Island Adventure
Camper Workbook
Saint Louis Zoo Spring Break Camp
Dear Campers,

We wanted to send some of the Spring Break camp experience home for you! In this workbook, you will find games, activities, and crafts that relate to what you would have learned at Spring Break camp at the Saint Louis Zoo. This book will take you to the deserts of Australia, the beaches of Hawaii, and the rainforests of Indonesia as we explore the islands of the world and their unique ecosystems!

Have fun, and we hope to see you soon at the Saint Louis Zoo!

Sincerely,

Spring Break Camp Staff
Awesome Australia
Complete the crossword puzzle below

Across
2. Monotremes are unique mammals that lay _____!
4. Australia’s waters have some of the most venomous of these invertebrates. Be careful of their stingers if you go swimming!
5. The red ______ hops along at great speed with their strong legs. They can jump almost the length of a school bus!
6. This mammal swims, has a duck bill, a beaver tail, and lays eggs!
10. A member of the kingfisher family, this bird is famous for its laughing call.
11. This mammal looks a lot like a porcupine, but don’t be fooled! These ‘spiny anteaters’ lay eggs.
12. The pig-nosed ________ is a shelled reptile that lives in Australia’s rivers and lakes.

Down
1. This is the largest island in the world! It’s so big it’s also considered a continent.
3. Australia has about 140 species of these legless reptiles. The inland brown taipan is one of the most venomous in the world!
7. This marsupial spends most of its time in trees eating eucalyptus leaves. It is not a bear, despite often being called one.
8. This unique group of mammals carries their young inside of a pouch!
9. The saltwater ___________ is a huge predatory reptile! They wait just under the water for prey to come get a drink.
## Aboriginal Symbols

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Man" /></td>
<td><img src="image" alt="Woman" /></td>
<td><img src="image" alt="Child" /></td>
</tr>
<tr>
<td>Man</td>
<td>Woman</td>
<td>Child</td>
</tr>
<tr>
<td><img src="image" alt="Family" /></td>
<td><img src="image" alt="Community" /></td>
<td><img src="image" alt="Tribes" /></td>
</tr>
<tr>
<td>Family</td>
<td>Community</td>
<td>Tribes</td>
</tr>
<tr>
<td><img src="image" alt="Adult or Man or Woman" /></td>
<td><img src="image" alt="Man" /></td>
<td><img src="image" alt="Child or Child in Initiation" /></td>
</tr>
<tr>
<td>Adult or Man or Woman</td>
<td>Man</td>
<td>Child or Child in Initiation</td>
</tr>
<tr>
<td>Boomerangs</td>
<td>Digging Sticks</td>
<td>Nulla nulla or Club</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Goanna Tracks</td>
<td>Goanna Burrows - often have multiple entrance</td>
<td>Goanna hole in spinifex country</td>
</tr>
<tr>
<td>Spear</td>
<td>Spears</td>
<td>Woomera</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Campfire or Waterhole</td>
<td>Campfire</td>
<td>Women Teaching Children - the passing down of knowledge.</td>
</tr>
<tr>
<td>Tracks</td>
<td>Kangaroo Tracks</td>
<td>Kangaroo Tracks</td>
</tr>
<tr>
<td>Kangaroo Tracks</td>
<td>Kangaroo Tracks</td>
<td>Kangaroo Tracks</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Emu Tracks</td>
<td>Emu Track</td>
<td>Emu Dreaming</td>
</tr>
</tbody>
</table>
# Marvelous Madagascar

Find words that have to do with the island of Madagascar!

| A | W | R | S | J | J | O | M | L | D | J | Q | E | W | O | V | X | J | L | J |
| T | T | S | A | Z | K | E | J | Z | L | W | J | G | U | X | E | Q | H | G | Q |
| Y | W | N | R | A | D | I | A | T | E | D | T | O | R | T | O | I | S | E | I |
| Z | O | C | H | S | W | A | U | K | H | O | O | V | O | F | O | P | H | W | B |
| K | Z | H | D | K | I | M | F | L | O | R | V | O | C | T | I | K | I | M | I |
| W | F | M | M | M | A | A | F | L | P | B | X | R | U | L | Q | L | E | V | D | T |
| L | A | M | A | D | A | G | A | S | C | A | R | H | G | I | A | H | A | F | N |
| I | H | L | Z | H | N | V | C | K | S | A | D | K | I | S | U | D | R | P | C |
| T | S | C | K | H | E | Z | E | K | A | Q | K | O | S | D | S | A | S | R | O |
| T | Q | I | Z | I | W | T | U | Q | H | K | N | C | L | G | Z | F | P | R | N |
| H | I | S | S | I | N | G | C | O | C | K | R | O | A | C | H | R | W | A | T |
| A | R | K | X | D | F | G | H | V | G | P | U | R | N | A | E | I | S | T | I |
| P | H | M | W | H | O | L | S | M | Q | J | Q | A | D | T | N | C | Q | P | N |
| Z | G | B | O | L | S | A | Q | M | I | G | D | D | H | Z | E | B | F | W | N |
| A | Y | P | B | B | A | T | B | Z | P | C | W | T | E | M | M | M | X | J | T |
| D | C | V | K | R | C | V | O | O | E | G | K | U | C | D | I | W | U | D | A |
| U | S | Q | A | F | T | N | F | Q | J | Y | W | T | D | M | C | F | M | R | L |
| H | N | O | Y | K | M | A | L | A | G | A | S | Y | I | V | X | B | T | U | C |
| A | N | M | F | K | F | V | Q | Y | S | C | R | P | P | W | V | P | I | S | C |
Madagascar Word Bank

AFRICA – Madagascar is located off the Eastern coast of Africa.

CONTINENTAL – Madagascar is a continental island. It was formed when tectonic plates shifted and caused it to break off from the mainland.

HISSING COCKROACH – Madagascar has incredibly unique animals, including the hissing cockroach which eats dead leaves on the forest floor.

ISLAND – Madagascar is the world’s second largest island country

LEMUR

MADAGASCAR – Madagascar is the 2nd largest island, and 4th largest island country in the world!

MALAGASY – The Malagasy people are native to Madagascar.

RADIATED TORTOISE – An endangered tortoise native to Madagascar.

LEMUR – Primate Family unique to Madagascar.

ENDEMIC – Meaning a species that can be found only in that part of the world. For example, lemurs are endemic to Madagascar.

FOSSA – A small carnivore that specializes in hunting lemurs on Madagascar.

SIFAKA – A type of lemur. Coquerel’s sifakas can leap about 30 feet in one jump!

WALKINGSTICK – The giant jumping stick is a type of walking stick insect endemic to Madagascar.
Raffia Craftia Animal Cut Outs
Cut out the animal stencils below to make a 3-D animal. Then you can wrap them in raffia to make a work of art, just like how the Malagasy people do!

African Elephant
Giraffe
African Lion
Zebra
Black Rhinoceros
Lemur Lab
Station 1—Circle the correct answers based on what you see

<table>
<thead>
<tr>
<th>What do Lemurs Have?</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingernails</td>
<td>Claws</td>
<td>Neither</td>
</tr>
<tr>
<td>Prehensile Tails</td>
<td>Non-Prehensile Tails</td>
<td>No Tails</td>
</tr>
<tr>
<td>Stripes</td>
<td>Spots</td>
<td>Different Patterns</td>
</tr>
<tr>
<td>Large Brains</td>
<td>Medium Brains</td>
<td>Small Brains</td>
</tr>
</tbody>
</table>

Station 2—‘The Nose Knows’ Based on their noses, group these primates into two groups. Why do you think they are different?

<table>
<thead>
<tr>
<th>Strepsirhines</th>
<th>Haplorhines</th>
</tr>
</thead>
<tbody>
<tr>
<td>(meaning “Wet Nose”)</td>
<td>(meaning “Dry Nose”)</td>
</tr>
</tbody>
</table>
Station 3—Match the adaptations you see to the behavior they help lemurs to do. You can draw the adaptation on the lemur!

