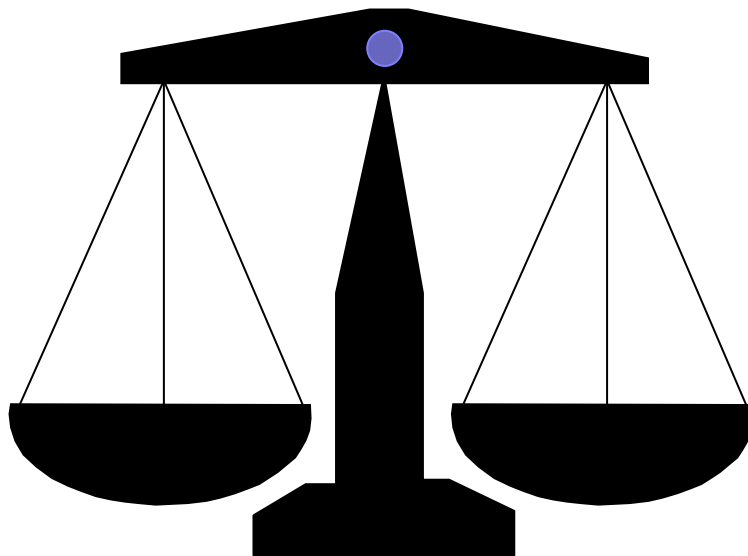


ELEMENTARY SCIENCE PROGRAM
MATH, SCIENCE & TECHNOLOGY EDUCATION

Elementary Science Program Assessment
3rd grade



Elementary Science Program Assessment

2nd grade

Overview

Students will rotate through stations that help assess a student's level of knowledge and understanding after completing the third grade science kits. Special emphasis is placed on observing, classifying, manipulating, measuring, communicating, and collecting data.

Scheduling

This kit contains five copies of five different stations. There are enough materials in the kit to set up each station in five different locations. Third grade teachers can decide if they want to set up all the stations in one location and have the classes rotate through the stations at a scheduled time or the stations can be set up in individual classrooms.

Materials to be obtained locally:

Water

Paper towels

Caution

Remind students to wash their hands after handling any of the materials in the kit.

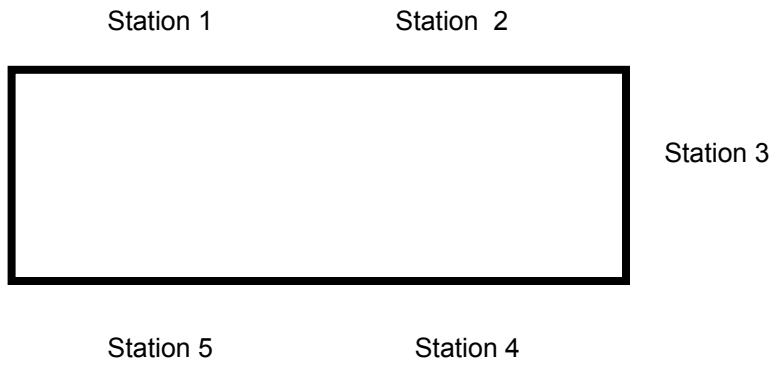
About the Format

Each station's directions in the teacher's guide is numbered and titled. Under each title is the task for that station.

The directions for the teacher in this guide are divided into two columns. The column on the left side of the page lists materials and preparation. The right column gives an explanation of how students will be completing each station.

There are **picture cards** provided in the kit to show how the materials at each station should be set up. These cards should be positioned above the materials at each station.

If all five stations are set up at the same time, the rotation of stations could be set-up as in the diagram below.



Background Information and Answers to the Stations

Station 1 – Floating

Students should observe that the wood ball in the salt water floats higher than the wood ball in fresh water. The salt added to the water makes the water denser. Liquids with a greater density push upon objects with a greater buoyant force. The greater density of the salt water increases the buoyancy of the objects placed in the salt water.

