PHILLY SCIENTISTS

exploring our city

Instructor Manual – Fall 2018

WELCOME

Dear Teacher,

The Philly Scientist Team would like to sincerely thank you for participating in this research project. We understand that being part of a research project can be a large undertaking, and we want to make sure we respect your time and commitment throughout this process.

It is of utmost importance that we recognize you as the classroom expert. Because this is a project that incorporates modifications each implementation cycle, your feedback is welcomed and necessary. The support team will be present to answer any questions and provide support materials throughout the curriculum. Once the curriculum has been completed, we will schedule an exit interview with you. In this exit interview, we want to clarify observation notes that were kept throughout the entire curriculum. We also want to hear your candid perspective on successful curriculum features and areas of improvement. For example, please feel free to modify the curriculum to fit your teaching style. If you add any additional resources, please share those with us. Also, your feedback is requested for how your experience was with the professional development session, technology usage, and Next Generation Science Standards inclusion.

Again, we sincerely appreciate your participation in this project. We hope you enjoy working with us as much as we look forward to learning from and working alongside you. We look forward to working with you to cultivate the next generation of emerging scientists.

Please let us know how to best support you during this implementation.

Happy Tracking!

The Philly Scientist - Curriculum Team (2018-2019)

Guillermo Ibarrola Recalde, Graduate Research Assistant.

Winnie Black, Co-Principal Investigator.

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Nancy Songer, Principal Investigator.

CURRICULUM STORY

Blue = Science & Engineering Practices
Orange = Disciplinary Core Ideas
Green = Crosscutting Concepts

Lesson Overview	3D Learning Goal	Career Awareness
Lesson 1: Solving the Mini-Beast Mystery (90 min) **Badge 1: Mini-Beast Tracker**	**Students construct a claim based on evidence about whether their Mini-Beast is an insect.**	Students will focus on critical thinking to identify scientific skills needed to be a tracker.
Lesson 2: Tracker Observations (90 min) **Badge 2: Urban Tracker**	**Students make observations of plants and animals in their schoolyard.**	Students add their observations to the Philly Scientists database.
Lesson 3: Tracking Animals and Plants in your Schoolyard (90 min) **Badges 3: Field Researcher**	**Students collect animal and plant data within a zone of their schoolyard/ neighborhood.**	Students use technology as a data organization and collection tool.
Lesson 4: Tracking the Biodiversity in your Schoolyard (90 min)	**Students create a claim backed with evidence about which zone has the lowest biodiversity.**	Students engage in critical thinking by making a claim supported with evidence.
Lesson 5: Energy in a Food Web (90 min)	**Students create a claim backed with evidence using their own data to illustrate a food chain.**	Students use problem solving skills to explain energy flow in a food web.
Lesson 6: Improving Biodiversity in my Neighborhood (90 min) **Badge 4: Solution Generator**	**Students create a solution (claim) backed with evidence to increase neighborhood biodiversity.**	Students conduct research to find a solution that increases neighborhood biodiversity.
Lesson 7: Tracker Planning (90 min)	**Students create a display of their biodiversity solution in written text, tables, diagrams, and/or charts (patterns).**	Students create a display of their solution.
Lesson 8: Tracker Communication (90 min) **Badge 5: Completion badge**	**Students communicate scientific and/or technical information on their biodiversity solution and evaluate competing design solutions provided by other teams (patterns, systems and system models, and stability and change).**	Students communicate their scientific claims, evidence, and solutions to the science community.
Total: 10.5 hrs w/o summit; 12 hrs w/ summit **Total 45 minute periods: 14 w/o summit**		

LESSON 1

Title: Solving the Mini-Beast Mystery.
Learning goal: Students construct a claim based on evidence about whether their Mini-Beast **is an insect.**
Career Awareness: Students will focus on critical thinking (to identify whether or not the Mini-Beast is an insect).
Investigation Question 1: Is your Mini-Beast an insect?
Badge 1: ***MiniBeast Tracker -*** *Discover a Mini-Beast and use evidence to decide if it's an insect.*

	**Lesson Overview:** • Students use the Philly Scientist App on iPads to identify Mini-Beasts. • Students are introduced to making a scientific claim and supporting it with evidence through a Tracker Letter. • Activity Sheet 1: Picture Identification. • Activity Sheet 2: Mystery Mini-Beast.
	**Total Time:** 90 min or two 45 minute periods.
	**Materials:** • iPads (1 iPad per 2-4 students). • Lucite animal samples (provided by Drexel Support Team). • 1 portfolio per student. • Tracker Letters (provided by Drexel Support Team; 1 letter per 2-4 students).
	**Before You Begin:** • Familiarize yourself with the history of the Philly Scientists App and Art of Tracking, https://www.cybertracker.org/ • Walk through using the Philly Scientists mobile app on iPads for collecting data on living things. • Check with your Drexel classroom support person to make sure you have iPads ready to go (Philly Scientist App is on each one). • Familiarize yourself with Lesson 1 Key Terms.

