

# Science @Home

## RAINFORESTS

**Ascend into the rainforest canopy for a week of science crafts, activities, coloring, and guided videos for ages 4-8.**

Tropical rainforests only cover about 6% of our planet's surface, but they're home to more living things than anywhere else on Earth. Immerse yourself in the sights and sounds of these incredible, endangered ecosystems and learn more about how they are part of your everyday life.

*Please note: While Science @ Home activities are designed to be conducted by kids, some little ones might need adult help with reading instructions and preparing crafts.*

### **Day 1: Welcome to the Rainforest** 30-45 minutes

- » Rainforest Layers and Animals (coloring)
- » Scavenger Hunt: Rainforests at Home (activity)
- » Rainforest Tour with Macaw (video)

### **Day 2: Rainforest Biodiversity** 45 minutes

- » Clothespin Sloth (craft)
- » Rainforest Color-and-Cut (craft) (en español)
- » Rainforest Arthropods (video)
- » Mighty Arapaima (video)

### **Day 3: Rainforest Around You** 60 minutes

- » Rainforest Sound Journey (video)
- » Rain Stick (craft) (en español)
- » Bromeliad Blanket Fort (activity)

### **Day 4: Rainforests of the World at the Academy** 45 minutes

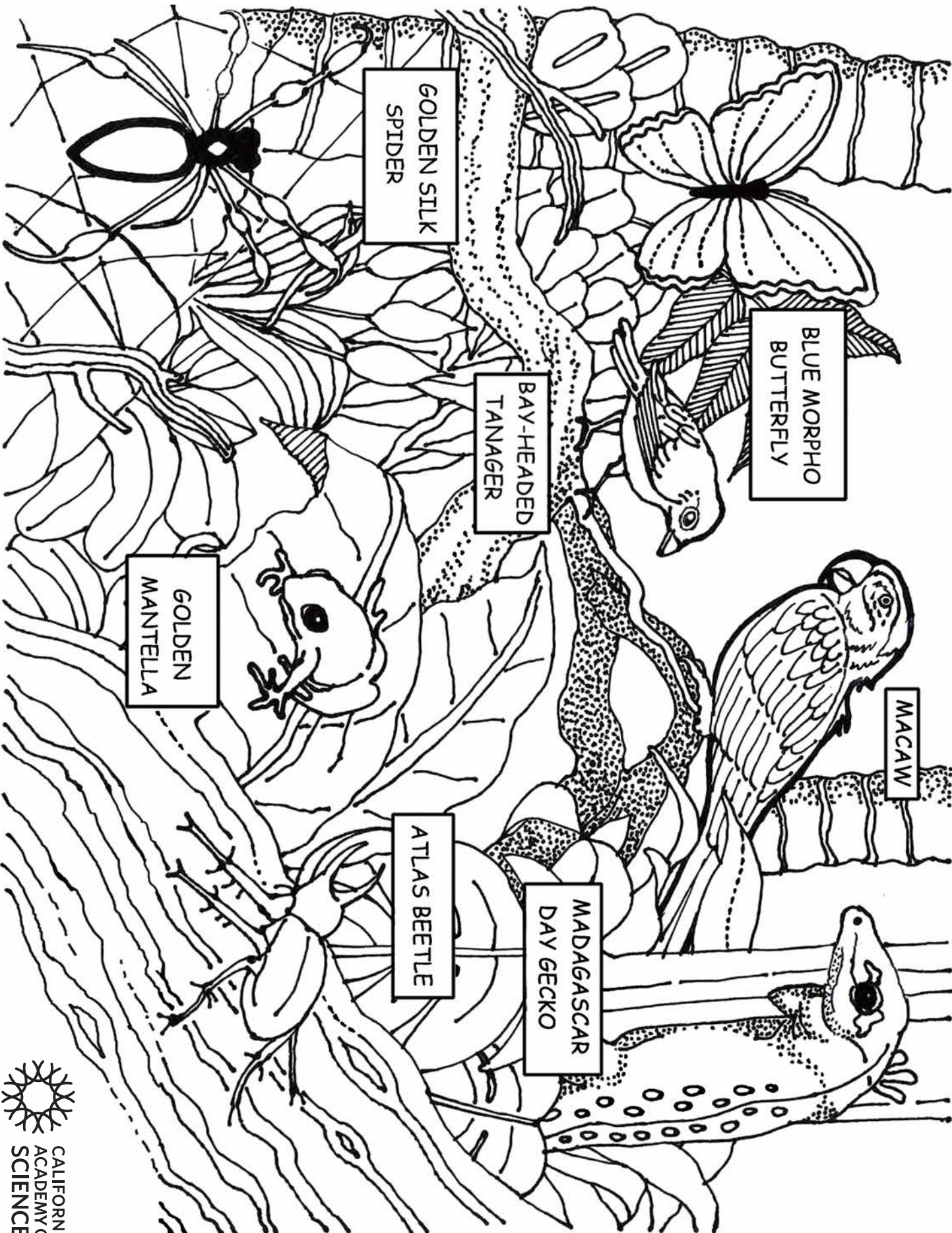
- » Rainforest Animals Coloring Pack (coloring)
- » Handprint Macaws (craft) (en español)
- » Macaw Feather Investigation (activity)

### **Kid and caregiver extension activities**

- » Rainforest Scavenger Hunt (activity)
- » Expedition Malaysia: A Top-to-Bottom Rainforest Survey (video)
- » Creature Closeup: Golden Mantella frog (resource)







GOLDEN SILK  
SPIDER

BLUE MORPHO  
BUTTERFLY

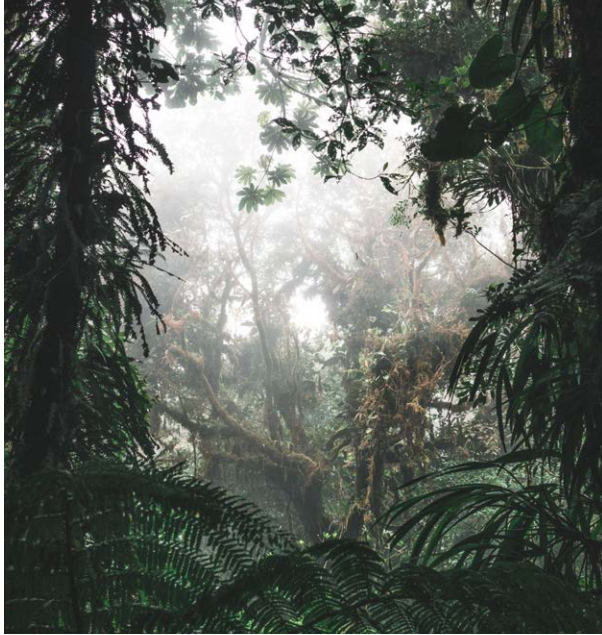
BAY-HEADED  
TANAGER

GOLDEN  
MANTELLA

MACAW

ATLAS BEETLE

MADAGASCAR  
DAY GECKO



# Rainforests at Home

Rainforests are home to more *species*, or types of living things, than anywhere else on land. Plants and animals find their food, water, and shelter there. Items that we use everyday come from the rainforest, connecting all of us to this important ecosystem—you probably even have a piece of the rainforest sitting in your kitchen right now! Rainforests provide for people around the world, so it is important for us to care for them in return. Learn more about rainforest conservation [here](#).

## Materials

1 piece of white printer paper  
Crayon, marker, pen, or pencil  
"Scavenger Hunt: Rainforests at Home" print-out (next page)

## Directions

1. **Print** "Scavenger Hunt: Rainforests at Home" on the next page.
2. **Look** at the 9 items. Have you seen them before? Where were you? What did you use it for?
3. **Search** your home for the 9 rainforest items, with an adult's permission. *Tip:* If you can, check the ingredients list. You may not have a whole coconut, but your family might cook with coconut oil or coconut milk!
4. **Draw** an "X" over the rainforest items using a crayon, marker, pen, or pencil when you find them. How many pieces of the rainforest can you find in your home?
5. **Share** what you found with your family and friends. Have they lived with pieces of the rainforest too? Learn more about how many types of living things exist in the rainforest in this video: [Exploring Ecosystems: Tropical Rainforest Diversity](#).

## Scavenger Hunt: Rainforests at Home

Draw an "X" over the rainforest items that you find in your home. Can you find all nine?



Coffee beans



Cashew nuts



Coconut



Avocado



Vanilla



Pineapple



Chocolate



Banana



Chewing gum



# Clothespin Sloth

Sloths are found in the rainforests of Central and South America. They are slow movers and spend most of their time hanging in trees. In fact, they are so still that they have algae and fungi living in their fur! Make your own sloth with clothespin feet and see where it can hang.

