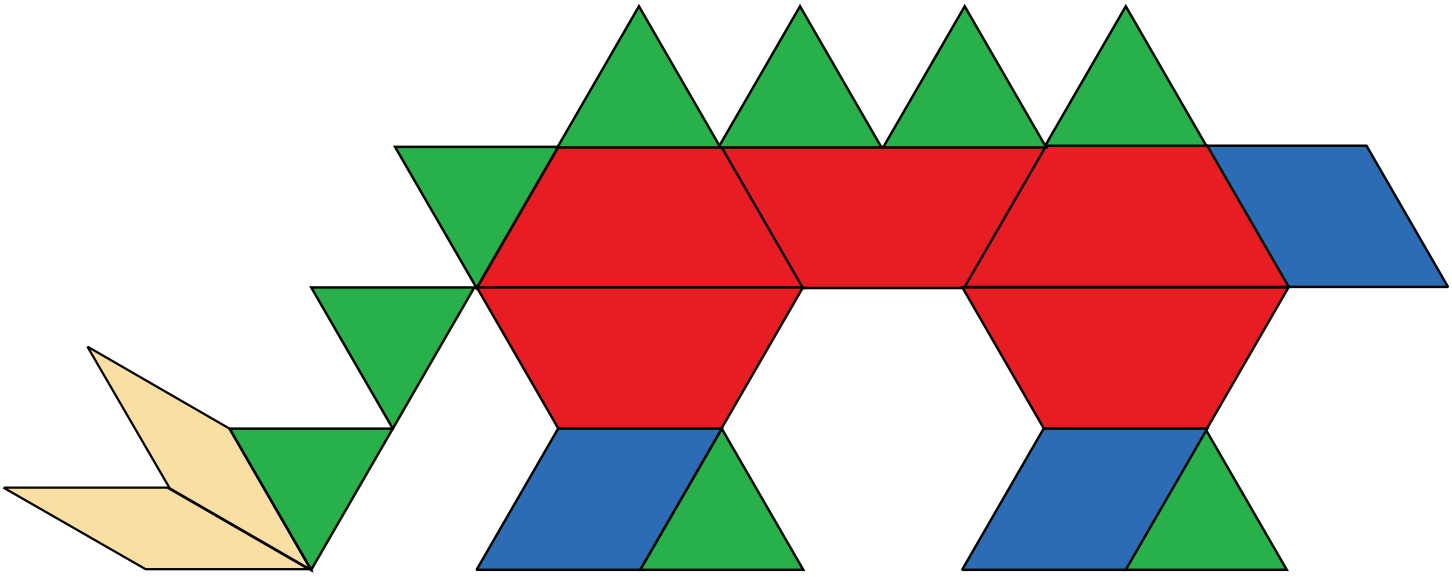
Stegosaurus



Activity sources – https://classplayground.com/pattern-blocks/
https://aussiechildcarenetwork.com.au/printables/shapes-worksheets/dinosaur-pattern-blocks

