



EXPEDITIONARY
LEARNING

Grade 5: Module 2A: Unit 3: Lesson 6

Conducting Research: Asking and Answering our Questions about Rainforest Arthropods



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Conducting Research:

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Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)

- I can explain what a text says using quotes from the text. (RI.5.1)
- I can determine the main idea(s) of an informational text based on key details. (RI.5.2)
- I can summarize an informational text. (RI.5.2)
- I can build knowledge about multiple aspects of a topic by conducting research. (W.5.7)
- I can use several sources to build my knowledge about a topic. (W.5.7)
- I can document what I learn about a topic by taking notes. (W.5.8)
- I can effectively engage in discussions with diverse partners about fifth-grade topics and texts. (SL.5.1)

Supporting Learning Targets

- I can take notes by recording direct quotes from a text about rainforest insects.
- I can take notes by paraphrasing information from a text about rainforest insects.
- I can use evidence from the text to answer questions.
- I can take notes from different sources about insects in the rainforest.
- I can work cooperatively with my classmates in an expert research group.

Ongoing Assessment

- Students' field journals
- Journals (C/F/Q/R Note-catchers)
- Ant question charts (ant groups)
- Butterfly Life Cycle graphic (butterfly group)



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Agenda	Teaching Notes
<ol style="list-style-type: none"> 1. Opening <ol style="list-style-type: none"> A. Homework Review (10 minutes) B. Introducing Learning Targets (5 minutes) 2. Work Time <ol style="list-style-type: none"> A. Establishing Expert Groups (10 minutes) B. Researching in Expert Groups (30 minutes) 3. Closing and Assessment <ol style="list-style-type: none"> A. Review (5 minutes) <p>Homework</p> 	<ul style="list-style-type: none"> • In this lesson, students formally launch their research in their “expert groups.” The purpose of providing choice is to increase engagement. Students work in small groups on tasks for which the scaffolding is built in to the lesson. However, students still need teacher support to build their literacy skills. For the majority of Work Time, circulate to instruct one group at a time as the other groups work more independently. Review Work Time Part B carefully in advance, to envision the flow of activities. • Please note that 4M2B also includes research on butterflies. The study of butterflies in this module is intentional and spirals in complexity from the research in Grade 4 to build across grade levels. • In advance: Gather a classroom library of books on rainforest insects as additional resources for students. For suggestions, see Unit 3 Recommended Texts list (on EngageNY.org). Add other available titles that seem appropriate. These books are not necessary to do the research, but they may be helpful and of great interest to students. It is imperative that students read a high volume of texts at their independent reading level, in order to continue building content knowledge and vocabulary. See Teaching Note in Unit 3, Lesson 1 for more on this. • In advance: Be sure to assign students to their expert groups: About half of the class should be assigned to a group studying either ants or butterflies. These groups should be about 3-4 students each, however student in the ant expert groups will begin this lesson in a group of approximately 5 for the Jigsaw protocol. These groups of 5 will all reading the same text, “Bullet Ants”, “Army Ants”, or “Leaf Cutter Ants”. After reading the text about their assigned ant, students will then be regrouped into groups of about three with each group having at least one student who has read about each of the different types of ants. Students will then share what they have learned with their new ant group. This group will remain their permanent ant expert group from this lesson on. Students in butterfly expert groups will remain in their assigned group of 3 through out the lesson and in subsequent lessons as well. • Launch expert groups in a way that ensures a positive, collaborative tone in every group. Take the time needed to build and enforce behavior norms. Be sure that students realize that they will need to be able to work independently, since you will be circulating between various groups to assist them. • Create folders for each group with the appropriate number of texts for each group member inside (see supporting materials).