Introduction to Animal and Plant Tracking (45 min.):

1. **Engage students in a class discussion.**
   A. What do scientists do? Do you know any scientists? What do they do?
   B. Have you heard of an animal tracker? What might they do?
   C. Now you are a Tracker! Your first Tracker job is to use the Philly Scientists App to learn more about one animal.

2. **Walk students through making a claim and supporting it with evidence.**
   A. Introduce the Philly Scientists App and how to do an observation activity
   B. Teacher picks up a lucite animal and introduces the Philly Scientist App on the iPads.
      i. Teacher walks through the steps of the app using the lucite animal.
      ii. Encourage the students to use the "Notes" screen to add additional comments about the animal, where it was found, what it was doing, color or markings, etc.

3. **Complete *Lesson 1: Activity Sheet 1* - Picture Identification.**
   A. Students are given one lucite animal and one iPad per table.
   B. Students practice using the Philly Scientists App by inputting the lucite animal data.
      i. Make sure students know how to turn the iPad on, adjust the brightness, and open the app.
      ii. Show students how to edit an observation.
      iii. If time allows, have groups exchange lucite animal with another group.
      iv. If time allows, each group should enter 2 observations of 2 different animals.

4. **Discussion and wrap-up.**
   A. Collect iPads and lucite animals.
   B. Class discussion of observations can be led by these questions:
      i. What did you learn about your animal?
      ii. What did you learn about what makes a good observation?
   C. Explain Philly Scientists Student Badges.
      i. Focus on the Learning Pathway (poster).
      ii. Mention receiving the Mini Beast Tracker Badge for making good observations of the lucite animal.
      iii. Explain to students there are more badges to gain.

Time check! This is a good place to **stop** in Lesson 1 if you are out of time.

Directions for Tracker Letter (45 min.):

1. **Begin a discussion about the Philly Scientists Badge Learning Pathway.**
   A. What badge did you earn in the last lesson?
   B. How did you earn it?

2. **Introduce Tracker Letters.**
   A. Have students read and discuss amongst themselves how to pronounce the tracker names and what they mean.

3. **Students work in groups to complete observations about their Mini-Beast from Tracker Letters.**
   A. Encourage students to talk with their group about the animal characteristics.
      i. Number of Body Parts.
      ii. Number of Legs.
   B. Tell the class that they received letters from professional Trackers that will help them to know their next activity as Trackers.
   C. Have students stay in the same groups of 3 or 4.
   D. Give each group a Tracker Letter. Ask them to read the letter and discuss the challenge they are given by their Tracker.
   E. Lead students through a discussion of what is a claim? What is evidence?
   F. Guide them through making a claim backed with evidence in ***Lesson 1: Activity Sheet 2*** **-** The Mystery Mini-Beast.
      i. Have the students complete the claim by writing "is" or "is not" in the blank.
      ii. After students have worked for a bit on the claim-evidence section, lead a discussion of claim and evidence with these suggested questions:
   G. What is a claim? What claims did different groups develop?
   H. What is evidence? What evidence did different groups develop?

4. **Lesson 1 wrap-up**
   A. Tell students that next class they will be going outside as Tracker teams to collect information about living things in their schoolyard.
   B. They should wear appropriate outdoor clothing for the next lesson (long pants and closed-toed shoes), Resources.

