

# **“Decomposition Detectives”**

## **by Helen de la Maza**

### **SYNOPSIS**

Students will learn about decomposition, fungus, bacteria, and invertebrates through an outdoor hands-on learning experience. They will use magnifying lenses to look for evidence of decomposition and decomposers.

### **VOCABULARY**

- decomposer
- decomposition
- fungus/fungi
- bacteria
- invertebrates

### **MATERIALS**

- Sidewalk chalk
- Photographs of worms, fungi, bacteria, invertebrates
- F.B.I. Name badges (sheets of sticky paper & markers)
- Hand lenses
- Chipboards/Clipboards
- Crayons
- Blank paper
- Vocabulary cards: F.B.I., fungus, bacteria, invertebrates, decomposers
- Moldy bread
- Compost w/ bugs and worms

#### **1) Set Induction**

- a) How many of you have ever been hiking before?
- b) How many of you have ever observed with any of your senses something in nature?
  - i) Today we are going to be nature detectives
- c) As we walk to our next stop, look at the animals and plants around you and count how many different kinds you see

#### **2) 1<sup>st</sup> Stop: Where do they go when they die?**

- a) Show me on your fingers how many different kinds of plants and animals you saw
  - i) Have students share examples
  - ii) Were they all alive?
- b) Did you see some dead stuff?
  - i) Share examples of dead stuff
  - ii) Did you see huge piles and piles of dead stuff? Did you see dead dinosaurs?
    - (1) Do you think very few things have died here in the past hundreds and hundreds and thousands of years?
      - (a) Then where did it all go?
- c) This mystery calls for a special kind of detective - an F.B.I. detective
  - (1) Raise your hand if you have ever seen a detective (Sherlock Holmes, Pink Panther,)
    - (a) Don "detective" wear (sunglasses, black tie, name badge)
    - (b) Hand out "F.B.I. detective" name badges
    - (c) Hand out magnifying lenses
  - ii) Think about this as we walk to our next stop... be an F.B.I. nature detective and use your lens to see if you can figure out where the dead stuff goes

- 3) 2<sup>nd</sup> Stop: Fungus
- a) Any ideas?
  - b) Hmm... while you think I'm going to have a little snack (pull out a moldy bread)... Oh No! What's going on here? Use your lens to examine my piece of bread
    - i) What is it? (fungus). Everyone say **fungus** [show vocabulary card]
      - (1) Show the body sign for fungus (stand straight and put arms above head like a triangle to demonstrate a mushroom shape)
      - (2) Show photographs of different fungi
    - ii) What will eventually happen to this piece of bread? (fungus will overtake it, bread will disappear)
      - (1) What does the fungus do to the piece of bread (break it down)
    - iii) Have them draw the "body outline" (like F.B.I. detectives do), of a fungus
  - c) Hmmm... could fungus grow on dead things out here in nature?
  - d) Be an F.B.I. nature detective, look for fungus, and think about this as we walk to our next stop
- 4) 3<sup>rd</sup> Stop: Invertebrates
- a) Do you think fungus might eat and break down dead things out here? (yes)
    - i) You may not see it out here easily because it likes to grow in dark, damp places
  - b) What else might break down dead things?
    - i) How many of you have ever dug in the soil in your backyard? What did you find?
      - (1) I have some soil from my garden (show soil full of sow bugs and earthworms)
        - (a) These animals are invertebrates, do you know what that means?
          - (i) Everyone touch the bones that stick out below your neck - what is this? (backbone, spine)
            1. That is your vertebral column. Animals without a back bone are called invertebrates. Everyone say **invertebrate** [show vocabulary card]
          - (b) Show body sign for invertebrate (be wobbly as if you have no spine)
          - (c) Show photographs of invertebrates
          - (d) Do you think invertebrates might eat and break down the dead things out here? (yes)
          - (e) Have them draw the "body outline" of an invertebrate
  - c) As we walk to the next stop, be an F.B.I. nature detective and use your lens to find invertebrates. Count how many you find.
- 5) 4<sup>th</sup> Stop: Bacteria
- a) Show me on your fingers how many invertebrates you saw
  - b) Show "F.B.I." card: Did you notice that today we are being F.B.I. nature detectives, and so far we've figured out that **F**ungus and **I**nvertebrates break down dead things? [match fungus and invertebrate card with F and I on the F.B.I. card]
    - i) Do you think that maybe the third thing that breaks down dead things might begin with the letter "B"? (yes!)
      - (1) Anyone know what it is?
        - (a) How many of you have ever been sick and had to go to the doctor and you had to take antibiotics?
          - (i) The same kinds of organisms that make you sick also live in your body normally and help you be healthy
            1. They can also break down dead things out in nature,
              - a. They are called **bacteria**. Everybody say **bacteria** [show vocabulary card]
            2. In order to see bacteria, we would have to use a microscope, which is a much stronger kind of magnifying lens
    - (b) Show photographs of bacteria
    - (c) Show body sign for bacteria (be tiny and make a funny shape)