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Agenda (continued)	Teaching Notes
	<ul style="list-style-type: none"> • Seat all the ant groups on one side of the room, and all the students studying butterflies on the other. In Work Time B you will see the group name in CAPS and the following bullet point instructions under it indented until the next group is written in CAPS. This means that all of the indented bullet point instructions are to be applied ONLY to the group name that is in CAPS above them. • Students in the Butterfly group read the transcript of an article called “Rainforest: The Most Precious Environment on Earth.” The full transcript of this article is provided for students. However they also receive a “Stop and Talk” version, in which the article is intentionally chunked with prompts for discussion. Based on the needs of your class, determine whether to have them read the full article first, or whether to simply orient them to the “Stop and Talk” version that is used explicitly in the lesson. • Review: Think-Pair-Share and Jigsaw protocols (Appendix 1).

Lesson Vocabulary	Materials
<p>expert, evidence;</p> <p>Butterfly group: howler (monkeys), venture, flit, camouflage, transparent, startle, scuttles, posterior, imbibing, vital, resounds, expanse, pristine, basking, ousts, massive, distended</p>	<ul style="list-style-type: none"> • <i>The Most Beautiful Roof in the World</i> (book; one to display) • Expert Groups chart (a chart that tells students which groups they are in; new; teacher-created) • Expert Group Folders (one per expert group) containing a task card and the appropriate text for that task card as follows: <ul style="list-style-type: none"> – Butterfly Expert Group Folders: Butterfly Expert Group Task Cards, Butterfly Life Cycle (graphic) and “Rainforest: The Most Precious Environment on Earth” (transcript) (approx. 15, one per Butterfly group member) – Ant Expert Group Folders: Three separate folders with either “Bullet Ants”, “Army Ants”, or “Leafcutter Ants” texts and all folders having the same Ant Expert Group Task Card (approximately 5 copies of a text and the task card per folder) • Chart paper (one sheet per ant expert group) • Features of Informational Text anchor chart (from Unit 1)



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Opening	Meeting Students' Needs
<p>A. Homework Review (10 minutes)</p> <ul style="list-style-type: none"> Return field journals to students and ask them to gather as a class. Ask them to locate their last homework entry. Ask: <ul style="list-style-type: none"> * “Who chose to observe the same spot you wrote about before?” * “Who chose a different spot?” * “Why did you make that decision?” * “What impact did it have on your journal entry?” Ask students to think, then talk with a partner about the questions. Cold call a few students to share out. Look for answers that indicate students understand the pros and cons of keeping a running record of an area and how it changes over time. Ask students to think about whether Meg Lowman returns to the same place in the rainforest, and why she might do that. Read aloud the passage from <i>The Most Beautiful Roof in the World</i> that begins with the last paragraph on page 15 (“Meg begins taking ‘snapshots’ of leaf-eating activity”) and continues through the first paragraph on page 17. Ask: <ul style="list-style-type: none"> * “What did Meg notice when she returned to this same region for many years?” (Answer: <i>A pattern of leaf eating</i>) * “Why did she keep coming back to investigate the same spot?” (Answer: <i>To see if her theory that insects like the newest leaves the best was right</i>) 	<ul style="list-style-type: none"> For students needing additional support producing language, consider offering a sentence frame or starter, or a cloze sentence to assist with language production and provide the structure required. (e.g., “I chose to observe _____. I chose to observe there because _____. It made my journal entry _____ because _____.”) Consider partnering an ELL with a student who speaks the same L1, when discussing journal entries. This can let students have more meaningful discussions and clarify points in their L1.
<p>B. Introducing Learning Targets (5 minutes)</p> <ul style="list-style-type: none"> Remind students of the learning targets covered in the previous lessons—quoting from and paraphrasing text in order to do research, taking notes on information about rainforest insects, and sorting that information into categories. Ask students to think back on what they did, and cold call students to define <i>quotes</i>, <i>paraphrasing</i>, and <i>categories</i>. Read aloud the first two learning targets for this lesson. Explain that they will be building on these skills today to meet these learning targets, using evidence from the text to answer questions, and taking notes from different sources. Read the third learning target. Ask a student to define the word <i>cooperatively</i>. Remind them that today they will begin working on their research in small groups and it will be very important to think about how to work cooperatively. 	<ul style="list-style-type: none"> Provide nonlinguistic symbols (e.g., magnifying glass for <i>details</i>, a light bulb for <i>main idea</i>) to assist struggling readers in making connections with vocabulary. These symbols can be used throughout the year. Specifically, they can be used in directions and learning targets.