<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Eyes</td>
<td></td>
</tr>
<tr>
<td>Tapetum Lucidum</td>
<td>Grooming</td>
</tr>
<tr>
<td>(Reflective eye layer)</td>
<td>Finding Food</td>
</tr>
<tr>
<td>Toilet Claws</td>
<td></td>
</tr>
<tr>
<td>Comb Teeth</td>
<td>Nocturnal Lifestyle</td>
</tr>
<tr>
<td>Specialized Long Finger</td>
<td></td>
</tr>
</tbody>
</table>
Station 4—Circle which skull you think looks most like a lemur’s. Then look at the labels and write what animal the skulls belong to:

<table>
<thead>
<tr>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Write some of the differences you notice:

Are lemurs more closely related to raccoons or monkeys?
Great Galapagos

Cut out the pictures to make the puzzle! What animal do you see?
Turtle Bowl Craft

The Galapagos are known for their giant tortoises. A Galapagos tortoise can weigh 600 pounds or more, making this the largest living tortoise in the world. Think about lugging around that huge shell! Fortunately, the shell bones of the Galapagos tortoise have a honeycomb structure, which reduces the weight of the shell so the animals can walk. Galapagos tortoises are also one of the longest living vertebrates – with lifespans over 100 years!

The Saint Louis Zoo is helping scientists learn more about these incredible giant tortoises on the Galapagos Islands. As we learn more about them, we better learn how to help them!

Now you get to make your own tortoise or turtle! Just follow these steps:

1. Get a paper bowl
2. Color the top of the bowl to make it the top of a turtle shell
3. Color the page below to be the bottom of a turtle shell
4. Cut out the turtle design from the page below
5. Staple or glue the turtle design to the bottom of your turtle shell
6. Voila! You have a turtle!

You can make a Galapagos tortoise, one of our native box turtles, or just design your own brand new turtle species!
Incredible Indonesia

Complete the Indonesian animal’s name by filling in the missing letters!

This ginger-haired great ape is found on the Indonesian Islands of Borneo and Sumatra.

O ____ G _ T ____

This bear has an impressive 14 inch long tongue to help it eat insects and honey from trees. It’s even nicknamed the ‘honey bear’

S ___ _ E _ R

This pachyderm is the second largest land animal, right after its African cousin.

A ____ N _ L ____ A _ T

These birds are aptly named after rhinoceroses, for the casque, or horn on top of their beaks.

H _ R _ B ____ L
Make Your Own Logo

The Round Table for Sustainable Palm Oil (RSPO) wants a new logo! We want this logo to grab people’s attention, and show people that these items are eco-friendly choices to make in the grocery store. Use the next page to make a new design!

Helpful hints to making this logo:

- As awesome as they are, not every country cares about orangutans. They may hold another animal dear in their hearts that would be more effective (Thailand/India and elephants is a good example)
- Make sure your logo says something about using sustainable palm oil, or supporting the Roundtable for Sustainable Palm Oil. No boycotting please.
- Logos need to be able to be easily recognizable and clear from a distance to be effective.
- Do you know a second language? Make a logo for that language too!
- 1-2 colors is helpful to save printing costs, and would lead to a wider adoption from companies.
Draw Your Logo Here:
Awesome American Pacific

Help the, extinct in the wild, Guam Kingfisher find its way to the safety of the Saint Louis Zoo!
Design-A-Bird

The birds of the Pacific Islands come in lots of different colors. Use this page to create whatever type of bird you want! It could have the orange, black and green of a Guam Kingfisher, striking yellow and white of the Golden White Eye, or anything else you can imagine!
Island Adventure
Parent Guide Book

Saint Louis Zoo
Spring Break Camp
Dear Parents,

We wanted to send some of the Spring Break camp experience home for you and your camper! In this guidebook and corresponding email attachments, you will find games, activities, and crafts that relate to what your camper would have learned about at Spring Break camp. There are also written instructions explaining how to lead these activities with your camper, along with a list of items you will need to complete the activities.

We have provided links to video clips from YouTube as well. Please make sure to view these videos prior to watching them with your campers as some animal scenes can include predator-prey scenes, which might be too intense for some children.

We hope these activities add a bit of island fun to your elongated Spring Breaks! If you take any pictures of what your campers create we would love to see them! Thanks for supporting the Zoo!

Sincerely,

The Spring Break Camp Staff
# Table of Contents

I. Island Basics – pages 4-6  
   A. Introduction PowerPoint and Island Design Project (attached to email)  
      1. Video Links  

II. Australia – Pages 7-11  
   A. Day Introduction PowerPoint Slides (attached to email)  
   B. Australian Animal Video Clip  
   C. Craft Instructions  
   D. Crossword Puzzle Answer Key (Puzzle in Camper Workbook)  
   E. How to Help at Home Section  

III. Island of Madagascar – Pages 12-17  
   A. Day Introduction PowerPoint Slides (attached to email)  
   B. Madagascar Animal Video Clip  
   C. Craft Instructions (Templates in Camper Workbook)  
   D. Word Search Answer Key (Puzzle in Camper Workbook)  
   E. Lemur Lab Instructions/PowerPoint (attached to email) and Answer Key  
   F. How to Help at Home Section  

IV. Galapagos Islands – Pages 18-21  
   A. Day Introduction PowerPoint Slides (attached to email)  
   B. Galapagos Animal Video Clips  
   C. Craft Instructions and Templates  
   D. Puzzle Answer Key (Puzzle in Camper Workbook)  
   E. How to Help at Home Section  

V. Indonesian Islands – Pages 22-28  
   A. Day Introduction PowerPoint Slides (attached to email)  
   B. Wild Indonesian Videos  
   C. Craft Instructions and Guidelines  
   D. Fill in the Blank Answer Key (Puzzle in Camper Workbook)  
   E. How to Help at Home Section  

VI. American Pacific Islands – Pages 29-32  
   A. Day Introduction PowerPoint Slides (attached to email)  
   B. Pacific Bird Video Clip  
   C. Hawaiian Ocean Animal Video Clip  
   D. Craft Instructions  
   E. Maze Answer Key (Maze in Camper Workbook)  
   F. How to Help at Home Section
Section I - Islands Basics

We have included a PowerPoint (Island Creation Makerspace) that includes information about the different types of islands as well as the different plants and animals that live on islands and some video clips from YouTube to help introduce the topics. Each session campers will learn about a feature of islands, pick from what they learned, and design their own island. A list of suggested items to use to make a 3D version of their island is included, however you can also have the camper draw it if supplies aren’t available.

Section 1 - Types of Islands

-Materials for Introduction: Island Makerspace Creation PowerPoint and a way to watch YouTube videos.

-Materials for building their Islands: A base to build on (cardboard or anything sturdy), and anything they want to use to make their island base we suggest clay, model magic, or something else they can use to build. They can also draw the island with markers on large paper or poster board.

The first step to them creating their own island is deciding which type of island they will be designing. To do this they will learn about how islands form. Below is a list of types of island types and the resources that we provided for you to be able to explain it to your camper.

- Continental Island - Slide 3 of the PowerPoint and a video to the Theory Continental Drift - https://www.youtube.com/watch?v=_5q8hzF9VVE
  o Continental Islands – Continental islands were once connected to a continent but became separated by some means. Some islands like Madagascar or Greenland were once connected to their now neighboring continents of Africa and North America. As the tectonic plates they are on shifted, they broke off from the mainland. Another way continental islands can form is from changes in sea level. As glaciers melt, the sea levels rise and can flood low-lying areas creating islands like the British Isles which were once connected to mainland Europe.

- Oceanic/Volcanic Islands – Slide 4 of the PowerPoint and two videos describing how they are formed - https://www.youtube.com/watch?v=RMtuTfAgAbo
  And https://www.youtube.com/watch?v=Hds1OBxVg4s
  o Oceanic Islands – These are also known as volcanic islands. There are different types of volcanoes that cause these types of islands to form. (1) The eruption of underwater volcanoes until the layers of lava break the surface can form an island. (2) Volcanoes can also form when one tectonic plate moves under another one – the island nations of Japan and Indonesia were formed this way as four different plates collide, with two subducting (going beneath) the others forming volcanoes. (3) Volcanic islands can also form as a continent shifts over a “hot spot” in the Earth’s mantle, in which the hot
mantle bubbles up to the Earth’s crust. The islands of Hawaii are an example of this, as the “Big Island” sits on top of a hot spot which formed its two volcanoes which are still active today.

