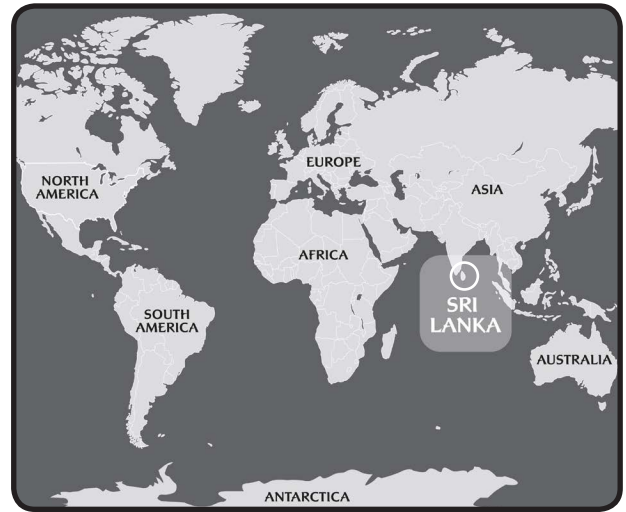


## Where Do Toque Macaques Live?

The race is on! Can you help the toque macaques navigate through their habitat? Read the questions below, use the map on Activity Sheet 2 and record answers on a separate sheet of paper.



### 1 SCIENCE

1. What does endangered mean?
2. Identify two threats to toque macaques.
3. How does living on an island impact the macaques?
4. What do toque macaques eat?
5. Identify one natural predator of the toque macaque.

### 2 GEOGRAPHY

6. Where in Sri Lanka is the Polonnaruwa Quadrangle?

*For the following questions, use the Activity Sheet 1 map and identify the coordinate pair. Some questions may have multiple answers.*

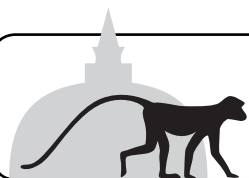
7. Where might the toque macaques find food?
8. Where might the toque macaques bathe? Why?
9. What building is found at coordinate (6,8)?

*For the following questions, use the Activity Sheet 1 map.*

10. Where do you think the macaques could go to sleep safely? Explain your answer.
11. What quadrangle should the macaques visit to find their banyan tree?
12. Use the scale provided to measure the distance from the banyan tree to the closest water source. What obstacles, if any, are between the banyan tree and the water source?
13. If you wanted to walk around the perimeter of the Polonnaruwa Quadrangle, about how many yards or meters would you travel?
14. Which building touches the fewest grid areas?

### BONUS

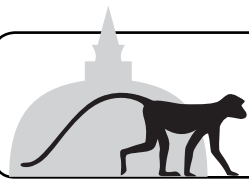
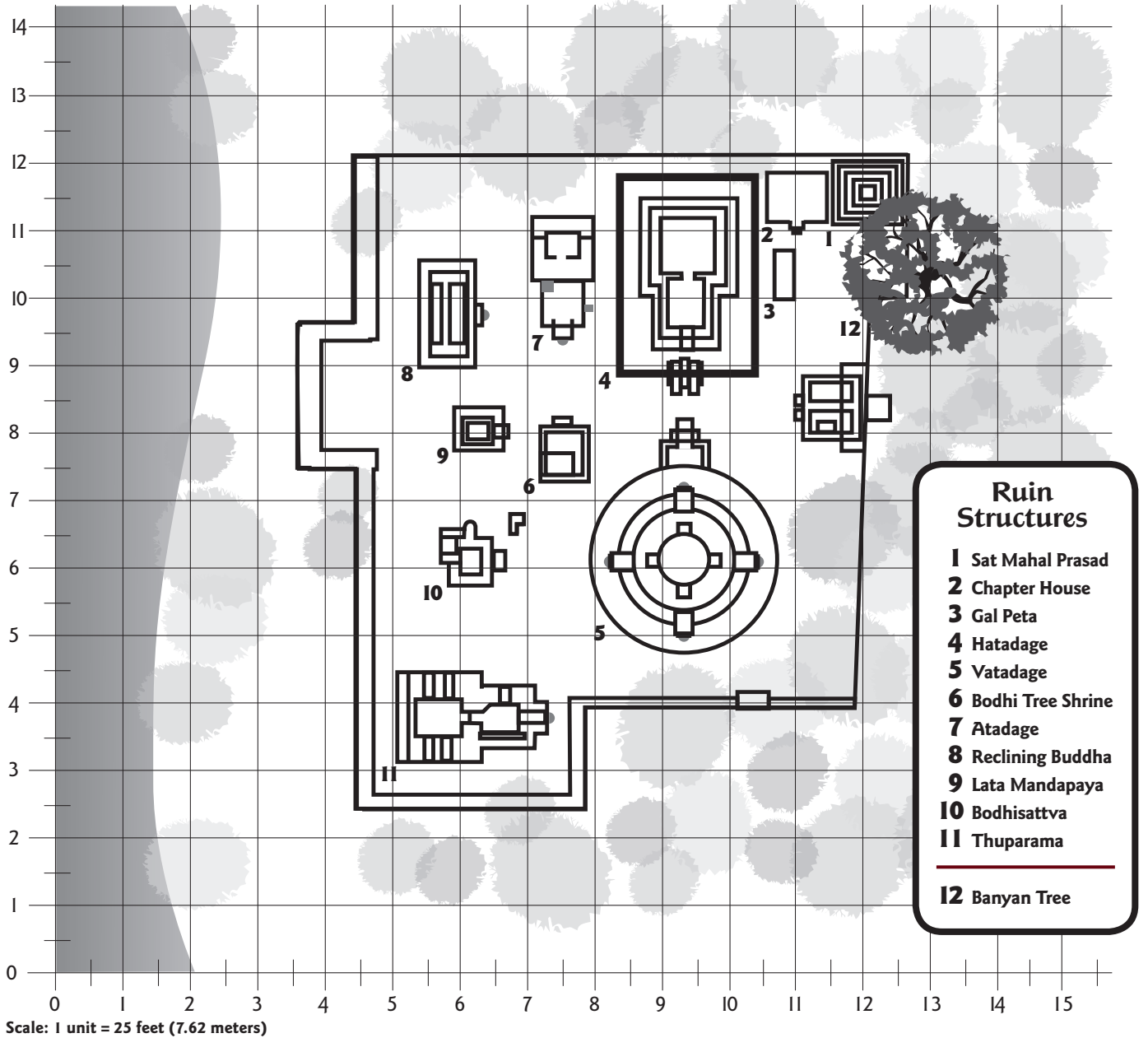
15. Use the map to determine which building touches the greatest number of grid areas. Does that mean it is the largest building?



#### Don't Feed The Animals.

Toque macaques are omnivores and eat a wide variety of foods. It is important to not feed wild animals because they can become dependent on humans for their next meal. Observe wildlife from a distance and remember our yummys are not good for their tummies!

## Map of a Quadrangle in Polonnaruwa



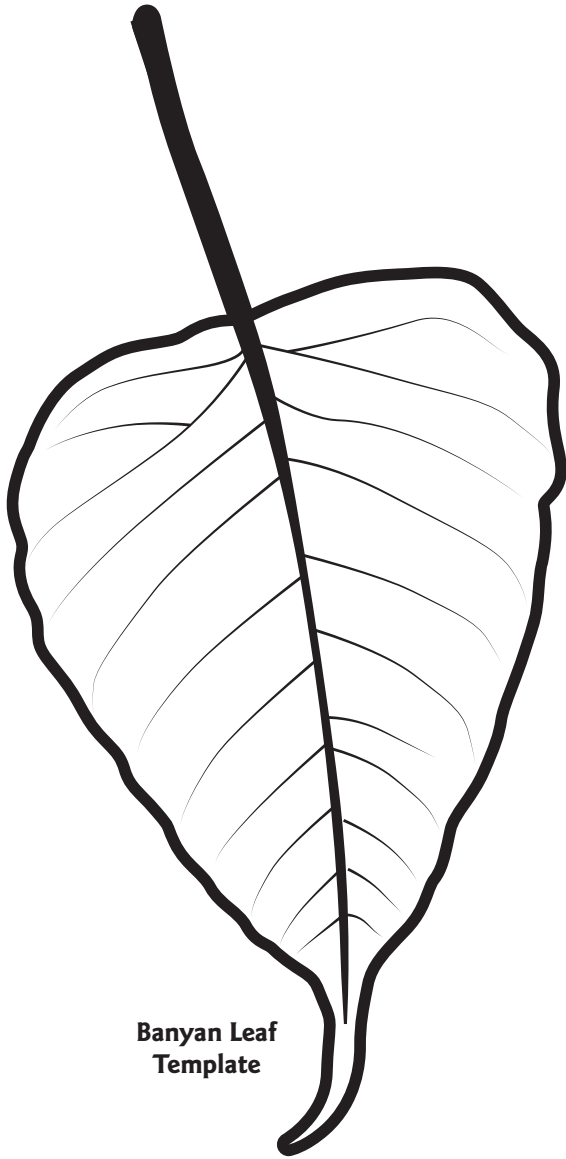
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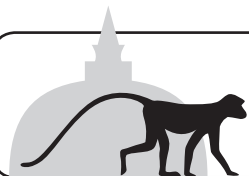
# Who Shares a Banyan Tree with the Toque Macaques?