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Work Time	Meeting Students' Needs
<p>A. Establishing Expert Groups (10 minutes)</p> <ul style="list-style-type: none">• Tell students that one smart thing researchers do is make sure that they can talk with and learn from other experts who are studying the same or similar topics. Remind students of how Meg Lowman sends research findings and reports to other scientists. Tell students that although they will be doing individual research during this project, they will rely on their expert group through the process.• Give students time to Think-Pair-Share with a partner about ways an expert group could support their research process. Share out. Listen for students to say that others in their expert group can help them understand text, organize their thinking, and add ideas.• Explain that half of the expert groups will continue to focus on ants, and the other half will research butterflies. Announce entomologist expert groups and post an Expert Groups chart of who is in each group. Designate meeting spots for expert groups to gather and store their materials. Explain to students in who will be studying ants, that they will work in two different groups today with their first group reading about the same ant, then with a smaller group where they will share their learning. Explain that this smaller group will be their permanent group (see teaching notes at the beginning of this lesson for guidance on grouping for students studying ants).• Ask students to move to their group spot. Ask them to talk at their tables about how following the Active Listening criteria will help them be successful as a group. Have students assign someone in their group to be their note-taker for the day.	<ul style="list-style-type: none">• Consider partnering an ELL with a student who speaks the same L1, when discussing Expert Groups. This can let students have more meaningful discussions and clarify points in their L1.



Conducting Research:

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Work Time (continued)	Meeting Students' Needs
<p>B. Researching in Expert Groups (30 minutes)</p> <ul style="list-style-type: none"> • Tell students that they will be working with you for half the period and in groups on their own for the other half. • Instruct all students to create a four-column C/F/Q/R Note-catcher, like the one they have been using in the past few lessons, on the next clean sheet of their journals. • While they are creating their Note-catchers, distribute Expert Group folders. • Get ant and butterfly groups each started by reviewing their cards: • BUTTERFLY: Ask students to read through each step on the Butterfly Expert Group task card and think of any questions they may have about their task. Tell students you will answer their questions after you have gotten the ant groups set with their task cards. • ANTS: Explain to the ants groups that each of the groups will be studying a different kind of ant: bullet ants, army ants or leafcutter ants. Ask students to read through each step on their Ant Expert Group task card in their expert group folder. Review the Jigsaw protocol with students. Clarify any directions as necessary. Give each group studying bullet ants, army ants, or leafcutter ants, a separate sheet of chart paper for recording and sharing with the Jigsaw protocol. Briefly review this protocol if necessary. Tell them that if they finish their task card before you are finished with the butterfly groups, they may read other books from the classroom library of ant resources, looking for additional information about the contribution of rainforest insects to record in their C/F/Q/R Note-catchers. • BUTTERFLY: Answer any clarifying questions from students about the task card then invite students to refer to the "Rainforest: The Most Precious Environment on Earth" text in their expert group folders. • Explain that because this text is very difficult, you will first read it aloud to students. Ask them to follow along. Begin with the title, "Rainforest: The Most Precious Environment on Earth. A rainforest experience, narrated by Adrian Hoskins." After the first three sentences, pause and ask: <ul style="list-style-type: none"> * "What kind of informational text do you think this is?" 	<ul style="list-style-type: none"> • Consider including texts for expert groups that reflect a range of text complexity so that all students can independently access the print materials. • Provide ELLs bilingual word-for-word translation dictionaries or online translation sources such as Google Translate to assist with comprehension. ELLs should be familiar with how to use glossaries or dictionaries. • When possible, provide text or materials for research found in students' L1. This can help students understand materials presented in English.