Dinosaur pattern block cards

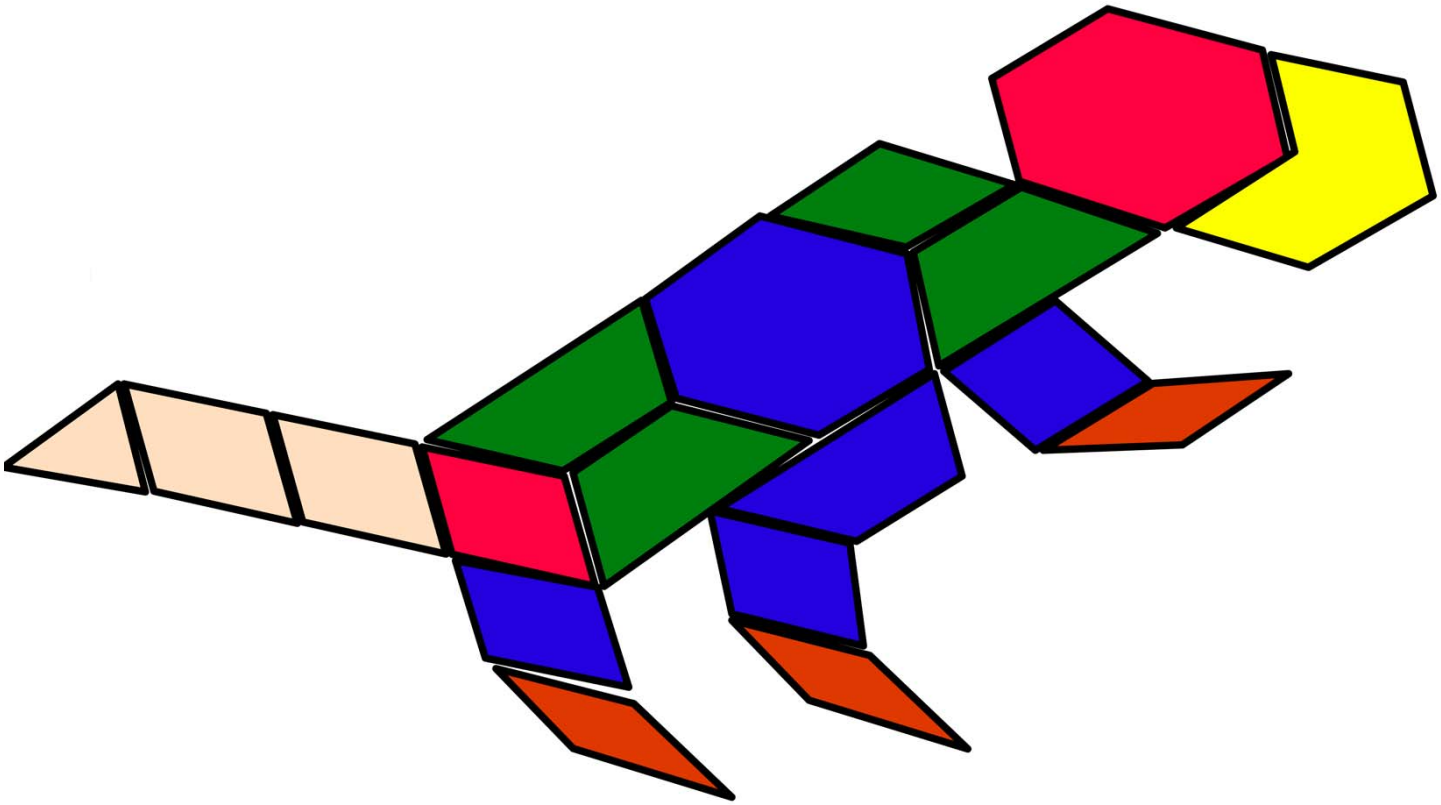
Stegosaurus



Activity sources – https://classplayground.com/pattern-blocks/
https://aussiechildcarenetwork.com.au/printables/shapes-worksheets/dinosaur-pattern-blocks

