

WELLINGTON

ZOO

# BUSH BUILDERS



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# INTRODUCTION

At Wellington Zoo we want to ignite a Zoo revolution. We deliver innovative learning programmes to connect people with animals and save animals in the wild by building community action for wildlife.

Wellington Zoo Bush Builders is a hands-on environmental education programme designed to connect urban students with the variety of life around them. The programme uses the living world to create fun and meaningful learning experiences, empowers learners to take positive action, and allows Wellington Zoo to collect a broad view of the connectedness of Wellington children to their natural environment.

Students will develop their environmental literacy over three distinct phases including a launch at Wellington Zoo, scientific surveying at school and a conservation action at the end of the programme. The overarching theme for the programme is biodiversity; we will work with you to meet the needs of your students and to ensure that the theme, learning and conservation outcomes fit your unit of learning or inquiry topic.

As a Wellington Zoo Bush Builders School you will be part of Wellington Zoo's research into the impact Wellington Zoo Bush Builders has on increasing students' nature awareness over the course of the programme.

Wellington Zoo Bush Builders programme is a partnership between the school and the Zoo. Wellington Zoo will provide Zoo resources, and an expert Zoo Educator to help implement the programme in your school. In order to participate in the programme, you must commit to completing all three phases and ensure completion of pre and post evaluation surveys with your students within a timeframe agreed with our Wellington Zoo Bush Builders Educator.



## WELLINGTON ZOO BUSH BUILDERS GUIDING PRINCIPLES

- Pride- valuing ourselves and the world around us
- Curiosity- investigating and exploring the living world
- Community- connecting with people and place
- Partnership- working together to achieve conservation and learning outcomes
- Action- making a difference

## WELLINGTON ZOO BUSH BUILDERS BIG IDEAS

- Everything is connected (interdependence)
- People are part of the living world and our actions matter (sustainability)
- Scientists ask questions, investigate responses, and use scientific tools to explore the world around them (Nature of Science)
- We can make a difference by working together to take action (responsibility and stewardship)

## WELLINGTON ZOO BUSH BUILDERS TOOLS

You will be provided with the following tools:

- This resource booklet which contains session plans and activities you can use to support learning;
- A toolkit containing scientific surveying equipment, books and other useful resources (on loan for the duration of your participation);
- Access to resources, such as staff expertise and use of equipment during the action phase.

# WELLINGTON ZOO

# BUSH BUILDERS

# CURRICULUM LINKS

Wellington Zoo Bush Builders has strong links to science and can also support other areas of the Curriculum. Wellington Zoo Bush Builders encourages learners to get out of the classroom to explore their immediate outside world, where they will be challenged in their thinking, in managing themselves, relating to others and participating and contributing.

## SCIENCE L1 - L4

### NATURE OF SCIENCE

Wellington Zoo Bush Builders aligns closely with the four sections of the Nature of Science strand:

#### Understanding about Science

Wellington Zoo Bush Builders encourages learners to ask questions about the world and to anticipate that there may be multiple answers once the questions are investigated. By exploring their natural surroundings they will be able to collect evidence and create new theories to explain what they observe.

#### Investigating in Science

Learners will build on their prior knowledge by asking questions, collecting evidence and discussing their findings to develop ideas and build simple models to explain their findings. Older learners may be able to evaluate the suitability of their investigation methods and adapt them as needed.

#### Communicating in Science

Learners are encouraged to present their findings to each other. To support this they will need to expand their science vocabulary to better explain the concepts they have been exposed to.

#### Participating and Contributing

At its heart, Wellington Zoo Bush Builders is about enhancing local biodiversity, which in turn supports local conservation efforts to save animals in the wild. The actions learners take will make a difference for the local environment, while taking into account the needs of the animals and people sharing that space.

Living World · Evolution · Life Processes · Ecology (L3 - L4)

Planet Earth and Beyond · Earth Systems · Interacting Systems

Aside from Science Wellington Zoo Bush Builders can support other areas of the Curriculum, we're happy to discuss additional curriculum links with you. We have some examples below:

## TECHNOLOGY L1 - L4

*Technological Practice* · Planning for Practice · Brief Development · Outcome Development / Evaluation; *Technological Knowledge* · Technological Products; *Nature of Technology* · Characteristics of Technology (L1-L2) · Technological Outcomes (L3 -L4)

## SOCIAL SCIENCES L1 - L4

*Understand how places in New Zealand are significant for individuals and groups* (L1) · *Understand how places influence people and people influence places* (L2) · *Understand how people view and use places differently* (L3) · *Understand how exploration and innovation create opportunities and challenges for people, places and environments* (L4).