## Materials

Paper  
Crayons or colored pencils  
Clothespins  
Glue  
Scissors  
Print-out templates (next page)

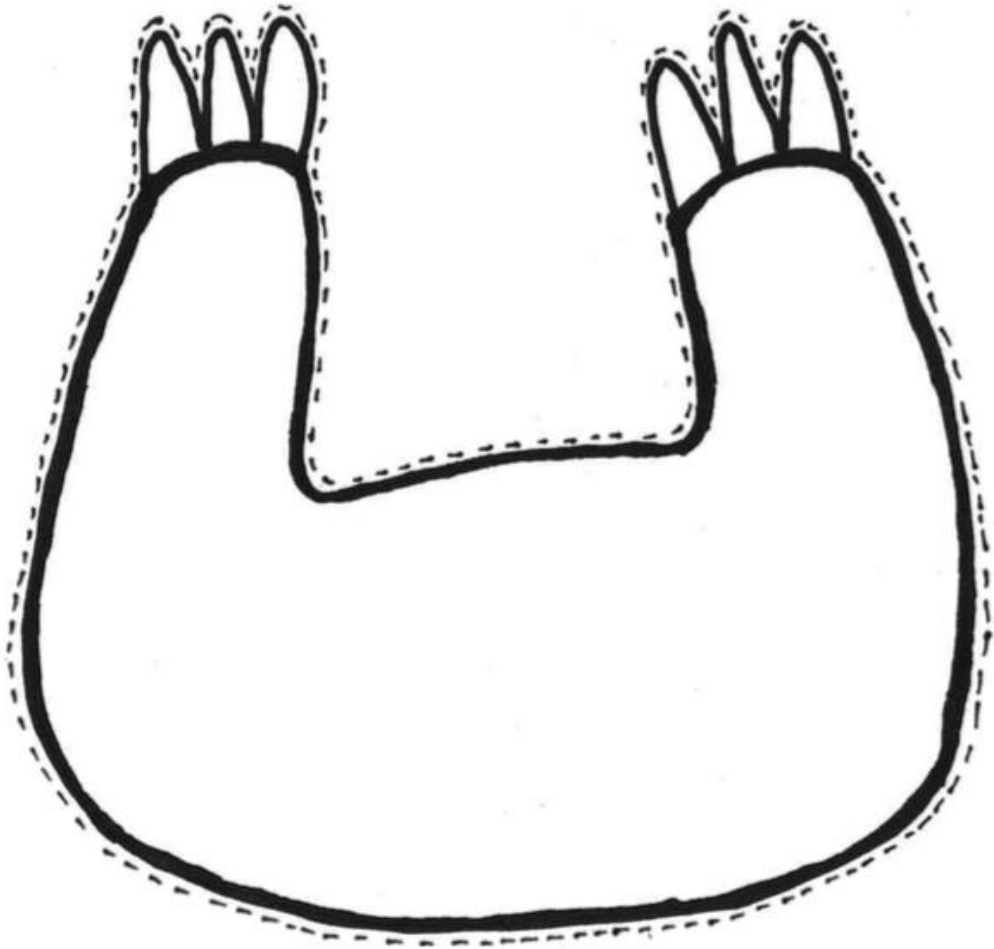
## Directions

1. **Print out** the sloth template on the next page.
2. **Color** your sloth any way you'd like. Is its fur brown? Yellow? Greenish because of the algae and fungi growing in its fur?
3. **Cut out** the sloth following the dotted lines.
4. **Glue** the head of your sloth to the body.
5. **Glue** the clothespins to the back of the sloth's arm.
6. **Hang** your sloth upside down once the glue has dried.





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# Rainforest Color-and-Cut

Rainforests are some of the most biodiverse ecosystems in the world, home to an astounding variety of plants and animals. Both rely on one another: Animals make use of plants for food and shelter, while pollinators help plants reproduce throughout the rainforest. In this activity, learn about some interactions between species that occur in the rainforest and try to match each plant with its “partner” animal.

## Materials

Rainforest Habitat sheet (page 3)  
Rainforest Animals sheet (page 4)  
Scissors  
Colored pencils, crayons, or markers  
Glue or tape

## Directions

1. **Print** the Rainforest Habitat sheet and Rainforest Animals sheet on pages 3 and 4.
2. **Color** the plants and animals found in the rainforest. What colors did you use?
3. **Cut out** the animals on the Rainforest Animal sheet.
4. **Glue or tape** the animal cutouts onto the Rainforest Habitat sheet. For hints on where to put the animals, **read** the Ecosystem Interactions on page 2. In the rainforest, certain animals only interact with certain plants to find food and shelter. Make your best guess on where each animal fits best.



## Bromeliads and Tree Frogs



Certain species of tree frogs rely on rainwater that collects in the trough-like leaves of the bromeliad plant to lay their eggs. The leaves are able to hold large amounts of water, sometimes up to 2 gallons (7.6 liters), creating an aquatic environment high in the trees. These leaves provide convenient spawning grounds and nurseries for tree frog tadpoles, as microorganisms and aquatic insects provide food for the growing tadpoles.

## Darwin's Hawkmoth and Star Orchid



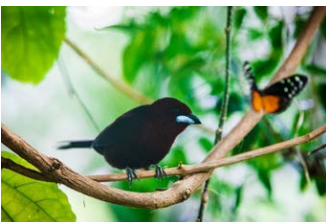
Star orchids are a strange species of flower, as their nectar is located down a spur (hollow part of the flower) an average of 13 inches (33 cm) long. Naturalist Charles Darwin hypothesized that an insect would have to have an equally long proboscis to pollinate the flower, and he was right: In 1882, the Darwin's hawkmoth was discovered, with a proboscis as long as the flower's spur. One of the few animals that can access the nectar of the star orchid, the hawkmoth is a wonderful example of coevolution, where two animals evolve alongside each other.

## Passion Vine Leaves and Postman Butterflies



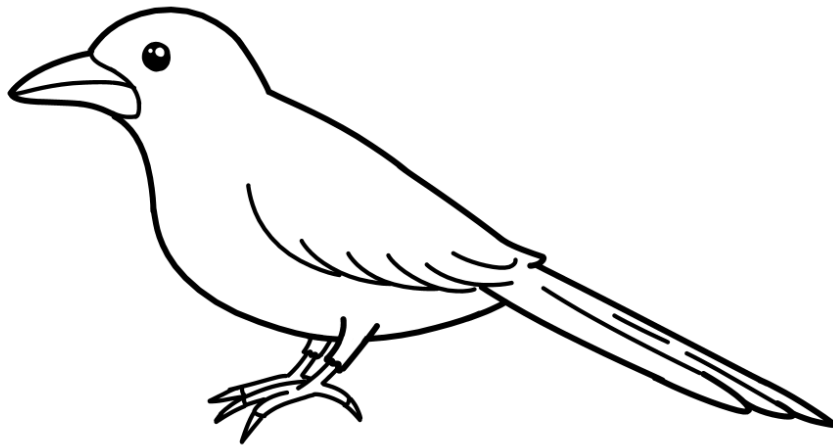
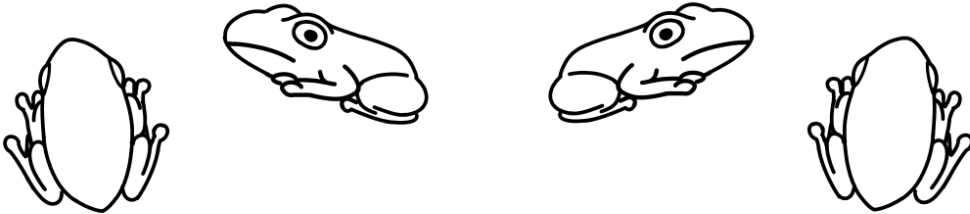
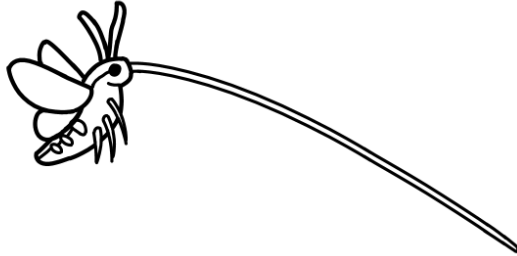
Passion vine leaves and flowers contain toxic compounds that deter herbivores from eating them, but the caterpillars of the postman butterflies are immune to the toxins. As the caterpillars eat the passion vines, the toxin builds up in their bodies and even stays with them when they undergo metamorphosis and become butterflies. The wings of the postman butterfly are brightly colored to let predators know to stay away.

## Silver-beaked Tanagers



Tanagers can be found in the rainforests of South America and come in a variety of different colors. They primarily feed on fruit and insects and regularly fly around the forest to find food. Try to find a cluster of berry-like fruits from the coffee plant and place the silver-beaked tanager near them.







# Colorea-y-Corta de la Selva Tropical

Las selvas tropicales son algunos de los ecosistemas más biodiversos del mundo, hogar de una asombrosa variedad de plantas y animales. Ambos dependen el uno del otro: los animales hacen uso de las plantas para alimento y refugio, mientras que los polinizadores ayudan a las plantas a reproducirse en toda la selva tropical. En esta actividad, aprende sobre algunas interacciones entre especies que ocurren en la selva tropical y trata de hacer coincidir cada planta con su animal "compañero".