- Coral Islands – Slide 5 of the PowerPoint and a video describing how they are formed - [https://www.youtube.com/watch?v=vrD1O5hex6Y](https://www.youtube.com/watch?v=vrD1O5hex6Y)
  o Coral islands are formed from the growth of coral reefs building up in layers from the sea floor until they break the water’s surface. Corals trapping other material like rock and sand help to create these islands. Islands like the Bahamas are examples of coral islands

- Other Islands – Slide 6 of the PowerPoint
  o Other types include atolls, where coral reef build up creates an outer ring of islands around a bigger island, and tidal islands, where sand buildup creates small areas of land. Both of these types can be found by other islands and could be part of your design.

After they have learned about the different types of islands, they should pick which type of island they want their island to be and then they will start the construction of their own island. Using the pictures in the PowerPoint and videos they will start making the shape of their island. After they have the base finished you can move on to section 2.

Section 2 – Abiotic Factors/Island Landscapes

-Materials for Introduction: Island Makerspace Creation PowerPoint

-Materials for building their Islands: They will be designing whatever non-living factors they would like to add so they can use paper or other objects to make whatever they decide. We would suggest construction paper, scissors, tape, glue, markers and other basic supplies. Other items that might be helpful would be paper tubs or paper bags to make mountains/volcanos or to add elevation to your island. You can also use some “real” items from outside, like rock or stones and maybe even sand or dirt!

Show the camper slides 7 and 8 from the PowerPoint which shows some different landscapes on different islands. Your camper should add abiotic factors to their island next. Abiotic factors mean the parts of an ecosystem that aren’t alive, such as rocks, sand, water, etc. Today we’re going to start building the landscape of our island by shaping its abiotic factor. Think about what kind of island you want to make and what the landscape of that island looks like. Did you make a volcanic island? You should have a volcano somewhere on your landscape. Did you make a continental island? If so, you won’t have a volcano, but you can have cliffs, rivers, and hills. How about coral islands? They are often low elevation islands with beautiful beaches. Add your beaches, rocks, and other things that make up the structure of your island. After your landscape is decorated, you can move on to the next section.
Section 3 – Flora

-Materials for Introduction: Island Makerspace Creation PowerPoint

-Materials for building their Islands: They will be designing whatever plants they would like to add so they can use paper or other objects to make whatever they decide. We would suggest construction paper, scissors, tape, glue, markers and other basic supplies. You can also use some "real" items from outside like leaves, grass and flowers or if you have any fake leaves, flower, moss, Easter grass etc. that can be used as well.

Show the camper slides 9, 10, and 11 from the PowerPoint which shows some different types of plants that live on different islands. One of the most unique aspects of islands is that they often have species that are endemic, which means they live only on that island. That includes both the plant and animal life.

Now you are going to start making some of the biotic factors, or living parts, of your island! What kind of habitat is your island? Is it tropical with palm trees or not? Is it a rainforest island? What about an island that is covered in tall cliffs? Once you decide what type of habitat your island is covered with, your camper can design, make, and add any plants that they want to grow on your island like trees, flowers, and grasses! After the island is covered with plants you can move on to the next section.

Section 4 – Fauna

-Materials for Introduction: Island Makerspace Creation PowerPoint

-Materials for building their Islands: They will be designing whatever animals they would like to add, so they can use paper or other objects to make whatever they decide. We would suggest construction paper, scissors, tape, glue, markers and other basic supplies. You can also make animals from model magic, playdough, or air-dry clay which can be colored after drying. You can also use plastic animals if you have them, which can be re-colored with sharpies if they want to make them specific to their island.

Show the camper slides 12, 13, and 14 from the PowerPoint which shows some different types of animals that live on different islands. Much like plants, many animals are also endemic, meaning they only live on that island, so they often have unique adaptations.

Now you are going to start making some animals for your island! Once you decide what type of habitat your island is covered your camper can design, make, and add any animals that they want to live there. Animals need to be able to survive in their habitat so when they design their animals, they should think about the ways their animals would get their food, water, and shelter on their island. They should also think about the food chain and make sure they have all pieces on their island. Are there humans on their
island? If so, how do they affect it? After they have added all their animals then their island is complete!

**Section II - Australia**

**Introduction to Australia**

-Materials for the Introduction – PowerPoint “Our Island Adventure” Slides 1-12 and Australian Animal video clip

We have made a PowerPoint to introduce each location of the day. We will use the first 12 slides for the Australia section. This is a PowerPoint made by the staff as they “traveled” to each these islands so they could teach about it at camp. So, it includes lots of pictures and descriptions for you to use on each slide. Go through the slides to introduce Australia with your camper.

- Slide 1 and 2 – Introduction slides
  - Slide 3 and 4 – What is an Island? – Ask your camper this question and see what they know already. Definition: An island is a body of land, smaller than a continent, surrounded by water.
    - They can be made by corals, tides, volcanoes, and the movement of tectonic plates. Islands are formed in a variety of ways.
    - Underwater volcanoes may erupt, causing land to start to form under water. This land would keep on rising up as the volcano erupts over time. Over thousands of years, the land would go above the water, thus creating land that is surrounded by water or in other words, an island.
    - Islands can also be formed when continental plates collide. When they collide they push land up creating an underwater mountain that goes above land. This land, when surrounded by water, is called an island.
    - When tectonic plates shift, sections of land may break off from the mainland and become an island.
    - Coral reefs can build up and emerge from the water creating islands as well.
    - Tides can also form islands, as deposits of sand and other debris are picked up from the water and moved elsewhere. Overtime, these tides can form islands.
    - There are even manmade islands in parts of the world!
  - Slide 5 – Australia Intro Slide – Notes: Our first trip is to Australia! It is the largest island in the world – so big it’s considered a continent!
  - Slide 6 – Introduction Slide for the next few slides – A few reasons Australia is so awesome…
  - Slide 7 - Social History – Notes: The history of people on Australia can be traced back at least 65,000 years! Europeans first arrived in Australia in the early 1600s. It officially became a settlement of Britain in 1788, and was set up as a penal
colony to relieve Britain’s overcrowded prisons. The eleven ships that made up the First Fleet which colonized Australia included 850 convicts and their guards.

- Slide 8 – Great Barrier Reef – Notes: The Great Barrier Reef is so awesome because it is the largest coral reef system in the world and the only living organism (coral is an invertebrate animal) that can be seen from space!

- Slide 9 and 10 – Biodiversity – Note: Australia is full of unique animals!

- Slide 11 – Monotrems and Marsupials – Notes: Most of the world’s marsupials and all of the world’s monotremes live in Australia. Marsupials are pouched mammals; Monotremes are egg-laying mammals.

- Slide 12 – Dangerous Animals – Notes: Australia is also home to some of the world’s most dangerous animals! Their beaches house deadly jellyfish and box jellies and venomous stone fish. They have the most venomous snake in the world – the inland brown taipan. And of course the huge saltwater crocodiles AKA Salties.

After you finish the slides, you should play the video clip which gives more information about some Australian animals. - https://www.youtube.com/watch?v=TkCq54_ho-A

Bark Painting Craft

-Materials: Bark-like paper – Brown paper bag cut up, brown construction paper etc., bucket with water, markers (or paint can be used), and scissors

Brief History of Bark Paintings - Bark painting by Aboriginal people (native people on Australia) has a long history, perhaps extending back thousands of years. In northern Australia, paintings on bark shelters in the Kimberley and Arnhem Land were stylistically similar to rock shelter paintings. They were used to illustrate stories told to young people during the long hours of the wet season when people were confined to the shelter. Bark paintings with deep cultural and ritual significance still feature in the Aboriginal sacred ceremonies of northern Australia peoples and they, along with some coastal inhabitants are the only indigenous Aborigines still making traditional bark paintings.

Often times the subjects of these paintings were animals since they were such a large part of their lives. Discuss how the Aboriginal people traditionally made bark paintings and then work with your camper to make a replica bark paper today. Panels of bark cut from a stringybark tree were heated over a fire, then flattened and dried before being painted with color: ochres (red and yellow), river-bed clay or plant pigment (white) and, where available, manganese (black). The paint was applied with brushes twisted from plant fibers. Tree sap was used as a fixative. (Show the bark painting picture in this book.) These steps are done to make these painting in a traditional way we are going to be making out bark paintings using paper that looks like bark instead of tree bark.
Instructions:

1) Give them each a piece of brown paper. They can cut it into whatever shapes they choose.
2) Have the camper dip the paper in a bucket of water and saturate the paper.
3) Pull the paper back out and start carefully crinkling it up into a ball and then uncrinkling it. Do this a few times until the paper begins to look a bit more uneven and rough.
4) Flatten the paper out and lay the paper in a warm spot to dry.
5) After the paper is dry, you can have your camper color with markers or paint an Australian animal on their “bark paper.” You can also have your camper add aboriginal symbols to their paper. A key is included in the camper workbook.