## ENGLISH L1 - L4

*Listening, Reading, Viewing* · Ideas · Structure · Purposes and Audiences; *Speaking, Writing, Presenting* · Ideas · Structure · Purposes and Audiences

## HEALTH AND PHYSICAL EDUCATION L1- L4

*Relationships with other people* · Identity, Sensitivity and Respect (L1) · Interpersonal Skills; *Personal Health & Physical Development* · *Relationships with other people* · *Healthy Communities and Environments* (L2-4)

## MATHEMATICS AND STATISTICS L1- L4

*Number and Algebra* · Number Strategies (L1); *Geometry and Measurement* · Shape (L1); *Statistics* (L2-4)

## THE ARTS L1- L4

*Visual Arts* · *Music – Sound Arts* · *Drama* · *Dance*

# PRE-EVALUATION ACTIVITIES

NB completion of pre-evaluation activity is mandatory for involvement in Wellington Zoo Bush Builders

## WHAT'S AROUND US?

### LEARNING INTENTIONS

To work as a group to sort information  
To be aware of living things in our area

### EQUIPMENT

Felt tip pens/crayons/colouring pencils  
Blank A4 paper

### METHOD

#### 1. In my school, not in my school

*Group activity*

Split learners into groups.

Ask learners to look at the images on their cards. Get learners to sort the pictures into two groups: Group 1 – animals and plants they might see in and around their school; Group 2 – animals and plants they wouldn't see around their school.

#### 2. Picture of my school

*Done individually*









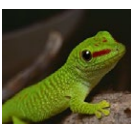





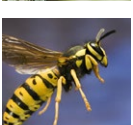
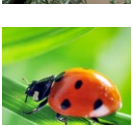
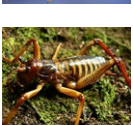




Ask learners to draw a picture of what they think their school looks like on a blank A4 sheet of paper. Ask learners to put their name and room number on the sheet.

#### 3. Wellington Zoo Bush Builders Programme

*Group discussion*

Ask learners to think about the images or ideas that the words 'bush' and 'builders' bring to mind. Capture their ideas in some way (useful to refer back to at a later stage).

# IN MY SCHOOL, NOT IN MY SCHOOL

ANIMALS /PLANTS		LIKELY TO BE IN SCHOOL	NOT LIKELY TO BE IN SCHOOL	ANIMALS /PLANTS		LIKELY TO BE IN SCHOOL	NOT LIKELY TO BE IN SCHOOL
	Manu Pango <b>Blackbird</b>	<input type="radio"/>	<input type="radio"/>		Paihamu <b>Possum</b>	<input type="radio"/>	<input type="radio"/>
	Ngeru <b>Cat</b>	<input type="radio"/>	<input type="radio"/>		Rīroi <b>Rat</b>	<input type="radio"/>	<input type="radio"/>
	Tohetaka <b>Dandelion</b>	<input type="radio"/>	<input type="radio"/>		Ngata <b>Snail</b>	<input type="radio"/>	<input type="radio"/>
	Ngarongaro <b>Fly</b>	<input type="radio"/>	<input type="radio"/>		Tiu <b>Sparrow</b>	<input type="radio"/>	<input type="radio"/>
	Moko Kākāriki <b>Gecko</b>	<input type="radio"/>	<input type="radio"/>		Rākau <b>Trees</b>	<input type="radio"/>	<input type="radio"/>
	<b>Grass</b>	<input type="radio"/>	<input type="radio"/>		Tuatara	<input type="radio"/>	<input type="radio"/>
	Harakeke <b>Flax</b>	<input type="radio"/>	<input type="radio"/>		Tūi <b>Tui</b>	<input type="radio"/>	<input type="radio"/>
	Kererū <b>Wood Pigeon</b>	<input type="radio"/>	<input type="radio"/>		Wāpi <b>Wasp</b>	<input type="radio"/>	<input type="radio"/>
	<b>Ladybug</b>	<input type="radio"/>	<input type="radio"/>		Wētā <b>Weta</b>	<input type="radio"/>	<input type="radio"/>
	Pōhutukawa	<input type="radio"/>	<input type="radio"/>		Pūngāwere <b>Whitetail</b>	<input type="radio"/>	<input type="radio"/>
	Tuatete <b>Hedgehog</b>	<input type="radio"/>	<input type="radio"/>		Kurī <b>Dog</b>	<input type="radio"/>	<input type="radio"/>