## Materiales

Hoja de hábitat de la selva tropical (página 3)  
Hoja de animales de la selva tropical (página 4)  
Tijeras  
Lápices, lápices de colores o marcadores  
Pegamento o cinta adhesiva

## Instrucciones

1. **Imprime** la hoja de hábitat de la selva tropical en las páginas 3 y 4.
2. **Colorea** las plantas y animales que se encuentran en la selva tropical. ¿Qué colores usaste?
3. **Corta** los animales en la hoja de animales de la selva tropical.
4. **Pega** los recortes de animales en la hoja de hábitat de la selva tropical con pegamento o cinta. Para pistas sobre dónde colocar a los animales, **lee** las Interacciones del ecosistema en la página 2. En la selva tropical, ciertos animales solo interactúan con ciertas plantas para encontrar alimento y refugio. Haz tu mejor adivinanza sobre dónde encaja mejor cada animal.

### **Bromelias y ranas de árbol**



Ciertas especies de ranas de árbol dependen del agua de lluvia que se acumula en las hojas en forma de canal de la planta bromelia para poner sus huevos. Las hojas son capaces de contener grandes cantidades de agua, a veces hasta 2 galones (7,6 litros), creando un ambiente acuático alto en los árboles. Estas hojas proporcionan convenientes zonas de desove y viveros para los renacuajos de las ranas de árbol, ya que los microorganismos y los insectos acuáticos proporcionan alimento para los renacuajos en crecimiento.

### **Subespecie de la polilla continental africana de Darwin y orquídea estrella**



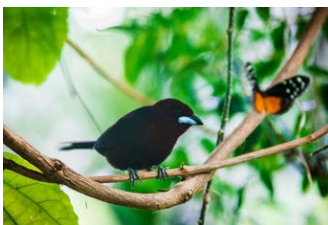
Las orquídeas estrella son una extraña especie de flor, ya que su néctar se encuentra en un espolón (parte hueca de la flor) con un promedio de 13 pulgadas (33 cm) de largo. El naturalista Charles Darwin planteó la hipótesis de que un insecto tendría que tener una probóscide igualmente larga para polinizar la flor, y tenía razón: En 1882, se descubrió la polilla de Darwin, con una probóscide tan larga como el espolón de la flor. Uno de los pocos animales que pueden acceder al néctar de la orquídea estrella, el hawkmoth (llamado en inglés) es un maravilloso ejemplo de coevolución, donde dos animales evolucionan uno junto al otro.

### **Hojas de la vid de pasión y mariposa del cartero**



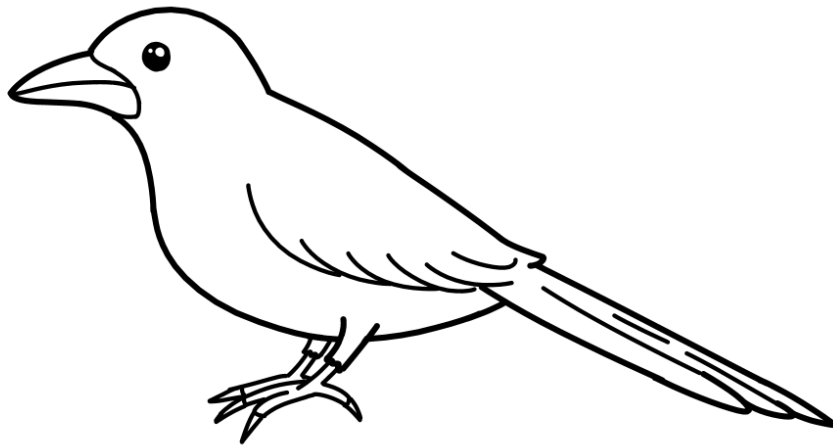
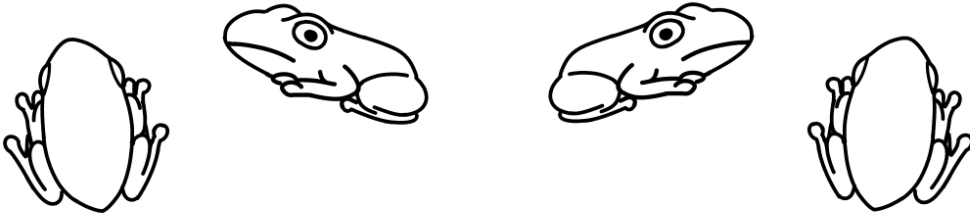
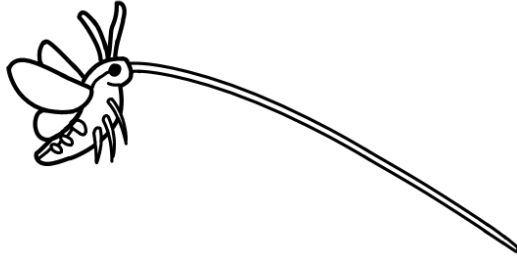
Las hojas y flores de la vid de la pasión contienen compuestos tóxicos que disuaden a los herbívoros de comerlas, pero las orugas de las mariposas del cartero son inmunes a las toxinas. A medida que las orugas comen las vides de la pasión, la toxina se acumula en sus cuerpos e incluso se queda con ellas cuando experimentan metamorfosis y se convierten en mariposas. Las alas de la mariposa del cartero son de colores brillantes para que los depredadores sepan que deben mantenerse alejados.

### **Tangaras con pico de plata**



Los tangaras se pueden encontrar en las selvas tropicales de América del Sur y vienen en una variedad de diferentes colores. Se alimentan principalmente de frutas e insectos y vuelan regularmente alrededor del bosque para encontrar alimento. Trata de encontrar un grupo de frutas parecidas a bayas de la planta de café y coloca la tangara de pico plateado cerca de ellos.







# Rain Stick

Close your eyes and imagine the sounds of the rainforest. Between the macaw squawks, monkey howls, and insect chirps, what else might you hear? Make your own rain stick to mimic the sound of rain falling from the canopy to the understory.

## Materials

Printed tube-cap templates (page 3)

Paper towel tube or 2 toilet paper tubes

Rain stick filling (rice, dehydrated beans, gravel, or pebbles)

Crayons, markers, or colored pencils

Tape

Optional: blank paper to wrap around tube for decorating

## Directions

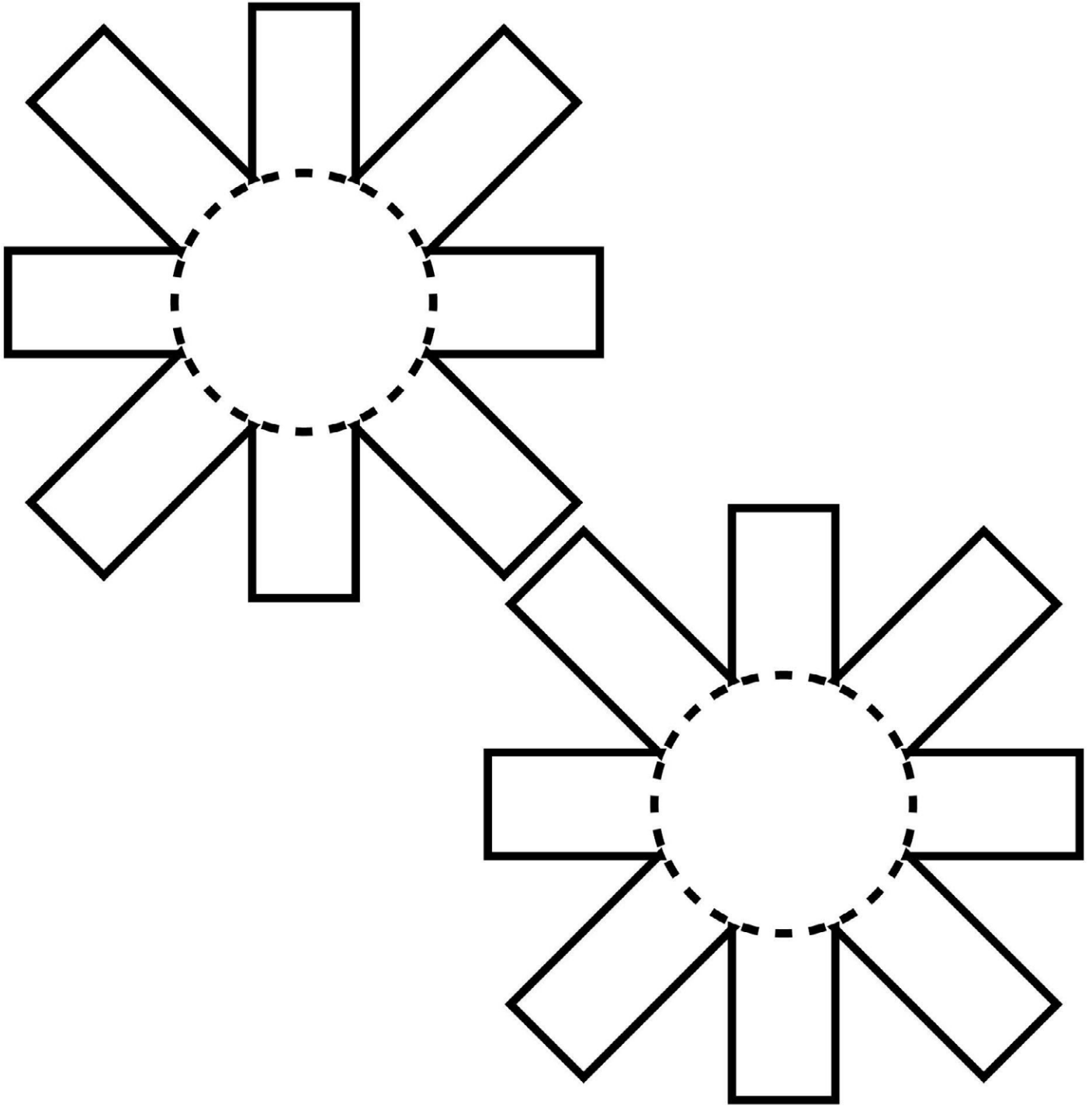
1. **Remove** any leftover paper from your cardboard tube. If using 2 toilet paper tubes, tape them together one on top of the other to make one longer tube.
2. **Decorate** your rainstick! Color directly on the cardboard, or trim and tape a piece of paper to wrap around it for a white background. Think about a rainforest for inspiration. What colors would you see? Can you draw some lines or a pattern to represent rain?
3. **Print** the tube-cap templates on page 3, and decorate them however you'd like.
4. **Cut out** the tube-cap templates along the solid lines. The circles will be the end covers of your rain stick and the tabs will help you tape them to your tube.