2 **ONE**  
ACTIVITY SHEET  
GRADES 2-3

## Banyan Tree Images and Banyan Leaf



Banyan Leaf  
Template



### Plant A Tree.

For these tropical forest animals, life revolves around the banyan tree as it provides food and shelter for its inhabitants. Create your own wildlife habitat by planting a tree near your home, school or local park.

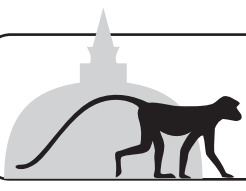
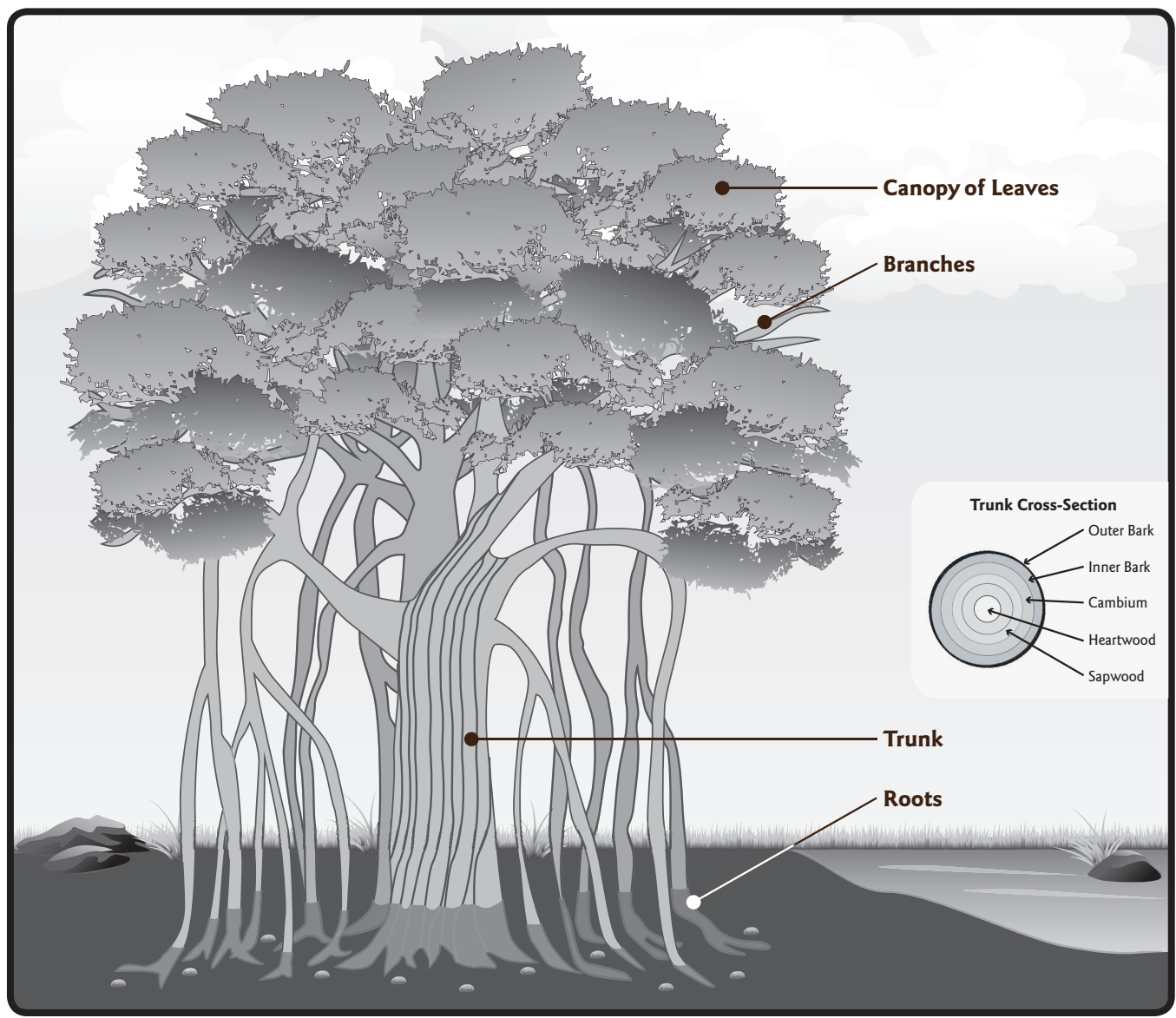
Disney *nature*  
**Monkey Kingdom**



# Who Shares a Banyan Tree with the Toque Macaques?

## Diagram of a Banyan Tree

List at least one toque macaque troop activity you observed in each part of the banyan tree or ground below.



### Plant A Tree.

For these tropical forest animals, life revolves around the banyan tree as it provides food and shelter for its inhabitants. Create your own wildlife habitat by planting a tree near your home, school or local park.



# Who Shares a Banyan Tree with the Toque Macaques?

ACTIVITY SHEET  
**2 THREE**  
GRADES 2-3

## Biodiversity of Polonnaruwa

The following list is only a small sample of the incredible biodiversity found in the tropical forests of South Asia. In Polonnaruwa alone, there are over 160 species of birds, 30 species of mammals and a variety of large and small reptiles and amphibians that live in this incredible habitat.

### AMPHIBIANS



Common Toad  
Golden Shrub Frog  
Leaf Dwelling Shrub Frog  
Nollert's Toad  
Red Narrow-Mouthed Frog

### FLOWERS



Orchid  
Hibiscus  
Lotus  
Ruk Aththana

### BUTTERFLIES



Common Birdwing  
Ceylon Tiger  
Tree Nymph

### BIRDS



Black-Headed Yellow Bulbul  
Brown-Capped Babbler  
Golden-Fronted Leafbird  
House Crow  
Indian Pitta  
Red-Rumped Swallow  
Scarlet Minivet  
Sri Lankan Magpie  
White-Browed Bulbul  
White-Throated Flowerpecker

### MAMMALS



Asian Elephant  
European Otter  
Fishing Cat  
Golden Jackal  
Golden Palm Civet  
Indian Flying Fox  
Indian Gray Mongoose  
Indian Muntjak  
Layard's Palm Squirrel  
Sloth Bear  
Water Buffalo

### REPTILES



Asian Water Monitor  
Black Turtles  
Brown Vine Snake  
Cat Snake  
Geckos  
Green Forest Lizard  
Green Vine Snake  
Painted Lipped Lizard  
Python  
Rat Snake  
Star Tortoise

### PRIMATES



Purple-Faced Langur  
Red Slender Loris  
Toque Macaque  
Tufted Gray Langur

### TREES



Indian Banyan Tree  
Ebony  
Mahogany  
Satinwood  
Teak

### INVERTEBRATES

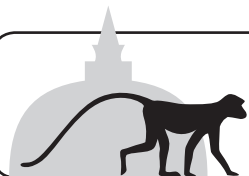


Beetle  
Red Dragon  
Scorpion  
Termite

### FISH



Carp  
Eel  
Tilapia



### Plant A Tree.

For these tropical forest animals, life revolves around the banyan tree as it provides food and shelter for its inhabitants. Create your own wildlife habitat by planting a tree near your home, school or local park.

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# Who Shares a Banyan Tree with the Toque Macaques?

ACTIVITY SHEET  
**2 FOUR**  
GRADES 2-3

## Research an Animal or Plant of Polonnaruwa

As a group, research your assigned tropical forest animal or plant at the library or on the Internet to complete the sections below. Be prepared to share with the class.

**ANIMAL OR PLANT:**

---

**PHYSICAL DESCRIPTION:**

What does the animal or plant look like?

---

**NOURISHMENT:**

What does your animal or plant eat?

---

**SHELTER:**

What part of the banyan tree does your animal or plant inhabit?

---

**HABITS OR BEHAVIOR:**

What is special about your animal or plant?