Dinosaur pattern block cards

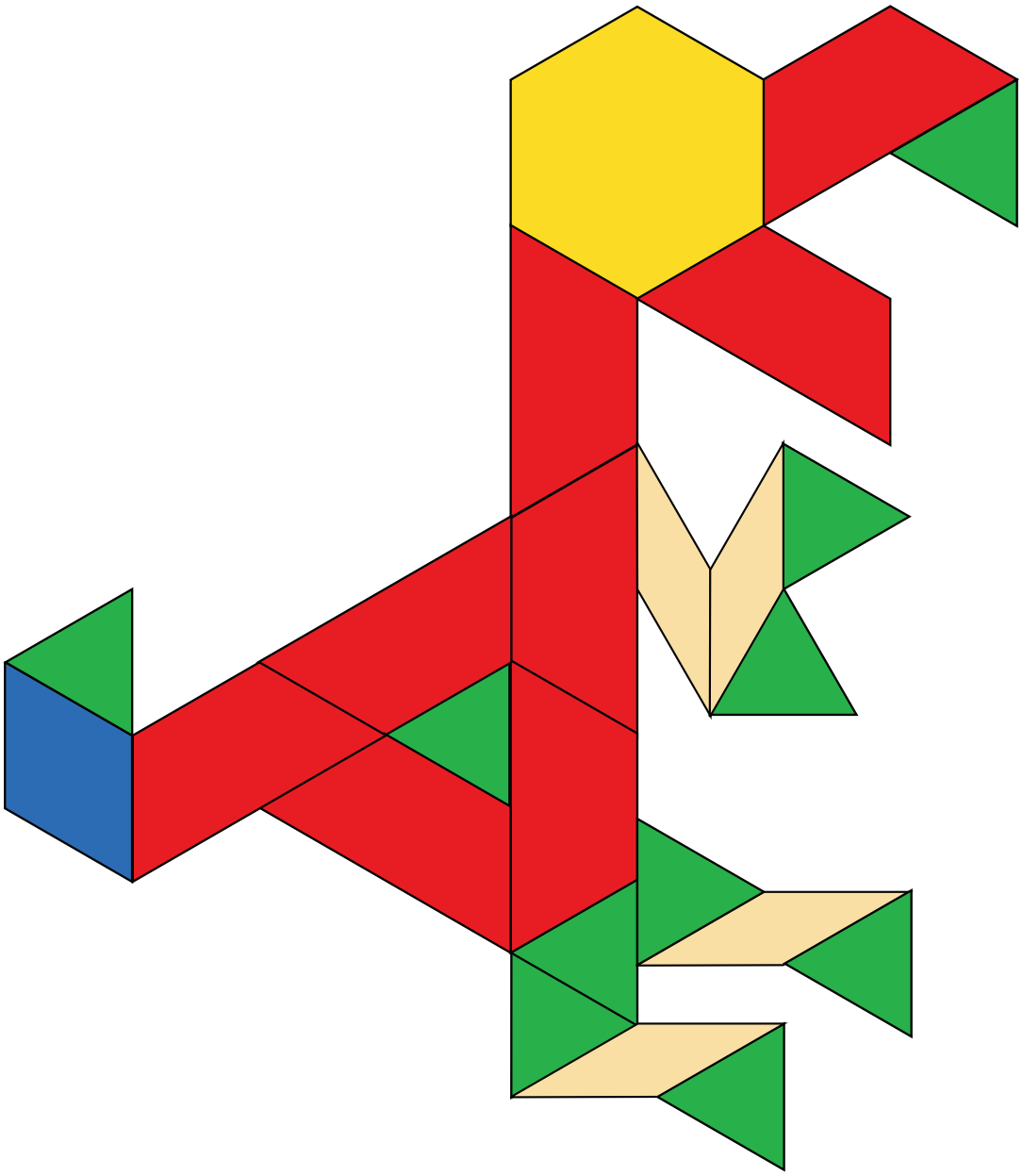
Tyrannosaurus Rex



Activity sources – https://classplayground.com/pattern-blocks/
https://aussiechildcarenetwork.com.au/printables/shapes-worksheets/dinosaur-pattern-blocks