- (d) Have them draw the "body outline" of bacteria
  - c) What are the three things that break down dead things (fungus, bacteria, invertebrates) [show vocabulary card]
    - i) Repeat the three several times and have students show body signs
    - ii) Play "The FBI" verses 3 and 4 from the *Banana Slug String Band*
      - (1) Hand out the words to the students
        - (a) Have students sing along and do the body signs as they're sung in the chorus
  - d) There is a special scientific name that describes the category to which fungus, bacteria, and invertebrates belong – the role they play in the ecosystem - think of it as we walk to our next stop
- 6) 5<sup>th</sup> Stop: Decomposers
- a) Show me the signs and say the words for the three things that break down dead things (fungus, bacteria, invertebrates)
    - i) Anyone know their special name? (decomposers)
      - (1) Everyone say **decomposer** [show vocabulary card]
      - (2) Everyone say
        - (a) "Thank you decomposers!"
        - (b) "for breaking down all the dead things"
        - (c) "so I don't have to walk"
        - (d) "through piles of scat (poop) and dead things!"
    - b) Explain that decomposers are special not only because they eliminate the dead stuff, but because they break it down into a form that is usable again - nutrients are returned to the soil which plants need to grow
    - c) As we walk to our last stop, think about whether or not everything decomposes
- 7) 6<sup>th</sup> Stop: Do not decompose
- a) Does everything decompose?
    - i) Some things take a long long time to decompose
    - ii) [Throw plastic and trash on the ground] Do these things decompose? Not for a long time
      - (1) What should we do with these things and why?
        - (a) Put them in the trash because they will stay in nature for a long time
- 8) End: Check for Understanding
- a) Find one or two other people to work with and do the signs and say the name of the decomposers (fungus, bacteria, invertebrates)
  - b) Have the students make a half circle
    - i) Say an example of a decomposer and have them say the name and do the sign
      - (1) Mushroom (fungus)
      - (2) Things that live in your body that sometimes make you sick but others help you stay healthy (bacteria)
      - (3) Worms, beetles, pill bugs (invertebrates)
  - c) Why is decomposition important (gets rid of dead stuff and puts nutrients back in the soil for plants to use)
  - d) Does everything decompose? (no)
    - i) What doesn't? (synthetic materials)
    - ii) Tell the students to think about something they can do, starting Monday, to help keep things off the ground that do not decompose
      - (1) Have the students pair with another student and share their commitment
      - (2) Have that pair share their commitments with another pair
    - iii) Back in the large group, ask the students who wants to share something neat they heard somebody else was going to do

### **SCIENCE EXTENSIONS**

- Have the students collect data (e.g., presence/absence of species or groups of decomposers; species counts; length of decomposers found)
- Have the students develop a testable question/hypothesis, experiment/collect data on their “Decomposition Detectives” outing, then write a report detailing the scientific processes which they followed
- Construct bar graphs utilizing data collected during the “Decomposition Detectives” outing

### **MATH EXTENSIONS**

- Measure the decomposers found during the hike (use rulers, convert to metric)
- Grow mold on a piece of bread by doing the following: slightly moisten a piece of bread, touch it on a table top/surface counter/desk top, seal it in a plastic bag and keep it in a dark warm place. Take it out every few days and monitor/measure the spread of the mold.
- Use photos/diagrams/specimen/plastic models of decomposers to practice counting, adding, subtracting, multiplying, dividing, and working with fractions
- Construct bar graphs utilizing data collected during the “Decomposition Detectives” outing

### **LANGUAGE ARTS/ENGLISH LANGUAGE DEVELOPMENT EXTENSIONS**

- Read to the students from nonfiction books; have them read out loud to each other
- Have the students write a narrative description of their “Decomposition Detectives” experience
- Have the students make an oral presentation about their “Decomposition Detectives” experience
- Have the students research reference material to write an explanatory/informative report on decomposers
- Have the students make an informative oral presentation on topics covered in “Decomposition Detectives”