5. **Fold** the tabs along the dotted lines.
6. **Cover** one end of the tube with a tube-cap and **tape** the tabs to the cardboard tube.
7. **Add** a small handful of filling of your choice to your tube: dried goods like rice or beans or gravel from outside. Just enough to cover the circle at the bottom of the tube should be enough.
8. **Cover** the other side of the tube with the second tube-cap and securely **tape** the tabs.
9. **Make it rain!** Slowly turn the tube upside down, then right side up. What does it sound like? Can you make your rain stick sound like a light pitter-patter? How about a summer storm?







# Palo de Lluvia

Cierra los ojos e imagina los sonidos de la selva tropical. Entre los graznidos de guacamayos, los aullidos de los monos y los cantos de los insectos, ¿qué más podrías escuchar? Haz tu propio palo de lluvia para imitar el sonido de la lluvia que cae desde el dosel hasta el sotobosque.

## Materiales

Plantillas impresas de tapa de tubo (página 3)

Tubo de toalla de papel o 2 tubos de papel higiénico

Relleno para el palo de lluvia (arroz, frijoles deshidratados, grava o guijarros)

Crayones, marcadores o lápices de colores

Cinta adhesiva

Opcional: papel en blanco para envolver alrededor del tubo para decorar

## Instrucciones

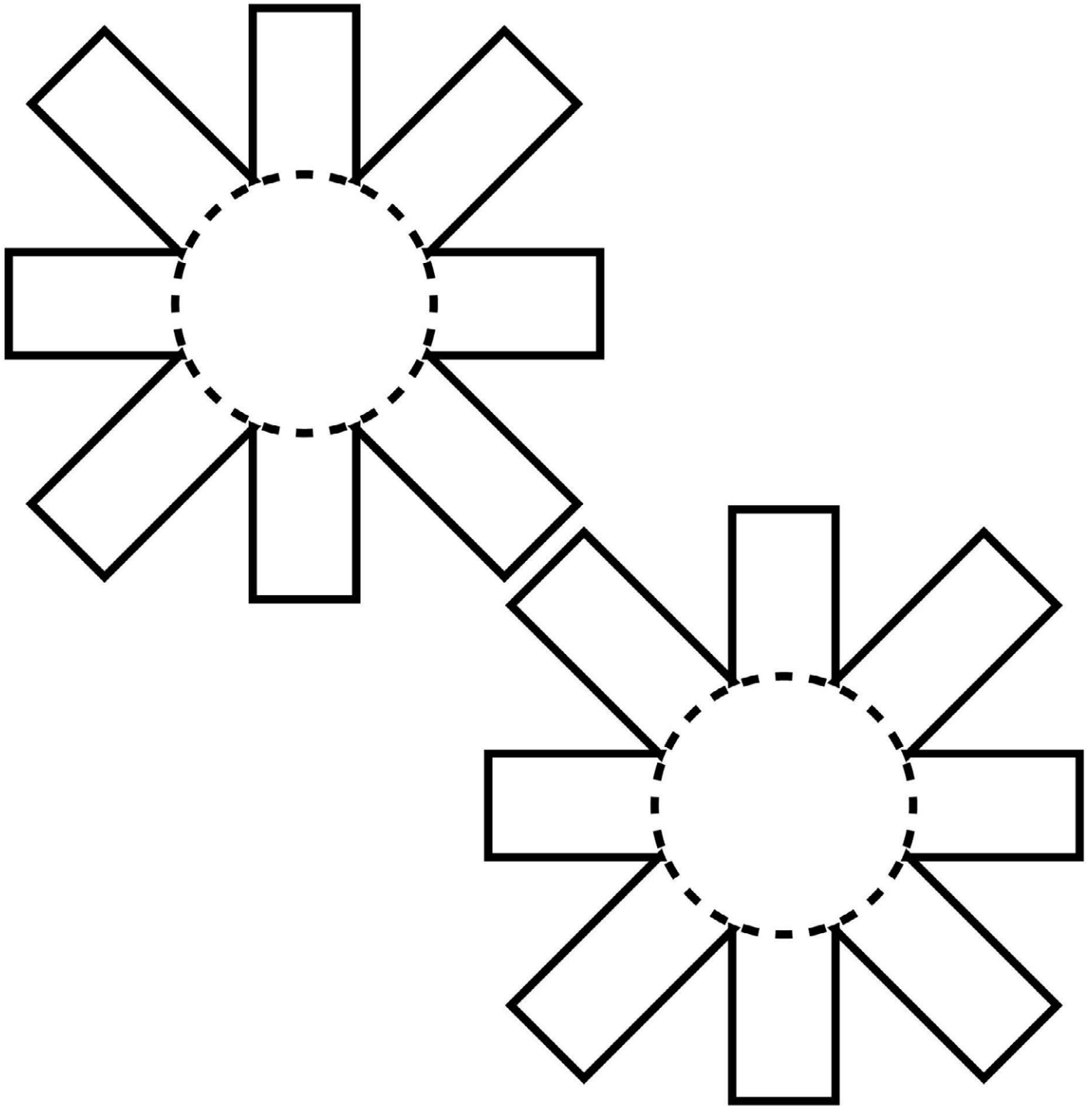
1. **Elimina** cualquier papel sobrante de tu tubo de cartón. Si usas 2 tubos de papel higiénico, pégalos uno encima del otro para hacer un tubo más largo.
2. ¡**Decora** tu palo de lluvia! Colorea directamente sobre el cartón, o corta y pega un pedazo de papel para envolver alrededor de él para un fondo blanco. Piensa en una selva tropical como inspiración. ¿Qué colores verías? ¿Se pueden dibujar algunas líneas o un patrón para representar la lluvia?
3. **Imprima** las plantillas de tapa de tubo en la página 3 y decorarlas como desees.
4. **Corta** las plantillas de tapa de tubo a lo largo de las líneas sólidas. Los círculos serán las cubiertas finales de tu palo de lluvia y las lengüetas te



ayudarán a pegarlos a tu tubo.

5. **Dobla** las lengüetas a lo largo de las líneas punteadas.
6. **Cubre** un extremo del tubo con una tapa de tubo y **pega** las lengüetas al tubo de cartón.
7. **Añada** un pequeño puñado de relleno de tu elección a tu tubo: productos secos como arroz o frijoles o grava del exterior. Lo suficiente para cubrir el círculo en la parte inferior del tubo debería ser suficiente.
8. **Cubre** el otro lado del tubo con la segunda tapa del tubo y pega firmemente las lengüetas.
9. **¡Haz que llueva!** Gira lentamente el tubo boca abajo, luego del lado derecho hacia arriba. ¿Cómo suena? ¿Puedes hacer que tu palo de lluvia suene como una lluvia ligera? ¿Qué tal una tormenta de verano?