---

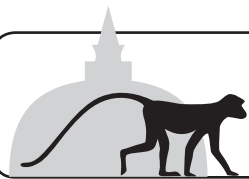
**BONUS: RELATIONSHIP TO THE TOQUE MACAQUE**

Is your animal or plant a friend, predator or food for the toque macaques?

---

**ANIMAL  
OR PLANT:**

Draw a picture of your animal or plant in this space.



**Plant  
A Tree.**

For these tropical forest animals, life revolves around the banyan tree as it provides food and shelter for its inhabitants. Create your own wildlife habitat by planting a tree near your home, school or local park.

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# How is a Toque Macaque Troop Organized?

3 ACTIVITY SHEET  
ONE  
GRADES 4-6

## Animal Cards

My name is:

**MAYA**



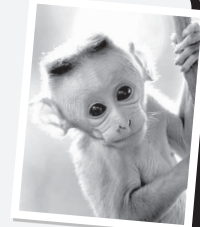
GENDER: Female

BEHAVIOR: Independent, motherly, resourceful

RELATIONSHIPS: Mother to KIP

My name is:

**KIP**



GENDER: Male

BEHAVIOR: Curious, still learning

RELATIONSHIPS: Son of MAYA

My name is:

**RAJA**



GENDER: Male

BEHAVIOR: Protective, responsible

RELATIONSHIPS: Alpha male of the Castle Rock macaques

My name is:

**KUMAR**



GENDER: Male

BEHAVIOR: Intelligent, earns respect of others

RELATIONSHIPS: Sub-alpha male to RAJA

We are: **THE SISTERHOOD**

GENDER: Female

BEHAVIOR: Privileged, controlling, loyal to each other

RELATIONSHIPS: Highest ranking females in the troop



My name is:

GENDER:

BEHAVIOR:

RELATIONSHIPS:



My name is:

GENDER:

BEHAVIOR:

RELATIONSHIPS:

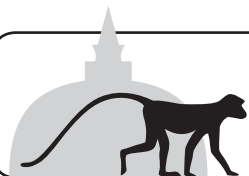


My name is:

GENDER:

BEHAVIOR:

RELATIONSHIPS:



### Take Action!

Toque macaques live in groups called troops. Join or start your own group or club that pledges to help protect plants and animals! Take action by planting a community garden or participating in a waterway clean up.

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**Monkey Kingdom**



# How is a Toque Macaque Troop Organized?

ACTIVITY SHEET  
**3 TWO**  
GRADES 4-6

## Behavior Question Cards



**A. Highest ranking females may take food out of a lower ranking female's mouth:**

- a) True
- b) False

Set  
1

**B. When macaques spend time foraging, that means they are:**

- a) Getting ready for sleep
- b) Grooming
- c) Looking for food

Set  
1

**C. High ranking born females do not have the right to the best resources:**

- a) True
- b) False

Set  
1

**D. A male gains dominance by fighting the alpha male and winning:**

- a) True
- b) False

Set  
1

**E. Macaques groom each other to:**

- a) Keep relationships strong
- b) Try new hairstyles
- c) Practice digging

Set  
1

**F. Infant toque macaques learn by:**

- a) Watching other species of animals
- b) Repetition and watching other members of the troop
- c) Taking a test

Set  
1

**G. A troop's dominant male is usually easy to identify because he:**

- a) Is large, muscular and well groomed
- b) Is small and dirty
- c) Avoids predators and rival troops

Set  
1

**H. Toque macaques sleep in the canopy of trees hugging each other in a line because:**

- a) Sleeping space is limited in trees
- b) Huddling together provides warmth
- c) They structure the troop hierarchy by judging who is tallest

Set  
1

**I. Young toque macaques play fight in order to:**

- a) Release energy and learn how to fight for protection
- b) Get first choice of food
- c) Avoid boredom

Set  
1

**J. Lower ranked females must be resourceful and clever to survive:**

- a) True
- b) False

Set  
1

**K. Troops will defend and fight over territory that:**

- a) Has the prettiest views
- b) Has the most monkeys
- c) Has the most resources

Set  
1

**L. Toque macaques vocalize or call to their troop in order to:**

- a) Alert for predators
- b) Notify about a food source
- c) Both a and b

Set  
1

**M. Toque macaques do not get along with any other animals:**

- a) True
- b) False

Set  
1

**N. \_\_\_\_\_ gets the best location for food over other macaques:**

- a) A baby macaque
- b) An alpha male
- c) The largest female

Set  
1

**O. In addition to food, toque macaques look for a habitat close to:**

- a) People
- b) Water
- c) Parks

Set  
1

# How is a Toque Macaque Troop Organized?

3 ACTIVITY SHEET  
**THREE**  
GRADES 4-6

## Character Scenario Cards



Set  
2

A. Who is the dominant male?

Set  
2

B. Who gets groomed the most?

Set  
2

C. Who would like to eat a termite?

Set  
2

D. Who takes care of another macaque?

Set  
2

E. Who is still learning how to forage?

Set  
2

F. Who forages highest in the banyan tree?

Set  
2

G. Who forages closest to the ground?

Set  
2

H. Who would take food from another macaque?

Set  
2

I. Who clings to their mother's back?

Set  
2

J. Who is the dominant female?

Set  
2

K. Who is the rival to the dominant male?

Set  
2

L. Who do you think could survive on their own?

Set  
2

M. Who do you think could not survive on their own?

Set  
2

N. Play two macaques that are related.

Set  
2

O. Play two macaques that do not get along.

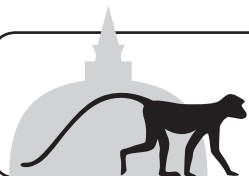
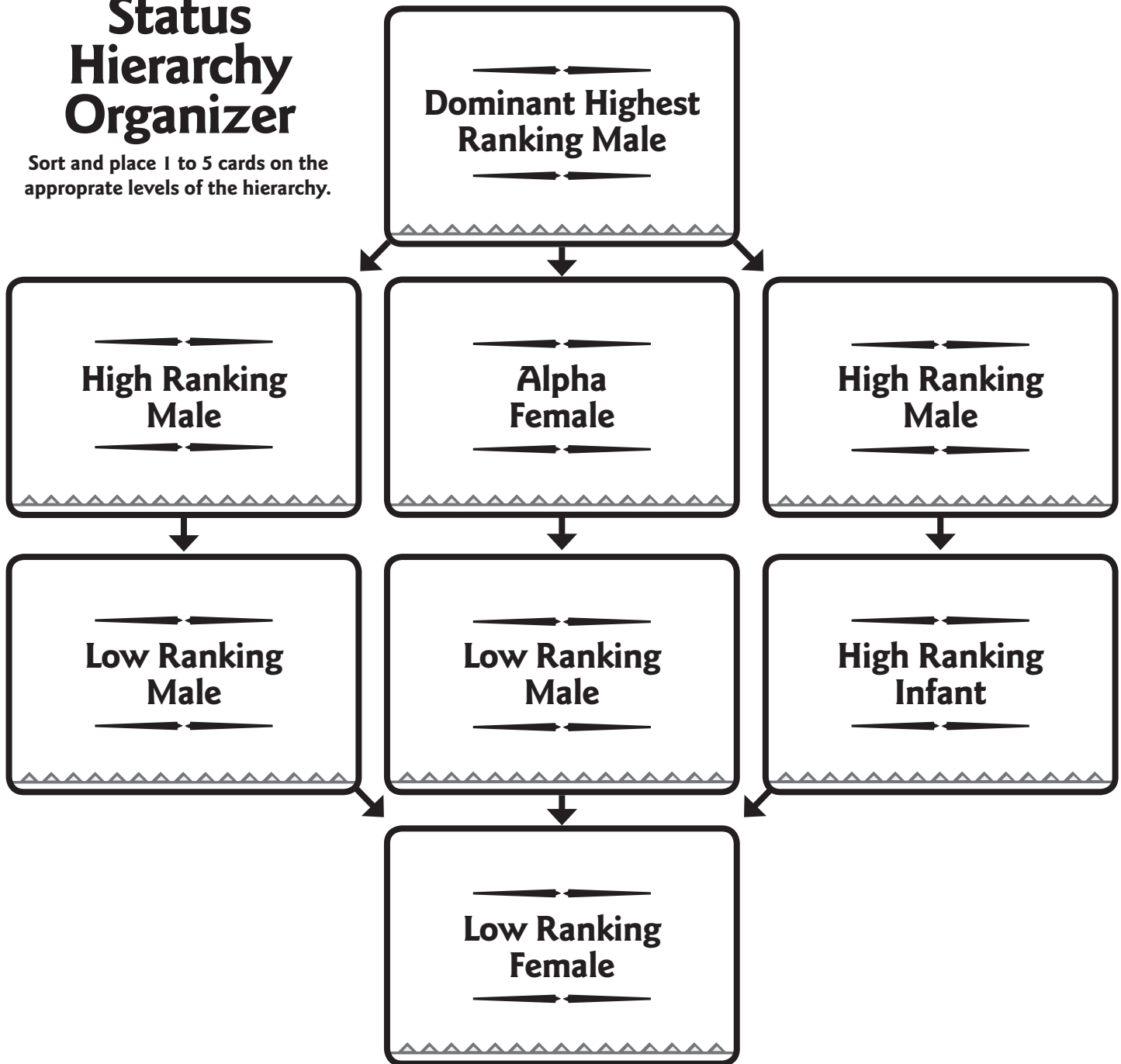
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**Monkey Kingdom**

# How is a Toque Macaque Troop Organized?

3 ACTIVITY SHEET  
**FOUR**  
GRADES 4-6

## Status Hierarchy Organizer

Sort and place 1 to 5 cards on the appropriate levels of the hierarchy.