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Work Time (continued)	Meeting Students' Needs
<ul style="list-style-type: none">• Confirm that this is a field journal, and ask students to refer to the Features of Informational Text anchor chart to remind themselves of what this text might include (direct observations by the author, factual scientific information, precise descriptions, personal information, pictures and text, in the first person).• Continue reading through the end of the first paragraph. Explain: "The strange sounding words in green are the scientific Latin names of certain butterflies, and we do not need to know exactly how to pronounce them in order to understand the passage."• Ensure that students understand the key vocabulary in the paragraph—<i>howler</i> (monkeys), <i>venture</i>, <i>flit</i>, <i>camouflage</i>, <i>transparent</i>, <i>startle</i>—by asking students to supply the meaning through the context one at a time.• Continue reading aloud the remainder of the article, pausing at the end of each paragraph to discuss vocabulary.<ul style="list-style-type: none">* Paragraph 2: scuttles, posterior* Paragraph 3: imbibing, vital* Paragraphs 4 and 5: resounds* Paragraph 6: expanse, pristine* Paragraph 7: basking, ousts* Paragraph 8: massive, distended• When you have finished this first read aloud, tell the students that they are now going to work together as expert groups to reread the article. Invite students to read the task card: "Rainforest: The Most Precious Environment on Earth," in their expert group folder. Clarify instructions as necessary.• ANTS: After approximately 8–10 minutes, return to the ant groups. If they are not yet done with their reading and gist statements, circulate to monitor and support their work. When they finish, have them display their posters on their tables.• Regroup the students into new groups, ensuring that at least one student from each ant expert group (bullet, army, leafcutter) is represented in the new groups. Place one group at each poster, and ask the person who is from the expert group that created the poster to explain the gist to the other students, as well as the details that they have captured in their C/F/Q/R Note-catcher. Every 3 minutes, ask students to circulate so that every group goes to every table.	<ul style="list-style-type: none">• Consider providing smaller chunks of text for research (sometimes just a few sentences) for some students. Teachers can check in on students' thinking as they write or speak about their text.• Consider writing and breaking down multistep directions for research into numbered elements for each group's tasks. Students can return to these guidelines to make sure they are on track.



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Closing and Assessment	Meeting Students' Needs
<p>A. Review (5 minutes)</p> <ul style="list-style-type: none">• Gather the whole class together. Remind students of the learning targets.• Pair students so an ant expert is matched with a butterfly expert. Ask students to share the following with their partner:<ol style="list-style-type: none">1. One interesting fact you learned about your rainforest insect today.2. How well your expert group did in meeting the learning target of working cooperatively together.• If time permits, have a few students share out their interesting facts with the whole class.	<ul style="list-style-type: none">• For students needing additional support producing language, consider offering a sentence frame, sentence starter, or a cloze sentence to assist with language production and provide the structure required. (e.g., “One interesting fact I learned today was _____. My group met _____ learning target because _____.”)
Homework	Meeting Students' Needs
<ul style="list-style-type: none">• Choose one of the texts you read in class today and reread it to someone (or yourself) at home. Share one new thing you learned about either ants or butterflies of the rainforest.• Use your field journal to record notes from nature, either by going outside, looking out your window or from <i>The Most Beautiful Roof in the World</i>. You may want to return to the spot where you recorded your first homework notes, or choose a new focus for your observations	<ul style="list-style-type: none">•



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Supporting Materials



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PART I:

Prepare to participate with other groups in a Jigsaw discussion (using the **Jigsaw protocol**) about the information you learn about your ant.

Read the article about your ant, independently. Use the following process as you read:

- A. Stop at the end of each paragraph.
- B. Think about the main idea of each paragraph.
- C. Circle words that helped you understand the main idea (scientific and academic).
- D. Try to figure out the meaning of key words from context or by breaking them apart into known words.

PART II:

After you have finished reading independently, talk with your group members about:

- A. The main idea of the article, and
- B. The meaning of *key words*.

Work with your expert group members to:

- A. Choose five key words from the reading that help convey the gist of the article.
- B. Assign one member of your group to record the five key words at the top of your chart paper.
- C. Discuss the five key words, and then write a draft of your gist statement on lined paper.
- D. Refine and finalize the *gist statement*, and then have one member of your group write the statement on your chart paper.

PART III:

Record new information you learned about your ant into your C/F/Q/R Note-catcher.
Add one *academic word* and one *scientific word* to your glossary.