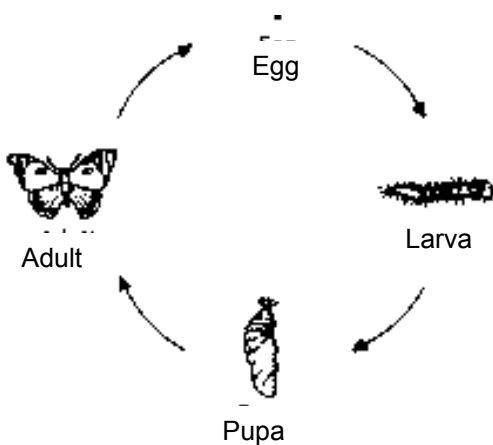
The questions students may ask will vary.
Questions that are acceptable may include the following:

Are the balls made of the same or different materials?
Is one ball hollow?
Are there different liquids in the cups?
Was salt added the cup where the ball floats higher?

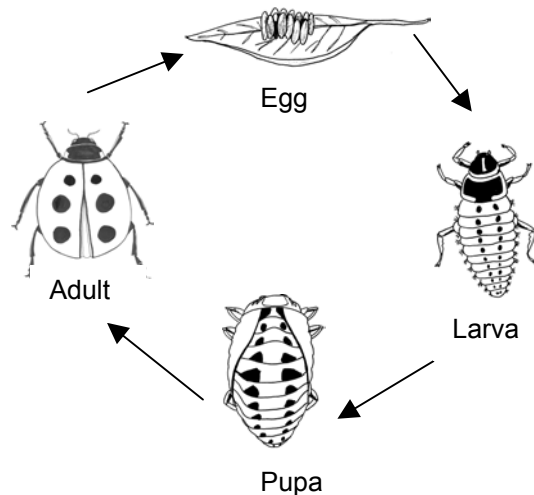
Questions that are not acceptable may include the following:
Why is one ball floating higher than the other?
One liquid is not water.
I think it is because one ball is heavier.

Station 2 – Life Cycle

Both the butterfly and the ladybug have a four stage metamorphosis or a complete metamorphosis. The four stages are shown below.



Butterfly Life Cycle



Ladybug Life Cycle

Each stage of the life cycle is important because it is a continuous cycle. The egg is the first stage of the life cycle, and it is where development begins. The larva then hatches out of the

egg. The larva stage is the growing stage. The larva eats, grows and develops until it is ready to change into the pupa stage. The pupa stage is a period of dormancy. This dormant stage is when the larva is transformed into the adult insect. In the adult stage, the insect does not go through any more physical changes. However, the adult female insect lays the eggs for a new generation of insects.

At this station, there are two pictures in which students must examine closely and decide which picture shows a moth and which shows a butterfly. Students list the indicators that led them to that identification.

Picture A shows a moth.

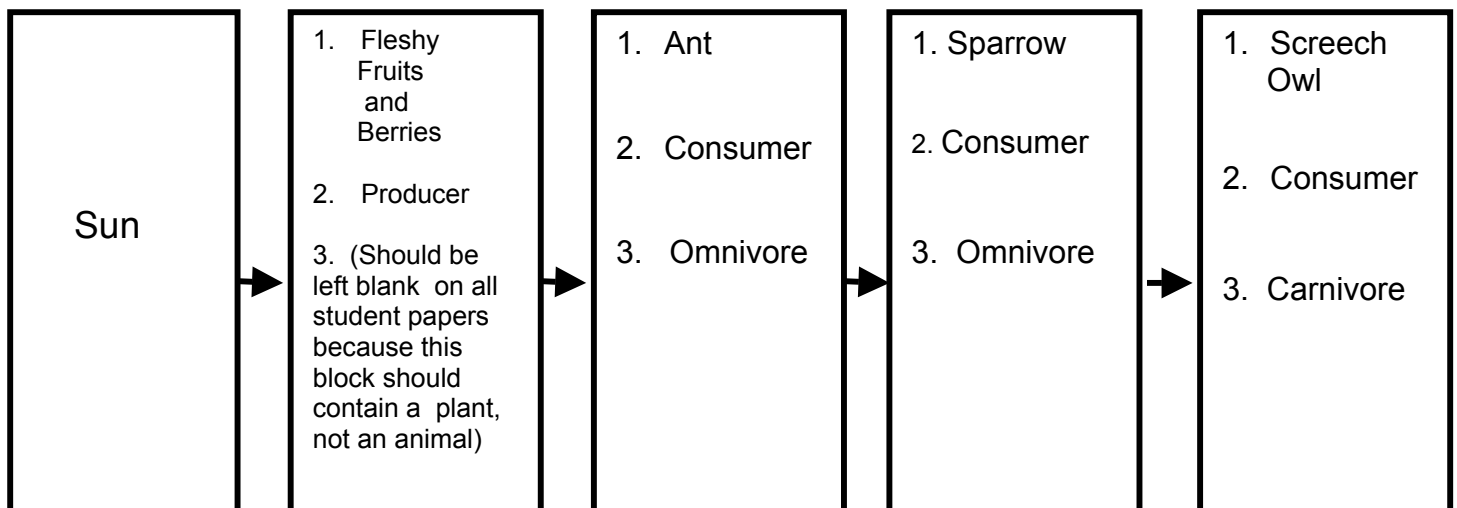
Picture B shows a butterfly.