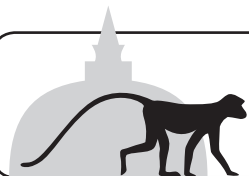
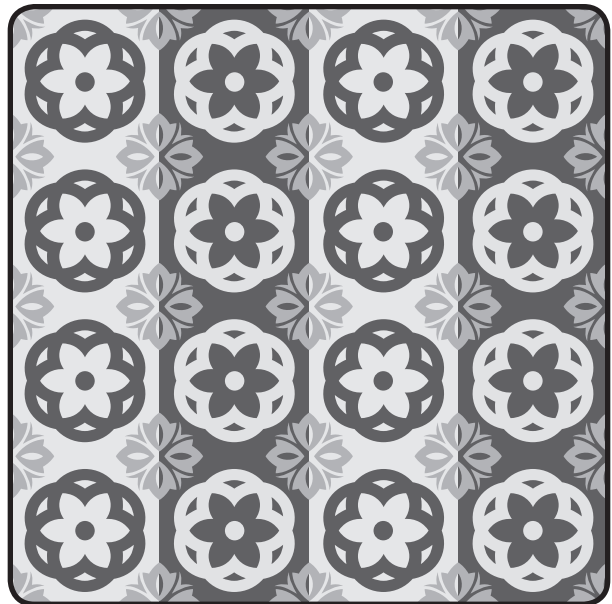
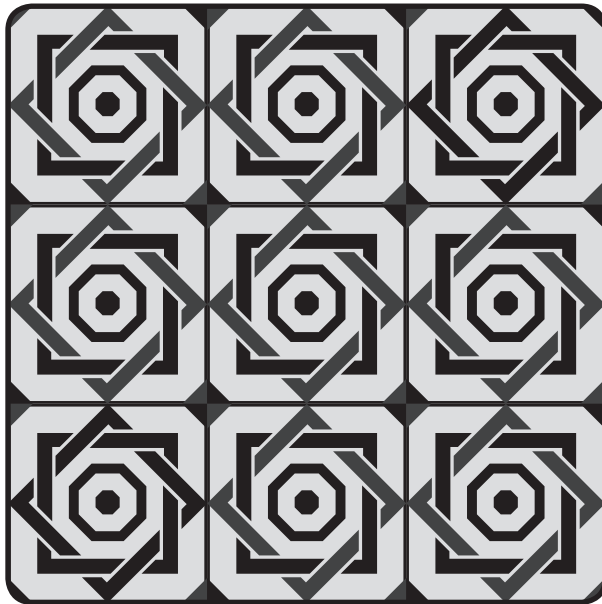
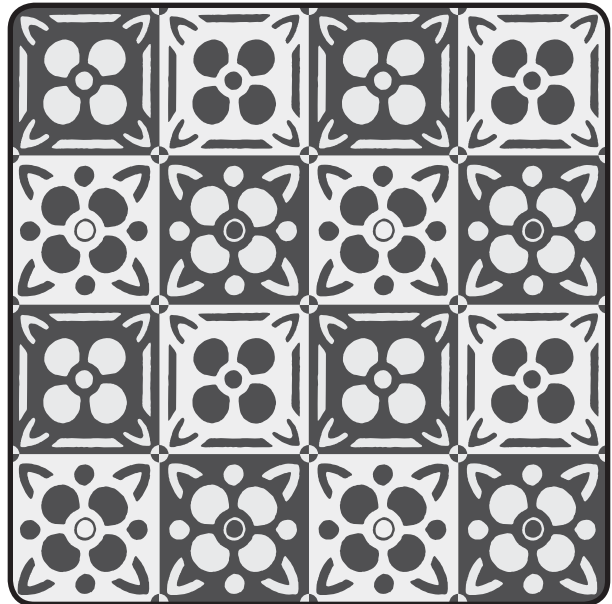
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**Monkey Kingdom**



## Tessellation Resources

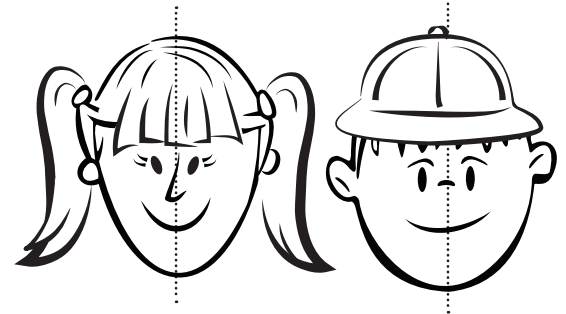


### Watch And Learn!

Toque macaques communicate through facial expressions and vocalizations. You can visit a local AZA-accredited zoo or aquarium to learn more about animals and their behavior!

## Symmetry in a Human Face

Can you find human lines of symmetry in your face? Determine your face shape then see if you have symmetry! Look for lines of symmetry in different objects around you using mirrors.



### 1 Determine SHAPE \_\_\_\_\_

What is the geometric shape of your face? With your partner, look at your reflection in the mirror and determine which geometric shape is most like the shape or outline of your face.

What shape is your face? \_\_\_\_\_

What shape is your partner's face? \_\_\_\_\_

### 2 Determine SYMMETRY \_\_\_\_\_

Is your face symmetric? Check by pretending to draw a line from the top of the head, down through the tip of the nose and the middle of the chin. What could you say about each side of your face? It is symmetric if one side looks like the reflection of the other side.

Is your face symmetric? Why or why not? \_\_\_\_\_

\_\_\_\_\_

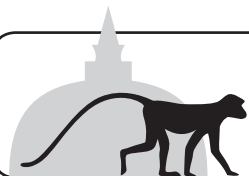
## BONUS

Can you find examples of symmetry in the classroom and outside in nature?

*Tip: Check using a mirror. Place the mirror along the possible line of symmetry, perpendicular to the face of the object or shape. It is symmetrical if the reflection completes the object.*

List at least 2 objects in the classroom that are symmetric. \_\_\_\_\_

List at least 1 object in nature that is symmetric. \_\_\_\_\_



### Watch And Learn!

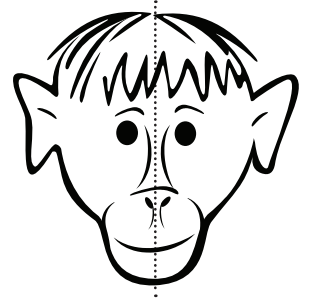
Toque macaques communicate through facial expressions and vocalizations. You can visit a local AZA-accredited zoo or aquarium to learn more about animals and their behavior!

# How Do Toque Macaques Communicate?

ACTIVITY SHEET  
**4 THREE**  
GRADES 2-3

## Symmetry in a Toque Macaque Face

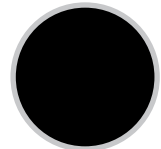
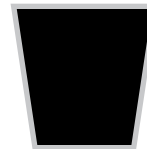
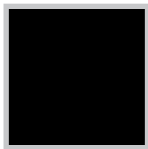
Examine each toque macaque face below to determine the line of symmetry. Use a mirror to confirm where the line is located. With a ruler, draw the line of symmetry for each face.



Are any of the lines of symmetry hard to find? Which ones and why?

Select one picture you will use to determine the basic shape of the toque macaque's face. Use your set of shapes as a guide.

Circle the shape that best matches that of the toque macaque's face.