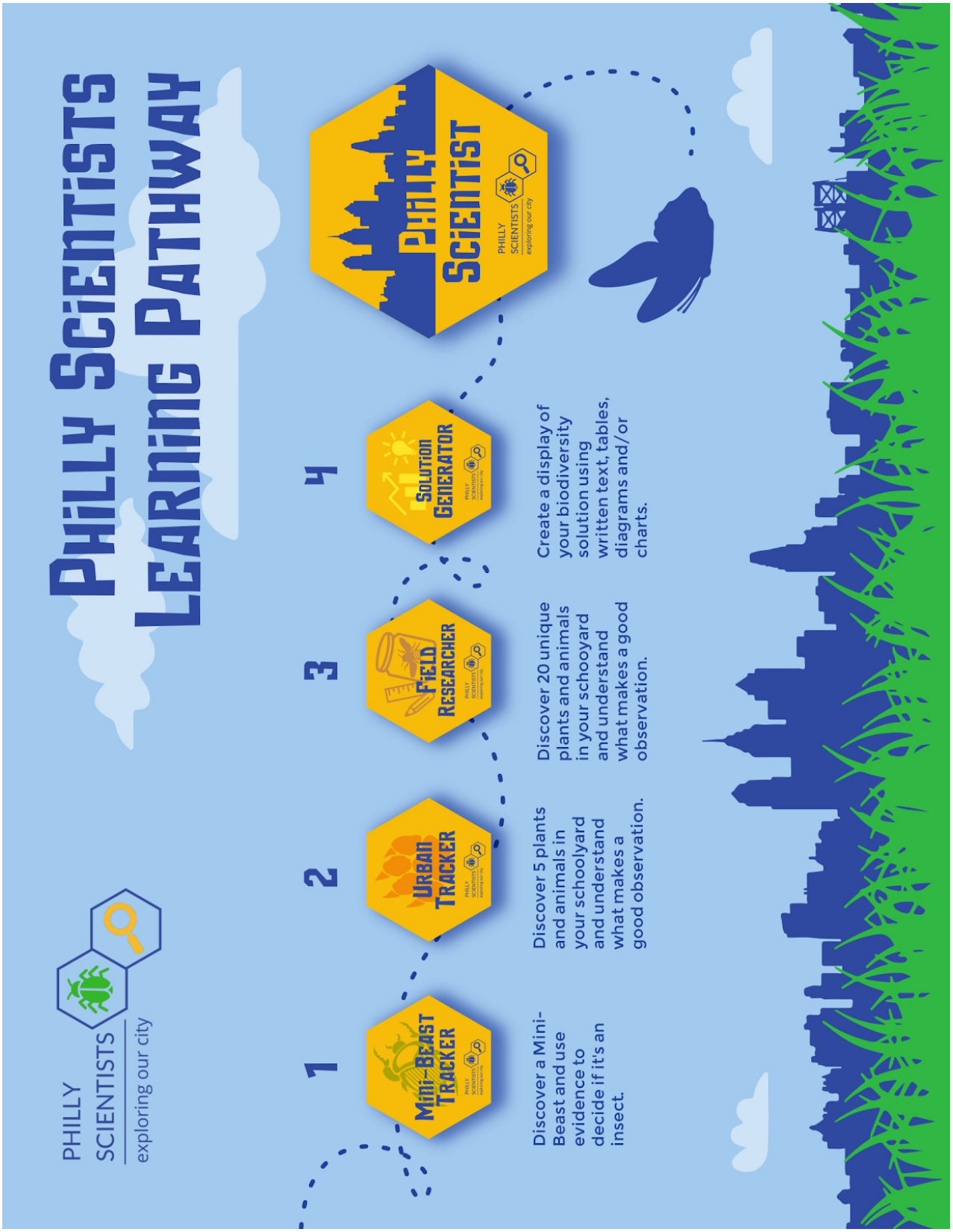
Key Terms –

Characteristics: Features of an animal or plant that help to identify it.
Scientists collect data on animal characteristics to learn about their similarities and differences in order to classify them.

Claim*: A complete sentence that answers the investigation question.
Scientists make claims about our world that are based on scientific data.

Evidence*: Observations, data or information that helps you answer the scientific question.

Philly Scientists Learning Pathway for Badges



Tracker Names

Isoke [pronunciation: ih-so-key] is from Nigeria. Her name means "a beautiful gift," so her icon is a wrapped present.

Faraji [pronunciation: fuh-rah-jee] is from Kenya. His name in Swahili means "consolation". His icon is fire because his father says he has such a fiery spirit.

Rakanja [pronunciation: ruh-kahn-jun] is also from Kenya. Her icon is an antelope skull because she found one of these once and keeps it as a special treasure.

Sanjo [pronunciation: sahn-joe] lives in Nigeria. Among the Yoruba people her name means "one who appreciates the past". Her icon is a sunrise.

Aren [pronunciation: air-en] is also from Nigeria. His icon is an eagle which is what his name means.

Zahra [pronunciation: zah-rah] is from Uganda. Her name means "flower" in Swahili.

Miniya [pronunciation: min-ee-yuh] is from Ethiopia. Her icon is a snake because as a child she was bitten by a snake. She survived and became an expert tracker.

Alem [pronunciation: ah-lem] is a tracker from Eritrea, neighbor to Ethiopia. His name means "world", so his icon is the Earth.

