THE BIODIVERSITY GROUP
Focusing on life overlooked

BIODIVERSITY PEEK 3-5TH GRADE STEAM LESSON OUTLINE

"Take into account that great love and great achievements involve great risk."
-Dalai Lama

Keystone Projects -- Explain & Elaborate & Evaluate

Just Add Water

What happens to the abundance and variety of local wildlife when students design, build, test, assess, and improve re-purposed water features?

What happens to the abundance and variety of wildlife when a water source is introduced to the school yard or backyard? Students ask this question, design up-cycled water features, test numerous iterations of their designs, and assess how well they are working. An interactive presentation gets them started on the road and the Engineering Journey student sheets, for data keeping and evaluating, guide them on their journey. Just Add Water can last a few weeks or span an entire year, serving as the base for a complete interdisciplinary curriculum.

Gimmie Shelter

What happens to the abundance and variety of local wildlife when students design, build, test, assess, and improve natural or up-cycled animal shelters?

Students ask the question: What happens to the abundance and variety of wildlife when animal shelters are introduced to the school yard or backyard? They design shelters from recycled and natural materials, test numerous iterations of their designs, and assess how well they are working. The interactive presentation gets them started on the road and the *Engineering Journey* student sheets, for data keeping and evaluating, guide them on their journey. Gimme Shelter can last a few weeks or span an entire year, serving as the base for a complete interdisciplinary curriculum.

Who's Got the Munchies?

What happens to the abundance and variety of local wildlife when students research, create native-food sources, test numerous iterations of their designs, and assess how well they are working?

What happens to local biodiversity when native food sources are introduced to the school yard or backyard? Students ask this question, do research, create food sources, test numerous iterations of their designs, and assess how well they are working. The interactive presentation gets them started on the road and the *Engineering Journey* student sheets, for data keeping and evaluating, guide them on their journey. *Who's Got the Munchies* can last a few weeks or span an entire year, serving as the base for a complete interdisciplinary curriculum.

Getting STEAMed Up - Our Class Biodiversity Project

This is the heart of Biodiversity PEEK's project-based learning. Students evaluate their specific site through the observations and data they have collected there. Then they brainstorm ways they can help native plants and animals near school have a more supportive and biodiverse environment and develop a feasible plan and take action to improve or protect their local biodiversity. They do the work, not you!

STEAM Exhibition

Here's your chance to show off to the entire school, parents, and greater community the variety of work your students have been doing as a part of Biodiversity PEEK. We don't have a "cookie cutter" plan for you, but instead enable you to create an event that works for you and your situation. You may even choose to have your Biodiversity PEEK projects displayed as part of a larger event that your school already hosts, thus bringing in more visitors with less work on your part. The main thing is to step back and let the kids use their growing skills in communication, planning, art, math, design, etc. to create the

display. All you should do is guide them so that an organized and feasible exhibition happens and that it shows off the work and talents of all students. We give you some ideas for a successful exhibit and remind you to creatively up-cycle whenever you can and make what you've got work like a beautiful beast!

ENGAGE Lesson Group I -
Priming the pump of curiosity

1. ***EyeSpots: Seeing & Feeling*** --
Getting out their outdoor sillies!

A short welcome from The Biodiversity Group gets your gang excited to help collect science data on biodiversity near their school. Then they are introduced to their own special, unplugged, natural spot, their EyeSpot, to which they will return for observing, wondering, and investigating via journaling and photography. This first EyeSpot experience could be so strange to them that they are wiggly, giggly, and a bit silly and that is okay—they will get over it.

2. ***Beach Surprise --***
A Biodiversity PEEK Story from Ecuador

This true story about some PEEK kids rescuing a sea turtle packs a big punch. It gives your kids a real Biodiversity PEEK example of how important their citizen-science work of collecting photo data and making observations can be for the conservation of biodiversity. It also gives them a chance to get familiar with and explore the iNaturalist database, and apply some key terms. Plus, who doesn't love sea turtles?!

3. Citizen-Science Race

This is a fun check-in and review before going further into our STEAM lessons. First, students use their own maps to relocate and revisit their *EyeSpots*. Then, through a fun and physical game, you check for students' understanding of some key concepts, and help them recognize the importance of citizen-science, data and observations to the biodiversity that is needed for a healthy and wonder-filled planet.

4. ***Silly Skits --***

A comedy of errors.

Students consider how photography helped make data collection a lot better for people and animals! Then, after being inspired by our own hilarious video, they use humor and drama to create and act out skits showing how to act safely and ethically in their environment. And, they get some tips from our nature photographers on how to sneak up on animals to get their photos.