Example Picture of a real Bark Painting:

Comparison with our replica Bark Painting:
Australia Crossword Puzzle Answer Key

In the Camper Workbook is a Crossword puzzle about Australian animals. Here are the answers.

Across
2. Eggs
4. Jellyfish
5. Kangaroo
6. Platypus
10. Kookaburra
11. Echidna
12. Turtle

Down
1. Australia
3. Snakes
7. Koala
8. Marsupial
9. Crocodile

Helping at Home

Australia was recently in the news due to the severe bushfires that swept across the country in recent months. Did you know that one of reasons the bushfire season was so severe this past year was because of climate change? Climate change occurs when changes in Earth’s climate system result in new weather patterns that remain in place for an extended period of time. Scientists have tracked the changing climate back to rampant levels of greenhouse gases, such as CO₂, in our atmosphere. But we can do something to help! Humans can reduce the amount of energy we use which can decrease our carbon footprint, or the amount of greenhouse gases we are adding to the atmosphere. Government agencies, corporations, school districts and communities conduct energy audits to save money and resources. You can, too! Here are some things you and your camper can look for in your household:

- **Which appliance is most efficient?** When buying a new appliance, look for an ENERGY STAR label. You can find ENERGY STAR products at www.energystar.gov.
- **Use it or lose it.** Turn off lights in any room you’re not using. Also, don’t light an entire room. Focus task lighting where you need it.
- **Better bulbs.** Install compact fluorescent bulbs in place of existing incandescent bulbs when operation is more than two hours per day.
- **Caulk and weatherstrip** doors and windows that leak air.
• **Check it out.** Set the thermostat to cooler temperatures in winter and warmer settings in summer when your home is unoccupied or when you're sleeping.
• **Replace or clean** furnace air filter(s) once a month. Have your furnace serviced before each heating season to make sure it's operating safely and efficiently.
• **Clean** registers, baseboard heaters and radiators as needed. Make sure they’re not blocked by furniture, carpeting or drapes.
• **Insulate** and seal ducts in unconditioned areas such as attics and crawl spaces.
• **Down the drain.** Repair leaky faucets promptly. A leaky faucet wastes gallons of water in a short time.

For more information on how you can do an energy audit in your home, you can visit this website:
[https://www.stlzoo.org/conservation/doityourselfconservation/athomeconservation/energyaudit](https://www.stlzoo.org/conservation/doityourselfconservation/athomeconservation/energyaudit)
Section III – Island of Madagascar

-Materials for the Introduction – PowerPoint “Our Island Adventure” Slides 13-20 and Madagascar Animal video clip

We have made a PowerPoint to introduce each location of the day. Go through the slides starting at slide 13 to introduce Madagascar to your camper.  

- Slide 13 – Madagascar Intro Slide  
- Slide 14 - Introduction Slide for the next few slides – A few reasons Madagascar is so awesome…  
- Slide 15 – Notes: Madagascar is the 4th largest island in the world. It is about the size of the state of Texas! Like Australia, some geologists think that Madagascar should also be considered a continent, and it is sometimes referred to as “The 8th Continent.” It is home to a variety of habitats, and a unique array of animals.  
- Slide 16 – Varying Climates: Madagascar has a wide range of climates and ecosystems. Meaning they have lots of wildlife adapted to these different areas.  
- Slide 17 – Plants - Notes: Baobab trees (Madagascar is home to 6 of the 9 species of this unique tree), raffia palms whose fronds can be used to make baskets, rugs, hats, and art  
- Slide 18 – Lemurs; Lemurs are a unique group of primates that can only be found on Madagascar.  
- Slide 19 – Cool Insects! Notes: Home to cool insects like giant emerald green pill millipedes, giant jumping stick insects and giant Madagascar hissing cockroaches.  
- Slide 20 – Chameleons Notes: It is home to both the largest (28 inches) and the smallest (1/2 inch) chameleon and about 75 more chameleon species

After you finish the slides, you should play the video clip, which gives more information about some animals from Madagascar - https://www.youtube.com/watch?v=Vtfp27g2_mk

Raffia Craftia

-Materials: 3-D Animal Cut outs (in Camper Workbook), printer paper/printer (or you can use cardstock or old cereal boxes for stronger animals), raffia, (string or yarn can be used as a replacement), glue or glue gun and scissors.

Background Information: The raffia palm tree is a plant native to Madagascar. Each palm of the tree is made up of around 100 leaflets, which can be cut off and dried to create raffia fibers. The fibers are sorted by their color, length, and width. These fibers are commonly used by the Malagasy (people native to Madagascar) to create baskets, rugs, hats, textiles, shoes, and art. (Show picture from in their guidebook.) There’s another important function of this fiber – to protect wildlife! The promotion of sustainably
sourced raffia products as an international trade product creates an income for Malagasy people and incentive to protect forests by providing an economic alternative to slash-and-burn agricultural practices. This means that both the people and wildlife of Madagascar benefit from the use and trade of sustainable raffia products. We’re going to make our own craft using raffia.

Instructions:

1) Have your camper pick out a 3D animal from their workbook. (If you have time they could also make them all.) Print out the animal design.
2) Have them cut out their animals. (For stronger animals you can use cardstock or have your camper trace and cut out the animals on old cereal boxes or chipboard. This is a great way to re-use and will make it easier to wrap them in raffia.)
3) Glue your 3D animals together and let them dry. (For quicker drying, you can also use a glue gun but supervise your camper if you do this option.)
4) Wrap your 3D animal using raffia (string or yarn can be used for a similar effect). You will need to glue every few wraps so it holds. (For quicker drying, you can also use a glue gun but supervise your camper if you choose this option.)
5) Optional Step: Feel free to add googley eyes or draw on eyes to make your animal even more fun!

Example Picture:
Madagascar Word Search Answer Key

In the Camper Workbook is a Word Search about Madagascar. Here are the answers.

Marvelous Madagascar
Find words that have to do with the island of Madagascar!

A W R S J J O M L D J Q E W O V X J L J
T T S A Z K E J Z L W J G U X E Q H G Q
Y W N R A D I A T E D T O R T O I S E I
Z O C H S W A U K H O O V O F O P H W B
K Z H D K I M F L O R V O C T I K I M I
W F M M A A F L P B X R U L Q L E V D T
L A M A D A G A S C A R H G I A H A F N
I H L Z H N V C K S A D K I S U D R P C
T S C K H E Z E K A Q K O S D S A S R O
T Q I Z I W T U Q H K N CL G Z F P R N
H I S S I N G C O C K R O A C H R W A T
A R K X D F G H V G P U R N A E I S T I
P H M W H O L S M Q J Q A D T N C Q P N
Z G B O L S A Q M I G D D H Z E B F W N
A Y P B B A T B Z P C W T E M M M X J T
D C V K R C V O O E G K U C D I W U D A
U S Q A F T N F Q J Y W T D M C F M R L
H N O Y K M A L A G A S Y I V X B T U C
A N M F K F V Q Y S C R P P W V P I S C
Lemur Lab

- Materials: Lemur Lab Worksheet (in camper Workbook), pencils, and lab photos (in the PowerPoint attached to the email, you can show them on the computer or print them out)

Introduction: Lemurs are a unique group of primates. What makes them so different and how are they adapted to the environment of Madagascar? In this lab, we will explore what makes a lemur a lemur, how they are different from other primates, and some of their amazing adaptations.

Stations and Answer Key:

Station 1: Lemur Factoids! – Have the camper look at the pictures of lemurs in the PowerPoint and circle the correct answers based on what they see. The correct answers are highlighted below.

