EXPEDITIONARY LEARNING

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

Structuring The Search: Categorizing Our Research

Structuring The Search:
Categorizing Our Research

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can locate an answer or solve a problem efficiently, drawing from multiple informational sources. (RI.5.7) I can document what I learn about a topic by taking notes. (W.5.8) I can summarize or paraphrase information in my notes and in finished work. (W.5.8)	
Supporting Learning Targets	**Ongoing Assessment**
• I can sort information about rainforest insects into categories. • 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.	• Students' field journals • Exit ticket

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Agenda	Teaching Notes
1. Opening A. Homework Review (5 minutes) 2. Work Time A. Creating Categories for Information: A Researcher's Version of 20 Questions (10 minutes) B. Sorting Information into Categories (10 minutes) C. Vocabulary and Research Time (25 minutes) 3. Closing and Assessment A. Review Learning Targets (5 minutes) B. Introducing Research Expert Groups (5 minutes) 4. Homework	• This lesson introduces the research component of this module. Note that in this lesson, all students research ants together. In future lessons, students will get to choose whether to continue studying ants or to build expertise about butterflies. • In this lesson, students begin to create categories for their own research by first playing a version of 20 Questions. This helps them realize the types of questions researchers ask in order to help them gather information about what they are researching. They are guided to generate the categories that will drive their research about rainforest insects. • During Part A of Work Time, a new anchor chart is created during the 20 Question game (i.e., a different chart from the Ant Research C/F/Q/R Note-catcher created during Lesson 4). The purpose of the new chart is to help students see the connection between the questions they ask and the categories for research. Students then return to the Lesson 4 Ant Research C/F/Q/R Note-catcher during Part B of Work Time, in order to complete the CATEGORY column. • During Part B of Work Time, students are introduced to the term arthropods. Students should know that spiders are not insects because they have two, not three, main body parts. Both are part of the family of animals called arthropods, but spiders are in the class called arachnids. • In advance: * If students don't have access to the Internet, print out articles on designated websites. * Review: Fist to Five strategy (Appendix). * Cut up Facts about Arthropods (in supporting materials). * Create a new anchor chart titled Categories for Research on Rainforest Insects (see model in supporting materials). * Make signs for each text code category to hang around the room for the fact sorting activity. * Consider writing the list of vocabulary words used in Part C of Work Time in advance on the board or on chart paper.

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Lesson Vocabulary	Materials
categories, categorize; unique, capabilities, prevalent, termites, arthropods, abdomen, thorax, enthusiastically, typically, defy, ensure, function, typically, communicate, cooperate, promising, extensively, fiber, seize	• Categories for Research on Rainforest Insects anchor chart (new; teacher-created; see supporting materials) • Ant Research C/F/Q/R Note-catcher (from Lesson 4; in students' journals) • Facts about Arthropods (cut into strips) • Facts about Arthropods Sorted into Categories (one per student) • "Ants" text (one per student)

Opening	Meeting Students' Needs
A. Homework Review (5 minutes) • Ask students to take out their field journals and exchange them with a partner. Give the students a minute to look at the last entry of their partner's journal. Ask them to focus on how well the writer used precise descriptive language or sensory details. • Remind students that giving feedback helps everyone learn. Ask students to take a minute each to give feedback that is kind, specific, and useful. Remind students to give one each: – Compliment – Question – Suggestion • After students have given and received feedback, collect all field journals to review as an ongoing assessment.	• 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.

