Fostering Inquiry-based Natural Discovery Science
(F.I.N.D.S.)

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Team Teacher Plan

August – A meeting with our building principal was held to discuss the plans for our upcoming project.

August 22 – Planning of the classification lesson and student groupings as well as constructing the Classifying Fun Bags to be used for activity was completed.

August 29 – Completion of the classification lesson with our students and evaluation of the success of the lesson after school took place on the 29th.

September 4 – The classification of fish lesson was completed with the third grade under the observation of Mr. Eckart.

September 5 – Mr. Eckart completed the Potato chip classification lesson with the fifth grade students while Mrs. Collins observed.

September 9 – Goals for culminating activity were set. Materials were selected and created for student use and parent letters and bus request were written.

September 23 – On September 23rd, we met at the outdoor classroom pond to complete lesson plans, familiarize ourselves with the area and prepare for the lesson.

September 25 – Preparation of student packets and organization of student groupings with teachers and volunteers was completed on the 25th.

September 26 – On September 26th, the third grade and fifth grade students took their field trip to the pond to complete the culminating activity.

September 27 – Thank you notes were sent to volunteer parents and grandparents on the 27th of September and we picked up microscopes from the middle school.

September 28 – On the 28th of September, we combined classes for observation and identification of organisms that were collected at the pond. Students used microscopes, magnifying glasses, Pond Life, and other reference books in order to complete this task.

October 14 – The 14th of October provided us with time to plan our in-service/workshop sharing with building science teachers using “Inquiry Made Easy” and writing lesson plans using the exploration, invention, and expansion stages.

October 22 – On October 22nd, we completed our in-service at West Elementary with the other science teachers during the K-8 Plan/Work Day.
LESSON INFORMATION - CLASSIFICATION

KEY IDEA: What is classification?

GOAL: Students will explore ways to classify.

EXPLORATION PHASE:

OBJECTIVES:

1) Students will work in cooperative groups to classify objects in their Fun Bag.
2) Cooperative groups will record why objects were grouped together.
3) Students will work in cooperative groups to reclassify the objects in their Fun Bag in a different way.
4) Groups share ways objects were classified and why they did this.

MATERIALS:

Fun Bags – Bags filled with assortment of objects. For example, one bag may be filled with paper clips, a coin, a safety pin, crayons, chalk, a cardboard tube, paper, rubber bands, etc.

QUESTION: Do scientists do what you just did? If so, why? When? If not, why not? Students discuss this in cooperative groups and reporter shares the answers.

ASSESSMENT: Students will be monitored for participation in the discussions by offering and listening to ideas.
INVENTION PHASE

OBJECTIVES:

1) Students will understand why scientists use classification.
2) Students will define classification, vertebrate, and invertebrate.
3) Students will classify organisms as vertebrate or invertebrate.

MATERIALS:

Vocabulary word cards
Vertebrate/invertebrate posters
Specimen jars of vertebrates/invertebrates
Bones from vertebrates
Picture cards of a variety of organisms

PROCEDURE:

1) Give students information and definition of classification.
2) Introduce classification of animals as vertebrates or invertebrates.
3) Using posters, students learn the definition of vertebrate and invertebrate.
4) Students feel their own vertebrates.
5) Students observe specimen jars and vertebrates.
6) Students are given picture cards to classify as vertebrates or invertebrates.

ASSESSMENT: Teacher observation if student places picture card in correct class.

EXPANSION PHASE

OBJECTIVES: Student will build a paper model of a vertebrate or invertebrate.

MATERIALS:

Scissors
Glue
Colored Pencils
Crayons
Paper Models

ASSESSMENT: Instructor will check student work samples and ask questions for understanding of classification as students are working.
LESSON INFORMATION – BINOMIAL CLASSIFICATION

EXPLORATION PHASE

KEY IDEA: Students will classify items by using a dichotomous key

GOAL: Students will observe characteristics of items and classify items by using and making a dichotomous key.

PREREQUISITE SKILLS AND CONCEPTS: Students should know why we classify items.

OBJECTIVE: Students will use a dichotomous key to get a creature in its own group.

MATERIALS:

Copies of Classification: Why Classify?
Copies of Creature Feature

PROCEDURE:

1) Review why we classify from previous lesson.
2) Read Classification: Why Classify?
3) Pass out Creature Feature Sheet (Guided Practice)

EVALUATION: Check students Creature Feature Sheet for correctness.

INVENTION PHASE

OBJECTIVE: Students will make their own dichotomous key using creatures from Creature Feature Sheet number two.

MATERIALS:

Creature Feature Sheet #2
Crayons
Scissors
Construction paper (12" by 18")
PROCEDURE:

1) Pass out Creature Feature Sheet #2.
2) Students color out creatures.
3) Students cut out creatures.
4) Students make their own dichotomous key to get creatures by themselves.
5) Students make key on construction paper and glue down creatures where they belong on their key.

EVALUATION: Students will be evaluated through the correctness of their dichotomous keys.

EXPANSION PHASE

OBJECTIVES: Students will observe characteristics of several kinds of potato chips and make a dichotomous key.