Students could list the following identifiers from the picture:

Moth	Butterfly
Thick body Holding wings across body at rest Feathered antenna	Slender, long body Holds wings up at rest Antenna with knob at the end

Station 3 – Food Chains

The food chains students create will vary, however, they must be consistent with the information found on the plant and animal cards. A sample food chain may include:



If the item in the food chain is a plant, it is a producer. Plants produce their own food. Animals are consumers.

If the animal is a herbivore, it only eats plants. A carnivore only eats other animals and an omnivore eats both plants and animals. These answers can be determined by reading through the card of each animal and determining if it eats only plants, only animals, or plants and animals. The plants in the food chain should not be classified with the herbivore, carnivore, or omnivore label. Line #3 would be left blank for the plants in the food chain.

Broadleaf Plants	Producer	
Fleshy Fruits & Berries	Producer	
Grasses & Grains	Producer	
Seeds, Nuts, Acorns, Cones	Producer	
Woody Plants	Producer	
Ant	Consumer	Omnivore
Aphid	Consumer	Herbivore
Cat	Consumer	Carnivore
Caterpillar	Consumer	Herbivore
Centipede	Consumer	Carnivore
Cricket	Consumer	Omnivore
Frog	Consumer	Carnivore
Garter Snake	Consumer	Carnivore
Ground Beetle	Consumer	Omnivore
Hawk	Consumer	Carnivore
Jumping Spider	Consumer	Carnivore
Ladybug	Consumer	Carnivore
Mouse	Consumer	Omnivore
Orb-Weaver Spider	Consumer	Carnivore
Rabbit	Consumer	Herbivore
Raccoon	Consumer	Omnivore
Robin	Consumer	Omnivore
Screech Owl	Consumer	Carnivore
Snails & Slugs	Consumer	Herbivore
Sparrow	Consumer	Omnivore
Squirrel	Consumer	Omnivore
Toad	Consumer	Carnivore

Many conditions could effect a food chain so answers will vary. Some examples may be that a certain type of animal population changes, extreme weather conditions, a plant species is does not grow, or land conditions change.

Station 4 – Energy Forms

At this station, students are finding the mass of 35 unpopped popcorn kernels and recording their data on the chart on their answer sheet. It is important that students include the unit of measurement, (g), in their answer.

	MASS
35 popcorn kernels	Approximately 7 g

Students are then asked what would happen to the mass of the popcorn kernels if they were dried and if they were soaked in water. Answers will vary. Examples of acceptable answers are as follows:

If the popcorn kernels were to be dried, the mass of the kernels would decrease due to the water that would have evaporated from the kernels. The removal of the water reduces the mass of the kernels.

If the popcorn kernels were soaked in water, then the mass of the kernels would increase due to the water that would be absorbed by the kernels. The increase in water in the kernel increases the mass of the kernels.

