Butterfly Experiments – Grades 3 and up

Purpose:
To encourage student questioning and finding of answers through the use of science process. Students will brainstorm questions, make a hypothesis and collect data. They will be "helping" the garden discover answers to important questions.

Curiosity Classroom

1. Introduction /review of science process
2. Brainstorm student questions, allow students to work in small groups to generate a list of things they are interested in finding more about
3. As a whole group list different questions and select 2-3 questions to answer
4. Develop Experiment: Have students decide what methods we will use
5. Go into Indoor CG
6. Allow students to explore and collect data
7. Summarize data and draw conclusions, if time through graphing
8. Many questions might be unanswerable by a simple observation or experiment in the garden, but can be done at home or in the classroom. Use online Wonder Wall to follow up

Indoor Children's Garden

1. Brief introduction of the Garden
2. Exploration and observation as it relates to questions
3. Sketching and journaling: data collection

Name: _____
Date: _____

Butterfly and Plant Experiments

1. Ask a Question: Write your question about butterflies or plants.

_____

_____

_____

2. Research: Where can you look to find more information about your question? What other information will help you set up your experiment?

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3. Hypothesis: I think that…

_____

_____

4. Experiment: Materials and Methods

How are you going to set up your experiment?

_____

_____

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_____

What materials do you need? Make a list below.

_____

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_____

_____

_____

5. Collect Data: What things are you going to measure?

_____

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_____

How are you going to share your data with the 4-H Children's Garden?

_____

_____

_____

6. Explain Data: What does your data mean? Can you make a graph of your information? Was your hypothesis correct? Why or why not?

7. New Questions: What new questions do I have after all of this?

Butterfly Experiment 1: Do butterflies have a favorite color when they eat?

Purpose:
To focus on science process and doing science. Students will learn about science process, do some research, make a hypothesis and collect data. They will be "helping" the garden discover answers to important questions.

Indoor 4-H Children's Garden

1. Brief tour and introduction of the garden
2. Scavenger Hunt and Exploration
3. In amphitheater or classroom talk about what they observed, questions, something new, surprising, interesting

1. Visit "experiment stations" in the garden and take data
    a. Observe for a given time period
    b. Count number of butterflies that land on sponge
    c. Make observations on other things butterflies are doing – notes and drawings
    d. Take pictures??
2. Write wonder questions

Experiment:
Sponge color – blue, yellow, orange, red
(Need 4 to 5 observation places, data sheets, amount of time to watch)

Curiosity Classroom

1. Science process – what are the steps and what does it look like?
    a. Ask the question (and conversation): Do butterflies have a favorite color when they eat? How can we find out? Make initial hypothesis
    b. Research – use internet, books
    c. Hypothesis – Write on chalkboard and have students write down their own hypothesis
    d. Design experiment with students… How do they think we can find out?

1. Explain Data: Students can make a bar graph of their collected data. On overhead make a whole graph using all of the student data. Talk about the conclusions made from data.
2. Write wonder questions

Post visit

1. Follow up meetings using the internet (Online Wonder Wall) – set up to meet with groups for 10 minutes. Look and discuss results online…
2. Compare results to other classes
3. Ask questions – questions they would like to have answered, questions that could become an experiment for "Butterflies in the Garden"

Make: Data they have collected
Take: Butterfly plants
Leave: Questions and comments

Name: _____ Date:_____

Butterfly Experiment

Question: Do butterflies have a favorite color when they eat?

Hypothesis: (circle one color)
I think butterflies will like the Red Green Blue Yellow sponge best.

Data Collection:
Observe the butterflies eating from the sponge for 10 minutes. While you watch, count the number of butterflies that land on the sponge.

Count using tally marks:

Red	Green	Blue	Yellow

Notes: Write and sketch down any special things you see.