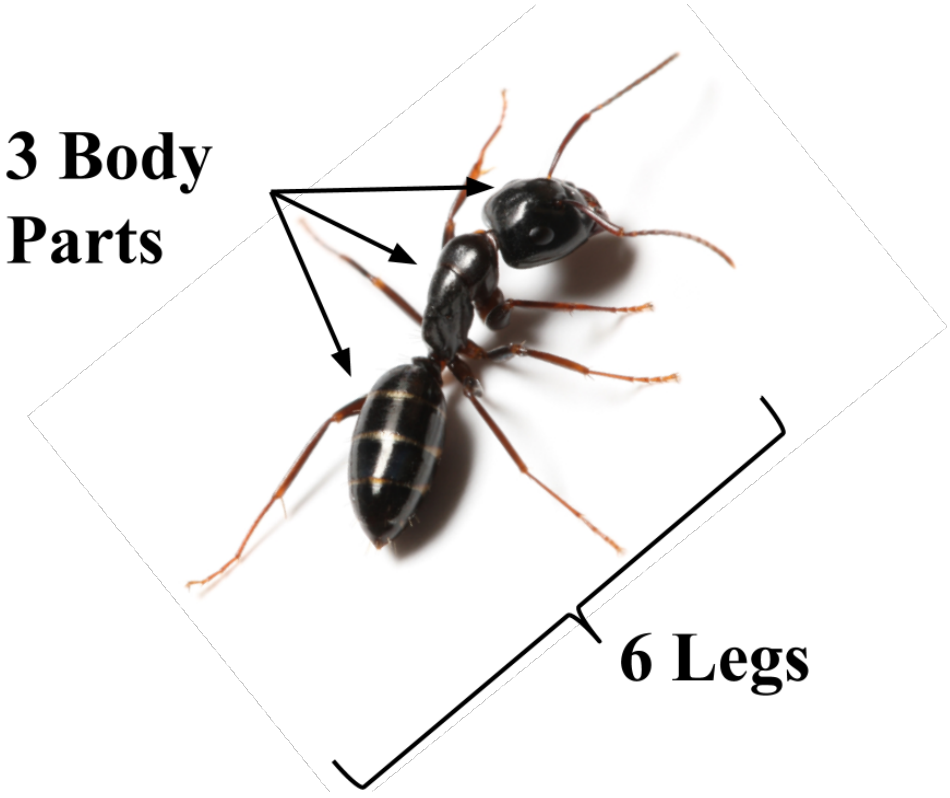
Ghe'le [jeh-lay] is Alem's younger brother. The very strong bear is his icon because his name means "strength".

Mkalli [pronunciation: muh-kah-lee] is from Tanzania. She chose a fish as her icon because she loves to go fishing and she loves to eat fish.

Activity Sheet 1: Picture Identification

Insects have 6 legs and 3 body parts.

This animal is an ant. Is an ant an insect?



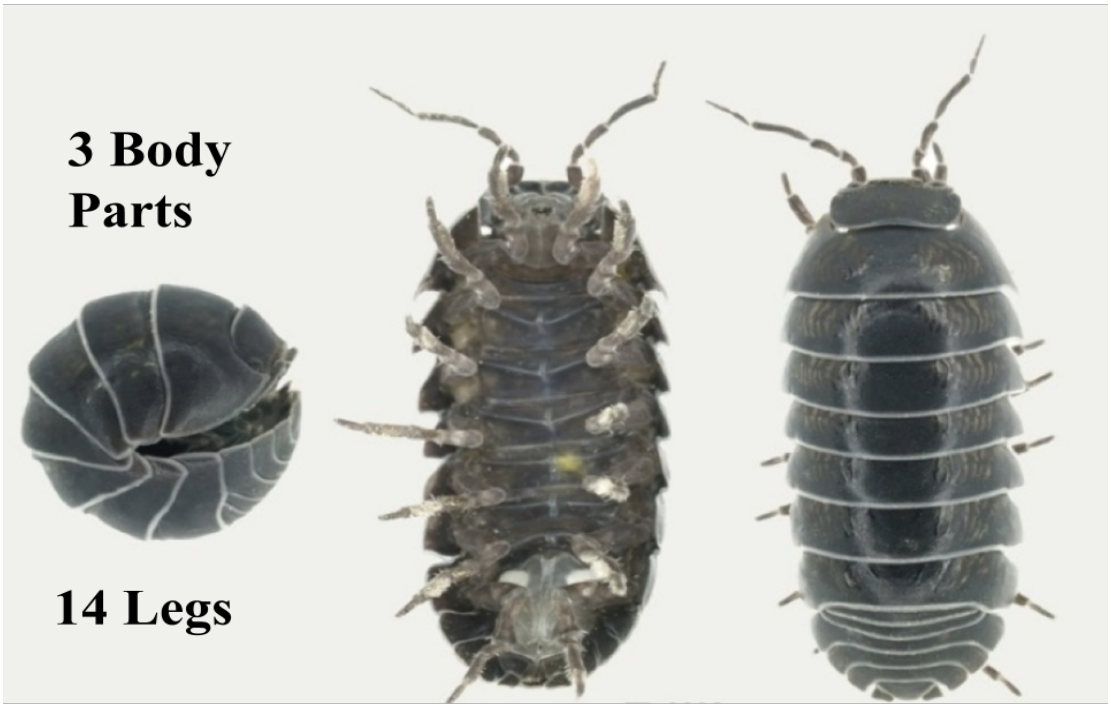
1. This animal has 6 legs.
2. This animal has 3 body parts.