Dinosaur pattern block cards

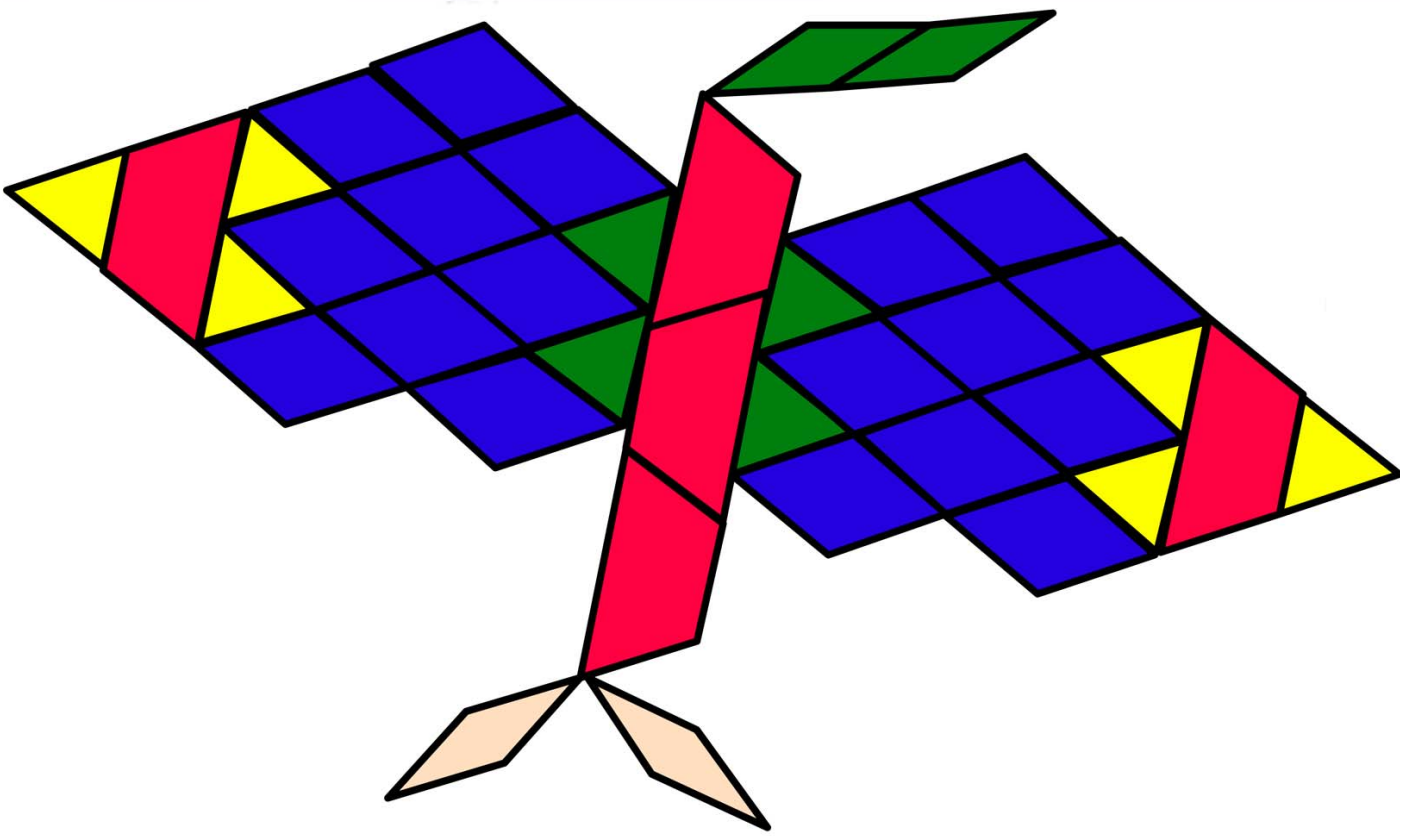
Raptor



Activity sources – https://classplayground.com/pattern-blocks/
https://aussiechildcarenetwork.com.au/printables/shapes-worksheets/dinosaur-pattern-blocks