<table>
<thead>
<tr>
<th>What do lemurs have?</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingernails</td>
<td>Claws</td>
<td>Neither</td>
</tr>
<tr>
<td>Prehensile Tails</td>
<td>Non-prehensile tails</td>
<td>No tails</td>
</tr>
<tr>
<td>Stripes</td>
<td>Spots</td>
<td>Different patterns</td>
</tr>
<tr>
<td>Large Brains</td>
<td>Medium Brains</td>
<td>Small Brains</td>
</tr>
</tbody>
</table>

Station 2: The Nose Knows! – Have your camper look at the differences between noses of different kinds of primates using the slides on the PowerPoint. Have them answer the questions on their worksheet. The answers are below.

Primates can be divided into two groups:

Strepsirhines (which means WET NOSE) - lemurs, lorises, and bushbabies
Haplorhines (which means DRY NOSE) - tarsiers, New World monkeys, Old World monkeys, apes and humans

The Lemurs (Madagascar) Lorises (Africa) and Bushbabies (SE Asia) all rely more heavily on their sense of smell than other primates and have a wet nose (often with a prominent snout). Lemurs have scent glands on their arms, tails and other places which they use to communicate. They leave their scent wherever they go. Males even have stink fights to determine who the strongest male is.

Station 3: Show the images of different lemur adoptions on the PowerPoint. Have your camper match the adaptation to the behavior you think it helps them accomplish!

(1) Large eyes and (2) tapetum lucidum (reflective eye layer behind the retina) help lemurs see at night! Although lemurs have large eyes, they do not have very good eyesight. They DO have tapetum lucidum, which causes their eyes to reflect light back through the retina a second time. This helps them to see better at night, as many lemur species are nocturnal. Lemurs do NOT have color vision.

(3) Toilet Claws and (4) Comb Teeth are used for grooming! The second toe on the hind foot does have a claw called a toilet claw, which is a claw used for grooming. Lemurs also have specialized incisors (front teeth) that continually grow (like a rodents) and are called comb teeth. They are also used for grooming.

(5) The Specialized Long Finger is an adaptation specific to a species of lemur called the aye-aye. The Aye-aye’s specialized finger is very long and thin, and used to tap tap tap on tree limbs. The lemur listens to the sound of the tapping, and can tell if a delicious insect is burrowing inside the limb. Their ears are super sensitive to the sounds. Once an insect is heard in the limb, the aye-aye gnaws a hole in the wood, then uses its long finger to probe and stab the insect, bringing it out to eat.

Station 4: Have you camper look at the pictures of the three skulls. Have them compare the lemur skull to the other two skulls. Doesn’t it appear to be more like a raccoon (the other similar looking skull) than to a typical primate? Have them look at the following things to help them make their decision of which one they think looks most like the lemur skull:

- The size of the brain case
- The shape of the teeth (check out those canines!)
- The placement of the eyes
- The fact that the eyes have bone all around them (a primate characteristic) in the lemur vs. the raccoon.

Have them circle which one they think looks most similar in their workbook.
Helping at Home

Lemurs are among the most endangered group of mammals in the world. Over 95 percent of the known lemur types live on the brink of extinction, and many other animals and plants on Madagascar, such as the radiated tortoise and the beautiful rosewood tree, are also at risk of disappearing. One of the biggest threats to the lemurs and other animals of Madagascar is the loss of their forest homes.

Here are some tips that we do can help reduce deforestation on Madagascar, and around the world:

- Buy forest-friendly food, wood products and paper – look for the Rainforest Alliance seal of approval!
- Avoid wood products made from mahogany, rosewood, lauan, redwood, sitka, spruce, ramin, teak, ironwood, ebony and sandalwood
- Plant trees
- Look for products with minimal packaging
- Recycle everything you can
- Use both sides of paper
- Use a canvas bag when you shop for groceries
- Buy energy-efficient appliances and fuel-efficient cars
- Avoid products made with rayon, which comes from wood pulp
- Support conservation groups.

To learn more about forest friendly products, you can visit this website: https://www.stlzoo.org/conservation/doityourselfconservation/athomeconservation/findingforestfriendlyprodu
Section IV – Galapagos Islands

-Materials for the Introduction – PowerPoint “Our Island Adventure” Slides 21-26 and Galapagos Animal video clip

We have made a PowerPoint to introduce each location of the day. Go through the slides starting at slide 21 to introduce the Galapagos Islands to your camper.

Slide 21 – Introduction to the Galapagos

Slide 22 – A few reasons why the Galapagos is great...

Slide 23 - The Galapagos Islands are famous for being where Charles Darwin did a lot of research on wildlife. By studying the wildlife on the different islands, he noticed that the birds, specifically the finches, on each island had uniquely shaped beaks that were specialized for eating whatever type of food was abundant on that particular island. Through this observation he came up with his theory of natural selection.

Slide 24 – Some of the unique species endemic to the Galapagos include the blue footed booby, 13 species of finches, land iguanas, and marine iguanas.

Slide 25 – The most famous inhabitant of the Galapagos is the Galapagos tortoise. They are the largest species of tortoise (weighing up to 600 lbs.) and the longest living known vertebrate on Earth (living over 100 years old). They are the largest vertebrate on the island so they play the role of an ecosystem engineer. This means that the actions of the tortoise help to shape the landscape. Where they walk, they trample and eat vegetation, preventing certain plants from growing.

Slide 26 – Penguins and sea lions, oh my! The Galapagos are home to their own species of penguins and sea lions. The Galapagos penguin is the Northern-most penguin species, and the only penguin to live in the Northern Hemisphere. They are able to do this because of the Humboldt current which brings cold water and abundant food to the waters around the islands. The Galapagos sea lion looks a lot like the California sea lions you see at the Saint Louis Zoo; they’re just a bit smaller.

After you finish the slides, you should play the video clips, which gives more information about some cool animals from the Galapagos and about tracking Giant tortoises.

https://www.youtube.com/watch?v=Dk5_JoPqPFk
https://www.youtube.com/watch?v=rEp6pkkYOgE

Totally Turtling Craft

-Materials: One paper bowl, plastron (or bottom shell on a turtle) copied on white paper or cardstock (in camper workbook), scissors, markers or crayons, a pencil, a stapler and/or glue and the internet for pictures of turtle and tortoises
Background: One of the unique species in the Galapagos Islands is the Galapagos tortoise. These animals have been documented to live more than 100 years! One of the conservation projects of the Saint Louis Zoo Institute of Conservation Medicine is studying how these tortoises move on their island homes. To date, over 70 giant tortoises have been tagged with GPS devices that record the location of each tortoise every hour. The tags record the orientation of the tortoises every five minutes, providing activity records. Data from the tags is downloaded when the researchers go out into the field and find the tortoises every one to six months.

We are also doing this movement research with box turtles right here Missouri as well. We are looking at turtles in Forest Park and out further in less urban parks and comparing how they move, as well as taking turtle health data. Because box turtles are not nearly as large, we have to use a smaller tag that requires us to use radio telemetry to locate them.

Scientist in Galapagos putting on a GPS unit  Scientist in Missouri taking Data

You are going to be making a turtle or tortoise craft! The camper can choose to make an existing species or come up with their own unique one!

Directions:

1) Google pictures of local box turtles (Three Toed and Ornate box turtles are native to Missouri) and the tortoises from Galapagos. Have your camper look at the patterns on the shells. Turtle shells often have very intricate patterns and designs. Then say that we will be making our own version of a turtle or tortoise.
2) Give your camper a plastron that you have printed and have them color it and cut it out. You should mention that the plastron is the word for the underside of a
turtle shell. Once it is colored, you can give them each a paper bowl, to color like a shell. You will want to point out that the shapes that make up the scales on the shell are often different shapes; most seem to have hexagons in the center and pentagons on the rest of the shell. These are a special kind of scale called scutes. Some may want a pencil to use to draw out the scutes before they use the markers.

3) Once they have finished coloring, have them put the plastron on the desk, colored side down. Glue the ends of the paper bowl to the bottom end of the cut out plastron. Then add some staples around the edges to help secure the shell.

4) Let your turtle dry all the way before trying to move it. You may need to touch up the edges of the back of the plastron with a marker if it isn’t a perfect fit. Now your turtle is complete!