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**Monkey Kingdom**



# How Do Toque Macaques Communicate?

## Write A List Poem

Get ready to write your List Poem by filling in the blanks to compare how your forms of communication are the same or different from those of a toque macaque. Add to the table any other forms of communication you noticed in Disneynature **MONKEY KINGDOM**. Use the information from the table to complete your List Poem.

Toque Macaque Feeling or Event	Toque Macaque Communication	Your Communication	Same (✓) Different (X)
Asserting Dominance	Eyebrow Raise		
Being Lost	Loud Coo		
Finding a Snack/ Hungry	Soft Hoo aimed at relatives		
Attracting a Mate	Lip Grimace		
Feeling Threatened	Fear Grimace (showing teeth)		
Seeing a Different Troop Approach	Raise Tails in Air Silently		
Keeping Troop Close Together	Small Chirp or Grunt		
Being on Look Out	Stand Tall and Bend Forward		

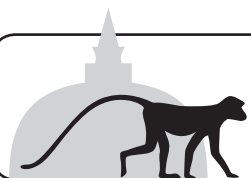
# What Life Events do Toque Macaques Experience?

5 **ONE** ACTIVITY SHEET  
GRADES 2-3

## Character Guide: Toque Macaque Behaviors and Life Events



<b>MAYA</b> The Mother	<b>KIP</b> The Baby	<b>KUMAR</b> Adult Male
Learning to forage	Nurses young	Joins a new troop
Climbs on mother's back for protection	Mimics others	Finds a mate
May leave the troop	Learning to lead	Establishes his rank
Observes others	Grooms others	Defends the troop

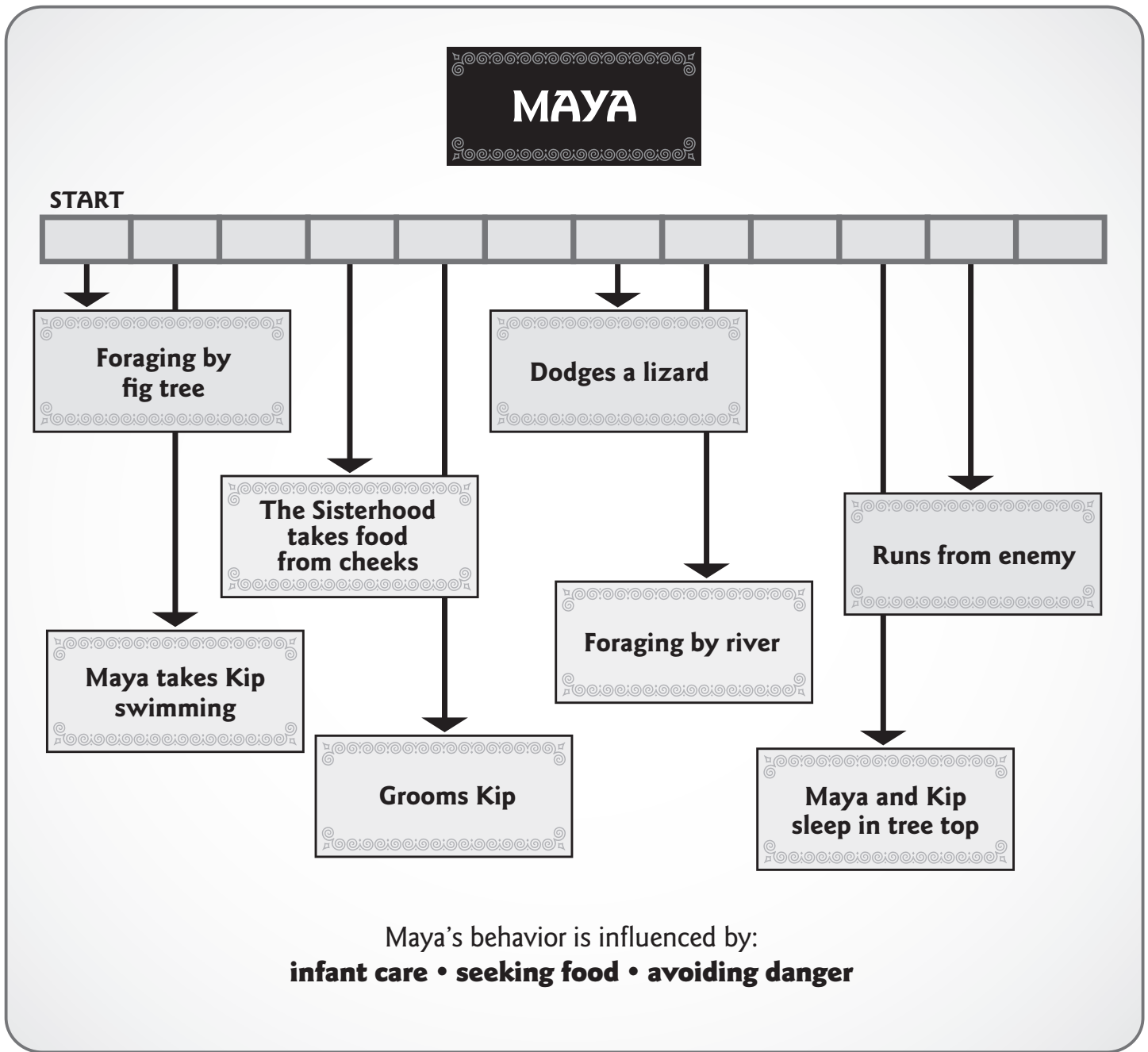


**Visit  
Your Local  
Library.**

You can learn more about toque macaques or one of the many other amazing species seen in Disneynature MONKEY KINGDOM by checking out a wildlife field guide at your library. Be sure to share this knowledge to inspire others to care about this diverse ecosystem!

Disneynature  
**Monkey Kingdom**

## Small Group – Sample Compiled Character Timeline

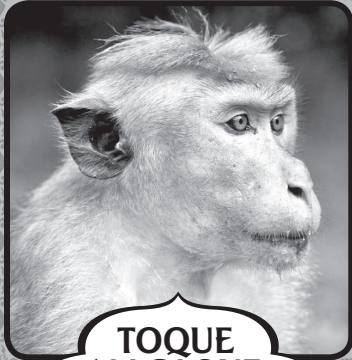




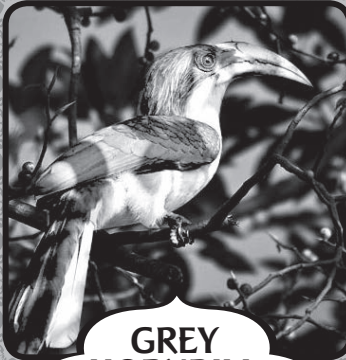
# How Does Biodiversity Impact the Toque Macaques?

ACTIVITY SHEET  
**6 ONE**  
GRADES 4-6

## Ecosystem Cards



TOQUE  
MACAQUE



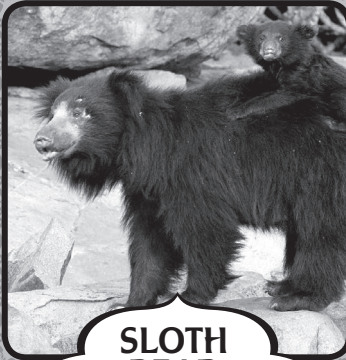
GREY  
HORNBILL



TERMITE



LEOPARD



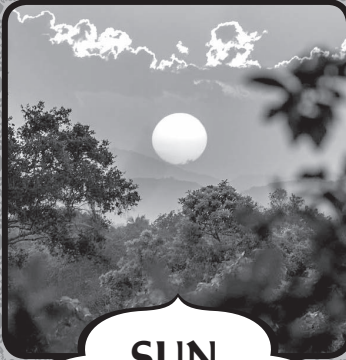
SLOTH  
BEAR



MONITOR  
LIZARD



LANGUR



SUN

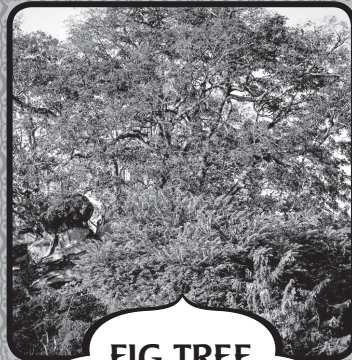


FIG TREE



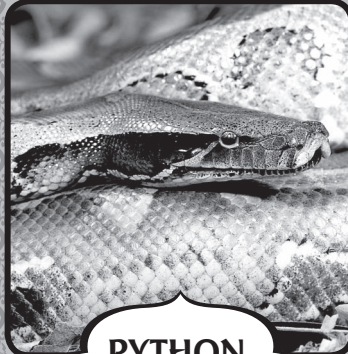
# How Does Biodiversity Impact the Toque Macaques?