Dinosaur pattern block cards

Pterodactyl



Activity sources – https://classplayground.com/pattern-blocks/
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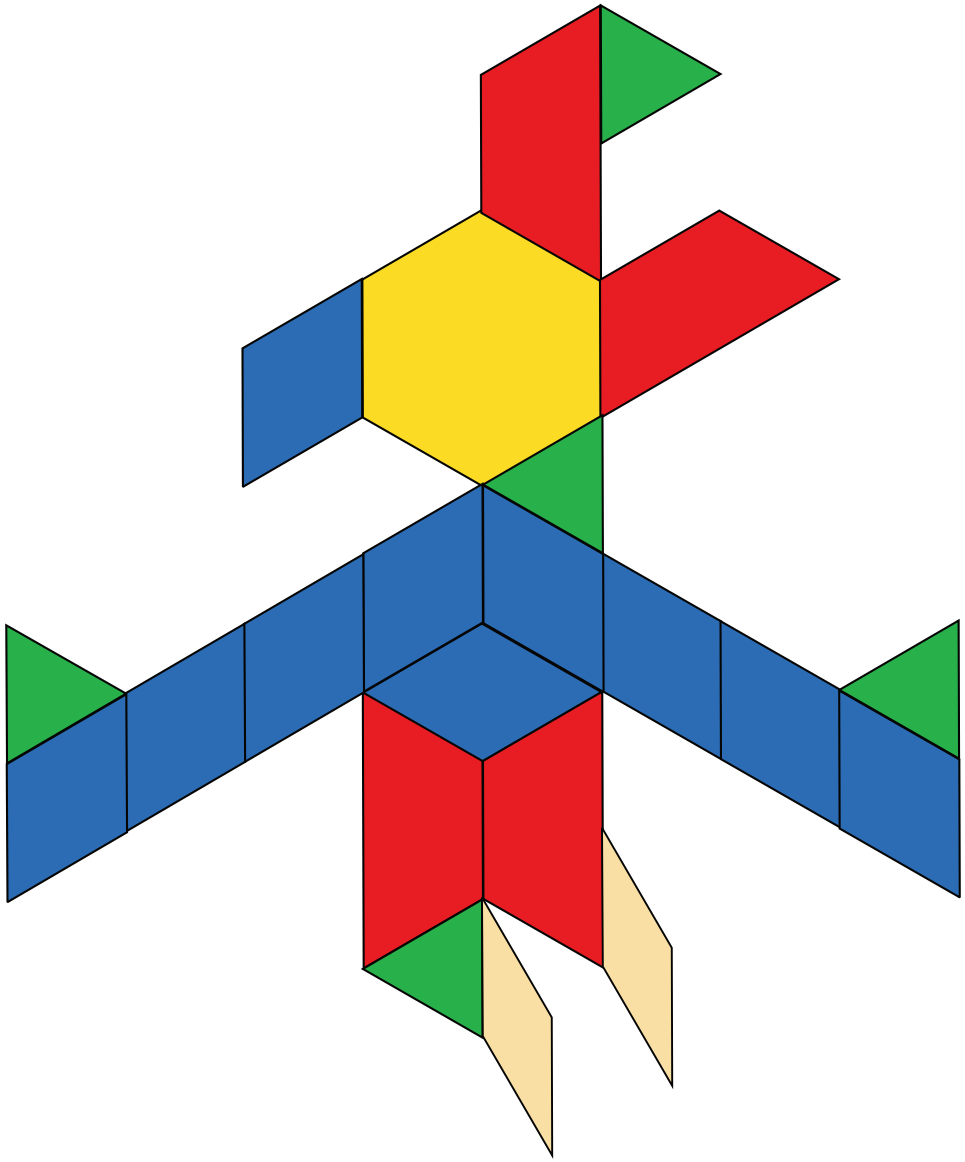
Dinosaur pattern block cards

Pterodactyl



Activity sources – https://classplayground.com/pattern-blocks/
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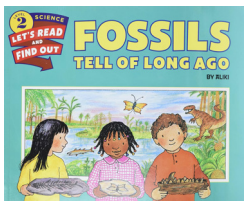
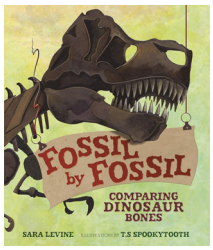
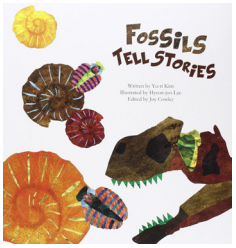
Suggested Reading List