# SCIENTIFIC SURVEYING ACTIVITY

## SORT LIKE A SCIENTIST

### LEARNING INTENTION

To understand that living things can be sorted in a number of ways

### EQUIPMENT

Vertebrate/invertebrate resource booklets

Natural items e.g. plants, fur, feathers, insect casings, leaves, etc.

Photos/resources for drawing animals that live in their neighbourhood

### METHOD

Explain to learners that there are a lot of different ways to group living things, and this is the type of thing scientists do. Below is a selection of possible activities you could use to explore this with your learners:

Select a small group of learners to stand at the front of the room. Ask the remaining learners to put those at the front of the room into smaller groups or pairs based on something they have in common.

Ask learners to bring in photos or draw pictures of the animals (both wild and domestic) that live in their neighbourhood. As a class, put these animals into groups. Use categories that learners think of, such as colour, size, species, habitat, etc.

Show learners a selection of real, natural items – plants, fur, feathers, insect casings, leaves, etc. Ask learners to sort these items into groups – colour, size, habitat, diet, etc. as above. Learners could glue the items onto a large sheet of paper to create a tactile record of different groupings for display.

Read a story together with the theme, living things. Have learners spot as many of the living things as they can. How can they tell it is living? E.g. does it breathe, does it eat or drink, does it reproduce, can it die?



# SCIENTIFIC SURVEYING ACTIVITY

## WHAT, WHY, HOW?

### LEARNING INTENTIONS

To ask scientific questions

To think about what might live in an area

### EQUIPMENT

Investigation plan worksheet

### METHOD

Think of an example experiment for your class to try. As a class, practice asking a question, thinking about the equipment needed, and predicting what might happen, e.g. dropping two objects at the same time. Learners decide which will hit the ground first. Establish a model suitable to class and level. Practicing the above will help prepare learners for starting their Wellington Zoo Bush Builders investigations.

What do they want to know about what's living in their school?

What will they need to help them find the answers?

What do they think they will find?

Use the worksheet as a guide to collate information. Display in the classroom where it can be referred back to and results added.

Did the learners find what they thought they would find?

## MY INVESTIGATION

I am trying to discover...

At the moment I think this will happen...

I think this will happen because...

I will find this out by...

## OUR GROUP INVESTIGATION

\_\_\_\_\_ thinks that we will find...

\_\_\_\_\_ thinks that we will find...

\_\_\_\_\_ thinks that we will find...

\_\_\_\_\_ thinks that we will find...

Together we predict that....

# SCIENTIFIC SURVEYING ACTIVITY

## MAP IT OUT

### LEARNING INTENTION

To create a map of an area

### EQUIPMENT

Gridded map templates

Internet access

Maps

Rulers

Paper

Pens

Colouring pencils

### METHOD

Ask learners, what is a map? Make a map of the classroom or the school and show it to the learners. Explain what a map is for, and the sort of things it will record.

Show learners a template of the area that will be surveyed (your school field, play ground, local park, etc). They are going to help put all of the things in the area onto the template to make a map of their area.

**Note:** You might want to add features to the map before you start as a reference point for your learners, e.g. a school building, a path, etc.

Go into the selected area. Take your learners around the site and together add features to your class map. This could be done with stickers or pictures that you give them and they stick on.

Back in class look at the map and talk about what can be added as the area is explored, e.g. insects, plants, and large animals. Display it somewhere in the classroom



# SCIENTIFIC SURVEYING ACTIVITY

## BUSH HUNTERS

### LEARNING INTENTIONS

To use scientific equipment

To find different kinds of plants, seedlings, and leaf litter

### EQUIPMENT

Plant identification cards

Plant identification book

Transects- tape measures

Quadrats

Plant counting sheet

### METHOD

Refer back to the investigation questions. As a class, go out to the site the learners are to survey. Highlight to your learners that scientists need to use specialist equipment to find plants, and they will use similar equipment.

