

A.I. Research Using Claude and Gemini

How well can GPT and Gemini determine
the grade level readability of a passage?





Process

- Since determining the readability of a passage is complex and disputed within the education community, we determined that the best measure for the grade level and types of passages we had was to use the Lexile measure. We ran each passage through Lexile's readability calculator to determine actual level.
- Using passages or excerpts from the CKLA curriculum, ask Claude and Gemini to determine the Lexile level of the passage.
- Then, push back against the given measure to see what the system would do.



Results

- It appears that Gemini had been trained with the curriculum because it often cited the level given in the teacher manuals, sometimes even giving the grade level and unit the passage could be found in.
- Both systems were able to be pushed into sycophancy and hallucinations sometimes.
- Overall, both systems were fairly accurate. They tended to be within one grade level.
- It can be tricky at the lower reading levels because one small change can make a huge difference in readability for real students. It doesn't look like the difference between a 200L and a 250L is huge, but it can be when an actual student is attempting to read a text.

2nd Grade Mega Unit

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Essential Question: Why are pollinators important to humans?

ELA Goals: Students will be able to write a multi-paragraph opinion essay **and** an informational essay.

Science Goal: Students will be able to explain the importance of pollinators and the consequences of what would happen if they were to disappear.

Math Goal: Students will be able to use addition to find the total number of objects in an array.

Connection to the Standards

Science

2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow.

2-LS2-2: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.





ELA

2.RC.7: Use various text features (e.g., table of contents, index, headings, captions) to locate key facts or information, and explain how they contribute to and clarify a text.

2.RC.8: Identify how a nonfiction text can be structured to compare and contrast, to describe a procedure, and to explain a cause and effect relationship.

2.W.2: Write pieces that introduce an opinion, give reasons that support the opinion, use linking words (e.g., because, and, also), include a concluding statement or section, and include multiple reasons to explain why a certain course of action should be followed.

2.W.3: Write informative/explanatory pieces on a main idea that introduces a topic, provides facts, and details about the topic, and includes a concluding state.

2.W.5: Apply the writing process to:

- Plan by generating ideas for writing by drawing and brainstorming; with support, revise writing by adding details (e.g., organization, sentence, structure, word choice); edit writing for format and conventions (e.g., spelling, capitalization, usage, punctuation) and provide feedback to other writers.
- Use available technology to produce and publish legible documents.

2.W.6: With support, conduct research on a topic.

- Find information on a topic of interest (e.g., cardinals)
- Identify various visual and text reference sources.
- Organize, summarize, and present the information, choosing from a variety of formats

RET in the Classroom:

I have used AI to create reading passages at the appropriate reading level. This allows me to be able to take those base passages and adjust them to the reading ability of the students in my class. I also used it to add images.



Real World Context



Students will learn about worms from a St. Joseph County Soil & Water Conservation District representative.

I will also work with a former parent to invite local gardeners to show their gardens.

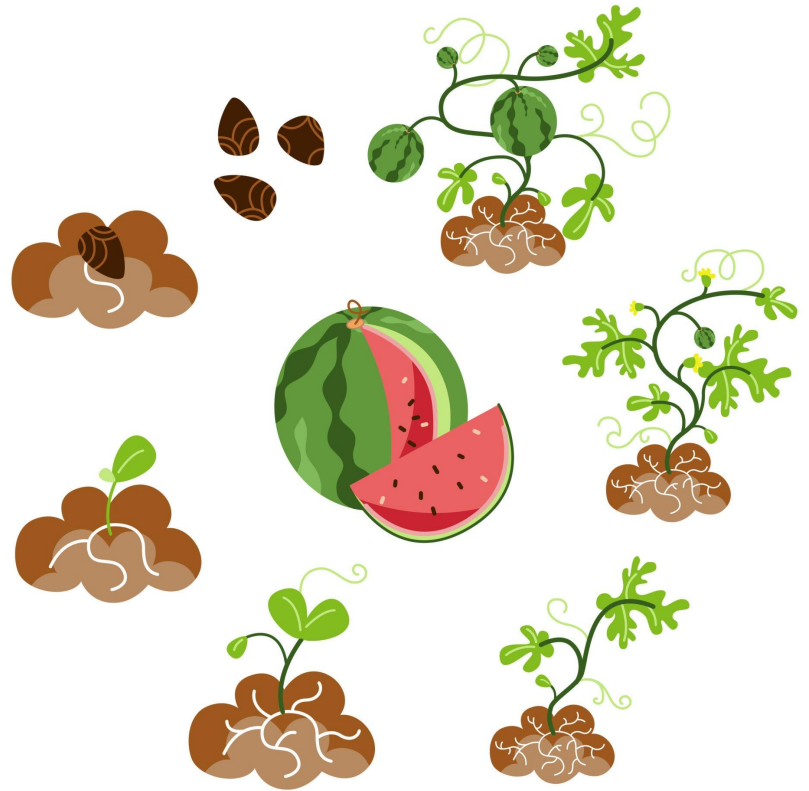


Gardeners, farmers and scientists think about the impact of pollination and the importance of specific pollinators. As students are learning about insects and then specifically about pollination, they are frequently thinking about how those ideas are present in their lives. The culminating project of the insect research is for the students to identify which insect they would want as their neighbor. They have to take into account the ways the insects are beneficial and what ways they could be harmful.