_____

_____

_____

_____

_____

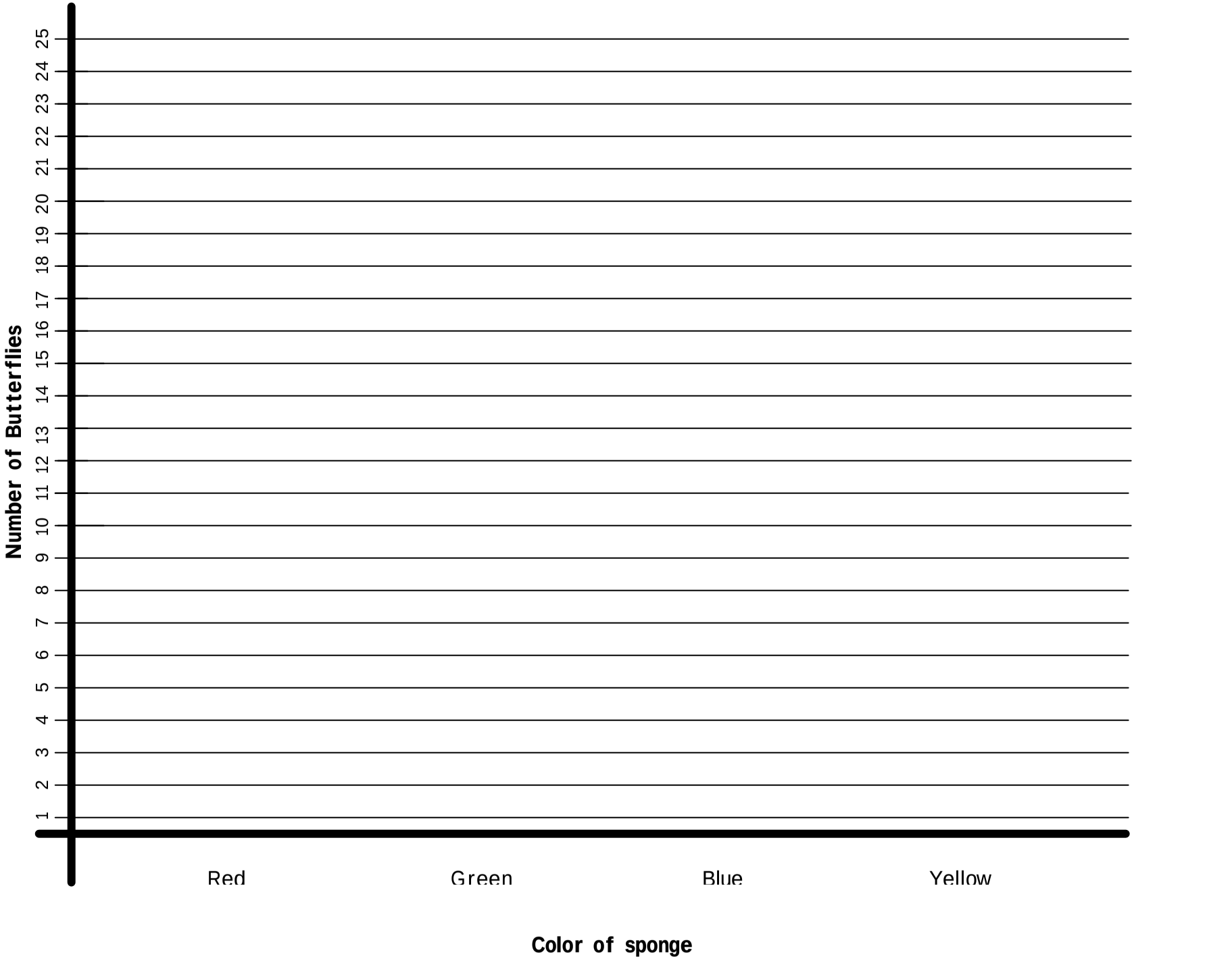
_____

_____

Butterfly Experiment

Do butterflies have a favorite color when they eat?

Type of butterfly: _____



Butterfly Experiment 2: What do butterflies *do* all day?

Purpose:
To focus on science process and doing science. Students will learn about science process, do some research, make a hypothesis and collect data. They will be "helping" the garden discover answers to important questions.

Indoor 4-H Children's Garden

1. Brief introduction and tour (5 min)
2. Scavenger Hunt and exploration
3. In amphitheater or classroom talk about what they observed, questions, something new, surprising, interesting

1. Students can begin at one of the 4-5 experiment "stations" based on their questions/ideas about what butterflies do.
    a. Observe for a given time period what butterflies are doing…students should choose different butterflies
    b. Make observations on other things butterflies are doing – take notes and drawings
    c. Take pictures
2. Write Wonder Questions

Curiosity Classroom:

1. Science process – what are the steps and what does it look like?
2. Start the experiment
    a. Ask the question : How long can butterflies fly? Have students make an initial hypothesis
    b. Research – use internet, books to see if they can find the answer
    c. Hypothesis – Write on chalkboard and in student journals/worksheet
    d. Experiment…Decide how to find out with students ideas

1. Explain data: Students work in small groups to make a concept map, share with whole group and write ideas on the board.

2. Ask NEW questions

Post visit

4. Follow up meetings using the Online Wonder Wall – set up to meet with groups for 10 minutes. Look at webcam to see butterflies?
5. Compare results to other classes
6. Ask questions – questions they would like to have answered, questions that could become an experiment for “Butterflies in the Garden”

Make: Data they have collected
Take: Butterfly plants
Leave: Questions and comments

Butterfly Observations: What do butterflies *do* all day?

Write your observations of butterfly behavior in the circles below.

Curriculum Standards and Benchmarks:

Butterfly Experiments

Science
Strand I. Constructing New Scientific Knowledge

Elementary:

1. Generate questions about the world based on observation.
   Key Concepts: Questions lead to action, including careful observation and testing.
2. Develop solutions to problems through reasoning, observation, and investigations.
   Key Concepts: (K-2) gather information, ask questions, think; (3-5) observe, predict, collect data, draw conclusions, conduct fair tests; prior knowledge.
3. Manipulate simple devices that aid observation and data collection.
   Tools: Various data collection tools suitable for this level, such as hand lenses, wind direction indicators…
5. Develop strategies and skills for information gathering and problem solving.
   Key Concepts: Sources of information, such as reference books, trade, books, magazines, websites, other people's knowledge.
1. Construct charts and graphs and prepare summaries of observations.

Strand II. Reflecting on Scientific Knowledge

Elementary:

1. Develop an awareness of the need for evidence in making decisions scientifically.
   Key Concepts: (K-2) observations; (3-5) data, evidence, sample, fact, opinion.
2. Show how science concepts can be illustrated through creative expression such as language art and fine arts.
   Key Concepts: poetry, expository work, painting, drawing, music, diagrams, graphs, charts.

4. Develop an awareness of and sensitivity to the natural world.
   Key Concepts: Appreciation of the balance of nature and the effects organisms have on each other, including the effects humans have on the natural world.

Strand III. 2- Organization of Living Things

Elementary:

4. Compare and contrast food, energy, and environmental needs of selected organisms.
   Key Concepts: Life requirements- food, air, water, minerals, sunlight, minerals, space, habitat.