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Work Time	Meeting Students' Needs
A. Creating Categories for Information: A Researcher's Version of 20 Questions (10 minutes) • Read aloud the learning target: "I can sort information about rainforest insects into categories." Display the new anchor chart: **Categories for Research on Rainforest Insects** (see supporting materials for model). • Tell the class that they will gathering a lot of information in the next few days to help them answer the focusing question: "How do [ants or butterflies] contribute to the rainforest ecosystem?" As they do their research, the information they find will need to be organized. One way to do this is to group facts into *categories* that capture the essential characteristics of their insects. Remind them that they left the CATEGORIES column of their four-column chart from the last lesson (Lesson 4) blank. They will go back and fill that column in later today. But first they are going to think a little bit more about what it means to *categorize* information. • Tell the class: "In order to think of these categories we're going to play a game that's like 20 Questions. In that game you ask yes/no questions to try to guess what someone is thinking of. But in our version, you won't just ask yes/no questions. You get to ask big questions that need more than a yes/no answer. You can ask any question that will give you important information so that you can quickly guess the animal I'm thinking of in as few questions as possible." Tell them they will practice together. • Play the game using a squirrel as your answer. Give the students a first question as an example: "Where does this animal live?" Record the question in the left-hand column of the Categories for Research on Rainforest Insects anchor chart. Tell students that the scientific word for where an animal lives is *habitat*, and write the word in the right-hand column next to the question. • Continue playing the game. In the left-hand column of the anchor chart, record students QUESTIONS. In the right-hand column, record the SCIENTIFIC TERM for the type of question students ask. Listen for the following types of questions; add any that the students do not generate: * "What do these animals look like?" (scientific synonym = physical characteristics) * "What do they eat?" (food source) * "Who/What are their enemies?" (predators) * "How do they have babies?" (life cycle) * "How do they defend themselves against enemies?" (defenses)	• Provide an anchor chart for "How to Play 20 Questions" that includes steps and sample question stems for students.

Work Time (continued)	Meeting Students' Needs
* "What do they do that is interesting or unusual?" (behavior) * "Where do they live?" (habitat)	
B. Sorting Information into Categories (10 minutes) • Explain that now they are going to practice sorting information about rainforest insects and spiders into categories, which will help them to be able to fill in the Categories column on the **Ant Research C/F/Q/R Note-catcher** from Lesson 4. (Explain that spiders aren't insects because they have two, not three, main body parts. Like insects, they are arthropods, but spiders are in the class called arachnids.) • Randomly distribute one **Facts about Arthropods** strip to each student. Tell students that they are going to do a mix and mingle activity (they have done this before). Give directions: 1. Read your strip. 2. Stand up and mingle. Find a partner to talk with. 3. As a pair, discuss: "Which category on the Categories anchor chart does this strip belong with? How do you know?" • Ask students to begin. As they mingle, circulate and listen to students' conversations and redirect when necessary. • After 5 minutes of mingling, ask students to return to their seats and take out their journals. • Distribute the **Facts about Arthropods Sorted into Categories**. Ask them to check their sentence strips against the Facts sheet.	• When possible, provide text or materials found in students' L1. This can help students understand materials presented in English. • 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. • Consider partnering an ELL with a student who speaks the same L1, when discussion of complex content is required. This can let students have more meaningful discussions and clarify points in their L1.

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Work Time (continued)	Meeting Students' Needs

C. Vocabulary and Research Time (25 minutes)
• Tell students that they are now ready to return to the Note-catcher they began in Lesson 4. Project and turn the class's attention to the Ant Research C/F/Q/R Note-catcher from Lesson 4. Ask the students to turn to the Ant Research C/F/Q/R Note-catcher in their journals.
• Divide the class into seven small groups. Distribute the **"Ants" text** to students. Assign one paragraph to each group.
• Write the following words on the white board or on chart paper:
  * 1st paragraph: unique, capabilities, prevalent,
  * Paragraph 2: termites, abdomen, thorax,
  * Paragraph 3: enthusiastically, typically, defy
  * Paragraph 4: ensure, function, typically,
  * Paragraphs 5 and 6: communicate, cooperate, promising
  * Paragraph 7: extensively, fiber, seize
• Ask students to read their paragraph silently for the gist and discuss it with their group members.
• Invite students to circle identified words in that paragraph.
• Reread the page aloud and give students 5 minutes to figure out the definition of the identified words from the context.
• Ask students to share at their tables about what they think the words mean. Circulate to correct any misinformation. Direct students to write the words and definitions in their glossaries (just for the words in their paragraph).
• Ask students to talk together in their groups about one new piece of information that they have learned from their assigned paragraph, and record this as a note in their C/F/Q/R Note-catchers. Tell them that today they are now ready to fill in the CATEGORY column, and can use the seven scientific terms they learned earlier in this lesson.
• Ask students to work in groups to reread the FACTS they have listed on their Note-catcher and determine the CATEGORY it would correspond with (of the seven identified) then write that in the CATEGORY column next to the fact. Remind students to add new information from the "Ants" text to their Note-catchers, remembering to assign facts to one of the seven categories.
	• Consider providing smaller chunks of text for research (sometimes just a sentence) for some students. Teachers should check in on students' thinking as they write or speak about their text.
	• Students needing additional support may benefit from a partially filled-in C/F/Q/R Note-catcher.
	• Consider partnering struggling readers with more proficient readers when tackling the difficult text for research.

