Title: Insect Exploration

Standards: By the end of the 2nd grade; Standard 1, Benchmark 1, 3, 4, 5. Standard 3, Benchmark 1, 2, 3, 4. By the end of the 4th grade; Standard 1, Benchmark 1, 3, 4. Standard 3, Benchmark 2.

Age Level: 2nd-4th grade

Background Information: This unit on insects follows the Inquiry Method to learning science which engages students to describe objects and events, ask questions, construct explanations, test those explanations, and then communicate their ideas to others. The lesson format is divided into three parts, the exploration phase, invention phase, and the expansion phase. Each of these three phases is further divided to include objectives and activities that further extend student learning.

Lesson Information: Buggy Beginning

Key Idea: What is an insect?

Goal: Students will observe, learn, and record information about an insect.

Prerequisite skills and concepts: random observations of insects.

Exploration Phase:

Objectives:

1. Students will brainstorm what they know about insects. (KWL)
2. Students will construct insects from puzzle pieces.

Materials:

1. Teacher made insect puzzle patterns, insect resource books, charts, manila envelopes, and markers.
   a. To make insect puzzle, enlarge each of the bug patterns onto a 12X 18” piece of construction paper. Trim around each shape and then cut each shape into four or five puzzle pieces.

Introduction to lesson: “Tell me what you know about insects.” (May use charts or pictures of insects)

Procedures:
1. Use many questions to determine prior and present knowledge.
2. Divide students into groups and give each group an insect puzzle to assemble.
3. After the puzzle has been constructed, use a reference book to name the insect and record three facts about the insect on the manila envelopes.
4. Color the puzzle pieces with appropriate marker colors. If desired, laminate the puzzle pieces and enclose them in the manila envelopes provided.
5. To extend student learning, manila envelopes can be traded to other groups to learn about other insect types

**Evaluation:** Monitor participation in the assembly of the puzzle. The students will also share the information they have learned with the class.

**Invention Stage:**

**Objectives:**
1. The student will observe and collect insects on a field trip.
2. The student will categorize and sort insects according to specific student preferences.

**Materials:**

1. Insect nets, collection bags, baggies, egg cartons, hand lens, poster board.

**Procedures:**

1. Teacher will provide a brief description of the tools used to collect insects and the use of the tools. Several collection techniques will be discussed using the butterfly net as a trap and as a sweeping tool.

2. On the nature walk, teacher will collect the insects to freeze them for further examination.

**Evaluation:**

1. On the next day, students will place individual insects they collected in egg carton sections.

**Expansion Stage:**

**Objective:**

1. The student will construct a poster using their insect collection.

**Materials:**

1. insects, 9” X 12” pieces of colored construction paper, glue, gallon baggies, and an insect ballot (teacher made)

**Procedures:**
1. Students will fold the paper into six sections according to teacher direction.
2. Students will classify their insects and place them into sections of the egg carton by biggest, smallest, ugliest, most colorful, longest antennae, and most unusual.
3. Students will display their collection by gluing the insects on poster board under the categories described above.
4. Slide the poster board into the baggies. Display the collection in a bug gallery in the hall for other students to enjoy.

**Evaluation:**

Instructor will check student work samples for accuracy and ask questions for clarification as needed.

**Objective:**

1. The student will conduct a survey polling other classes on their favorite insect.

**Materials:**

Insect ballot (teacher made), graph paper, and crayons

**Procedures:**

1. Using a partner, the students will go into different classrooms and conduct a survey by asking each student to vote for their favorite insect.
2. After voting, students will return to the classroom where the votes will be tallied.
3. Teacher will discuss how to create a bar graph using the data.
4. Students will create their own bar graph by coloring graph paper to represent the favored insect.
**Lesson Information:** Study of Butterfly Metamorphosis

**Key Idea:** Observation and recording of life-cycle stages of a butterfly.

**Goal:** Students will observe and record changes taking place during the stages of a butterfly’s life.

**Prerequisite skills and concepts:** random observations of butterflies and moths.

**Exploration Phase:**

**Objectives:**

1. Students will brainstorm what they know about butterflies and moths.
2. Students will observe butterflies and moths at the school playground and in the classroom for specific purposes.

**Materials:** teacher made observation booklets. (Can be a butterfly shape book or simple 5” X 7” sheets of paper stapled together.) video Eyewitness: *Butterfly and Moths*, Magic School Bus: *Butterflies*.

**Introduction to Lesson:** “Tell me what you know about butterflies and moths.” (May use charts or pictures of insects.)

**Procedure:**

1. Using a Venn diagram, teacher will record student responses to the above question.
2. Make Fluttery Snacks
   - Ingredients: one celery stick per student, twist pretzels, spreadable cheddar cheese or peanut butter, raisins, broken pretzel pieces.
   - Directions:
     a. Fill celery with cheese or peanut butter.
     b. Press two twist pretzel wings in place.
     c. Add two pretzel pieces for antennae and two raisin eyes.
     d. Enjoy!
3. Watch video and enjoy snack.
4. Discuss video. Make changes on Venn diagram.

After viewing the video, the student will record observations in their booklet by drawing pictures of butterflies and moths.
**Evaluation:** Teacher will monitor changes to the Venn diagram. Drawings made in observation booklets will be checked and shared for class information and reference.

**Invention Phase:**

**Objectives:**
1. The student will learn about the four stages of metamorphosis.

**Materials:** Plastic models of metamorphosis, magnifying glasses, butterfly habitat, paper plates, pom poms, twigs, tissue paper, glue rice, yarn, and pipe cleaners.

**Procedures:**

1. Provide many books about butterflies. (Read selected books from reference list)
2. Assemble purchased butterfly habitat in the classroom.
3. After studying plastic model of metamorphosis, construct a life cycle wheel.
   a. Gather twigs and leaves from the playground.
   b. Divide a paper plate into four equal sections.
   c. In section 1, glue a twig and a leaf. On the leaf, glue one grain of rice to represent a butterfly egg. (egg stage)
   d. In section 2, glue a leaf. Then construct a caterpillar out of pom poms. Don’t forget wiggle eyes and antenna from pipe cleaners! Glue the caterpillar on the leaf. (larva stage)
   e. In section 3, construct a chrysalis out of yarn by wrapping the yarn around a twig. Glue the twig to the paper plate. (pupa stage)
   f. In section 4, make a butterfly using pipe cleaners and tissue paper. (adult stage)

**Evaluation:**

Teacher observation of the life cycle wheel.

**Expansion Stage:**

**Objectives:**
1. Students will learn about migration routes of the monarch butterfly.

**Materials:**

1. Fabric map of North America, milkweed plant, monarch migration game. (see reference section for directions)

**Procedures:**

1. Question the students, “Tell me what you know about migration.”
2. Read *Monarch Magic*.
3. Discuss information gathered from the story.
4. Show the milkweed plant and discuss the monarch’s dependence on this plant as a food source.
5. Review the life cycle of the butterfly. Discuss the importance of the milkweed plant to the survival of the monarch. Monarchs can only be found in regions where milkweed is plentiful.
6. Using the fabric map, teacher will illustrate the migration patterns of the monarch butterfly.

Evaluation:

1. Students will be divided into cooperative groups to play the butterfly migration game.
2. Teacher will monitor groups for appropriate responses.