# Bromeliad Blanket Fort

Bromeliads are a group of plants whose leaves often grow in a spiral, collecting water at the center. Inside these pools live an abundance of animals—from spiders to salamanders, many species depend on bromeliads for food, water, and shelter. Some tree frogs, like the strawberry poison-dart frog, lay eggs on bromeliad leaves. Once the eggs hatch the frog parents rear their tadpoles in the bromeliad pool. Build your own bromeliad using blankets, pillows, and furniture, and don a frog hat while you relax in the “pool”!

## Materials

Pillows and blankets  
Chairs and other small items of furniture  
Frog hat template (pages 3-4)  
Tape  
Crayons, markers, or colored pencils

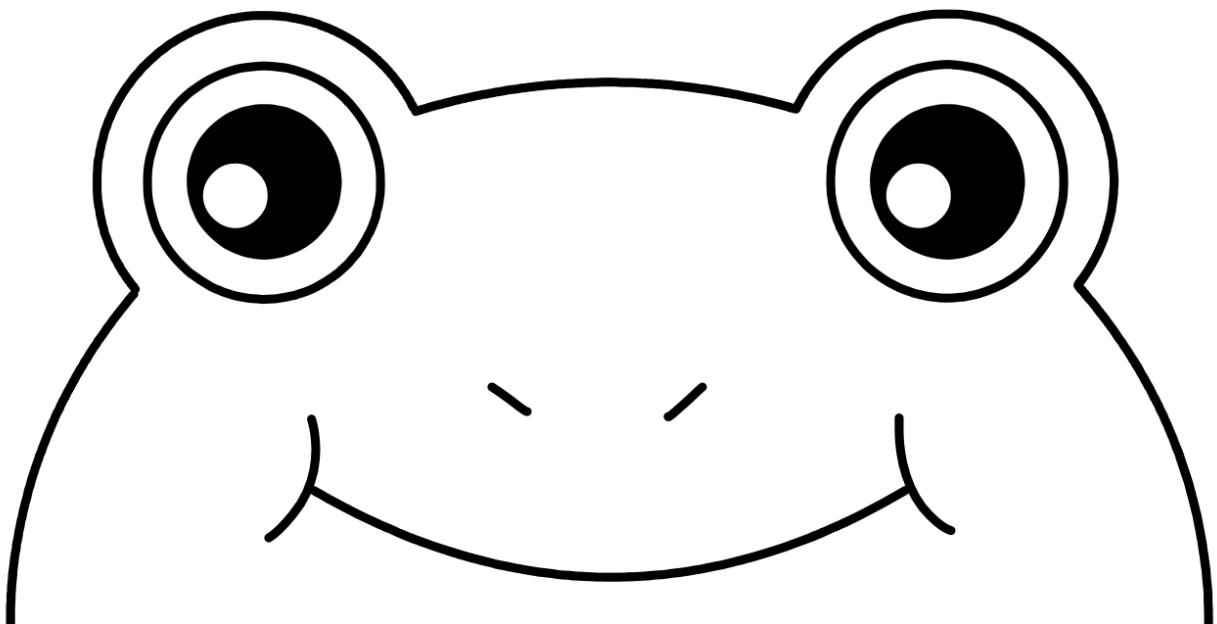
## Directions

1. **Print** and **cut out** the frog hat template pieces on pages 3 and 4.
2. **Color** the frog hat template pieces. Will you be a red strawberry poison-dart frog, a yellow bromeliad frog, or a light green glass frog?
3. **Fold** the front frog legs like an accordion.
4. **Tape** the frog headpiece and front legs to one of the wide bands. **Tape** the back legs to the other band, then **tape** the two bands together to form the hat.

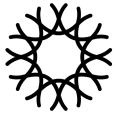


5. **Gather** blankets, pillows, and other soft fabric items. Many bromeliads are green or red: What colors will your bromeliad have?
6. **Make** a circle out of chairs and other small pieces of furniture with the help of an adult. **Drape** the blankets and fabric over the furniture. Make it cozy!
7. *Optional:* **Drape** a blanket across the top of your bromeliad to act as the rainforest canopy.
8. **Relax** inside your bromeliad pool!