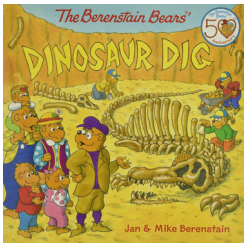
Fossils Tell of Long Ago
Aliki



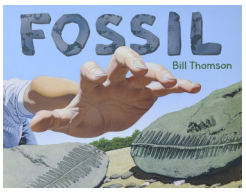
Fossil by Fossil
Sarah Levine



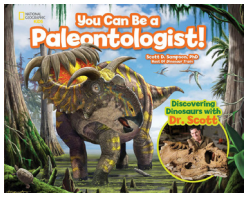
Fossils Tell Stories
Yu-ri Kim



Dinosaur Dig
Jan Berenstain

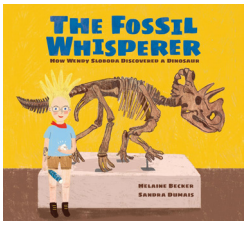


Fossil
Bill Thomson

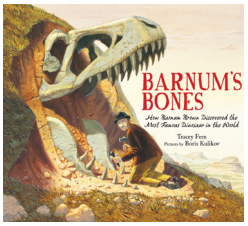


You Can Be a Paleontologist
Scott D. Sampson

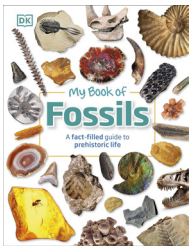
Emma Ren Junior Paleontologist
Jenny Lu



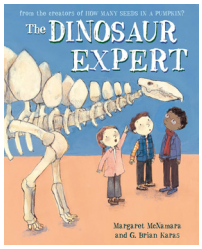
The Fossil Whisperer
Helaine Becker



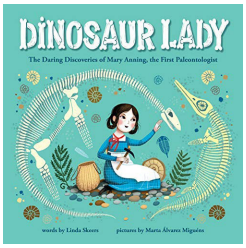
Barnum's Bones
Tracey Fern



My Book of Fossils
DK & Dean R. Lomax

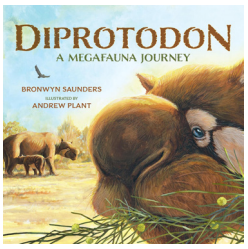


The Dinosaur Expert
Margaret McNamara & G. Brian Karas

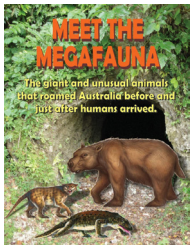


Dinosaur Lady
Linda Skeers

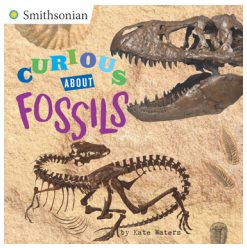
Here We Go Digging For Dinosaur Bones
Susan Lendroth



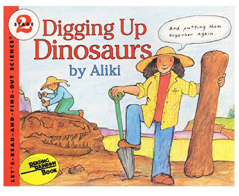
Diprotodon
Bronwyn Saunders



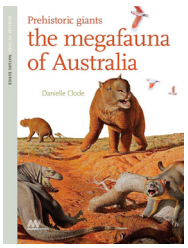
Meet The Megafauna
Elaine Ouston



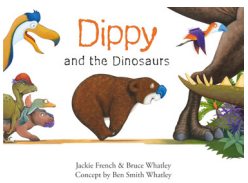
Curious About Fossils
Kate Waters



Digging Up Dinosaurs
Aliki



Prehistoric giants – the megafauna of Australia
Danielle Clode



Dippy and the Dinosaurs
Jackie French & Bruce Whatley

Dinosaur Bones
Bob Barner