Investigation Question 1: Is this animal an insect?

This animal **is** an insect.

Insects have 6 legs and 3 body parts.

This animal is a pillbug. Is a pillbug an insect?



1. This animal has 14 legs.
2. This animal has 3 body parts.

<u>Investigation Question 1</u>: Is this animal an insect?

This animal **<u>is not</u>** an insect.

Insects have <u>6 legs</u> and <u>3 body sections</u>.

This animal is an earthworm. Is an earthworm an insect?

1. This animal has 0 legs.
2. This animal has more than 3 body sections.

<u>Investigation Question 1</u>: Is this animal an insect?

This animal **<u>is / is not</u>** an insect.

(circle the correct answer)

Lesson 1: *Activity Sheet 1* - Is your animal an insect?

Insects have 6 legs and 3 body sections.

Draw a picture of your animal

Investigation Question: Is this animal an insect?

This animal **is / is not** an insect.

(circle the correct answer)

1. This animal has _____ legs.

2. This animal has _____ body parts.

Example: Tracker Letter

Dear Trackers,

Welcome to Mkalli team! I'm Mkalli and I'm from Tanzania, a country on the coast of Africa. The Mkalli team's logo is a fish because I love catching and eating fish from the three lakes in Tanzania.

In Tanzania, we have many insects. I recently observed this animal and was trying to identify if it's an insect. I know that all insects have **6 legs** and **3 body parts.**

Investigation Question: Is this animal an insect?

Put your observations in your workbook.

Happy tracking!!!

Mkalli

Lesson 1: *Activity Sheet 2* - The Mystery Mini-Beast

Hints –

1. This animal has 2 specialized pincers.
   Be careful not to confuse them with legs!
2. This animal has 2 body parts.
3. This animal has 8 legs.

Lesson 1: Activity Sheet 2 - The Mystery Mini-Beast

1. How many legs does your animal have?

   Our animal has _____ legs.

2. How many body parts does your animal have?

   Our animal has _____ body parts.

2. Investigation Question: Is this animal an insect?
Claim: *Circle your answer to complete the sentence.* This animal **is / is not** an insect.
Evidence: *Fill in the blank.* 1: Insects have 6 legs and this animal has ____ legs. Insects have 3 body parts and this animal has ____ body parts.

Lesson 1: Activity Sheet 2 **KEY-** The Mystery Mini-Beast

Group	Invertebrate Animal	Is it an insect?
Mkalli	Tanzanian Giant Tailless Whip Scorpion	**No** **Arachnid**
Isoke	Puss Moth	**Yes** **Insect**
Faraji	Spiny Orb Weaver	**No** **Arachnid**
Alem	Ghost Mantis	**Yes** **Insect**
Zahra	Giant African Millipede	**No** **Myriapod**
Ghe'le	Red-Rimmed Melania (freshwater snail)	**No** **Mollusk**
Miniya	African Giant Earthworm	**No** **Annelid**
Aren	Gorongosa Spiny Crustacean	**No** **Crustacean**
Sanjo	Africanized Bee (Killer bee)	**Yes** **Insect**
Rakanja	Funnel Weaver (funnel-web spider)	**No** **Arachnid**

LESSON 2

Title: Tracking Animals and Plants in your Schoolyard.

Learning goals: Students make observations of plants and animals in their schoolyard.

Career Awareness Alignment: Students develop their observation skills during their field data collection.

Investigation Question: What makes a good observation?

Badge 2: Urban Tracker – *Discover 5 plants and animals in your schoolyard and understand what makes a good observation.*

	**Lesson Overview:** • With guidance from a scientist student discuss, what makes a good observation. • *Discover 5 plants and animals in your schoolyard and understand what makes a good observation.*
	**Total Time:** 90 min or two 45 minute periods.