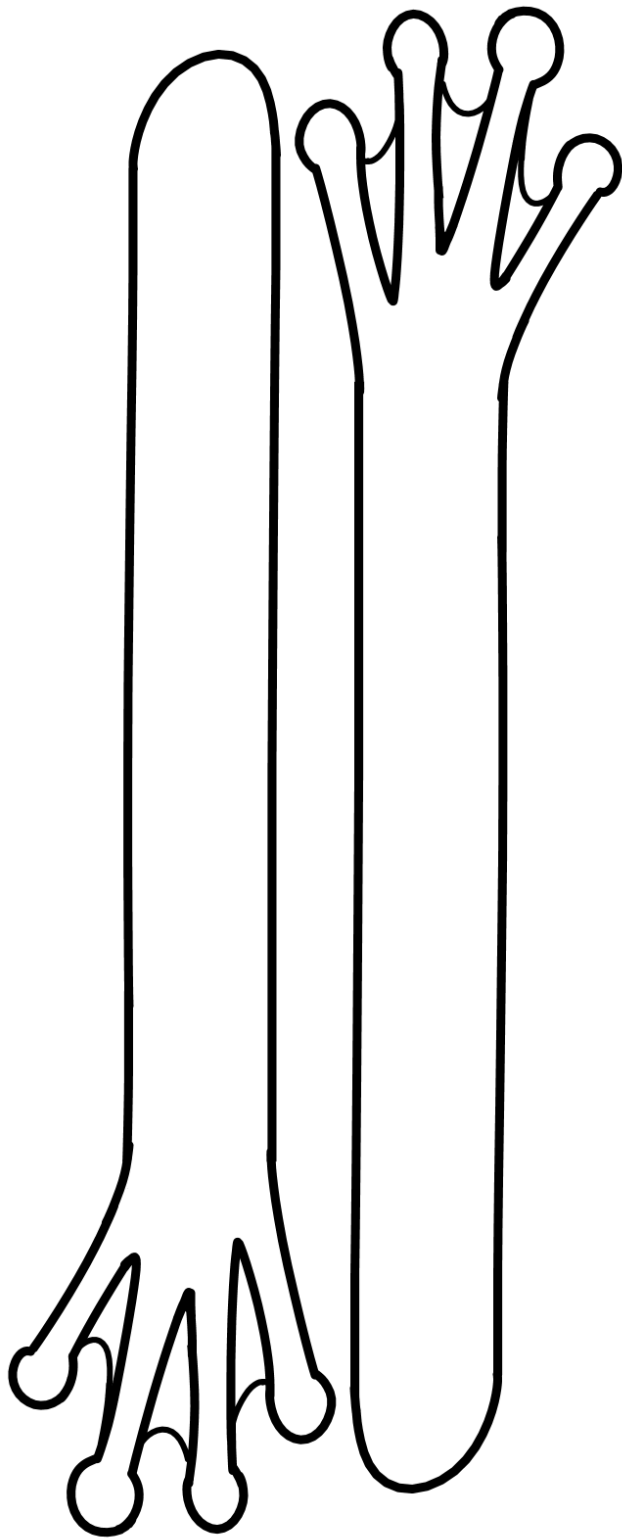


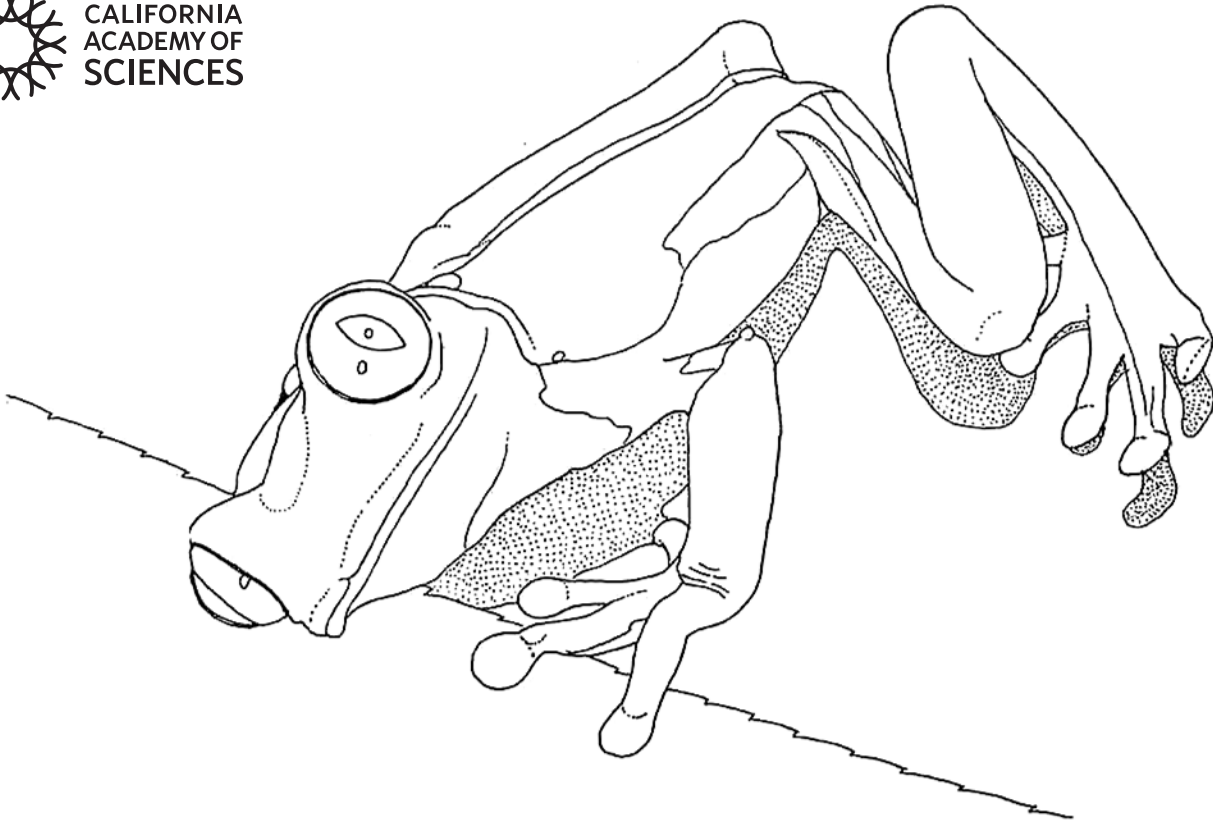






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Don't eat me! Bright colors on a **frog** can tell potential predators that the frog is poisonous.

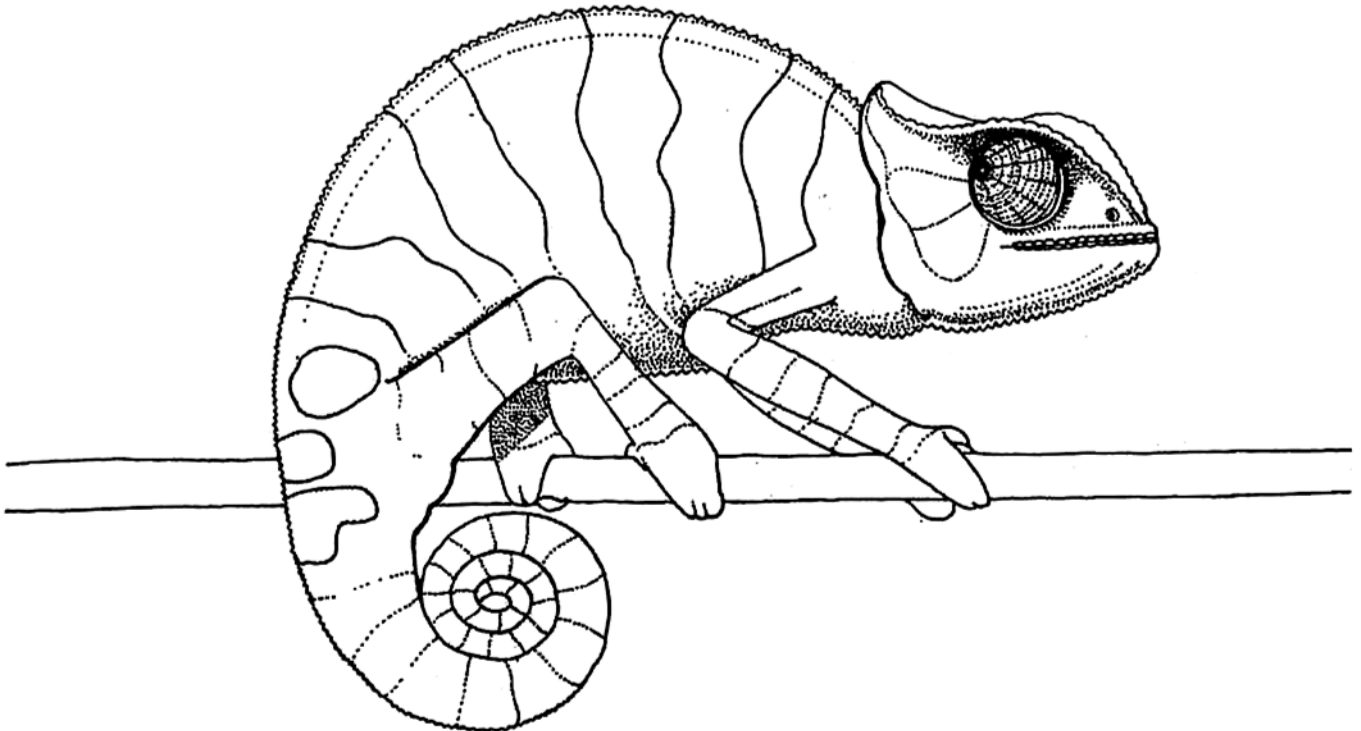
**Snake** scales come in many different colors. Will your snake blend in or stand out?





**Macaw** colors are almost as loud as their squawks!

**Chameleons** can change their color and pattern to react to other chameleons and changing conditions like temperature.





# Handprint Macaws

Blue and gold macaws are colorful, intelligent birds that *pair-bond*. That means macaws choose a mate and usually stay together for most of their lives. That may be a long time since macaws can live for 80 years! They strengthen their bond by *preening*, or straightening and cleaning each other's feathers with their beak, sharing food, and *roosting*, or resting, together. Make your own pair-bonded macaws to share your home!

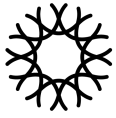
## Materials

Macaw body stencils (next page)  
4 pieces of colored paper or old magazines  
Scissors  
Crayons, markers, or colored pencils

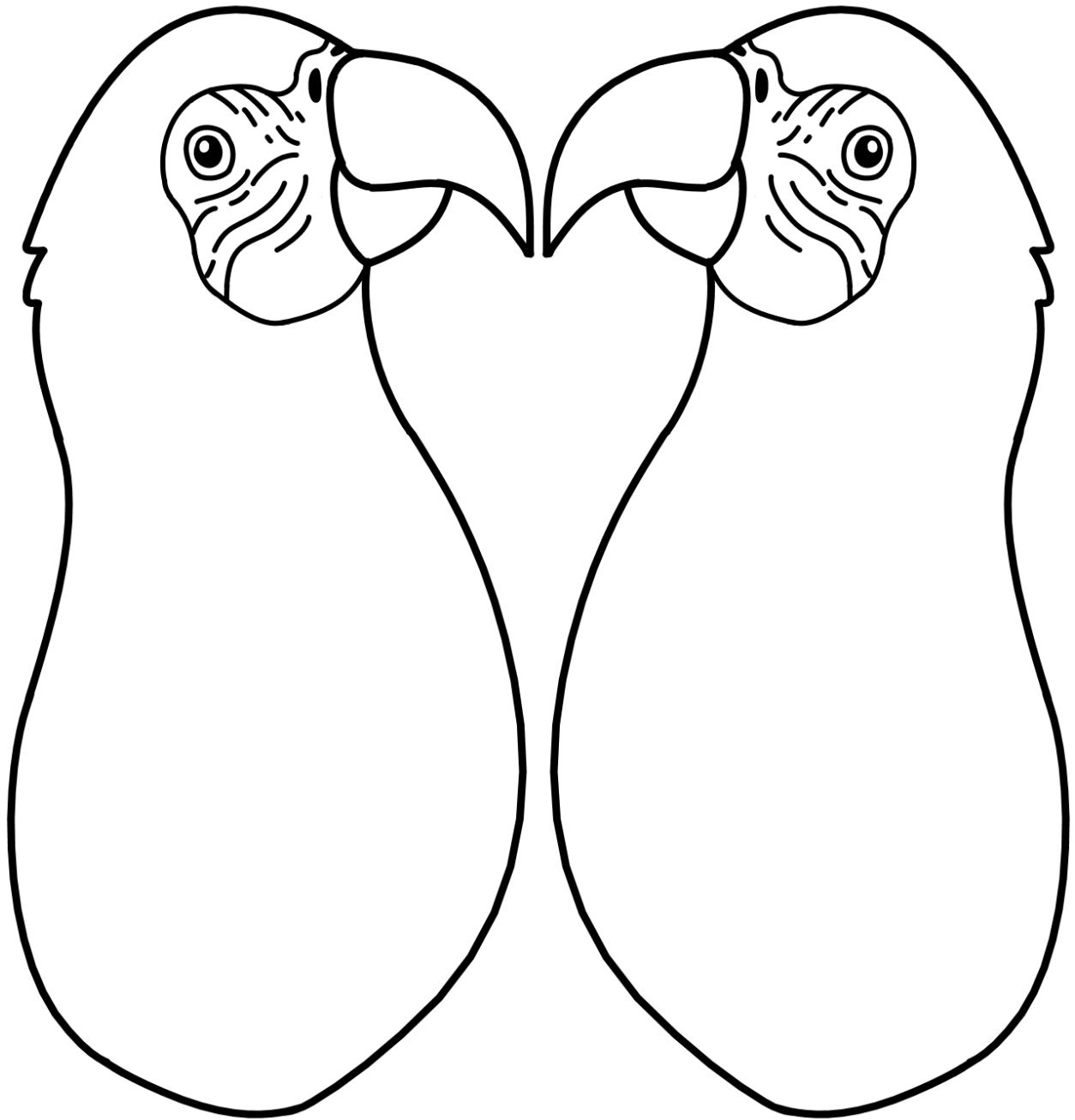
Pencil  
Glue stick or tape  
2 chopsticks or crafting sticks (optional)