ACTIVITY SHEET  
**6 TWO**  
GRADES 4-6

## Ecosystem Cards



BLUE  
MAGPIE



PYTHON



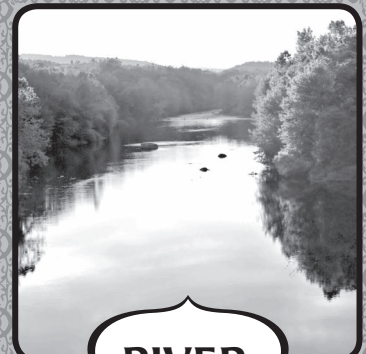
WATER  
LILY



SOIL



PEACOCK



RIVER



SCORPION



FUNGI



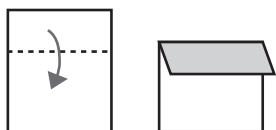
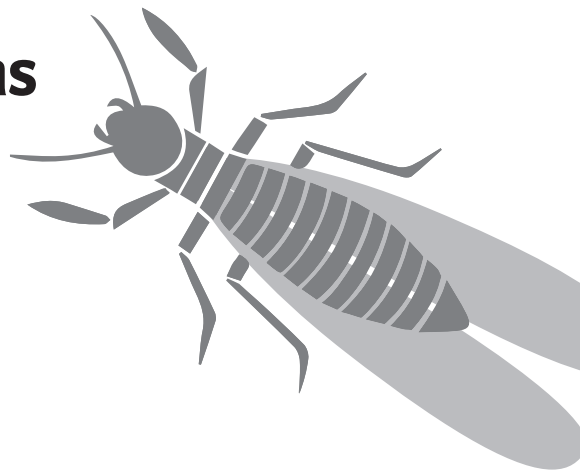
ELEPHANT

Blue magpie: © Canstock Photo  
Python, peacock, soil, river, scorpion, fungi, elephant: © @superstock.com

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**Monkey Kingdom**

## Termite Origami Instructions

Before beginning, practice folding. Use scrap paper to make valley folds (fold to the front or toward you). Then make mountain folds (toward the back or away from you.) The dotted lines show where to fold the paper.



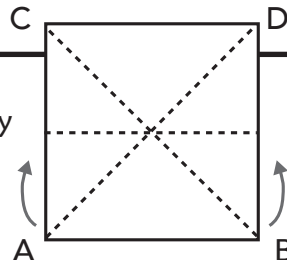
**Valley Fold**  
(Fold to the front)



**Mountain Fold**  
(Fold to the back)

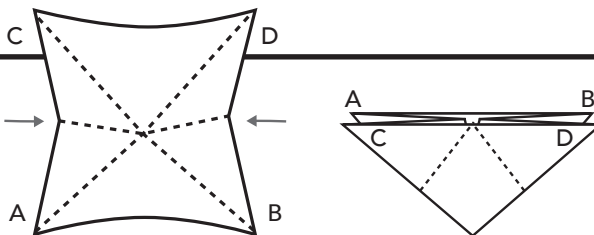
**1**

Start with  $8\frac{1}{2} \times 8\frac{1}{2}$  inch square paper and make a valley fold horizontally across the paper, as illustrated. Then make mountain folds along the diagonals. Label each corner lightly with a pencil. Corners A and B will make front wings, and C and D will make back wings.



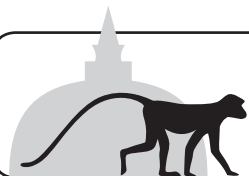
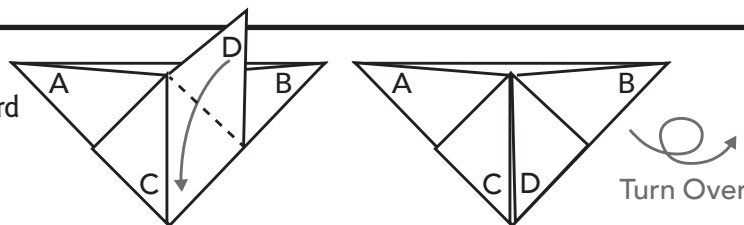
**2**

Bring corners A and C together. Then bring corners B and D together. Tuck the sides in at the horizontal crease to make a triangle shape.



**3**

Fold down corners C and D toward the bottom point of the triangle. Then turn your piece over.



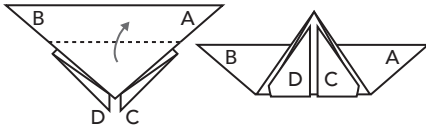
**Explore  
The Great  
Outdoors.**

Biodiversity can be found in any habitat, even your own backyard. Explore habitats near you such as a local park or playground and see how many species you can find when spending time outdoors!

## Termite Origami Instructions *continued*

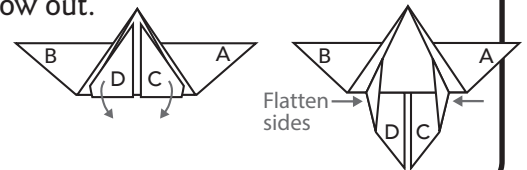
**4**

For the top wings, make a mountain fold across the triangle, so D and C are pointing up, and B and A form wings.



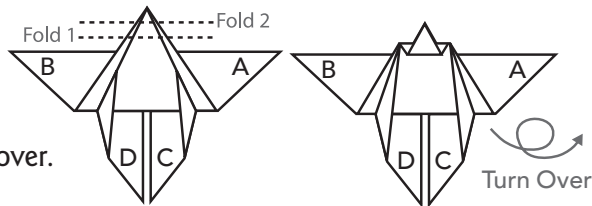
**5**

For the bottom wings, open flaps D and C downward. You will need to flatten the sides that bow out.



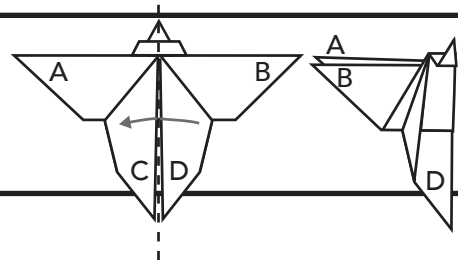
**6**

To make the head, you need two folds: First make a valley fold at Fold 1, then a mountain fold at Fold 2. Turn your insect over.



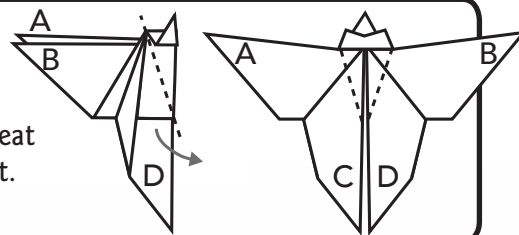
**7**

Fold your insect in half lengthwise using a valley fold, bringing wing A to wing B so flying insect is touching sides.



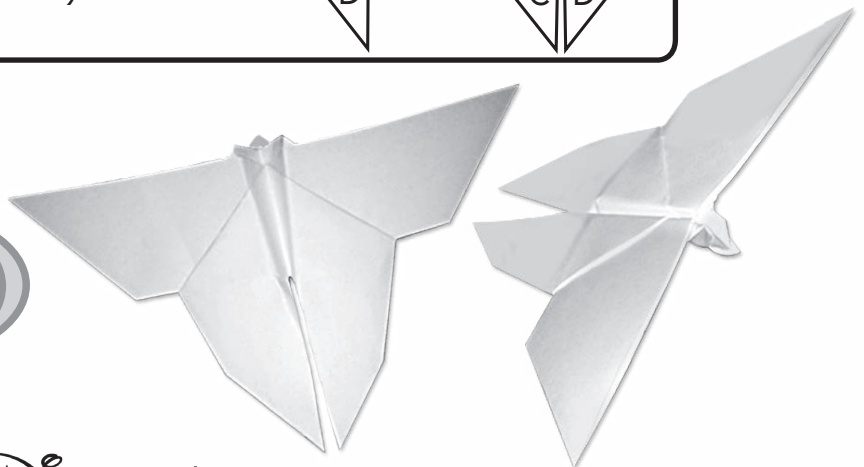
**8**

Finally, make the body. Make a valley fold from either side of the head down to where the bottoms wings begin. Repeat this step on the other half of your insect.



**WELL DONE!**

Your flying termite is complete!