	**Materials:**
	• 1 student workbook per student.
	• 1 iPad per group of 3-4 students.
	• 1 Field Collection bag per group of 3-4 students:
	  • 2 Magnifying glasses.
	  • 3 Collection jars.
	  • 1 Trowel.
	  • 1 Field guide.
	  • 1 Set of tweezers.

	**Before you Begin:** • Check materials in each collection bag. • Your Drexel classroom support person will coordinate with an Academy of Natural Sciences student regarding class introduction. • Refer to the student groups registered on the Philly Scientists Website. • Map out the schoolyard into different zones for each of the student groups. • Print the schoolyard map for each group. • Review *Tips for Outdoor Lessons.*
	**Tips:** Remind students to wear appropriate clothing in advance of this lesson meeting.

Directions:

1. Introduce Academy of Natural Sciences representative.
   A. The Academy of Natural Sciences representative leads a conversation with the class on what makes a good observation.
      I. What makes a good observation?
         i. Focus on the five senses: sight, sound, smell, touch, and taste.
         ii. Stand still and listen as well as look.
         iii. You might want to look over or under things, such as a rock, brick, or leaf.
         iv. Share suggestions of where to look for insects are the bases of trees, sidewalk cracks, and near trash cans. Small animals like to hide in damp, dark places. Good places to find invertebrates are in dead leaves, tall grass, underneath objects on the ground, and around damp places.

2. Divide students into their pre-assigned groups.
   A. Ask the students to recall their group name from the tracker sheet.
   B. Their assignment is to use all the tools in their bag to collect and record information on living things in their zone for 15 minutes outside.
   C. Pass out collection bags, field guides and iPads.
   D. Have groups look in bags and discuss how each tool is used.
   E. Make sure the students know the **time** they are to **stop collection.**
   F. Encourage the teams to record at least 5 observations of living things in the Philly Scientist App.
   G. Have each group collect at least 1 specimen using the collection jars. This will be a catch and release.

3. Mention the Urban Tracker Badge for 5 observations into the app
   A. Use the Learning Pathway Poster in the room to emphasize badge earned after lesson 2.

Time check! This is a good place to **stop** in Lesson 2 if you are out of time.

4. Class discussion on observations using these suggested questions:
   A. What senses did you use during your data collection?
   B. What animals did you find and where did you find them?
   C. What plants did you find and where did you find them?
   D. Where were the best places to find living things?
   E. Did you have to move rocks, leaves or soil to make your observation?
   F. What sound or smell observations did your team make?
   G. What was the best observation the team made?
   H. Did you make at least 3 observations in the app?
   I. Did your team use the items in the collection bag?
   J. Did anyone have problems?

5. Complete ***Lesson 2: Activity Sheet 1*** **-** Making Observations.

6. **Lesson 2 wrap-up**.

   a. Tell students that now that they have practiced being a Tracker, that next time they will be in charge of gathering information on all of the living things in their zone.
   b. Remind the students to wear appropriate outdoor clothing for the next lesson (long pants and closed-toed shoes).

Key Terms

Observation: To use one of your five senses to gain information about something.
Scientists make observations as a form of data collection.

Data: (plural) Are the observations and recorded information collected during scientific exploration.
Scientists collect data from observations and experiments in order to answer scientific questions.

Tips for Outdoor Lessons- Instructor

Day before lesson:

1. Remind students to dress appropriately: closed shoes and long pants.
2. Check study area for potential hazards: trash, glass, visibility, etc.
3. Check area for possible overlapping usage: recess, sports practice, etc.

Day of the lesson:

Rules and safety issues:

1. Students will be doing what biologists do, observing and recording features of the natural environment. Students should make observations carefully and not disturb the natural environment too much.
2. Students should not try to catch vertebrates while out making observations. If a larger animal is found dead in the observation area, make sure the students stay away from that area and a facilities employee is contacted.
3. Students may find signs of animals such as tracks, burrows, nests, scat (animal droppings), dead animals, etc. These should be recorded as evidence of the animal, but should not be touched or disturbed.

Tips for Observing and Collecting:

1. Even if the weather's still chilly don't be discouraged, there will still be plenty of animal life to find, you may just have to look a little closer.
2. Have your students stand still and listen as well as look. By listening, they can detect birds, squirrels, and other animals that they might otherwise have missed. This is especially true in the springtime when the birds are singing. Encourage them to make sound observations in the app.
3. Remind your students that they don't have to see a live animal to know it was there. A spider web, a blob of worm castings on the ground, an acorn with bite marks, a nest in a tree, all of these are signs that animals are or were present, and there is a place in the app to record them.
4. Invertebrates are small and like to hide in damp, dark places. Good places to find invertebrates are in dead leaves, tall grass, underneath objects on the ground, and around damp places.
5. Pay special attention to early sprouts. Look for little flowers that come up early under shrubs and in the grass. Some insects may have already started to feed on them!
6. Great spots to look for insects are the bases of trees, sidewalk cracks, and near trash cans.
7. Invertebrates should be collected using tweezers, trowels, and collection containers. Do your best to avoid being bit by the animal.