## Directions

1. **Print** the macaw body template on white paper.
2. **Color** in your macaws using crayons, markers, or colored pencils. The pair-bonded macaws in Osher Rainforest are blue and gold macaws, but you can use any colors you like!
3. **Cut** out both macaw body templates.
4. **Choose** four pieces of colored paper. You can use any colors you'd like, even old magazines.  
If you want to match the blue and gold macaws, use blue and yellow paper.
5. **Trace** the outline of your hand with a pencil onto the four pieces of colored paper.
6. **Cut** out the four handprints.
7. **Glue** two handprints onto one macaw's body to give it wings and a tail. **Glue** the other two handprints on the second macaw body.
8. *Optional:* **Glue or tape** the craft stick to the back of the macaw.
9. **Fly** your macaws around your home!  
Choose a good spot for them to roost for the night. Where will your pair-bonded macaws live?



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# Huellas de Guacamayo

Los guacamayos azules y dorados son aves coloridas e inteligentes que se unen. Eso significa que los guacamayos eligen una pareja y generalmente permanecen juntos durante la mayor parte de sus vidas. ¡Eso puede ser mucho tiempo ya que las guacamayas pueden vivir por 80 años! Fortalecen su vínculo al preñar, o enderezar y limpiar las plumas del otro con su pico, compartiendo comida, y durmiendo, o descansando, juntos. ¡Haz tu propia pareja de guacamayos unidos!

## Materiales

Plantillas de cuerpo de guacamayo (página 2)  
4 trozos de papel de colores o revistas antiguas  
Tijeras

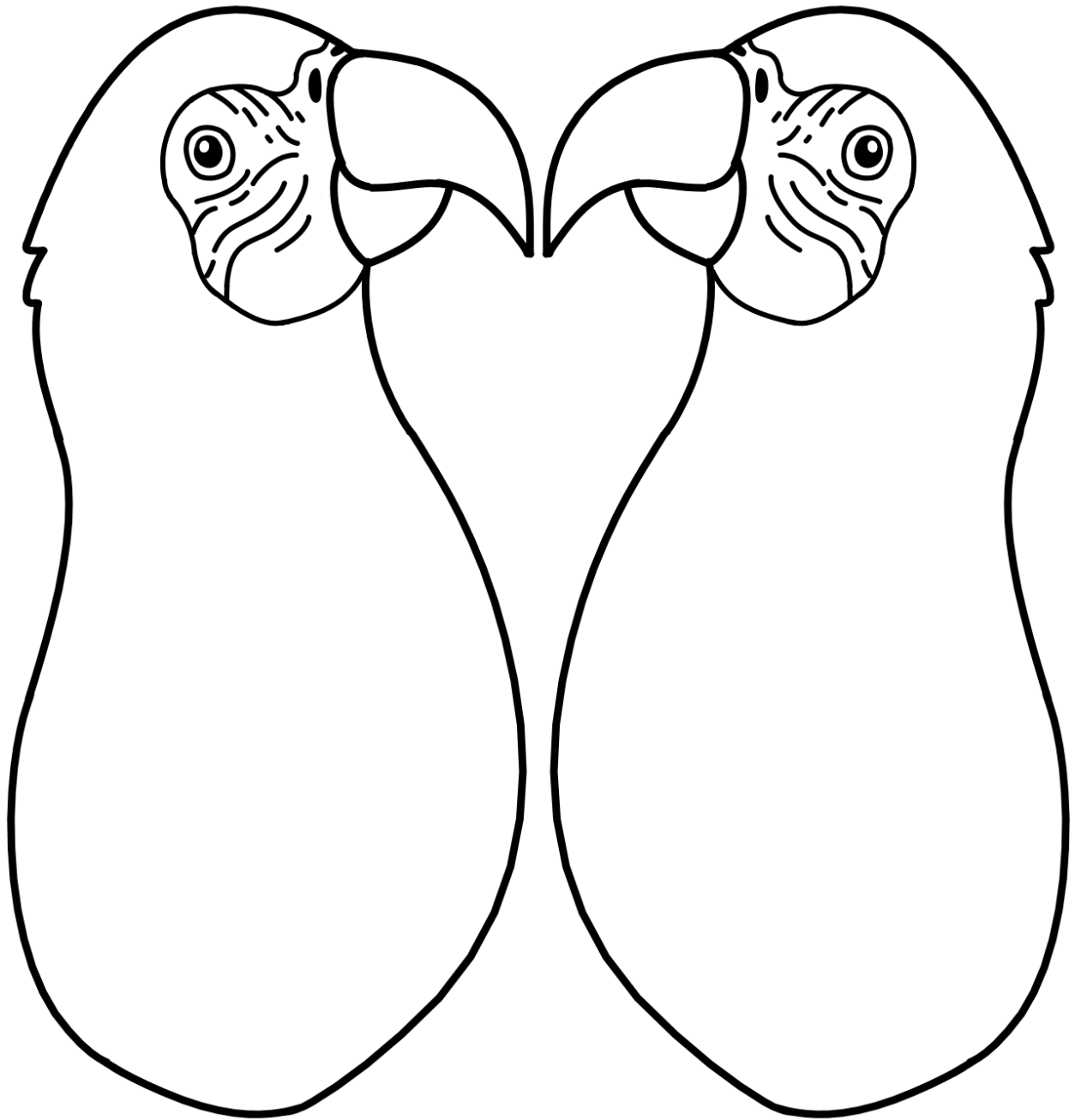
Crayones, marcadores o lápices de colores  
Lápiz  
Pegamento o cinta adhesiva  
2 palillos o palos de artesanía (opcional)

## Instrucciones

1. **Imprime** la plantilla del cuerpo del guacamayo en papel blanco.
  2. **Colorea** tus guacamayos usando crayones, marcadores o lápices de colores. Los guacamayos en Osher Rainforest (la selva tropical en la Academia) son guacamayos azules y dorados, ¡pero puedes usar los colores que quieras!
  3. **Corta** ambas plantillas de cuerpo de guacamayo.
  4. **Elige** cuatro trozos de papel de colores. Puedes usar los colores que quieras, incluso las revistas antiguas. Si deseas que coincida con los guacamayos azules y dorados, utiliza papel azul y amarillo.
1. **Traza** el contorno de tu mano con un lápiz sobre los cuatro pedazos de papel de colores.
  2. **Corta** las cuatro huellas de mano.
  3. **Pega** dos huellas de mano en el cuerpo de un guacamayo para darle alas y una cola. **Pega** las otras dos huellas de mano en el segundo cuerpo de guacamayo.
  3. *Opcional:* **Pega usando pegamento o con cinta** el palo de artesanía en la parte posterior de la guacamaya.
  4. **¡Vuela** tus guacamayos alrededor de tu casa! Elige un buen lugar para que duerman por la noche. ¿Dónde vivirán tus guacamayos?



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# Macaw Feather Investigation

Have you seen the blue-and-yellow macaws that live in the Academy's indoor rainforest? Take a close-up look at their feathers and use your observation skills to sketch your own feather.

## Materials

Pictures of macaw feathers (page 3-4)  
Colored pencils, markers, or crayons  
Piece of paper

## Directions

1. **Print** or look at the images of the feathers on pages 3-4, and **read** the information on feather anatomy on page 2.
2. **Think** about the following five questions as you investigate the pictures. Share your answers with a friend or family member or just think in your head.
  - a. What do you notice about the shape of the feather? Is it similar or different from other feathers you've seen?
  - b. Do you think all of the macaw's feathers are shaped this way? Why or why not?
  - c. How might the anatomy of the macaw's feathers help it stay dry in the rainforest?
  - d. What colors do you see? Why do you think macaws have such brightly colored feathers?
  - e. What else can you guess about the macaw just by looking at its feather?
3. **Use** your coloring materials and a blank piece of paper to sketch your own feathers. Try sketching a wing feather with smooth edges and a downy feather that would keep a bird warm.