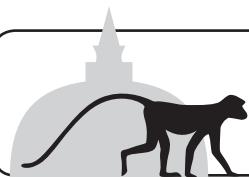


# What Types of Relationships do Toque Macaques Develop?

**7** ACTIVITY SHEET  
**ONE**  
GRADES 4-6

## Writing a Script

Narrator	Order of Events	Dialogue / Narration	Actions
	<b>TITLE</b>	<b>TITLE:</b>	<b>SHOW TITLE POSTER TO AUDIENCE</b>
	<b>INTRODUCTION</b> Set the mood and give an overview.	<b>DIALOGUE:</b>	
	<b>SETTING</b> Describe the time, place and characters.	<b>DIALOGUE:</b>	
	<b>ACT 1</b> The conflict begins to take form.	<b>DIALOGUE:</b>	
	<b>ACT 2</b> The conflict develops and reaches its climax.	<b>DIALOGUE:</b>	
	<b>FINALE</b> The conflict is resolved.	<b>DIALOGUE:</b>	
	<b>Credits</b>		



### Find The Right Pet.

Although dynamic and impressive, toque macaques are still wild animals and do not make good pets. Choose pets wisely by learning about any new animal you wish to add to your family.

Disney *nature*  
**Monkey Kingdom**

# What Types of Relationships do Toque Macaques Develop?

ACTIVITY SHEET  
**7 TWO**  
GRADES 4-6



## Writing a Song for a Musical

Writing a song requires a mixture of inspiration and form. Consider the following options for songwriting if you wish to add a song to your puppet play musical.



### 1 SONG PARODY

Start with a song you already know, such as Old MacDonald Had a Farm. Look at the first verse and chorus. Think of a topic for your song and how you could depict that topic with new words but keeping the same melody. Such as:

#### **Old MacDonald - Original Song Lyrics**

Old MacDonald had a farm, E-I-E-I-O  
And on his farm he had a cow, E-I-E-I-O  
With a "moo-moo" here and a "moo-moo" there  
Here a "moo" there a "moo"  
Everywhere a "moo-moo"  
Old MacDonald had a farm, E-I-E-I-O

#### **Toque Macaque - Parody Song Lyrics**

The toque macaques they had a fight, My-O-My-O-My  
And in this fight they showed their teeth, My-O-My-O-My  
With a grimace here and a grimace there  
Here a grimace, there a grimace  
Everywhere a grimace - grimace  
The toque macaques they had a fight, My-O-My-O-My

### 2 TURN A POEM FOR TWO VOICES INTO A SONG

This type of poem shows two opposing points of view on a topic. For toque macaque troops, the poem voices the reasons each troop is involved in a conflict. Troop A might want Troop B's habitat for many reasons; Troop B wants to protect its habitat. Writing this type of poem means expressing both sides of the conflict. Just remember that each monkey's voice should speak about the same topic for each line of the poem. See how this type of poem might start below:

**TITLE: "It's all about Real Estate - Location, Location, Location!"**

#### **TOQUE MACAQUE SPEAK:**

What are you doing in our tree?  
You're not welcome, so get out!

#### **CHALLENGING MONKEY SPEAK:**

We love your home, give us a key.  
We're going to stay - watch us shout!

### 3 WRITE ORIGINAL LYRICS

Write an original song based on characters or events in the script. First, discuss the examples of character songs and story songs shown below, and help students identify a place in their script where one of the song types will be helpful to illustrate how a character feels or what is happening in the story.

#### **CHARACTER SONGS:**

- **"I am"** songs are when characters express how they feel at the moment. The songs define the character's personality and reveal something about what they are thinking and feeling.
- **"I want"** songs suggest a course of action for the future. Characters often express their goals and dreams through songs.
- **"Story Climax"** songs happen at the high point or resolution of the story. Characters can express feelings such as fear, love, success or joy using songs that represent these feelings. Story climax songs are usually energetic, enthusiastic, passionate and feel like a celebration.

#### **SONGS THAT TELL STORIES:**

- **Exposition songs** tell what has happened prior to the story being told in the play and what has brought the characters to this particular point in the story; they also may preview the themes of the play.
- **Conflict songs** describe how characters struggle to achieve differing goals. The songs focus on frustrating challenges and give insight into the beliefs and attitudes of the opposing sides in the conflict.
- **Conversation songs** tell a story by having two or more characters sing a conversation.

**FINALLY:** Once the type of song has been chosen, students can create lyrics based on the script and improvise a melody that fits the lyrics. Sometimes it is easier to start with a melody, and then add the words. Sometimes the words can lead to the melody. There is no right way to create a song. Have students add body percussion sounds to the song and rehearse it so that they can perform it as part of the play performance.

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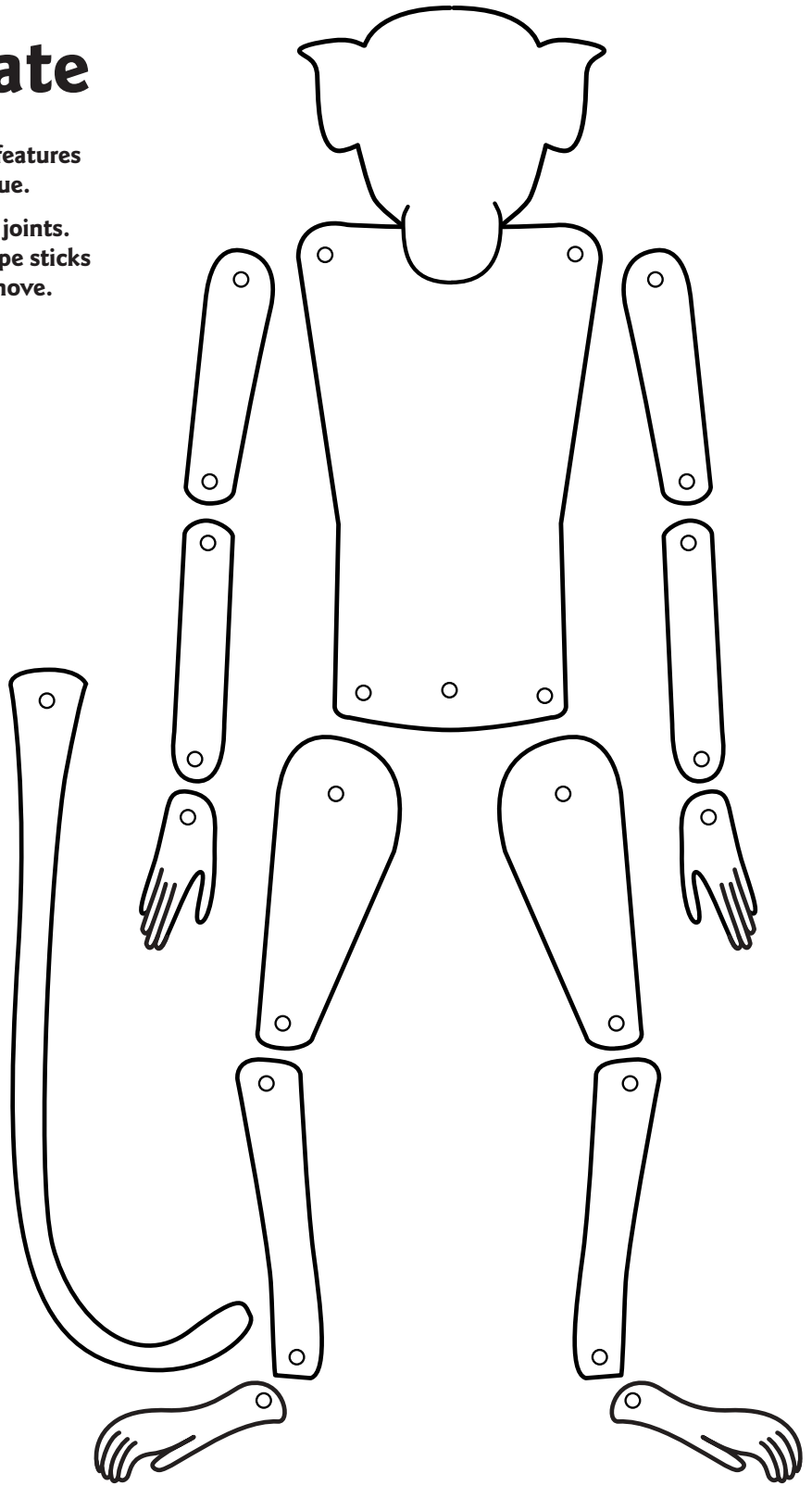
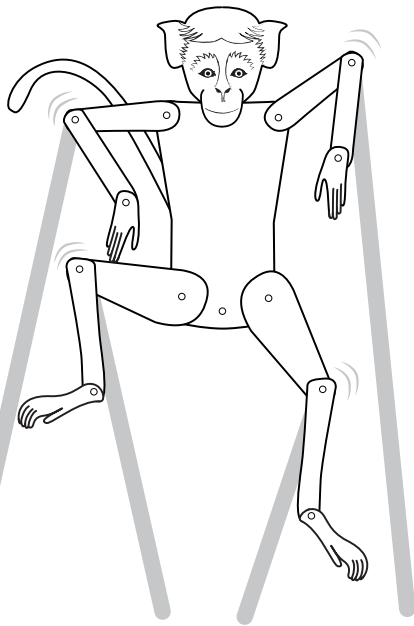
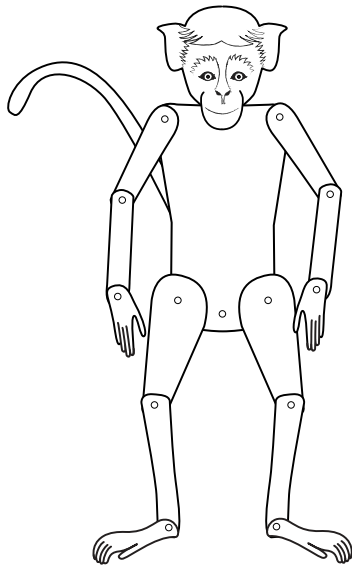
# What Types of Relationships do Toque Macaques Develop?