Ant Expert Group:
“Bullet Ants”

The sting of a bullet ant feels like being shot by a bullet. The sting is extremely painful. They are also called “24-hour ants” because that is how long the pain from their sting can last. According to the book *Discover the Amazon*, by Lauri Berkenkamp, “Some native Amazonian tribes use the bullet ant as part of a ceremony welcoming young men into adulthood. For example, members of the Satere-Mawe tribe of Brazil put dozens of bullet ants into a woven glove. The boys put on the glove and see how long they can stand to have their hands in it. The longer they keep the glove on, the more they prove their manhood.” (page 23)

Even though bullet ants can cause a lot of pain, they aren’t really aggressive. They only use their stingers to help them gather food, or when their nests are attacked. Just before they sting, they make a noise, “Eep, eep, eep,” and they give off a musky smell. That’s your cue to run!

Bullet ants can grow to be as much as one inch long. They are the largest ants in the Amazon, and one of the most common. They resemble large, wingless wasps.

Bullet ants usually build their nests in and around the big roots of trees, and sometimes in holes in trees.



Ant Expert Group:
“Army Ants”

Here come the army ants. If you are an insect, look out! Thousands of ants may be in the column of raiders that is advancing through the rainforest, pinning down and cutting up every small creature that cannot get away. The swarm changes shape as it advances, but it may fan out as it moves until it is as wide as 100 feet at the front. In the 1930s work done at the Smithsonian Tropical Research Institute pioneered the study of army ant ecology and behavior.

Army ants don't spend all their time on raids like this. They move through the forest on about a 35-day cycle. They will stay in one place for almost three weeks, sweeping out the area around the always-temporary nest. Eggs are laid during this time. After these eggs hatch, producing larvae, the raids begin—to feed the hungry young.

These raids may last a couple of weeks. When the ants are on a raid, the column advances by during the day. At night, the ants again create their temporary nest called a bivouac. To build the nest the ants hook their claws together so their bodies form a living shield. Inside, the larvae and queen are kept safe. The army ants spend each night that way and then in the morning they move on. Once the larvae change into nonfeeding pupae, the cycle begins again.

This is how army ants make sure that they can successfully raise their young. However, as is typical in rainforests, the lives of other species are connected with those of the ants.

For example, certain kinds of beetles, wasps, and millipedes imitate the smell of the army ants. Ants don't see well. They communicate with each other mostly by smell. So when these other insects imitate the army ant smell, the ants think these strangers are part of the swarm and do not attack them. That way these other insects can safely do the eating without being army ant prey.

The best known camp followers are the antbirds. Sometimes as many as ten different kinds will follow a column of army ants, flying along the front of it. These birds do not eat the ants, but feed on insects the ants have caught and on insects that are trying to escape from the ants. Some are professional ant followers, highly dependent on swarms and seldom found away from them.

The chain of connection goes even further. There are butterflies that flutter around army ant columns. What they are interested in is the antbirds' droppings.

Even rainforest people have found ways to use the army ants, some of which have huge pincher-like jaws. These jaws are so big and strong that Indians in South American rainforests sometimes use them to clamp wounds shut, the way our doctors use stitches. (The ant is killed after it has bitten the wound closed.)

Source: Smithsonian Tropical Rainforest Institute. Non-commercial, educational use permitted. See original article at:
http://www.stri.si.edu/sites/rainforest/Army_ants.html

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Ant Expert Group:
“Leafcutter Ants”

These little ants do a lot of big work in the rainforest. You will usually see worker ants following each other single file into and out of their underground nests. Worker ants carry pieces of leaves along well built trails into the nest. A smaller pilot “hitchhiker” ant usually protects the leaf and the worker ant from pesky parasites (wasps, phorid fly). Without the protection from this tiny ant the entire colony could be destroyed due to infestation from parasite eggs. The worker ant carries the leaves to smaller workers, which chew the leaf into smaller pieces, making it all sticky. The sticky leaf mass is then added to the fungus garden that the ant colony eats. The ant needs to defecate (poop) on the leaves in order for the fungus to grow. All of the ants work to take care of the fungus garden, growing fungus just like we grow food. They have help from a bacterium that grows right on their bodies. The bacterium protects the garden from disease. These ants are very sensitive about the needs of their gardens and “talk” to them with chemical signals. They are very important to the rainforest ecosystem.