Work Time (continued)	Meeting Students' Needs
• Review the distinction between direct quotes and paraphrasing, and let students know that is okay to include direct quotes, but that when they do so, they need to put the words in quotation marks. • As students work, circulate and support as needed.	

Closing and Assessment	Meeting Students' Needs
A. Review Learning Targets (5 minutes) • Reread the learning targets aloud: "I can sort information about rainforest insects into categories," "I can take notes by recording direct quotes from a text about rainforest insects," and "I can take notes by paraphrasing information from a text about rainforest insects." • Using the Fist to Five strategy, ask students to self-assess their progress toward meeting these learning targets. Tell students: "If five fingers means I really understand and can do this, and a fist means I need a lot more help, put up the number of fingers that shows where you are in your progress toward meeting this learning target."	
B. Introducing Research Expert Groups (5 minutes) • Tell students: "You will begin research in expert groups in the next lesson. Groups will be researching either ants or butterflies in order to gather information to create a field journal page. At the bottom of the page that has your C/F/Q/R Note-catcher, write which expert group you would prefer to be in and why. I will do my best to make sure everyone gets to research their preferred arthropod." Give students a few minutes to decide and write their choice in their journal. • Collect students' journals and the exit tickets and review them to see which students may need additional support in learning how to take notes independently.	• Consider allowing students who may have difficulty making a decision about which insect to research the opportunity to discuss one-on-one with the teacher to allow them to process the choice orally.

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Homework	Meeting Students' Needs
• Continue reading in your independent reading book for this unit at home. *Note: Review students' field journals as an ongoing assessment and write a specific comment about using sensory details or close observation sketches in each one.* *Starting in Lesson 6, students will continue their research in expert groups (three to four students per group). Half of the groups will focus their research on ants and the others on butterflies. Assign students to groups strategically and heterogeneously so that they will be able to work well together independently while you are assisting the other groups. You may want to group students with the same L1 together.*	

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Supporting Materials

Categories for Research on Rainforest Insects Anchor Chart

Question	Scientific Term

Categories for Research on Rainforest Insects Anchor Chart
(For Teacher Reference)

Question	Scientific Term
What do these animals look like?	physical characteristics
What do they eat?	food source
Who/What are their enemies?	predators
How do they have babies?	life cycle
How do they defend themselves against enemies?	defenses
What do they do that is interesting or unusual?	behavior
Where do they live?	habitat

Facts about Arthropods

Teacher Directions: Cut these into strips before the lesson.

Cockroaches live just about everywhere. Some species can become pests in the home where their flattened bodies enable them to hide in narrow crevices, making them difficult to get rid of.
There are at least 400,000 different kinds of beetles, living everywhere from snowy mountaintops to scorching deserts and muddy ponds.
Flies are found all over the world, from the icy polar regions to the equatorial rainforest.
Beetles play an important role in nature by eating dead plants and animals and returning them to the soil as valuable nutrients.
The South American grasshopper feeds mostly on the leaves, stems, flowers, and fruits of the vegetation in the rainforest. Like other grasshoppers, it chews its food with its powerful mandibles, or jaws.
The large jaws of the tarantula inject poison into its prey, and as with all spiders, the food is sucked into the body as a liquid.