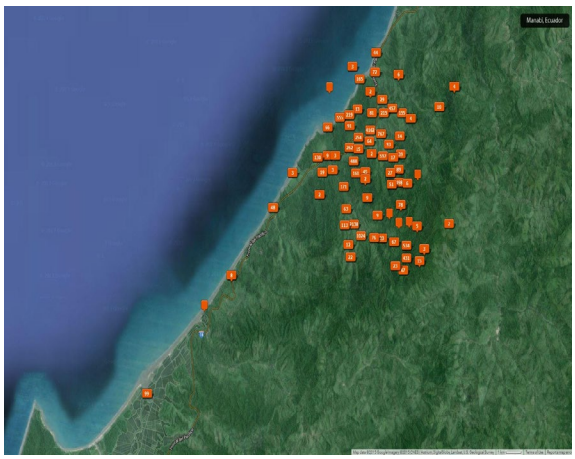
ENGAGE & EXPLORE –

Wondering how matter cycles through our ecosystem and how organisms get what they need to live.

5. ***Bio-GRAPHing***

This lesson is a sneaky way to get your kids graphing data. Through an engaging, photo-filled, true story of a 15-year-old Phoenix girl trying to protect her suburban community's backyard wilderness, your students will learn the value of not only biodiversity but also the value of data for protecting it. This lesson sets the stage for your students to do their own biodiversity assessment, graphing, interpreting their own data, and taking action. Plus, it shows that kids can make a difference in their communities!

6. ***Biodiversity Assessment***



Your kids get a count of the number and variety of plants and animals in their *EyeSpots*! A presentation helps them understand how to fill out their data sheets, and then off they go . . . out to their *EyeSpots* for their own baseline *Biodiversity Assessment*. Back inside, they graph and save their results. They will later compile and use this to help them decide how they want to try and improve their school's biodiversity, and for later comparison to see how successful they were.

Engage Lesson Group II

7. SunPrints --
Cause and Effect Art

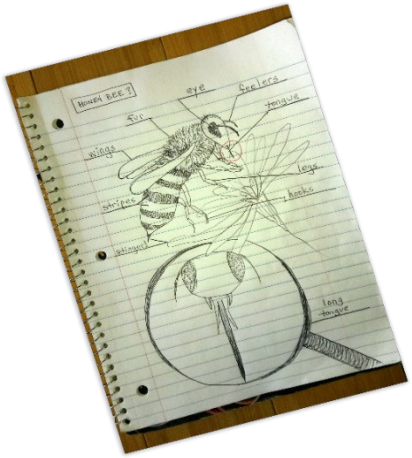
This is the first truly STE**A**M experience for your students. They go to their *EyeSpots*, or at least just outside, to create art in a mysterious cause and effect process of light that you DO NOT explain at first Instead the kids play with some variables, make observations, and form an evidence-supported claim for what may be happening and why. And, they'll have some hauntingly beautiful art to show for it!

8. ***Math + Art = Frames!***

This lesson challenges students to use math and measurement and learn from mistakes as they solve the problem of making a frame to showcase their *SunPrint* in your STE**A**M Exhibition. And, it saves you from having to do the display work! You can adjust the lesson and apply related science standards to be more or less challenging based on your students' abilities, and create final frames that fit your particular budget, supplies, and taste. We say, relax and let the kids do the head-scratching work!

ENGAGE & EXPLORE –
Wondering what affects plants' and animals' abilities to survive and thrive in their environments

9. ***Journal Wonderings***



Curiosity doesn't kill cats, it teaches kids! First, students sit in their EyeSpots and observe the plants and animals they're curious about. Then they use a writing and drawing journal activity to help them develop several questions about what traits and behaviors help those plants and animals survive and thrive. Later on, students will research their questions to help develop and present an argument with supporting evidence. Half your class can do this lesson while the other half does *Photography in The Weeds*.

10. ***Wonderings Researched and Shared***

This is the follow-up to the questions generated during the *Journal Wonderings & Photography In The Weeds* lessons. Students use the internet to research their questions. Their research, along with any drawings and/or photos they made, will then be used as evidence to support the arguments they share and discuss about how particular traits and behaviors help the organism they focused on to survive.

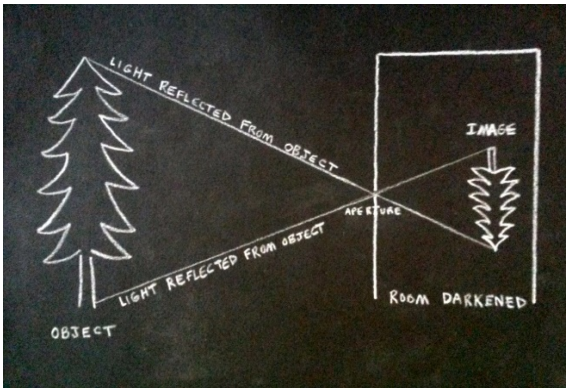
11. ***Survival Game***

This true hummingbird story and game helps your kids elaborate on their knowledge of how an organism's traits and behaviors help it live in an ecosystem. They assume the role of the plant or animal they researched previously and use their imaginations to consider how changes in its environment can affect a population's ability to survive and thrive there. Half your class can play the game on their own while the other half do *Sharing Photo Data*. Seriously, hummingbirds? What's not to love?

12. ***In A Dark, Dark Room . . .*** :
A Ghostly Mystery to Solve

This keep-it-secret lesson engages your students with a mysterious ghostly apparition in a very dark room… in essence using the properties of light to create a giant, room-sized proto-camera before their very eyes! You present them with this mystery on your own or using our spooky video to do the work for you. The video and journal guides them as they isolate and test variables to figure out what's going on. This super fun lesson sets the stage for students' creating and tinkering with their own handheld camera obscura. And, oh yeah…….BOO!