Students then find the length of 35 unpopped popcorn kernels and record their data on the chart on their answer sheet. It is important that students include the unit of measurement, (cm), in their answer.

	LENGTH
35 popcorn kernels	27 cm

There is a picture at this station showing three objects that students are familiar with: a flashlight, a popcorn popper, a television, and a bell. Students examine the four pictures at this station. Then students read each statement in the chart describing an energy change. They are to write the name of the object from the picture card in the chart below next to the type of energy change that takes place within that object.

(Note: One object on the picture card will not be used for an answer.)

ENERGY CHANGE	OBJECT FROM PICTURE CARD
Electrical energy to light energy	Flashlight
Electrical energy to heat energy to mechanical energy	Popcorn popper
Electrical energy to light and sound energy	Television

Station 5 – Displacement

Students are to use the double pan balance to find the mass of the glass ball and the black rubber ball. It is important that students indicate the unit of measurement, (g), in their answer.

GLASS BALL	Approximately 23 g
BLACK RUBBER BALL	Approximately 10 g

When students place the glass ball in the 20 ml of water they should notice that the water level rises (to approximately 27 ml). When they place the black rubber ball in the water they should notice that the water level rises to the same level (to approximately 27 ml).

Water Level with Balls in the Water	Subtract	Beginning Water Level	Volume
Approximately 27 ml	-	20 ml	7 ml
Approximately 27 ml	-	20 ml	7 ml

There is a change in water level because the ball pushes aside (displaces) the amount of liquid in a container. The ball takes up the space the liquid once held.

Students should explain that even though the balls are different masses the water level in the medicine cup rises the same amount because the rise in water level is due to volume of the object. Volume is related to the amount of space an object takes up. Since both balls cause the water level to rise the same amount, the two balls are similar in volume.

Station 1 – Floating

Task: At this station, students will compare how two wood balls float in two different liquids and pose questions that, if answered, would provide information to help understand why the balls are floating differently.

Materials for each station:

Picture card for set-up
Answer sheet for each student
2 9-oz plastic cups
2 wood balls
1 teaspoon
1 jar of canning salt
water*
paper towels*

*provided by teacher

Preparation:

Fill each 9-oz cup 2/3 with water. Mix 4 teaspoons of salt into one cup of water at each station. Stir the salt into the water until it dissolves. Warmer water will help the salt dissolve. The water with the canning salt, after settling, will appear clear to the student.

The equipment at this station is to be set up exactly as it appears on the picture card provided in the kit. After students have completed this station, they are to arrange the materials as they found them so materials are ready for the next student.

At this station, students are to place two wood balls into the two cups of water. One cup contains water with four teaspoons of canning salt mixed within it, but students **do not know that**. Students are to only observe how the wood balls are floating in the water and pose questions about the ball or the water that, if answered, would explain why the wood ball floats differently in the two different liquids.

Students are to dry off the materials after they have been placed in the water.

Station 2: Life Cycles

Task: At this station, students will sequence pictures of the life cycle of a butterfly and another insect and explain the importance of each stage. Students will examine two pictures and identify each as a butterfly or moth and give two reasons for their identification.

Materials for each station:

Picture card for set-up
Answer sheet for each student
Picture A
Picture B
Scissors
Glue stick

* provided by teacher

Preparation:

The equipment at the station is to be set up exactly as it appears on the direction card provided in the kit. After students have completed a station, they are to arrange the materials as they found them so materials are ready for the next student.

At this station, students are to cut out pictures of the butterfly life cycle. Students are to paste the pictures in order on the chart on page 2 of their answer sheets. Students are to name each stage and explain its importance. Then students cut-out the pictures of the ladybug life cycle. Although students have not had direct experience with the ladybug at this grade level, this insect is one students are familiar with, and it also has a four stage metamorphosis. Therefore, the stages are similar to that of the butterfly. Students are to then paste the pictures in order on page 4 of their answer sheet and name each stage.

A picture of a butterfly and a moth are found at this station (Picture A and B). Students are to examine the pictures and identify which is a butterfly and which is a moth. On page 5 of their answer sheet, students make their identification and name two items on/about the insect that helped with their identification.