ACTIVITY SHEET  
**7 THREE**  
GRADES 4-6

## Puppet Template

Use this template to color in the physical features that are specific to your toque macaque.

Assemble your puppet using brads at the joints. On the back side of your puppet, glue or tape sticks to arms and legs to make your puppet move.



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# What Types of Relationships do Toque Macaques Develop?

## Exploring Shadows

Mark **X** to indicate that type of object (Opaque, Translucent, Transparent)

1

OBJECT	Opaque	Translucent	Transparent

2

Position	Distance from flat surface / wall	Shadow appearance
Close to light source		
Close to flat surface/wall		
At an angle		

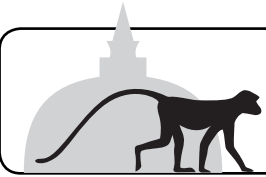


# How Dangerous is the Journey to Water?

**8** ACTIVITY SHEET  
**ONE**  
GRADES 2-3

## Data Recording Sheet

Round	Prey Survived	Prey Captured	Notes
<div style="border: 1px solid gray; border-radius: 10px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">1</div> <p>*No predators</p>			
<div style="border: 1px solid gray; border-radius: 10px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">2</div>			
<div style="border: 1px solid gray; border-radius: 10px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">3</div>			
<div style="border: 1px solid gray; border-radius: 10px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">4</div>			
<div style="border: 1px solid gray; border-radius: 10px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">5</div> <p>*Logging introduced</p>			



**Help Save  
The Tropical  
Forests.**

One of the greatest dangers to macaques is the loss of habitat. Help protect the tropical forest by switching to sustainably sourced or recycled household paper products.

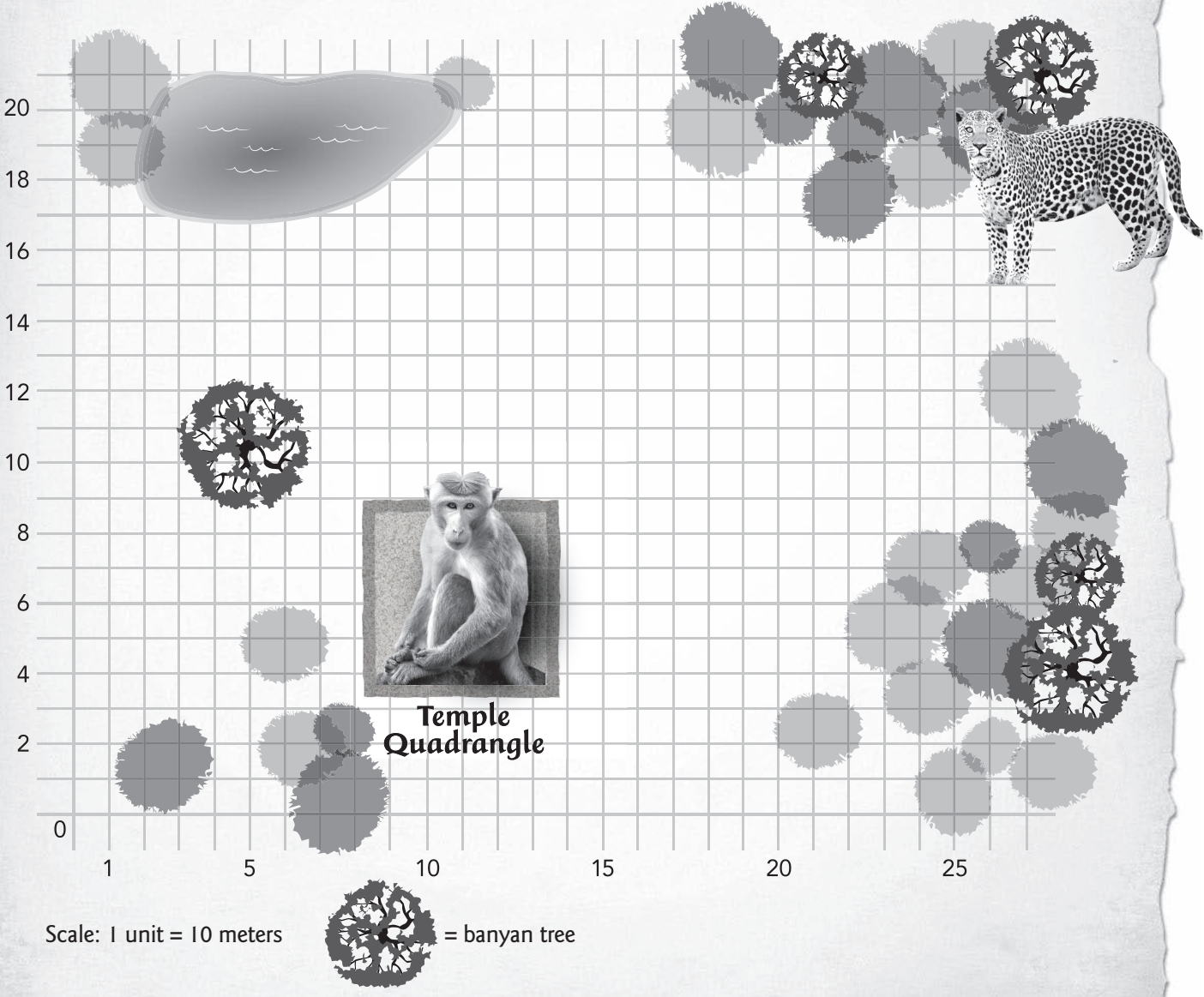
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**Monkey Kingdom**

# How Dangerous is the Journey to Water?

ACTIVITY SHEET  
**8TWO**  
GRADES 2-3

## Journey to the Water

Use this map to answer the questions in *Activity 3: What's the Best Route?*



## What's the Best Route?

Step into the shoes of a scientist who is interested in figuring out the best – or optimal – route for toque macaques to avoid predators and get safely to and from the temple ruins and water source. As a scientist, you realize that the variables will change. For example, the starting positions of predator and prey will change frequently. You also realize that the distance traveled and the speed at which predator and prey travel are also important in figuring out the best routes.

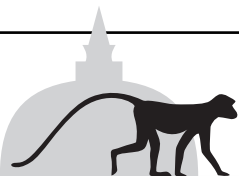
### SITUATION

*The toque macaque is located in the Polonnaruwa ruins at coordinates (11,6). The closest shoreline or bank of the water source is located between coordinates (2,17) and (11,20). Notice the banyan tree at (5,10). A leopard is waiting in the jungle at coordinates (26,15). The leopard can sprint at a speed of approximately 60 kilometers per hour (16 meters per second). The toque macaque can travel across open ground on all fours at a maximum speed of 12 kilometers per hour (3.3 meters per second).*



### QUESTIONS

- 1) How far is it from the toque macaque to the nearest banyan tree? \_\_\_\_\_
- 2) How far is it from the leopard to the same banyan tree? \_\_\_\_\_
- 3) If the toque macaque makes a fast dash for the nearest banyan tree, where will it be when the leopard could see it? \_\_\_\_\_
- 4) Will the toque macaque reach the tree before the leopard could get to it? \_\_\_\_\_
- 5) If the toque macaque heads straight for the water source from the temple, without stopping to hide in the tree, could the leopard catch it before it gets to the water source? \_\_\_\_\_



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