Show learners a quadrat. It is like taking a photo of different parts of an area. Model how to use the quadrat including throwing it to land randomly so we don't know the exact spot it will land. Throw it three times and record what you find.

**NB:** A simple random sample is meant to be an unbiased representation of a group.

Divide learners into groups. Each group will throw the quadrat three times and tick the image on the worksheet that represents what they find each time. Some of the plants might be too large for the quadrat. Then show students how to use transect lines.

Run your transect from the outer edge of the area to an inner point. Record the plant that appears at each metre marker. Ask students to consider what other methods we could use to survey plants and animals that are too big to fit in a quadrat, e.g. random sampling.



# WORK SHEET

## BUSH HUNTERS (YEARS 1-3)

Mark down in the boxes when you spot one of these types of plants, seedlings, and leaf litter.

**Tree**

**Bush**

**Flower**

**Grass**



# WORK SHEET

## BUSH HUNTERS (YEARS 4-8)

Mark down in the boxes when you spot one of these:

### Tree

Pōhutukawa  
Beech  
Kōwhai  
Puka  
Nīkau  
Ngaio  
Tī Kōuka (Cabbage tree)  
Rimu  
Lancewood  
Tawa  
Rewarewa  
Tōtara  
Mahoe  
Ponga (Silver Fern)  
Fivefinger

### Bush/Shrub

Harakeke (Flax)  
Koromiko  
Kawakawa  
Coprosma  
Hebe  
Rangiora (Bushman's Friend)

### Weeds

Blackberry  
Gorse  
Old Man's Beard  
Sycamore  
Agapanthus  
Wandering Jew  
Broom  
Ivy

### Flower

Daisy  
Dandelion

### Ferns/Grass

Toetoe  
Dandelion

### Flower

Orange Pore Fungus  
Birds Nest Fungus  
Pauwhatitiri (Basket Fungus)

Have you discovered something unexpected? Record your discovery here, using descriptive words or a sketch

# SCIENTIFIC SURVEYING ACTIVITY

## BACK TO THE PAST

### LEARNING INTENTIONS

To think about how an area might have changed over time

To investigate how we use different methods to find out what things were like in the past

### EQUIPMENT

Computer

Paper

Pencils

Coloured Pencils

### METHOD

Each group will investigate what the area looked like at a certain point in time and draw a picture of it:

50 years ago

100 years ago

300 years ago

1,000 years ago

Students will need to think of different ways they can find out what the area might have looked like, using different sources of evidence to build the picture.

Some questions for the students to ask are:

- What kinds of animals would be present?
- How would the plants be different?
- What impact (if any) have people had on the area?



# SCIENTIFIC SURVEYING ACTIVITY

## MINI-BEASTS

### LEARNING INTENTIONS

To use scientific equipment

To find 3-4 different kinds of invertebrates (bugs)

### EQUIPMENT

Nets	Simple Invertebrate I.D. cards
Trays	Life-Sized Guide to Insects
Leaf litter	Worksheets
Trowels	Clipboards
Soil sample	

### METHOD

Refer back to the investigation questions. As a class, go out onto the mapped site you are surveying to investigate what invertebrates live there. Tell learners they are going to try some different ways of finding them. Model the equipment before trying each activity. Try each method three times. Collect data on the worksheet.

**Nets:** 2 for each group – sweep backwards and forwards across ground/bush to catch bugs

**Leaf litter and trays:** 3 scoops of leaf litter – just top layer, put in tray and see what bugs they can find.

**Soil sample:** Dig a hole – put dirt in tray and look through sample for bugs (learners may need adult help for this, and ground may need to be wet before holes are dug).

*Have a discussion with learners about the importance of returning anything they find back to the area they found it.*

Did the class find what they thought they would? Collate class results.

**Extension:** The invertebrates have been grouped on the worksheet in a particular way; are there any other ways you could group them? How do these invertebrates fit within their ecosystem?



# WORK SHEET

## BUG COUNTING (YEARS 1-3)

Mark down in the boxes when you spot one of these types of bugs.

**Spider**

**Ground/tree dwelling insect**

**Flying Insect**

**Snail or worm**



# WORK SHEET

## INVERTEBRATE ID (YEARS 4-8)

Mark down in the boxes when you spot one of these types of bugs.