13. ***Tinkering****:*
Handheld Cameras Obscura



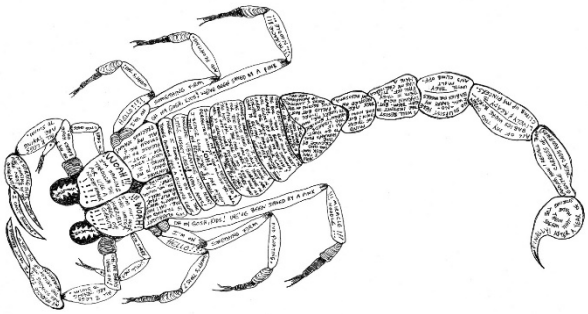
This iterative-process lesson is the backbone of Biodiversity PEEK's engineering and applied math experience. Students design their own handheld "dark rooms" and tinker as long as you want with various iterations of their designs. As your students make adjustments to their devices they will isolate variables, note causes and effects, raise new questions, and explore new hypotheses. They may even realize that they have created a model of the human eye!

EXPLORE & EXPLAIN Lesson Group II-
Wondering how light works to create an image and allow our eyes to see objects.

14. ***Your EyeSpot Environment***

This lesson starts with an eye-opening and question-raising photo presentation on the relationship between local biodiversity and the local environment. Then, they explore, draw and write in their guided nature journals, to help observe and consider what aspects of their environment help the animals and plants there survive and thrive, and find out what may be missing or problematic there. If your school grounds have little biodiversity, this lesson will help the kids notice that and be eager for change. This lesson sets the motivating stage for the upcoming *Class Biodiversity Assessment* and *Class Biodiversity Challenge*.

15. ***Can You See It My Way?***



This lesson taps into your students' recent explorations outside and their considerations about how plants and animals are supported and challenged by their environment. The creative writers, artists, and compassionate scientific thinkers in your class will really get into this challenge. First, with our illustrated story, students imagine what it feels like to be a scorpion mom trying to survive near a pool. Then, with the help of a story rubric, your kids slip into the skin, scales, bark, spines, or many feet of their own plant or animal and create and illustrate an imaginative story that builds empathy in readers for life overlooked. Come on, scorpions need love too!

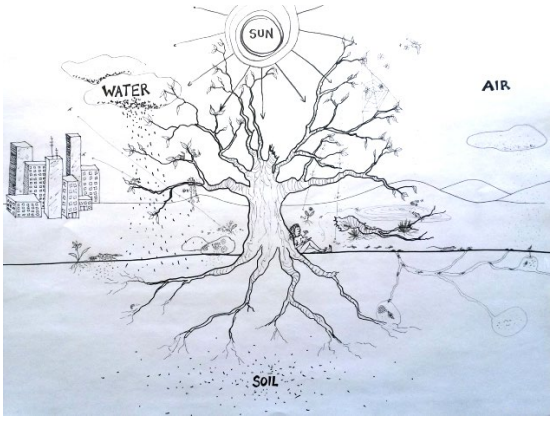
Engage & Explore Lesson Group

16. ***Adventure Matters***

Students are introduced to the many crazy ways in which matter cycles around and around and supports and connects all life in our ecosystems. Students read and re-read an adventure story that follows one tiny bit of matter from as close as inside their own lungs to as far away as another planet. With each reading, students make new choices and create new adventures. With as much time as you want to allow for it, your kids will then take on the creative challenge of writing and illustrating their own *Adventure Matters* story! Did you know that part of every cup of water on Earth was once dinosaur pee?

17. ***Matter Maps***

This is a creative yet realistic approach to modeling the multi-directional flow of life-sustaining matter in an ecosystem that's a lot more fun than that sounds. Students use drawings and photos of plants and animals in their own *EyeSpots* to show the interconnectedness of all life (including themselves!). You may choose to make one giant class map to which everyone contributes or you may have groups each create their own smaller maps. Regardless, you will have an intriguing and informative visual display for your *STEAM Exhibition.* We were not kidding about the dinosaur pee.



Explain & Elaborate Lesson Group

18. ***Patterns in Nature & Art***

This lesson is fun and a visual treat in itself, but it helps ready your students for making designs on their faux-antique metal frames. After "oohing and aahing" through a gorgeous slide show, they will extend their understanding of patterns in data to help them discover patterns in nature and in art. As students search for patterns in their *EyeSpots* they use repetition to draw pleasing, textural designs for use on their *Faux Antique Frames*. Those compulsive doodlers in your class now have a purpose!

19. ***Faux Antique Frames***

Even your most sloppy student will be able to create a gorgeous silver frame to show off their photography or other PEEK artwork at their STEAM Exhibition. Students use math and measuring to create a frame base and then what seems like magic for the faux-antique surface. We have a worry-free, step-by-step video to demo the process for you. You'll be making these for projects at home… guaranteed… just remember to give us credit when showing them off!