Facts about Arthropods

Under a spider's abdomen, near the rear, are tiny stubs called spinnerets. The spider uses its legs to pull liquid silk made in its abdomen from the spinnerets.
The biggest and most complex of insect societies are built by termites. The nests of some species may house up to five million, and are extraordinarily complex buildings, with full air-conditioning.
The nests built by the common wasp are always begun by a single queen working on her own. She builds a series of papery envelopes from chewed-up wood fibers and lays her eggs inside.
Female Mexican bean beetles lay their eggs in groups of about 50 on the underside of leaves, where they are well protected. Each egg stands on end and takes about a week to hatch.
Some spiders protect their eggs in silken egg sacs. The wolf spider carries her egg sac attached to her spinnerets.
Mosquitoes hatch out of eggs in wet places like ponds or puddles. Baby mosquitoes, or larvae, look like segmented worms about the size of a grain of rice.
Stick insects may be green or brown and are usually long and thin with slender legs and antennae.
Flies have large compound eyes, and claws and pads on the feet so they can walk on any surface.

Facts about Arthropods

Praying mantises are often slender, like stick insects. Many species are camouflaged in bright greens or dull browns.
Spiders, scorpions, ticks, and mites are all arachnids. They have eight legs and only one or two main body sections. They don't have antennae.
A tarantula's bite can be painful, but it isn't any more dangerous than a bee sting.
Threatened by a variety of larger insects, birds, and reptiles of the rainforest, the South American grasshopper uses its shape as camouflage. Sometimes it even sways in the breeze to appear even more like a twig or stick.
Leafcutter ants visit the canopy but live underground in great fungus factories.
Most ant species live and work together in big colonies, often building complex nests in which to rear their young.
Some ants in tropical areas from Africa to Australia build nests in trees by "sewing" together groups of large leaves.
When some ant species bite, they are able to squirt formic acid from the end of their abdomen into the wound—making it doubly painful.

Facts about Arthropods

Some groups of butterflies feed on rather poisonous plants. As a result, the adult butterflies often taste unpleasant and are avoided by insect-eating birds.
Adult butterflies and moths feed on liquids, which they suck up through a long, coiled "proboscis."
The most advanced insects, such as butterflies and moths, have a complex life cycle involving complete metamorphosis. The eggs hatch to produce larvae that are quite unlike adult insects in both form and appearance.
The wings and body of adult butterflies and moths are covered in tiny scales, which are really flattened and ridged hairs.

Written by Expeditionary Learning for instructional purposes

Sources:
Insect: DK Eyewitness Books, Laurence Mound (Dorling Kindersley Children, 2007)
Discover the Amazon: The World's Largest Rainforest, Lauri Berkenkamp (Nomad Press, 2008)
animaldiversity.ummz.umich.edu/site/accounts/information/Insecta.html
rainforests.mongabay.com/0509.htm

Facts about Arthropods Sorted into Categories

Habitat
• Cockroaches live just about everywhere. Some species can become pests in the home where their flattened bodies enable them to hide in narrow crevices, making them difficult to get rid of. • There are at least 400,000 different kinds of beetle, living everywhere from snowy mountaintops to scorching deserts and muddy ponds. • Leafcutter ants visit the canopy but live underground in great fungus factories. • Flies are found all over the world, from the icy polar regions to the equatorial rainforest.
Food
• Adult butterflies and moths feed on liquids, which they suck up through a long, coiled "proboscis." • Beetles play an important role in nature by eating dead plants and animals and returning them to the soil as valuable nutrients. • The South American grasshopper feeds mostly on the leaves, stems, flowers, and fruits of the vegetation in the rainforest. Like other grasshoppers, it chews its food with its powerful mandibles, or jaws. • The large jaws of the tarantula inject poison into its prey, and as with all spiders, the food is sucked into the body as a liquid.
Behavior
• Under a spider's abdomen, near the rear, are tiny stubs called spinnerets. The spider uses its legs to pull liquid silk made in its abdomen from the spinnerets. • The biggest and most complex of insect societies are built by termites. The nests of some species may house up to five million, and are extraordinarily complex buildings, with full air-conditioning. • The nests built by the common wasp are always begun by a single queen working on her own. She builds a series of papery envelopes from chewed-up wood fibers and lays her eggs inside. • Most ant species live and work together in big colonies, often building complex nests in which to rear their young. • Some ants in tropical areas from Africa to Australia build nests in trees by "sewing" together groups of large leaves.