MATERIALS:

Paper
At least eight kinds of potato chips

PROCEDURES:

1) Students will observe characteristics of chips.
2) Students will make a dichotomous key to classify chips.

EVALUATION: Check students' dichotomous keys for correctness.

SCIENCE STANDARD NUMBER ONE
LESSON INFORMATION – LEVELS OF CLASSIFICATION

KEY IDEA: Levels of Classification from Kingdom to Species

GOAL: Students will learn and apply the levels of classification to organisms.

PREREQUISITE SKILLS AND CONCEPTS: Students must know why scientists classify and how to use a dichotomous key.

EXPANSION PHASE

OBJECTIVES:

1) Students will brainstorm what they know about the levels of classification. These items will be put on a KWL chart.
2) Students will organize cards with grocery store items from general to specific.

MATERIALS:

Six sets of grocery store cards

PROCEDURE:

1) Ask students what they know about levels of classification.
2) Pass out grocery store cards to groups of four.
3) Students will organize cards into appropriate groups.

EVALUATION: Check each group’s cards for correct organization.

INVENTION PHASE

OBJECTIVE: Introduce the levels of classification used by scientists.

MATERIALS:

Reference books
Paper
Pencil

PROCEDURE:

1) Review exploration lesson.
2) Introduce Kingdom, Phylum, Class, Order, Family, Genus, and Species.
3) Introduce the memorizing technique: King Philip Came Over for Good Spaghetti.
4) Look in reference books and write several examples of classification levels of an organism.
   Kingdom: Animalia, Phylum: Chordata, Class: Mammalia, Order: Carnivore, Family: Canidae, Genus: Canis, Species: Canis familiaris

EXPANSION PHASE

OBJECTIVE: Students will make a Hyperstudio Presentation showing the levels of classification for a specific animal.

MATERIALS:

Hyperstudio Program
Computer Lab
Reference Books

PROCEDURES:

1) Review of Hyperstudio Program from technology class.
2) Students look in reference books to find classification levels of a particular animal.
3) Create Hyperstudio presentation with buttons to move sequentially through cards.
   Card One – Common Name of Animal
   Card Two – Kingdom
   Card Three – Phylum
   Card Four – Class
   Card Five – Order
   Card Six – Family
   Card Seven – Genus
   Card Eight – Species

EVALUATION: Instructor will check Hyperstudio Presentation for completeness and correctness.

SCIENCE STANDARD NUMBER ONE
LESSON INFORMATION – FIVE KINGDOMS

KEY IDEA: Scientists put all organisms into 5 Kingdoms.

GOAL: Students will observe examples of each Kingdom and learn the five Kingdoms.

PREREQUISITE SKILLS AND CONCEPTS: Knowledge of levels of classification and of the Plant and Animal Kingdoms.

EXPLORATION PHASE

OBJECTIVES:

1) Students will observe a sample of each Kingdom using their eyes, a magnifying glass and microscopes.
2) Students will draw a picture of each sample they observe.

MATERIALS:

Drawing paper
Crayons
Plant sample
Animal sample
Fungi sample – mushroom
Protist sample – algae slide
Moneran sample – bacteria slide
Microscopes
Hand lenses

PROCEDURE:

1) Each student will observe each sample and draw a picture of what they see.

EVALUATION: Check student drawings.

INVENTION PHASE

OBJECTIVES:

1) Students will identify each Kingdom.
2) Students will identify characteristics of each Kingdom.
MATERIALS:

Core Knowledge pages – Five Kingdoms
Paper
Pencil

PROCEDURES:

1) Read Core Knowledge pages – Five Kingdoms.
2) List characteristics of each Kingdom.
3) List common examples of each Kingdom.

EVALUATION: Instructor will check student’s notes over the Core Knowledge pages on the Five Kingdoms.

Forty-four third grade students were given the page “Where Do They Belong” as a pretest to classifying animals according to class. The pre-test average score was 48%. The same page was given as a post-test after the classifying lessons were taught. The average post-test score was 84%.
LESSON INFORMATION – CHARACTERISTICS OF FISH

KEY IDEA: What are the common characteristics of fish?

GOAL: Students will know the characteristics of fish: vertebrate, cold-blooded, hatch from eggs, aquatic, have scales and breathe through gills.

PREREQUISITE SKILLS AND CONCEPTS: Students must have an understanding of characteristics and classification prior to completing this activity.

EXPLORATION PHASE

OBJECTIVE: Students will record in a science journal and add to the class KWL chart.

MATERIALS:

One goldfish for every four students
Clear containers
Fish food
Science journals
Chart paper

PROCEDURE:

1) Students will record in their science journals what they think they know about fish.
2) Cooperative groups will observe goldfish in clear containers.
3) Students will record questions they have about fish after their observation time.
4) Students will make a class list of what they think they know.
5) Students will make a class list of questions they have about fish.
6) Students will learn the meaning of the word “aquatic”.

EVALUATION: Students will be evaluated through their science journal entries.
INVENTION PHASE

OBJECTIVES: Students will learn the characteristics of fish.

