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| Title | Meet the Pollinators |
| Overview | Student will be introduced to various insect and animal pollinators. Students will draw diagrams of specimens in their science notebook.  Optional: Models  You can bring in measurement and mathematics by asking students to use rulers to try to make their diagrams or models so that the size of the head, thorax, abdomen, wings. wingspan, beak, etc are in the correct proportion as you would find in a life-size model. Demonstrate this for one pollinator, e.g., a small beetle. In a hummingbird, the anatomical parts in the diagram or model can actually be equal in length to what you would find in the life-size model, but bees and even butterflies will need to be expanded in size yet retaining the proportions. By doing this, you can introduce the students to the concept of "drawn to scale" or "a scale model." |
| Standards | **English/Language Arts**  ELA.3.R.C2.4 Determine the meaning of general academic and domain-specific words and phrases in an informational text relevant to a grade 3 topic or subject area.  ELA.3.R.C3.3 Use information gained from illustrations (e.g., maps and photographs) and words in an informational text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).  If creating models:  **Math**  M.3.MD.4 generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch and show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves or quarters.  Mathematical Practices:   * Model with mathematics. * Use appropriate tools strategically. * Attend to precision.   **Science and Engineering Practice:**   * Developing and using models * Using mathematics and computational thinking. |
| Materials/Advance Preparation Needed | **Materials:**   * Article: Meet the Pollinators. *National Geographic Young Explorer*. April 2010, Vol. 4 Issue 6, p2-9 * Video: Schwartzberg, Louie. (March 2011). The hidden beauty of pollination. TED2011.   <http://www.ted.com/talks/louie_schwartzberg_the_hidden_beauty_of_pollination?language=en>   * science notebooks * colored pencils * specimens/pictures/printed diagrams   If making models:   * rulers * craft materials: feathers, Styrofoam, pom poms, cardboard, glues, tape, markers, pipe cleaners, etc.   **Advance Preparations:**  Preview video and articles.  **Teacher References:**   * Bee Anatomy:   <http://animals.howstuffworks.com/insects/bee1.htm>   * Honey Bee Anatomy Printable:   <http://thehomeschoolscientist.com/wp-content/uploads/2014/01/honey-bee-anatomy.pdf>   * Morphology of honey bee:   <http://visual.merriam-webster.com/animal-kingdom/insects-arachnids/honeybee/morphology-honeybee-worker_1.php>   * Anatomy of butterfly and moth:   <http://www.primarythinking.net/ANIMALS_Bugs/insects_Types_Butterfly_moth.htm>   * Ruby-throated hummingbird – step-by-step drawing lesson:   Amsel, Sheri. “How to Draw Birds.” Hummingbird (Ruby-throated) Drawing Lesson. Exploring Nature Educational Resource. © 2005 - 2014. December 17, 2014. <http://www.exploringnature.org/db/detail.php?dbID=46&detID=614> |
| Procedures/Steps:  (Emphasis on students making inquiry, e.g., posing questions/problems and working towards answers and solutions) | **Introduction:**   * Show Schwartzberg video. * Read article. * Explain to students that they’ve just met the pollinators. Bees, butterflies, moth, hummingbirds, bats, flies, and beetles are all pollinators.   **Diagrams/Science Notebook:**   * Create entry in table of contents titled Pollinator Diagrams. * Students working individually in their science notebooks with teacher modeling diagrams on chart paper.   Diagram 1 – Bee – Student can draw a diagram and label parts OR a diagram can be printed from Teacher Resources: Honey Bee Anatomy Printables, and students can label and include in science notebook. Be sure to point out pollen basket or cornbicula.  Diagram 2 – Butterfly – Be sure to identify proboscis.  Diagram 3 – Hummingbird – Show students one other "garden" birds (e.g., bluebird or goldfinch) and ask them what is something that is much longer in the hummingbird compared to these other birds. Conduct a discussion with them on the "function" of the beak in the hummingbird compared to the other bird (see "beak or bill" at <http://www.worldofhummingbirds.com/anatomy.php> ).   * Optional – Students can create models of pollinators.   For hummingbird, refer to Elementary GLOBE lesson: Season module learning activity – Honing in on hummingbirds – Part 2: Hummingbird Creations: <https://www.globe.gov/documents/348830/350902/ElementaryGLOBE_SeasonsActivity3_en.pdf>  Activity can be adapted for any of the other pollinators. |
| Assessment (What will be the evidence of student learning?) | Students' diagrams of bees, butterflies, and hummingbirds will be assessed for the presence of anatomical features and labeling of those features. If models instead of labeled diagrams are created, students will be asked to identify various features. |