### Arachnids

Daddy long legs  
Sheet web spider (native)  
Banded tunnel web spider (native)  
Nursery web spider (native)  
Large brown vagrant spider (native)  
Black headed jumping spider (native)  
White tail spider  
False scorpion

### Ground/tree dwelling

Ant  
Beetle  
Centipede  
Cockroach  
Millipede  
Silverfish  
Praying Mantis  
Wētā (endemic)  
Stick insect

### Flying

Bee  
Butterfly  
Cicada  
Dragonfly  
Fly  
Moth  
Wasp

### Soil

Earthworm  
Snail  
Slug  
Slater

### Larva

Grass grub  
Huhu grub (native)  
Tanguru grub (native)  
Caterpillar  
Maggot

Have you discovered something unexpected? Record your discovery here, using descriptive words or a sketch

# SCIENTIFIC SURVEYING ACTIVITY

## I SPY

### LEARNING INTENTIONS

To know how to observe animals in an area  
To find two larger animals

### EQUIPMENT

Investigation questions

### METHOD

Refer back to investigation questions.

Learners have found plants and invertebrates in their area. What sort of larger animals do they think they will find? Before leaving for the site, have a discussion with learners about how they should approach the surveyed area. Should they run in, make lots of noise? What might happen if they are quiet? What skills and senses should they be using?

Give learners time to make their observations. After a minute or two, ask them what they saw. Talk about the problems with sitting and watching. What might distract them from seeing anything? E.g. noise, daylight, traffic, number of people, etc.

Talk about other ways to survey larger animals – for example tracking or video recording. It might be better to find a different technique that will illustrate what animals are passing through an area, rather than waiting to see them. This links into the following session, ‘Now you see me, now you don’t’.

*Find a method that allows animals to leave a trail (see following session for tracking suggestion).*

# SCIENTIFIC SURVEYING ACTIVITY

## NOW YOU SEE ME, NOW YOU DON'T

### LEARNING INTENTIONS

To know how to track animals in an area  
To find signs of two larger animals

### EQUIPMENT

Investigation guidelines	Plastic lids
Sand	Water bottles
Trays x 5	Trowels
Peanut butter	

### METHOD

Remind learners about the conclusions they came up with in the previous session. Tell them that in this session instead of looking for the larger animals they are going to track them by building tracking tunnels, looking for signs that they are there. Discuss signs they might find, e.g. foot prints, feathers, fur, beak or teeth marks, poo. Take learners out onto the site. Put the learners into groups; each group will get one tray and one trowel each.

#### Demonstrate procedure:

- 1: Fill the tray about half way with sand. Use the trowel to shovel sand and level out. Take the bottle of water and wet the sand, just a little.
- 2: Take a small plastic lid or container and fill with peanut butter. Place container in the centre of the tray.

Groups locate an area where they can place their trackers overnight. They should be hidden so that people don't disturb them. Learners monitor their sand trackers. These can be reset each day for a week if necessary. Learners can draw, or photograph their results to record what they find.

# SCIENTIFIC SURVEYING ACTIVITY

## TRACKING TUNNELS

Tracking tunnels help collect evidence of animals living in an area.

Inside the tracking tunnel is bait – something with a strong smell. To reach the bait the animal will walk through the inkpad. As the animal leaves the tunnel it makes inky footprints on the paper left inside the tunnel.

### YOU WILL NEED:

An old cardboard box (large)  
Food colouring  
Margarine container lid or similar  
Tape and stapler  
An old dish cloth or flannel  
2 paper clips  
Blank paper

### PROCEDURE (PREPARE IN ADVANCE FOR YOUNGER LEARNERS):

1. Cut out a piece of cardboard - 40cm down by 58cm across
2. Place the cardboard flat and with a ruler mark measurements 2cm, 15cm, 30cm, and 43cm across. Do this at the top and bottom of the cardboard. Join these marks together with a line.
3. Score over the top of the lines with a pair of scissors. Be careful not to cut the cardboard.
4. Fold the box up to make a rectangle. Staple and or tape the 2cm flap to the side.
5. Cut the flannel / tea towel to fit the shape of the margarine lid.
6. Cut two pieces of paper, 13-x 21 cm.
7. Dilute the food colouring in water.
8. Saturate the lid and contained flannel with the food colouring.
9. Place a teaspoon full of peanut butter or other bait in the centre of the lid.
10. Carefully slide the lid into the middle of the tracking tunnel.
11. At each end of the tracking tunnel place the blank paper and secure with a paper clip.
12. Place the tracking tunnel in a small clearing where animals can access it. Avoid placing in exposed areas where it may be blown away.