Tips for Outdoor Lessons - Student

Dressing like a tracker:

1. Closed-toe shoes.
2. Long pants.

Tips for Observing and Collecting:

1. Use as many senses as you can during observations.
2. Make observations carefully and quietly. Sand still and listen as well as look.
3. If you dig, be sure to fill the hole back before you leave the site.
4. Do not try to catch large animals. If the animal will not fit in the observation, do not try to catch it.
5. **If a dead animal is found in the observation area, make sure your teacher and the ANS support person are alerted.**
6. Record any signs of animals such as tracks, burrows, nests, scat (animal droppings), dead animals, sounds of animals, etc. These should be recorded as evidence of the animal, but should not be touched or disturbed.
    a. A spider web, a blob of worm castings on the ground, an acorn with bite marks, a nest in a tree, all of these are signs that animals are or were present and good observations to record.
7. Invertebrates should be collected using tweezers, trowels, and collection jars. Do your best to avoid being bit by the animal.

Places to look:

1. Dead leaves, tall grass, underneath objects on the ground, and around damp places.
2. The bottom of a fence line and base of a tree are often good places to check.
3. Bases of trees, sidewalk cracks, and near trash cans.

Lesson 2: ***Activity Sheet 1*** **-** Making Observations.

1. Which senses did you use during your observations? (check all that apply)

   ☐ Sight ☐ Smell ☐ Sound ☐ Touch

2. Where were the best places to find living things?

3. Did you have to move rocks, leaves or soil to make any observations?

4. What sound or smell observations did your tracker team make?

5. Describe 1 problem you had while collecting observations?

LESSON 3

Title: **Tracking My Neighborhood.**
Learning goals: **Students collect animal and plant data within a zone of their schoolyard/ neighborhood.**
Career Awareness: Students use technology as a data collection tool (during their field data collection).
Investigation Question: How many different kinds of living things did your group collect?
Badge 3: **Field Researcher** – *Discover 20 unique plants and animals in your schoolyard and understand what makes a good observation.*

	**Lesson Overview:** • Students have a discussion (led by teacher) about the success and challenges of their data collection. • *Discover 20 unique plants and animals in your schoolyard and understand what makes a good observation.*
	**Total Time:** 90 min. or two 45 min. periods.

	**Materials:**
	• 1 student workbook per student.
	• 1 iPad per group of 3-4 students.
	• 1 Field Collection bag per group of 3-4 students:
	  • 2 Magnifying glasses.
	  • 3 Collection jars.
	  • 1 Trowel.
	  • 1 Field guide.
	  • 1 Set of tweezers.

	**Before you Begin:** • Make sure practice data is deleted from the iPads. • Register student groups on the Philly Scientists website, Resources. • Remind your students to wear appropriate clothes for field data collection. • Map out the neighborhood into different sections for each of the student groups. • Print maps of the neighborhood zone.

	• Prepare a list of responses from Lesson 2's class discussion to remind the students of how to make good observations.
	  • How did they work together as a team? Did everyone do their assigned roles? How can it be better for next time? Who is playing which role for lesson 3?
	  • What sound or smell observations did your team make? How can we make better observations? What challenges did your team have doing field data collection?
	• Review *Tips for Outdoor Lessons.*

	Tips: • Remind students to wear appropriate clothing for next class meeting. • After each day in the field, upload collection data to Philly Scientists website, see p. 9 for submitting data.

Directions for Field Collection 1:

1. Assign and discuss students' roles.
   A. Have students write down roles in their portfolios.
   B. Ensure students know where their assigned neighborhood zone is.

2. Explain students will be doing the work of Trackers today and next class. Therefore, they are responsible to collect and record information on all the living things in their schoolyard zone.

3. Their assignment today is to go into "the field" (their zone) for approximately 30 minutes and find and record information on all of the living things in their zone. Remind students that everyone has an important job. Trackers can look in the sky, in trees, in bushes, on the ground and all of the other places that are located in their zone. Mappers mark where that plant or animal was found on the schoolyard map. Recorders records the information in the Philly Scientist app.

4. Field Data Collection for approximately 30 minutes.
   A. Remind students to use their collection jars and items in their bag after field data collection.
   B. Make sure students "submit data" (Note: Wi-Fi is needed and can be provided by your Drexel support person).