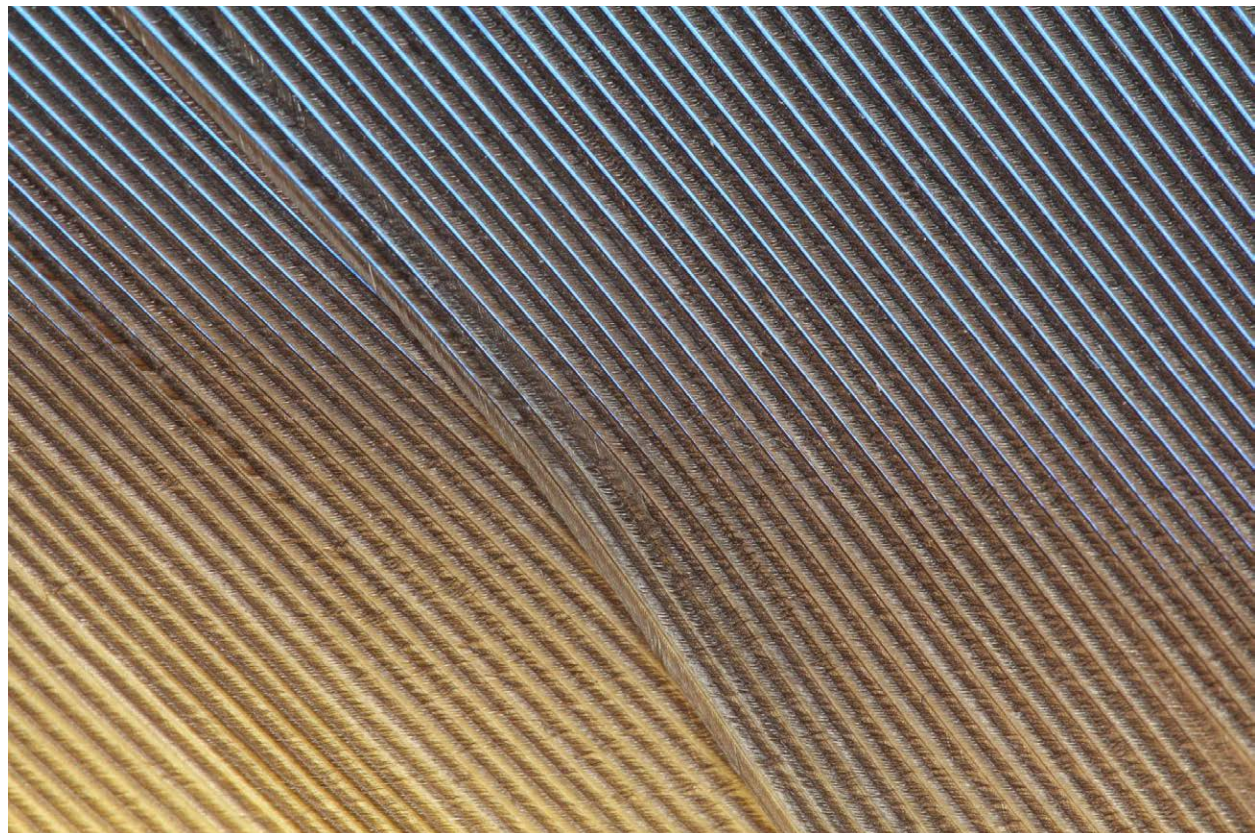


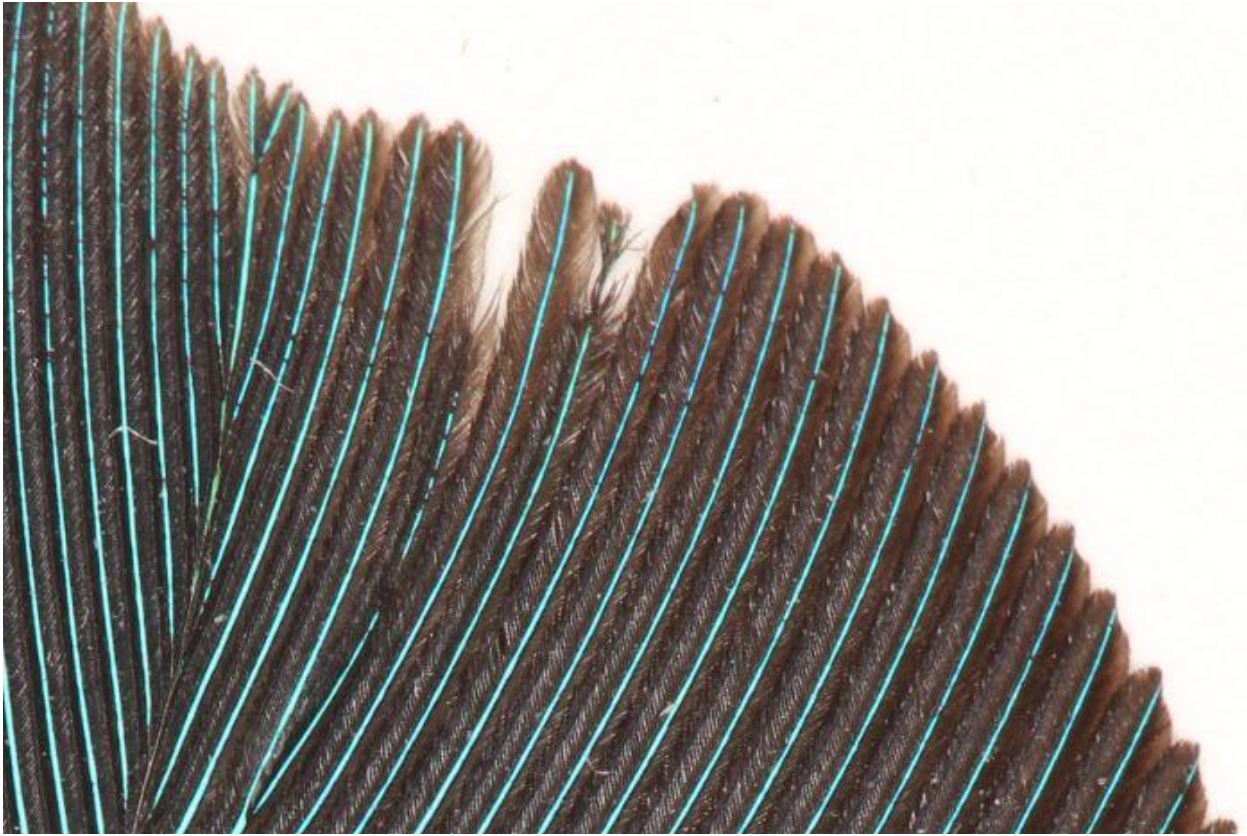
## Feather anatomy

While the feathers that grow on a bird's wing, tail, and body are shaped differently, they all share the same basic anatomy. The center of the feather is called the *rachis*, which branches off into *barbs*. Along the barbs are small *barbules* that interlock with neighboring barbules to provide a smooth, uniform surface. These microscopic hooks form a barrier against wind and water, allowing birds to fly and stay dry. Some feathers are fluffy and lack interlocking barbules; these help insulate the bird and keep them warm.

Do you see the two areas where the barbules have split in the photo below? Birds have a form of grooming called *preening* that helps restore the interlocking structure.



















# Rainforest Scavenger Hunt

Visiting the Academy? Bring along this scavenger hunt and look for the plants and animals pictured below. When you find one, mark it off or poke a hole through it. Good luck and happy exploring!

Canopy			
<p><b>Bird in a tree</b></p> 	<p><b>Hercules beetle</b></p> 	<p><b>Butterfly</b></p> 	<p><b>Purple flower</b></p> 
Understory			
<p><b>Macaw</b></p> 	<p><b>Day gecko</b></p> 	<p><b>Bromeliad</b></p> 	<p><b>Peach palm tree</b></p> 
Forest Floor			
<p><b>Vine</b></p> 	<p><b>Cacao tree</b></p> 	<p><b>Giant millipede</b></p> 	<p><b>Sungei toad</b></p> 

## Questions to consider:

### Canopy

1. If you were a bird in a rainforest canopy, why might you hang out in a tree?
2. What might the hercules beetle do with its horns?
3. Butterflies fly from flower to flower drinking nectar. How could this help the plant?
4. Flowers are special plant leaves that serve a particular purpose. Why do you think flowers are brightly colored?

### Understory

1. Macaws mostly eat fruit that grows wild in the rainforest. How might this help the plants?
2. How might the Madagascar day gecko's green skin help it in its tropical surroundings?
3. Bromeliad leaves form cups that catch rainwater. Animals such as frogs use these "cups" of water. What do you think they use them for?
4. How do you think this palm tree's long stiff spines might help it survive?

### Forest floor

1. Why do you think vines grow around trees in the rainforest?
2. The cacao tree (where chocolate comes from) has flowers and heavy fruit that grow right on its woody trunk. How might having easily seen fruit help a tree reproduce?
3. Millipedes eat decaying leaves and plants on the rainforest floor. How does this help the plants in the rainforest?
4. Why do you think this forest floor creature is dark green-brown colored?