Station 3: Food Chains

Task: At this station, students will use the plant and animal cards to create a food chain, and name the plants and/or animals in this food chain as producers, consumers, herbivores, carnivores, and/or omnivores.

Materials for each station:

Picture card for set-up
Answer sheet for each student
Plant and animal cards

Preparation:

The sheets labeled plant and animal cards will need to be cut out for each station 3.

The equipment at the station is to be set up exactly as it appears on the picture card provided in the kit. After a pair of students has completed a station, they are to arrange the materials as they found them so the materials are ready for the next pair of students.

Students are to use the plant and animal cards at the station to create a food chain. Information about what the animal eats and what it is eaten by is provided on the cards. Students name the plants and animals in their food chain on line #1 in the boxes on their answer sheet. Each student's food chain may differ depending on the cards they use. On line #2 in the boxes on the answer sheet, they are to label the plant or animal as a producer or a consumer. On line #3 in the boxes on the answer sheet, students are to name the animals as herbivores, carnivores, or omnivores. Again, the information provided on the card of what the animal eats should be used to assist students in making this determination. Finally, students are to name two things on page two of their answer sheet that could effect a food chain.

Station 4 – Energy Changes Form

Task: At this station, students will find the mass and length of popcorn kernels and answer questions about how their mass would change if their a change was made to the kernels.

Students will examine pictures of objects and match the energy transformation descriptions with the pictures.

Materials for each station:

Picture card for set-up
Answer sheet for each student
Station 4 – Picture Card
Metric ruler (with center groove)
35 popcorn kernels
Balance base
Balance arm
Balance stand
Balance pin
2 baskets
2 paper clips
1 jar of 30 gram cubes
Aluminum foil

Preparation:

Assemble the double pan balance. Line the baskets of the balance with aluminum foil to keep the kernels from falling through the holes of the basket.

The equipment at the station is to be set up exactly as it looks on the picture card provided in the kit. After students have completed a station, they are to arrange the materials as they found them so the materials are ready for the next student.

At this station, students are finding the mass of 35 unpopped popcorn kernels and recording their data on the chart on their answer sheet.

Students are then given two questions. These questions asks students what would happen to the mass of the popcorn kernels if they were dried and if they were soaked in water.

Students then find the length of 35 unpopped popcorn kernels. To find the linear measurement of the 35 kernels, students can line the kernels in the groove of the metric ruler provided. Students are to line the kernels end to end. A diagram explaining proper set-up is provided on the answer sheet. They are to record their data on the chart on their answer sheet.

The picture card at this station shows four objects that students are familiar with: a flashlight, a popcorn popper, a television, and a bell. Students are to examine the four pictures at this station. Then students read each statement in the chart describing an energy change. They are to write the name of the object from the picture card next to the type of energy change that takes place in that object. (Note: One object on the picture card will not be used for an answer.)

Station 5: Displacement

Task: At this station, students will observe changes in water level when two balls of different masses are placed in water and explain their observations.

Materials at each station:

Picture card for set-up
Answer sheets for each student
Glass ball
Black rubber ball
2 medicine cups filled with 20 ml of water
Balance base
Balance stand
Balance arm
Balance pin
2 baskets
2 paper clips
Measuring cup (2/3 filled with water)
1 jar of 30 gram cubes
water*
paper towels*

* provided by teacher

Preparation:

Assemble the double pan balance. Fill measuring cup 2/3 with water. Students will use the water in this cup to fill their medicine cups to 20 ml.

The equipment at the station is to be set-up exactly as it appears on the picture card provided in the kit. After students have completed a station, they are to arrange the materials as they found them so the materials are ready for the next student.

Students are to use the double pan balance to find the mass of the glass ball and the black rubber ball. They are to record the mass of the balls on their answer sheet.

Then students are to fill the two medicine cups with 20 ml of water. The water is provided in the measuring cup at the station. Students are to observe the water levels when they place the balls in the water. Students then describe their observations on their answer sheet. Students are to then provide an explanation of why they believe these results are occurring.