Background STEM Content

In a previous unit, students learned about plant and animal life cycles. I will use that previous content as an entrance to start the conversation about pollination.

Students will have also completed a mini-unit on habitats that will tie in with the idea that some plants and animals have evolved with a special pollinator/plant relationships.





Main Projects

Opinion Essay



My Neighbor is a bee!

My neighbor would be a bee. I think the bee could give me flowers. And the bee could help me grow my garden! Also I can go to their hive and ask for honey. And that's why my neighbor would be a bee!

By: [Redacted]

The goal is for students to have at least three paragraphs (introduction, body, conclusion) that answers the prompt and includes evidence from their research. The research is done in an Me-We-Two-You approach. Students will have familiarity with note taking, but I will start with modeling so they know my expectations at this point in the year. We will then do a day of research as a class. Next, students will work in small groups to do research then share it jigsaw-style. Finally, students will do their own research, without support from the teacher or peers. They will then use the provided graphic organizer and writing mini-lessons to go through the writing process. From research to finished essay, I estimate 12 days.



Garden Design



The goal will be for students to design a garden that attracts specific pollinators and contains what the identified plants need to survive. Students will learn about pollination and the structures on plants and pollinators that help or hinder the process. Students will develop a model of an original pollinator and matching plant. Students will observe (and hopefully hear from gardeners) actual gardens and the purpose they are meant to fill. Then, students will work independently to design their own garden. They will identify plants, pollinators, predators/pests, defensive measures and sources for water/sunlight. From the first lesson to the final presentation, I estimate 15 days.

Informational Text



Students will write an essay responding to the prompt “Plants depend on animals and insects to help them survive. Pick an animal or insect and describe how it helps the plant through either pollination or seed dispersal.” Students will have already completed research in prior lessons, unless they choose to write about seed dispersal, which was mentioned, but not prioritized in this unit. Students will use the provided graphic organizers and writing mini-lessons to work through the writing process creating an introduction (including a lead and thesis statement), at least one body paragraph, and a conclusion. From brainstorming to final product, I estimate 12-15 days.

Module Sequencing and Assessing





Math



At the beginning of this unit, students will learn about arrays and how that model assists with addition and multiplication. They will also begin to have an understanding of area and perimeter, although mastery is not expected in second grade. Later, students will use these concepts when designing their gardens in STEAM.



STEAM

- Students will design an experiment to discover what plants need to be able to grow.
- Next, students will be able to explain what a pollinator is and how some pollinators and plants have developed specifically for each other (i.e., hummingbirds and tube shaped flowers).
- After that, students will participate in a physical demonstration of pollination. Then, students will create a model of an insect and plant pair that have features that aid in pollination.
- Finally, students will create a design for a garden that is built to benefit specific plants and pollinators.



ELA

- At the same time as the STEAM lessons, students begin the unit by building an understanding of how habitats and vertebrates are “built” to help each other.
- Students then transition to insects. The first goal is to be able to explain what an insect is and be able to identify the body parts.
- Students then investigate social insects like bees and ants, with the goal of being able to explain how the insects work together for the good of the group.
- After that students will research solitary insects describing how the insects are similar and different from the social insects.
- Students will complete two writing assignments.
 - One, at the end of the insect research, will be an opinion essay about which insect would make the best neighbor.
 - The other, at the end of the pollinator unit, will be an informational essay describing their pollinator garden and how it is designed to help both the pollinator and the plants.



Assessments

There will be daily formative assessments in the form of exit tickets, my favorite “no”, graphic organizers and comprehension discussions. There will be six summative assessments: one presentation on habitats/vertebrates, one opinion essay on insects, one garden design, one informative essay about their garden, and two traditional multiple-choice tests (one on insects, one on pollination).



Recommendations for Implementation

Teachers will need to determine the best place in the classroom to grow plants. They will also need to have a plan for collecting all of the materials whether it is coming from parent donations, school purchasing, grants or a combination. Additionally, teachers will need to have a collection of appropriate books and articles to aid with research. Some students may need early reader or read aloud options, while others may need assistance using text features like index or table of contents to find information in more complex books. I have used AI to create a library of articles to align with the unit's goals that will be attached in Section 4.

In my area, I have made connections with the local Soil & Water Conservation District and they have two lessons that work well with this unit, one on native plants and pollinators and one on worms. I also found a nearby conservation area that has guided tours that fit well with this unit. Both of these were free. Other field trip/community connections could be botanical gardens, local gardening clubs, zoos, garden centers, farmers, etc. This unit is a great way to reach outside of the school setting and into the real world.