Facts about Arthropods Sorted into Categories

Life Cycle
• Female Mexican bean beetles lay their eggs in groups of about 50 on the underside of leaves, where they are well protected. Each egg stands on end and takes about a week to hatch. • The most advanced insects, such as butterflies and moths, have a complex life cycle involving complete metamorphosis. The eggs hatch to produce larvae that are quite unlike adult insects in both form and appearance. • Some spiders protect their eggs in silken egg sacs. The wolf spider carries her egg sac attached to her spinnerets. • Mosquitoes hatch out of eggs in wet places like ponds or puddles. Baby mosquitoes, or larvae, look like segmented worms about the size of a grain of rice.
Physical Attributes
• Stick insects may be green or brown and are usually long and thin with slender legs and antennae. • Flies have large compound eyes, and claws and pads on the feet so they can walk on any surface. • Praying mantises are often slender, like stick insects. Many species are camouflaged in bright greens or dull browns. • The wings and body of adult butterflies and moths are covered in tiny scales, which are really flattened and ridged hairs. • Spiders, scorpions, ticks, and mites are all arachnids. They have eight legs and only one or two main body sections. They don't have antennae.
Predators and Defense
• When some ant species bite, they are able to squirt formic acid from the end of their abdomen into the wound—making it doubly painful. • Some groups of butterflies feed on rather poisonous plants. As a result, the adult butterflies often taste unpleasant and are avoided by insect-eating birds. • A tarantula's bite can be painful, but it isn't any more dangerous than a bee sting. • Threatened by a variety of larger insects, birds, and reptiles of the rainforest, the South American grasshopper uses its shape as camouflage. Sometimes it even sways in the breeze to appear even more like a twig or stick.

Ants

By NG Staff/National Geographic Stock

Ants are common insects, but they have some unique capabilities. More than 10,000 known ant species occur around the world. They are especially prevalent in tropical forests, where they may be up to half of all the insects living in some locations.

Ants look much like termites, and the two are often confused—especially by nervous homeowners. However, ants have a narrow "waist" between the abdomen and thorax, which termites do not. Ants also have large heads, elbowed antennae, and powerful jaws. These insects belong to the order Hymenoptera, which includes wasps and bees.

Enthusiastically social insects, ants typically live in structured nest communities that may be located underground, in ground-level mounds, or in trees. Carpenter ants nest in wood and can be destructive to buildings. Some species, such as army ants, defy the norm and do not have permanent homes, instead seeking out food for their enormous colonies during periods of migration.

Ant communities are headed by a queen or queens, whose function in life is to lay thousands of eggs that will ensure the survival of the colony. Workers (the ants typically seen by humans) are wingless females that never reproduce, but instead forage for food, care for the queen's offspring, work on the nest, protect the community, and perform many other duties.

Male ants often have only one role—mating with the queen. After they have performed this function, they may die.
Ants communicate and cooperate by using chemicals that can alert others to danger or lead them to a promising food source. They typically eat nectar, seeds, fungus, or insects. However, some species have diets that are more unusual. Army ants may prey on reptiles, birds, or even small mammals.

One Amazon species (*Allomerus decemarticulatus*) cooperatively builds extensive traps from plant fiber. These traps have many holes and, when an insect steps on one, hundreds of ants inside use the openings to seize it with their jaws.