FLAP 2cm	15cm	30cm	43cm
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# ACTIVITY

## CONNECTIONS

### LEARNING INTENTION

To be aware of how living things are linked together

### EQUIPMENT

Labels

### METHOD

Create labels for the native plants, insects and larger animals the class has found. Make one label a rat label (or another non-native animal), which you will wear. Either give one label to each learner, or pick a handful of learners to demonstrate to the rest of the class.

Tell learners that we are going to discover how living things (plants, bugs and larger animals) are connected to each other.

Start with the plants – ask the learners wearing the plant labels to stand in the middle of the room. Tell everyone that these plants are well cared for and grow very well, but what happens if they grow too much? Something needs to stop the plants from overgrowing.

Who eats the plants? Add learners with the plant eater labels (often insects) into the web. What happens if we let the insects keep eating the plants? They might eat all the plants, so need to control them.

Who can eat the bugs? Add learners with the larger animal labels. All of these animals only eat what they need. It's enough to keep everything balanced.

When these animals die, they go back into the ground, and this feeds the plants.

What happens if a different animal (you- the rat!) eats these animals? The system might collapse.





## ACTIVITY

# COMMUNICATE

### LEARNING INTENTION

To present scientific findings to an audience

### EQUIPMENT

Video cameras

Camera

Paper

Felt tips

Computer

### METHOD

Create a presentation about what your site is like, what you've have found, and how you found it. Presentations don't need to be on the computer, they can tell a story through drama, visual art, or even song and dance!

Encourage learners to use the scientific language they have developed, supported with explanations. This is also a great opportunity to explain how everyone can get involved in future action.



## ACTIVITY

# OUR VISION

### LEARNING INTENTION

To create a plan for taking action

### EQUIPMENT

Books

Computer access

Paper

Felt tips or coloured pencils

Calculator

### METHOD

Each class (or smaller groups) submit an idea (in any form desired, e.g. a new map of their area with where they would like plants to be, the wildlife they would like to see there), to put toward a grand plan for taking action through planting. Decide as a class, syndicate, or school how the plan will be chosen, amended and finalised.

Extension: Learners can create a budget for the project by investigating the different costs of the items needed and find out different ways that they can reduce the overall expenses.



# POST-EVALUATION ACTIVITIES

NB completion of post-evaluation activity is mandatory for involvement in Wellington Zoo Bush Builders

## WHAT'S AROUND US?

### LEARNING INTENTIONS

To be aware of the life in our area

To reflect on Wellington Zoo Bush Builders programme

### EQUIPMENT

Felt tip pens/crayons/colouring pencils

Worksheet- In my School, Not in My School

A blank A4 paper

Bush Builders ideas from start of programme

### METHOD

#### 1. In my school, not in my school

*Group activity*

Split learners into four groups. Ask learners to look at the images on their cards. Get learners to sort the pictures into two groups: Group 1 – animals and plants they might see in and around their school; Group 2 – animals and plants they wouldn't see around their school.

#### 2. Picture of my school

*Done individually*

Ask learners to draw a picture of what they think their school looks like on a blank A4 sheet of paper. Ask learners to put their name and room number on the back.

#### 3. Bush Builders Programme

*Group discussion*

Refer back to the ideas learners had about Wellington Zoo Bush Builders back at the start of the programme. Were they right? Why or why not? What did they enjoy the most? What could have made the programme better?



# CELEBRATE

Thanks for partnering with Wellington Zoo to connect learners to the variety of life around them and empower them to take positive action for wildlife.

Your participation in our pre and post evaluation surveys has helped us to gauge the connectedness of Wellington children to their natural environment and contributed towards Wellington Zoo's research into the impact Wellington Zoo Bush Builders has on increasing students' nature awareness over the course of the programme.

Please contact the Wellington Zoo Bush Builders Educator about the next steps, and to find out how you can continue to grow your partnership with Wellington Zoo.