Source: <https://www.msu.edu/user/urquhart/rainforest/Content/Army-Ants.html#LC>. The Virtual Rainforest by Gerald Urquhart Copyright Gerald R. Urquhart, Michigan State University. Students and teachers have permission to quote text and use images from this website in class assignments. Images may be used in classroom and academic presentations with notification of author. All other use should request permission.



Butterfly Expert Group:
Task Card

Complete the following task AFTER the teacher reads aloud “Rainforest: The Most Precious Environment on Earth” to your group.

Work with your expert group members to:

- Reread the article one section at a time, stopping at the points in the text indicated below.
- Talk about the main idea of each section of text.
- Write a note in your C/F/Q/R Note-catcher, for each section of text.

1. Reread the first paragraph of the article, which begins with “It is 6:00 a.m...” and ends with “...a chance to escape.”

STOP AND TALK:

What is the main idea of this paragraph?

What have you learned about the way some butterflies defend themselves against enemies?

On your C/F/Q/R Note-catcher, record your note in the “FACTS” column. Then in the “CATEGORY” column, write which category this fact belongs in.

2. Reread the second paragraph of the article, which begins with “Every butterfly species...” and ends with “...beneath another nearby leaf.”

STOP, TALK, and WRITE:

What is the main idea of this paragraph?

What new information have you learned about the way some butterflies defend themselves against enemies? Record your note in your C/F/Q/R Note-catcher, and text code it for the category it belongs in.

Butterfly Expert Group:
Task Card (continued)

3. Reread the third paragraph of the article, which begins with “We come to a small glade...” and ends with “...shimmering blue spots.”

STOP, TALK, AND WRITE:

What is the main idea of this paragraph?

What new information have you learned about what some butterflies eat?

On your C/F/Q/R Note-catcher, record your note in the “FACTS” column. Then in the “CATEGORY” column, write which category this fact belongs in.

4. Reference the fourth and fifth paragraphs of the article, which begins with “11:00 a.a....” and ends with “...and praying mantises.”

STOP AND TALK:

How do you think the author is feeling? What words in the text support your opinion?

5. Reference the sixth paragraph of the article, which begins with “A little later...” and ends with “...barely find time to eat.”

STOP, TALK, AND WRITE:

Describe where the author goes in this paragraph.

What new information have you learned about where some butterflies live?

On your C/F/Q/R Note-catcher, record your note in the “FACTS” column. Then in the “CATEGORY” column, write which category this fact belongs in.

Butterfly Expert Group:
Task Card

6. Reference the seventh paragraph of the article, which begins with “In the afternoon we...” and ends with “...ousts every other species.”

STOP, TALK, AND WRITE:

What animals other than butterflies does the author write about in this paragraph?

What new information have you learned about what some butterflies do?

On your C/F/Q/R Note-catcher, record your note in the “FACTS” column. Then in the “CATEGORY” column, write which category this fact belongs in.

7. Reference the eighth and ninth paragraphs of the article, which begins with “We stop at various places...” and ends with “...wonderful place on Earth.”

STOP AND TALK:

What kind of animal is an anaconda? How do you know from the text what kind of animal it is?