Documents



Mighty Little Neighbors: All About Insects!

Look out your window, look down at the grass, or look up at the sky. Chances are, you will see an insect! Insects are the largest group of creatures on Earth. From **microscopic** lice to tiny ants to colorful butterflies, they live in almost every corner of our world.

Not every creepy-crawler is an insect! Spiders and worms are actually different. To be a true insect, an animal must have some special characteristics. Insects do not have bones inside their bodies like you do. Instead, they wear a hard outer shell called an **exoskeleton** to protect themselves. Also, all grown-up insects have exactly six jointed legs. Finally, insects have two feelers, called **antennae**, on their heads to help them smell, touch, and sometimes even hear the world around them!

Every insect's body is divided into three main sections.

1. **The Head:** This is at the front. It holds the insect's eyes, mouth, and antennae.
2. **The Thorax:** This is the middle part. The insect's legs and wings are always attached here. Think of it like the engine room that helps them move!
3. **The Abdomen:** This is the back part. It holds the insect's stomach and other organs that help it digest food.



Even though they are small, insects have huge jobs to do in their habitats. One reason is our planet needs them to survive! Bees, butterflies, and beetles fly from flower to flower. They carry a special powder called pollen. This is called **pollination**, and it helps plants make new seeds, fruits, and vegetables. Another reason is many insects eat dead leaves, fallen trees, and old food. They act like nature's recycling crew, keeping the ground clean and making the soil rich for new plants. Also, insects are a very important food source for larger animals like birds, frogs, lizards, and fish. Without insects, these animals would go hungry!

The next time you see a ladybug crawling on a leaf or a bee buzzing by, remember how hard they are working. Insects may be small, but they make a massive difference in our world!

Fireflies



close up photograph of a firefly glowing at night. Source: www.dreamstime.com

Fireflies look a lot like ordinary beetles when they rest on a leaf during the day, but they turn into magical nighttime neighbors when the sun goes down. Just like bees and ants, fireflies go through four life cycle stages as they grow up. A queen-like mother lays eggs in the damp soil. Next, little worm-like larvae hatch, and they are actually nicknamed glowworms because even the babies can shine! Then, they rest inside a pupa shell before finally **molting** and emerging as flying adults.

While they share the same growing-up steps as many other insects, adult fireflies have a very special feature called **bioluminescence**. This is a big science word that means they can make their own light right inside their bodies. Fireflies mix special chemicals inside their lower abdomens with the oxygen they breathe to create a glowing lantern. Unlike a hot lightbulb in your house, a firefly's light is a cold light, meaning it never gets hot or burns the insect.

Fireflies use their flashing lights to talk to each other in the dark and find a mate. Every different kind of firefly has its own secret pattern of flashes, almost like a glowing code! While they are solitary insects (do not live in a big colony), they still work together by filling the night sky with thousands of flashes to confuse predators like birds and frogs.

While fireflies may look like plain beetles during the day, their ability to make light makes them unique. By using their amazing bioluminescence to talk to each other and safely grow through their life cycles, these glowing insects bring a little bit of magic to our summer nights.

NAME: _____

Opinion Mentor Text - Reading Passage

The Secret Life of Cicadas



Cicadas are famous insects known for their giant wings, large eyes, and very loud voices. Like fireflies and beetles, cicadas go through a special life cycle. A mother cicada lays her eggs in tree branches, and when the babies hatch, they crawl down to the ground and dig deep into the dirt.

Young cicadas are called nymphs, and they spend most of their lives hiding safely underground. Some types of cicadas stay under the dirt for two or three years, while others stay underground for up to 17 years. While they are living in the dark, they do not bother anyone because they stay alive by drinking sap, which is a watery liquid found inside tree roots.

When it is finally time to grow up, the nymphs tunnel out of the mud and climb up the trunk of a tree. Just like other insects, cicadas must molt to get bigger. They split open their old, hard skins and crawl out as adults with brand-new wings, leaving behind empty, brown, crunchy shells stuck to the tree bark.

Male cicadas make a loud buzzing or clicking sound to talk to each other by using a special body part on their bellies called a tymbal that vibrates like a musical instrument. Even though they are very big and noisy, cicadas are completely harmless neighbors because they do not bite, sting, or carry diseases. When millions of cicadas emerge at once, they also help the environment by becoming an important food source for birds, squirrels, and other forest animals.

Brainstorming: Opinion (Evidence-Focused)

Prompt: Choose an insect that you've learned about recently. Think of reasons that best describes why that insect would make a good neighbor. Write an opinion piece that gives your opinion on what insect would make the best neighbor and why you chose that insect. Use details from the text to support your opinion.

Insect Name: Cicadas

Teacher Model