Puzzle Answer Picture
Helping at Home

Here are six actions that can help save turtles:

- **Pick it Up!** Don't litter. If you see litter and it is safe to do so, pick it up! Use reusable bags and bottles.
- **Take it Slow!** If you see a turtle or tortoise crossing the road while driving, slow down. Only stop and move it in the direction it is heading if it is safe to do so.
- **Don't Collect!** Don't collect turtles and tortoises from the wild. If you want a turtle or tortoise for a pet, research and buy responsibly captive bred pets.
- **Keep it Wild!** Help protect wetlands by not wasting water, planting rain gardens, and using rain barrels for irrigation. Also buy certified responsibly harvested wood/sustainable palm oil.
- **Don't Release!** Don't release unwanted pets into the wild. Contact local rescue organizations, pet stores, etc. to find a new home.
- **Be a Citizen Scientist!** Join our Turtle Road Watch Project to learn more about our turtles in Missouri. Learn more here: [https://www.stlzoo.org/files/7015/3186/3190/2018TurtleRoadWatch.pdf](https://www.stlzoo.org/files/7015/3186/3190/2018TurtleRoadWatch.pdf)
Section V – Indonesia

-Materials for the Introduction – PowerPoint “Our Island Adventure” Slides 27-32 and Galapagos Animal video clip

We have made a PowerPoint to introduce each location of the day. Go through the slides starting at slide 27 to introduce the Indonesian Islands to your camper.

Slide 27 – Indonesia Introduction slide

Slide 28 – A few reasons why Indonesia is so incredible…

Slide 29 – Rainforests – Indonesia lies right on top of the equator, so its climate is almost entirely tropical. Most of its natural landscape is rainforests, providing abundant homes for wildlife.

Slide 30 – Amazing Animals – Orangutans are great apes native only to the Indonesian islands of Borneo and Sumatra. Sun bears are the smallest species of bear. They have an incredible 14-inch long tongue used for eating insects and honey from holes in trees. Smaller than their African cousins, the Asian elephant can be found throughout India and Southeast Asia, including Indonesia.

Slide 31 – Beautiful Birds – The rhinoceros hornbill, named for the casque, or horn, on top of their beak that helps to amplify the sound of their call in the rainforest. The green peacock (the females aren’t nearly as brightly colored). And the Bali mynah--there are only about 60 of these birds left in the wild. They are valued as a status symbol in the pet trade.

Slide 32 – Agriculture – Palm oil agriculture is very common in Indonesia and neighboring islands. Palm oil is a vegetable made from the black palm tree, a tree not native to these areas. These plantations destroy the homes of wildlife, but by using the Cheyenne Mountain Zoo’s Palm Oil Shopping App you can help! This will help you to find products using RSPO certified sustainable palm oil, which help to protect the people and wildlife of Indonesia.

After you finish the slides, you should play the video clip, which gives more information about some of the Indonesian Islands. There are two series on YouTube - Wildest Islands of Indonesia and a series about individual species called – Wild Indonesia, which has a video about elephants, proboscis monkeys, babirusa and many more.

This video is for adult reference. It explains how palm oil gets to consumers but talks about topics that are not age appropriate for campers. However, it will help you when explaining palm oil to them. https://www.youtube.com/watch?v=0o6WHN4NDTk
Palm Oil Logo Craft

-Materials – Paper (in Camper Workbook), pencils, markers and pictures of logos (in this booklet)

Background - Palm oil is the most widely produced edible vegetable oil. It is harvested from the African oil palm tree, a tree that flourishes wherever heat and rainfall are abundant. It is mostly grown in Indonesia and Malaysia - the only places on earth where wild orangutans live - although this crop is expanding into Africa and South America.

Palm oil plantations are NOT a natural part of the rainforest. Palm oil is an introduced agricultural crop. Over 30 million tons of palm oil are produced in Indonesia and Malaysia per year. This demand is increasing rapidly due to recent trans-fat health concerns and bio-fuel development.

Boycotting palm oil is a choice consumers can make to try and help orangutans and other wildlife in Indonesia and Malaysia. However, using certified sustainable palm oil is a more effective and responsible choice.

Oil palms are the most productive type of all the edible oil plants. Oil palms produce five to ten-times more oil per acre than other crops like soy or canola. If grown sustainably, palm oil can be a more environmentally friendly oil because less land has to be cleared to get the same amount of product.

Certified sustainable palm oil isn't just any palm oil. It comes from a plantation that has made a commitment to produce palm oil in a way that minimizes its impact on wildlife, indigenous people and the planet. Palm oil is a huge industry, employing millions of people. Native people often lose their land and livelihoods to large palm oil companies. Most of the money from non-sustainably produced palm oil does not trickle down to local people. On certified sustainable plantations and mills, the workers have decent housing and wages as well as schools and health clinics. At plantations and mills that are NOT certified, conditions for workers and their families are not regulated.

Palm oil plantations and mills that are certified as sustainable by the Roundtable on Sustainable Palm Oil (RSPO) have met many criteria to achieve certification. Palm oil plantations and mills that are NOT certified as sustainable by the RSPO do not have to adhere to RSPO regulations. Therefore, consumers can't be sure whether or not the palm oil coming from non-RSPO producers has harmed native wildlife, violated the rights of indigenous people or had other negative environmental impacts.

One of the challenges of informing the public about sustainable palm oil is making it easy for them to know which products to support. One of the ways is product labeling. Some successful examples of product labeling are Dolphin Safe Tuna and Rainforest Alliance.

Companies have stated that they don’t want to use the RSPO logo for two reasons:
1. People don’t know about the crisis enough to give up vital real estate on their packaging for a logo no one is looking for currently.

2. More importantly, the logo is ugly and entire countries are not using it because of its resemblance to an illegal plant.

Consumption - Top 10 Countries

- Indonesia
- India
- EU-27- (European Union)
- China
- Malaysia
- Pakistan
- Thailand
- Bangladesh
- United States
- Nigeria

Volume - Top 10 Importing Countries

- India
- EU-27 (European Union)
- China
- Pakistan
- Bangladesh
- United States
- Egypt
- Philippines
- Russian Federation
- Myanmar

The countries producing the palm oil are not the ones using the palm oil, necessarily.

While we are working on #1 to raise awareness, you all can help us with the logo!

Your challenge, should you choose to accept it, is to design a new logo that can go on products or be an awareness sticker anywhere in the world. Some helpful hints:

- As awesome as they are, not every country cares about orangutans. They may hold another animal dear in their hearts that would be more effective (Thailand/India and elephants is a good example)
- Make sure your logo says something about using sustainable palm oil, or supporting the Roundtable for Sustainable Palm Oil. No boycotting please.
- Logos need to be able to be easily recognizable and clear from a distance to be effective.
- Do you know a second language? Make a logo for that language too!
- 1 or 2 colors is helpful to save printing costs, and would lead to a wider adoption from companies.

Students just like you are working together in India! Learn more about the Asian youth for sustainability here: https://www.rspo.org/news-and-events/news/asian-youth-voice-for-sustainability-at-annual-roundtable-we-want-a-future-full-of-hope-not-dismay One of our Zoo staff was fortunate enough to work with them while in Thailand at the RSPO conference, and they are amazing world changers who have their own great logo ideas too.
Example Logos from Other Successful Campaigns

Directions:

1) Talk with your camper about what sustainable palm oil is and why they need a new logo.
2) Have your camper look at the current logo and some other logos.
3) Have them draw out their idea for their own logo.
4) Send us a picture and we will send it to our partners!
Fill in the Blank Answer Key

- This ginger-haired great ape is found on the Indonesian Islands of Borneo and Sumatra.

ORANGUTAN

- This pachyderm is the second largest land animal, right after its African cousin.

ASIAN ELEPHANT

- This bear has an impressive 14 inch long tongue to help it eat insects and honey from trees. It’s even nicknamed the ‘honey bear’

SUN BEAR

- These birds are aptly named after rhinoceroses, for the casque, or horn on top of their beaks.

HORNBILL

Helping at Home

Indonesian animals are in trouble in the wild - their forest homes are being destroyed to make way for palm oil plantations. We can help by using certified sustainable palm oil, which has come from a plantation that has made a commitment to produce palm oil in a way that minimizes its impact on wildlife, indigenous people, and the planet.

How you can help orangutans:

- Download the Cheyenne Mountain Zoo's palm oil shopping guide app for Android or Apple. You can use this app in the grocery store, or make a game out of it and investigate the products you have in your home!
- Support companies that have joined the RSPO.
- Write to your favorite companies and restaurants. Ask them to use sustainable palm oil in their products and to join the RSPO if they haven't done so already.
- Write companies who are on the RSPO and tell them thank you for choosing to use sustainable palm oil!
- Promote better labeling. Encourage RSPO companies to label products with an "Orangutan Friendly" label, just like the "Dolphin Safe" tuna labeling.
• If you made your own sustainable palm oil logo send it to us so we can pass it on to our partner organizations.