MATERIALS:

Book:  *What is a Fish?*
Worksheet of fish shape for listing characteristics

PROCEDURES:

1) Begin by reading the book *What is a Fish?* aloud to the class.
2) Record the answers to the questions of the KWL chart.
3) List and discuss the characteristics of fish.

EVALUATION: Student will be evaluated on their list of characteristics, which was created on fish shaped paper or fish worksheet.

EXPANSION PHASE

ART: Students will spray paint a fish skeleton.

MISCELLANEOUS: Students will set up a classroom aquarium.
LESSON INFORMATION – AMPHIBIANS AND REPTILES

KEY IDEA: The key idea of this lesson is the classification of amphibians and reptiles.

GOAL: Students will learn the characteristics of amphibians and reptiles.

PREREQUISITE SKILLS AND CONCEPTS: Students must have an understanding of classification.

EXPLORATION PHASE

OBJECTIVE: Students will complete a KWL chart on reptiles and amphibians.

MATERIALS:
- Chart paper
- Science journals

PROCEDURE:
1) Students record what they think they know about amphibians and reptiles in their science journals.
2) Students will write their questions about amphibians and reptiles in their science journal.
3) Students will create a class chart using student information.

EVALUATION: Students will be evaluated through the use of their science journal entries.

INVENTION PHASE

OBJECTIVES:
1) Students will learn the characteristics of reptiles and amphibians.
2) Students will compare the differences and similarities of reptiles and amphibians.
3) Students will identify animals as amphibians or reptiles.

MATERIALS:
- National Geographic video: Amphibians and Reptiles
- Wall posters
- Science journals
- Venn Diagram worksheet
PROCEDURES:

1) Students will watch the Amphibians and Reptiles video.
2) Students will then record the facts they have learned in their science journals.
3) Using the information from the video, students will answer questions on their KWL wall chart.
4) Students will read the information contained on the amphibian and reptile wall posters.
5) Students will complete a Venn diagram comparing reptiles to amphibians.

EVALUATION: Student evaluation will be based on the correct completion of the Venn diagram.

EXPANSION PHASE

MUSIC: Students will learn the song “Salamanders and Frogs” from the Dirt Made My Lunch tape.

MISCELLANEOUS: Students will play a game of concentration using picture cards of reptiles and amphibians.
LESSON INFORMATION – CULMINATING ACTIVITY
TRIP TO OWLS POND

KEY IDEA: The key ideas of the culminating activity are the observation, identification and classification of aquatic organisms.

GOAL: Students will apply knowledge gained through previous lessons in a real world aquatic environment.

PREREQUISITE SKILLS AND CONCEPTS:

PREPARATION FOR TRIP: In order to prepare for the trip, dates must be set in advance, parent letters must be sent home, adult volunteers must be recruited and teachers must complete an on-site visit to familiarize themselves with the area.

EXPLORATION PHASE

OBJECTIVES:

1) In cooperative groups, students will brainstorm and predict what they may observe and find at the pond.
2) Students will become familiar with the tools and resources that will be available to them for use at the pond.

MATERIALS:

Aquatic nets
Field guides
Trays
Magnifiers
Clear containers

PROCEDURES:

1) Introduce students to the lesson by asking the question “If we travel to a pond, what might we find and see?”
2) Have students brainstorm and record their predictions in response to this question.
3) Discuss, as a class, the predictions and create a list of these predictions on the class chart.
4) Hand out the Pond Life Golden Guides and have students preview these.
5) Demonstrate the proper use of tools and the proper methods for collecting and observing organisms.
6) Discuss rules for learning at the pond area.
EVALUATION: Each cooperative learning group will collect aquatic organisms at the pond.
INVENTION PHASE

OBJECTIVE: Students will use Pond Field Guides, collection equipment, magnifiers, microscopes, and science journals to collect and identify organisms from an aquatic environment.

PROCEDURE:

1) Review learning rules with students.
2) Give students activity lessons to be completed.
3) Students sit or stand where they can observe the pond and listen from a distance without talking.
4) Using collection tools, students will collect organisms.
5) Students will observe and identify the organisms collected.
6) Students will then record their findings.
7) Teachers will release organisms back into their habitat.

EVALUATION: Students will be evaluated on their completion of an identification list with classification information.
REFLECTION

The three lessons that our students completed together were very successful. The students’ unit science tests reflected their learning and understanding of classification at both the third and fifth grade levels. Third grade especially enjoyed being a science buddy with a fifth grade student. The third graders often ask if we will be doing more science with the fifth graders.

We found the lesson-planning guide from F.I.N.D.S. was very helpful as we planned our lessons and activities. We will continue to use this as we plan units for our individual classrooms. We also shared our lessons and the guide with the other science teachers in our building.

Our required curriculum limits our ability to do more team teaching in science during the school year. There were times in which the noise level was high and confusion appeared to exist during our lessons as a result of the high number of students involved. Observations indicated the students were actively involved and completing the assigned tasks.

This experience was very beneficial. We would consider repeating it in the future.