Butterfly Expert Group:

“Rainforest: The Most Precious Environment on Earth”

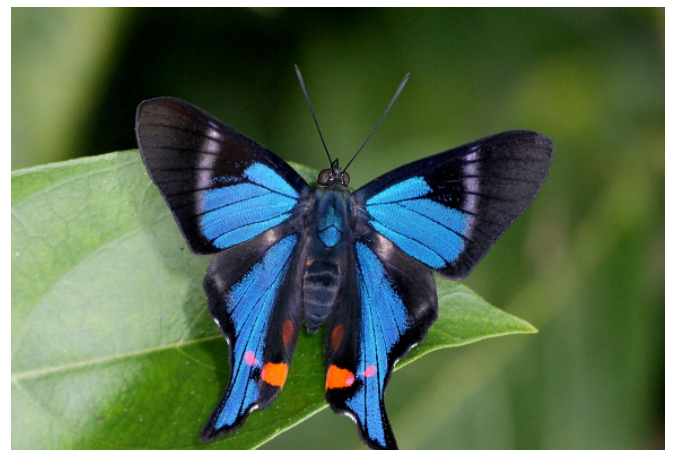
It is 6.00am, and we are awoken by the raucous echoing call of a troop of howler monkeys. They are perhaps 2 km away, but the sound fills the forest around us. Dawn is breaking as we venture along a trail through the primary rainforest. Mysterious butterflies flit around us. I spot where they have settled, but their amazing camouflage makes them almost impossible to locate. Some, like *Taygetis angulosa* look exactly like dead leaves. Others like *Haetera piera*, *Cithaerias pireta* and *Ithomia agnosia* are almost entirely transparent. Enormous *Caligo Owl* butterflies flit from one tree trunk to another. Their wings have a feathery appearance and are marked with false 'owl eyes', enough to startle any predatory bird and give the butterfly a chance to escape.



Amazon rainforest, Brazil

Every butterfly species here has its own distinct personality. The zebra-striped *Colobura dirce* sits motionless on tree trunks as it feeds at sap runs, but if disturbed, instead of taking flight it scuttles around to hide on the opposite side of the tree. The striped hairstreak *Arawacus separata* sits facing sideways on a leaf, but as soon as you get within a metre, it rotates to show you its posterior! Like many other butterflies it seems to take delight in taunting human observers, but its odd behaviour is simply a survival strategy - by rotating it narrows its profile and is much harder for a predator to spot. Butterflies use many strategies to hide themselves from predators, some use camouflage or disguise, others such as the *Eurybia Riodinids*, and the *Nascus* skippers, hide under leaves, darting out periodically to investigate intruders before disappearing again beneath another nearby leaf.

We come to a small glade, the site of a peccary mud wallow. Hundreds of butterflies are swarming around us - gorgeous black and yellow swallowtails, brilliant red and black *Callicores*, bright orange *Julias*, and *Morphos* - dazzling metallic blue butterflies the size of saucers. The muddy ground in the glade is carpeted with butterflies, which settle at our feet to imbibe at the mineral-rich mud. Male butterflies obtain vital chemicals this way, and pass them to females during copulation. There are myriads of butterflies here, and it's impossible to walk without treading on them.



Rhetus periander, Peru © Adrian Hoskins



Butterfly Expert Group:

“Rainforest: The Most Precious Environment on Earth”

Amongst them are glittering green Caria Metalmarks, red Marpesia Daggerwings and the stunning Blue Doctor Rhetus periander. At the edge of the glade we watch a Starry Night Hamadryas velutina basking head-downwards on a tree trunk. It is possibly the most beautiful butterfly we have seen today, with large velvety black wings adorned with hundreds of shimmering blue spots.

11.00am - It is hot now, and the forest resounds with the call of giant cicadas. The sound begins as a slow hesitant clicking, gradually accelerates to a rattle, then a hum, and escalates into a haunting siren wail which fills the air for a few moments before fading again into silence.

We have been here for 6 days, and seen almost 300 butterfly species, several of them previously unknown to science. Every step along the trails reveals exciting new finds - huge helicopter flies, strange hemipteran bugs, weird beetles, stick insects, and praying mantises.

A little later we climb the canopy tower. As we ascend we notice that every layer in the forest has its own characteristic butterfly fauna - Pierella Lady Slippers and Taygetis Dead-leaves at ground level, Tiger-mimics at about 3 metres, Heliconius at 10-20 metres. Many species, particularly the hairstreaks and metalmarks spend their lives almost entirely in the tree tops, and rarely descend to ground level. After a tiring climb we finally arrive at the top of the tower. We spend a relaxing half hour watching red and green macaws, great egrets, snail kites and oropendolas flying past. It is difficult to drag ourselves away, as the view across the vast expanse of pristine rainforest is awe-inspiring, but it is time for lunch, so we descend to ground level and slowly wander back along the trails to our base. We are so distracted by the myriads of butterflies seen along the route that we arrive late, and are so busy talking about the marvels we have seen that we barely find time to eat.