For more information on Palm Oil and how you can make a difference, you can visit the following website: https://www.stlzoo.org/conservation/doityourselfconservation/palm-oil-and-orangutans
Section VI – American Pacific Islands

-Materials for the Introduction – PowerPoint “Our Island Adventure” Slides 33-37 and American Pacific Islands Animal video clip

We have made a PowerPoint to introduce each location of the day. Go through the slides starting at slide 33 to introduce the American Pacific Islands to your camper.

Slide 33 – Introduction to the American Pacific Islands

Slide 34 – A few reasons why the American Pacific is so amazing…

Slide 35 – The U.S. Pacific Islands region includes our 50th state, Hawai‘i, as well as the Territories of Guam, American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), the Republic of Palau (RP), the Federated States of Micronesia (FSM), and the Republic of the Marshall Islands (RMI). This slide shows a few of these islands.

Slide 36 – Unique Wildlife of Hawaii includes the yellow hibiscus (state flower of Hawaii), Hawaiian monk seals, and the nene, Hawaii’s state bird.

Endangered Birds of the Marianas Islands – The birds of the Marianas islands are endangered due to an invasive brown tree snake. Some of these at risk birds include the golden white-eye, Guam rail, and Guam kingfisher.

Invasive species – An invasive species is an organism that causes ecological or economic harm in a new environment where it is not native. Invasive species can cause the extinction of native species, and islands are especially susceptible due to their small size and high number of endemic species. Some invasive species that have had severe impact on the American Pacific Islands include non-native birds such as the red-crested cardinal, feral or outdoor domestic cats, and the brown tree snake that was responsible for multiple bird extinctions on the island of Guam.

After you finish the slides, you should play the video clip, which gives more information about the conservation work the Zoo is doing for the birds in the Pacific Island and a video about the aquatic animals in Hawaii.

https://www.youtube.com/watch?time_continue=3&v=vTXmgvmD9so&feature=emb_logo

https://www.youtube.com/watch?v=MSqiSnFSZZo

Nest Buddies Craft

-Materials: Container for your nesting supplies, sheep wool, moss, yarn, jute scraps, grass from your yard etc. Jute or twine to make a hanging loop and scissors
We are doing lots of work to help same birds in the Pacific islands but you can also help birds right in your backyard! We have a large variety of songbirds living and migrating through our area throughout the year. In fact, the Mississippi River is followed by several bird species as they migrate North and South. For this reason, it is called the Mississippi Flyway. Being that we are right in this area of the country, it is especially important to help the birds in the area.

Some of the lesser known but super helpful things you can do are things like putting up window striping. Almost 50 percent of bird collision mortality happens on home windows, and the most likely place for birds hitting windows is near bird feeders. So not only putting out food but also making windows safe for birds is more helpful. There is more information about making your yard bird friendly - https://abcbirds.org/program/glass-collisions/bird-friendly-window-solutions/

We are also going to make something today to help birds nesting in the area. Birds collect items to not only build nests, but also to line birdhouses for their babies. They will gather natural items they locate like grass, moss etc. but also will find other items like string, animal fur, etc. and add that as well. Today we are going to make a little helper full of items for birds to use to build nests.

Directions:

1) Find something to put the bird nesting material in. Examples are grapevine balls, netting that can be wrapped around the items, a suet feeder, plastic bottle with holes on the sides, or other bird feeder. Anything that can hold grass, yarn scraps, wool, moss, hair etc. but still give the bird a way to get it out of the container. (see example pictures below.)

2) Let them pick items to put into their nest buddy--wool, yarn or string bits, grasses, dog or cat hair and small sticks are all items birds will use when building their nests.

3) Once your camper has gathered items, they will need to put it in their container and then make a way to hang it up in their yard.

4) They should hang them up in their yard in a tree that is easy for birds to get to. If it is emptied, they can re-fill it! Note – they should not fill with alpaca wool, it does not stretch so it can hurt bird feet. Sheep wool is a great alternative!

Example pictures:
Maze Answer Key
Helping at Home

Thousands of bird populations and entire species are hanging on by their wingtips. Here are some ways you can help save the birds that live in our backyards:

- Keep cats inside. By keeping your cat inside, you’re preventing your cat from preying on birds.
- Provide a bird-friendly habitat in your yard by including things such as a water source, native gardens, and trees for birds to nest in.
- Protect birds from reflective windows by decorating them with stickers or striping so that birds can see them and avoid them. The reflection in windows can be confusing for birds, and they may fly into them and hurt themselves. You can make it a family project and decorate your windows with home-made sun catchers!
- Avoid using harmful chemicals in your garden.
- Buy bird friendly products like shade-grown coffee and use reusable grocery bags.
- Become a citizen scientist by observing and counting birds in your backyard. You can share this information with the Great Backyard Bird Count and Project FeederWatch. More information can be found at ebird.org

For more information on helping native birds, you can go to this website: https://www.stlzoo.org/conservation/doityourselfconservation/saving-birds-you-can-help
ISLAND CREATION

Learn How Islands Are Made by Making Your Own!
TYPES OF ISLANDS

Section 1
Continental Islands

- Formed when tectonic plates shift and parts of land break off from the mainland
- Can form in any type of habitat and have a wide range of landscapes
- Animal life can be unique as the separation could have occurred millions of years ago
- Examples we will discuss: Australia (Monday), Madagascar (Tuesday)

Madagascar is the 2nd largest island country
Oceanic/Volcanic Islands

- Formed from the buildup of volcanic eruptions. Can be from:
  - Underwater volcanoes
  - Subduction zones
  - Hot spots
- Can have areas of high elevation
- Can be tropical (Hawaii) or not (Japan)
- Example we will discuss – Galapagos (Wednesday), Indonesia (Thursday), Islands of the Pacific (Friday)
Coral Islands

- Formed by coral reefs building up and reaching above the surface
- Are often very low elevation islands
- Typically in tropical regions where coral reefs thrive
- Examples we will discuss – Islands of the Pacific (Friday)

Coral islands of the Maldives: some of the lowest level islands in the world
Other Islands

Atolls

A ring-shaped coral reef that has breached the surface of the water

Tidal Islands

A piece of land that is connected to the mainland by a strip of land that is exposed at low tide
LANDSCAPES

Section 2
Not all islands are tropical with sandy beaches!

Iceland and the United Kingdom are islands with rocky cliffs.

The Indonesian islands are full of rainforests.

Volcanic islands like Japan and Hawaii have large hills and mountains.

Greenland is an island of mostly ice!
PLANT LIFE

Section 3
Endemic – An animal or plant species native to only one place

Islands have a lot of species that are endemic to only that island – meaning they can't be found anywhere else on earth.
Plant life is unique on many islands!

- Boabab Trees in the Spiny Forests of Madagascar
- Various species of palm trees
- Hibiscus flowers of Hawaii
- Fields of Iceland
- Rainforests of Indonesia
ANIMAL LIFE

Section 4
Remember what we learned yesterday?

Endemic – An animal or plant species native to only one place

Islands have a lot of species that are endemic to only that island – meaning they can’t be found anywhere else on earth.
Galapagos Tortoise
Endemic to the Galapagos Islands

Guam Kingfisher
Endemic to the island Guam

Orangutan
Endemic to Indonesian islands of Borneo and Sumatra

Coquerel's Sifaka Lemur
Endemic to Madagascar

Red Kangaroo
Endemic to Australia
ISLAND CHAIN

Section 5
An island chain, or archipelago, is a group of nearby islands. They are often formed in the same way, like a series of volcanoes or a coral reef. If you make more than one island you can form your own archipelago!
Lemur Lab
Station 1 – What does a lemur have?