In the afternoon we travel upriver by dugout canoe. Amazon kingfishers swoop past, a harpy eagle hovers high in the sky above us. On a nearby rocky island we see a caiman basking, and along the riverbanks we see sun bitterns and the beautiful capped heron. Strings of bright yellow Eurema and Phoebis butterflies fly in follow-the-leader fashion along the river's edge. Hundreds gather to imbibe moisture on the sandbanks, erupting into flight as our boat passes.



Phoebis argante and Rhabdodryas trite swarming on an Amazonian tributary © Adrian Hoskins



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We notice how most butterflies congregate with others of their own species - there are clusters of *Marpesia Daggerwings*, groups of *Heracides Swallowtails*, tightly packed clusters of *Protesilaus Swordtails*, and gatherings of bright orange *Julias*. Many different species arrive and depart throughout the day until late afternoon when a swirling swarm of migrating *Eunica Purplewings* ousts every other species.

We stop at various places along the river to explore the trails. Imaginary snakes wait to strike from behind every tree. But they are not all imaginary. Clambering up a riverbank we suddenly find ourselves confronted by an enormous anaconda with a massive head and a body 8 metres in length! Luckily for us it has already eaten - its belly greatly distended by the capybara which became its breakfast!

As the day cools down, we journey back along the river. Beautiful birds fly across our path - green ibis, ringed kingfisher, striated heron, kiskadee, paradise jacamar. A giant river otter inquisitively pops its head out of the water next to the boat. A capybara, looking like an enormous guinea pig, looks across at us from the riverbank. During the next half hour we see a dozen tapirs, amongst the most enchanting and gentle of all animals, emerging from the forest at different spots along the riverbank. Back at our base the light is fading fast, and the howler monkeys roar again. We sit down for our evening meal, comparing notes about the wonders we have seen, and agree that this is probably the most wonderful place on Earth.

The next morning we travel downstream for an hour, disembark from our dugout, and get into a jeep. We leave behind the beautiful pristine rainforest, travelling through secondary forest and then for several miles through cattle pastures, until we come to the town where we catch a plane to our next destination. For 4 hours we fly across what was formerly rainforest, but all we see is a huge expanse of semi-desert. The forest has all been burnt down and turned into cattle pasture, but the pasture only lasts for a few years, and all that remains now is a barren dusty landscape dotted with termite mounds. Looking down from our plane we see a dead parched world, devoid of life.



Rio Madre de Dios, Peru © Adrian Hoskins



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We have been told that our next destination is an oasis - an 'island' of pristine rainforest that has miraculously survived amidst a desert of failed cattle ranches in the state of Rondonia. Our plane lands and we board a bus. For the next 5 hours we are driven across 200 miles of devastated land. The forest has gone, the cattle ranches have failed, and the air is hot, dry and dusty. By the time we arrive at our base we have a feeling of the most intense grief. Many of us, all grown men, are in a state of stunned silence. We have left the most wonderful and precious environment

imaginable, and now realise the full horror of what is happening in Brazil. The foul air around us is thick with smoke, our eyes are watering, and we are struggling to breathe.

The spot where we are now standing was once the richest butterfly site known on Earth. Just 30 years ago it supported over 1500 butterfly species, but now they are very scarce. Within 5 years they will almost certainly be lost forever. For 4 days we search the tiny fragment of forest that still remains here, looking in vain for butterflies, muttering in disbelief at what has happened here. The incredibly rich forest, teeming with life, has been devastated, the life is gone.

Please help to save rainforests, by signing on-line petitions and lobbying politicians.



Fires raging uncontrolled in Rondonia, Brazil



Aerial view of fires burning in the southern Amazon

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