Use the following pictures to determine which one a lemur has!
Fingernails   Claws   Neither
Answer: Fingernails
Prehensile Tails  Non-Prehensile Tails  No Tails
Answer: Non-Prehensile Tails
Stripes  Spots  Different Patterns
Answer: Different Patterns
Large Brain    Medium Brain    Small Brain
Answer: Medium to Small Brains
Station 2 – The Nose Knows

Use the following pictures to categorize different primates as “wet nose” or “dry nose”.
Apes
Lorises
New World Monkeys
Tarsiers
Lemurs
Old World Monkeys
Bushbabies
Answers

Strepsirhines (Meaning “Wet Nose”)
- Lemurs
- Lorises
- Bushbabies

Haplorhines (Meaning “Dry Nose”)
- Tarsiers
- New World Monkeys
- Old World Monkeys
- Apes
Station 3 – Adaptations and Behaviors

Use the following pictures of lemur adaptations to decide which behavior it helps the lemur do!
Adaptation: Large Eyes
Behavior: Nocturnal Lifestyle

- Although lemurs have big eyes, they don’t have the best eyesight.
- Most lemurs are nocturnal, or are most active at night. Large eyes mean they can take in more light at night.
Adaptation: Tapetum Lucidum (Reflective Eye Layer)
Behavior: Nocturnal Lifestyle

- The tapetum lucidum is a reflective layer behind the retina of the eye. This causes their eyes to reflect light back through the retina a second time.
- This helps them to see better at night.
Adaptation: Toilet Claw
Behavior: Grooming

- The second toe on the back foot of all lemurs is longer, and referred to as the ‘toilet claw’
- They use this claw to groom themselves and other lemurs
Adaptation: Comb Teeth
Behavior: Grooming

- Lemurs have specialized incisors (front teeth) that continually grow and are called comb teeth
- They use these to groom themselves and other lemurs
Adaptation: Specialized Long Finger
Behavior: Finding Food

- Aye-ayes are a species of lemur that have a specialized finger – very long and thin – which they use to tap, tap, tap on tree limbs.
- By listening to the tapping, the aye-aye can tell if there is an insect inside a tree. They can then use the long finger to bring the insect out!
Station 4 – Lemur Skull

Use the following pictures to compare a lemur skull to two other species.
Lemur Skull
Compare the Lemur Skull to These Two Skulls. Which Is it More Similar to?
Compare the Lemur Skull to These Two Skulls. What are they really?

- Raccoon Skull
- Colobus Monkey Skull
What did you think?

- Even though lemurs are primates, like monkeys, the lemur skull has a lot more similarities to the raccoon skull. Why do you think this is?
- Lemurs and raccoons have similar adaptations for a similar nocturnal lifestyle. These adaptations include:
  - A long snout for a better sense of smell
  - Space for a medium sized brain (not as large as a monkey)
- What other similarities/differences do you see?
SPRING BREAK CAMP: ISLAND HOPPING
Let’s Go on an Island Vacation!
WHAT IS AN ISLAND ANYWAY????
WHAT IS AN ISLAND ANYWAY???

An island is a piece of land that is surrounded by water!

They can be formed in many ways:
- Volcanoes
- Continental Drift
- Coral Reefs
- Tides
- Man made

Not all islands are tropical - There are lots of islands all over the world with different types of habitats!
SECTION II: AUSTRALIA

Type: Continental Island – It’s so big it IS a continent!
A Few Reasons Australia is so Awesome...
Social History

- The history of people on Australia can be traced back at least 65,000 years!
- Europeans first arrived in Australia in the early 1600s. It officially became a settlement of Britain in 1788 and was set up as a penal colony to relieve Britain's overcrowded prisons.
- The eleven ships that made up the First Fleet which colonized Australia included 850 convicts and their guards.
The Great Barrier Reef

- The Great Barrier Reef is the largest coral reef system in the world and the only living organism (coral is an invertebrate animal) that can be seen from space!
Biodiversity!
Australia is full of unique animals
Sea Turtles

Little Blue Penguins

Cockatoos

Emus
MONOTREMES & MARSUPIALS

MOST OF THE WORLD’S MARSUPIALS AND ALL THE WORLD’S MONOTREMES LIVE IN AUSTRALIA. MARSUPIALS ARE Pouched Mammals, Monotremes are Egg Laying Mammals.
The Inland Brown Taipan is one of the most venomous snakes in the world!

Venomous stonefish camouflage with the coral reef.

Stinging jellyfish and box jellies can be hard to see while you're swimming!

Don't get close to the giant saltwater crocodiles!

DANGEROUS ANIMALS!
SECTION III: MADAGASCAR

Type: Continental Island
A Few Reasons Madagascar is so Magnificent...
Madagascar is about as big as the state of Texas!
Varying Climate

Mountains

Tropical Rain Forests

Dry Spiny Forests


Madagascar is home to Raffia Palms (left), whose fronds can be used to make baskets, rugs, hats, and art like you see in the middle picture. Madagascar is also home to 6 of the world’s 9 species of Baobab trees (right). Baobab trees are extremely long lived, and they survive in dry weather providing shelter and food for animals where there is very little vegetation.
LEMURS

Lemurs are a unique group of primates that can only be found on Madagascar!
COOL INSECTS

Madagascar Hissing Cockroach

Giraffe Weevil
CHAMELEONS

Madagascar is home to both the largest (28 inches) and the smallest (1/2 inch) chameleon. There are also about 75 other chameleon species on the island!
SECTION IV: GALAPAGOS

Type: Volcanic Island
A Few Reasons Why the Galapagos is Great...
History...

- The bird species on the Galapagos Islands are what inspired Charles Darwin’s theory of natural selection.
- He noticed that on each island there were different finches that seemed to be specially adapted to the foods available on that island.
UNIQUE ANIMALS

Blue Footed Booby

13 Species of Finches

Land Iguanas

Marine Iguana
Galapagos Tortoise

- The most famous inhabitant – the Galapagos tortoise. They are the largest species of tortoise (weighing up to 600 lbs) and the longest living vertebrate on earth (living over 100 years old).
- They are the largest vertebrate native to the island, giving them the role of an ecosystem engineer. This means that the actions of the tortoise help to shape the landscape. Where they walk, they trample and eat vegetation, preventing certain plants from growing.
The Galapagos penguin is the Northern most penguin species, and the only penguin to live in the Northern Hemisphere.
SECTION V: INDONESIA

Type of Island: Volcanic

NUSA TENGGARA
A Few Reasons Why Indonesia is so Incredible...
Indonesia lies right along the equator, so its climate is almost entirely tropical.

Most of its natural landscape is rainforests, providing homes for lots of wildlife.
Amazing Animals

- Smaller than their African cousins, the Asian elephant can be found throughout India and Southeast Asia, including Indonesia.
- Orangutans are great apes native only to the Indonesian islands of Borneo and Sumatra.
- Sun Bears Sun bears are the smallest species of bear. They have an incredible 14 inch long tongue used for eating insects and honey from holes in trees.
Beautiful Birds

- Like other peafowl, the green peafowl has extreme sexual dimorphism, where the males and females look different. Males are extremely colorful, while the females are mostly brown.

- The rhinoceros hornbill is aptly named for the casque, or horn, on top of their beaks, which helps to amplify the sound of their call in the rainforest.

- The Bali mynah is critically endangered. There are only about 60 of these birds left in the wild. They are valued as a status symbol in the pet trade.
Agriculture

- Palm oil agriculture is very common in Indonesia and neighboring islands.
- Palm oil is a vegetable made from the black palm tree, a tree not native to these areas.
- These plantations destroy the homes of wildlife, but by using the Cheyenne Mountain Zoo’s Palm Oil Shopping App you can help! This will help you to find products using RSPO certified sustainable palm oil, which help to protect the people and wildlife of Indonesia.
SECTION VI: AMERICAN PACIFIC

Type: Mostly Volcanic Islands
A Few Reasons Why the American Pacific is Amazing
Includes...
UNIQUE WILDLIFE OF HAWAII

Monk Seal

Yellow Hibiscus
State Flower of Hawaii

Nene
State Bird of Hawaii
ENDANGERED BIRDS OF THE MARIANA ISLANDS

Guam Rail

Golden White Eye

Guam Kingfisher
Invasive Species

- An **invasive species** is an organism that causes ecological or economic harm in a new environment where it is not native.
- Invasive species can cause the extinction of native species, and islands are especially susceptible due to their small size and high number of endemic species.
- Some invasive species that have had severe impact on the American Pacific Islands include non-native birds such as the red-crested cardinal, feral or outdoor domestic cats, and the brown tree snake which was responsible for multiple bird extinctions on the island of Guam.