C. To ensure student data is submitted, log into the Philly Scientist website using your log-in information and review the data students submitted. These instructional screenshots are located in Resources.

5. Wrap-up: Discuss the overall collection experience.
   A. Where were good places to find animals?
   B. How many different animal groups did your group collect?
      i. What kinds?
   C. How many different plant types did your group collect?
      i. What kinds?
   D. Discuss how the group roles worked for data collection.
      i. We recommend that roles change within groups for Day 2 of field data collection. Explain how the roles will change for each collection.
      ii. Indicate how additional notes are options for each entry. Encourage the students to take as many notes as they can in the app.
         a. Remind students they can make changes to entries
         b. Remind the students to wear appropriate outdoor clothing for the next lesson (long pants and closed-toed shoes).

Time check! This is a good place to **stop** in Lesson 3 if you are out of time.

Directions for Field Collection 2:

1. Scientists do not always get good information every day they try. This is especially true for Trackers that work outside, where temperature and weather conditions might be very different on different days.
   A. For this reason, we are going to do field data collection again today to make sure we have recorded information on ALL of the living things in our schoolyard zone.

2. Remind students of group roles
   A. Have students write down roles in their student workbook.
   B. Ensure students know where their assigned neighborhood zones are.

3. Field Data Collection for approximately 30 minutes.
   A. Remind students to use their collection jars and items in their bag.

4. After field data collection.
   A. Make sure students "Submit Data" (note: Wi-Fi is needed).

5. **Lesson Wrap-up**
   A. How many different animal groups did your group collect?
   B. How many different plant types did your group collect?
   C. Indicate groups receive the field researcher badge for both data collection days.

Key Terms –

Biodiversity: Variety of life based on richness and abundance.
Scientists can measure the biodiversity of an area by observing the abundance and richness.

Data Collection*: The part of a scientific process where observations are made and data are collected.
Scientists record their data during the data collection process.

Habitat: The natural home or environment a living thing, or organism, needs to survive, including food, water, and shelter.
Zoologists try to create a natural habitat for zoo animals sometimes including treats and toys.

Observation*: The process of viewing and recording events in order to gain information.
Scientists make observations as a form of data collection.

Species: A group of living things, or organisms, that share the same characteristics and can only breed with other members in the group.
Scientists know that dogs are a single species because types of dogs, Chihuahuas, Great Danes, and even gray wolves can breed and produce puppies.

Lesson 3: Activity Sheet 1 - Group Roles

Remember roles will change each lesson!

Recorder - inputs the animals and plants found into the iPad.

- Keeps track of time and location.
- Reminds the group when it's time to return from the field.

Day 1: _____

Day 2: _____

Tracker(s) - (Can be one or two people) - Helps to locate plants and animals. Also helps to makes sure the animals and plants are identified correctly

- Carries the "Field Guides"
- Collects specimens

Day 1: _____

Day 2: _____

Mapper - marks the location of the animals and plants found on the paper map

- Carries the "Field Collection Bag"
- Memos any important notes about the data

Day 1: _____

Day 2: _____

LESSON 4

Title: Tracking Biodiversity in My Neighborhood.

Learning goals: Students create a claim backed with evidence about which zone has the lowest biodiversity.

Career Awareness Alignment: Students engage in critical thinking by making a claim.

Investigation Question: What neighborhood zone(s) has the lowest abundance and richness?

	**Lesson Overview:** • Students are introduced to the terms richness and abundance to understand the concept of biodiversity • *Students make a claim using class data supported with evidence about the least biodiverse zone.*
	**Total Time:** 90 min. or two 45 min. periods
	**Materials:** • Student Workbooks • One class data summary for each group (printout or display) • One class bar graph for each group (printout or display)
	**Before you Begin:** • Print one class data summary for each group from the Philly Scientists website
	**Tips:**

Directions: What is Biodiversity?

1. Give each group a printouts of the class' data collection.
   A. Using the website, display the map of the collection site.

2. Ask students to look at these graphs and walk through what they mean.
   A. Abundance: Using the class data table, ask which zone has the most total number living things? How do we know this (e.g., what **evidence** do we have?).
   B. Richness: Using the class data table, ask which zone has the most different kinds of living things? How do we know this (e.g., what **evidence** do we have?).

3. Complete the table for their school yard.

4. Scientists use the word abundance to mean how many living things we have
   A. Using this word, which zone has the highest abundance? How do we know this (e.g., what evidence do we have?).

5. Scientists use the word richness to mean how many different kinds of living things we have.
   A. Using this word, which zone has the highest richness? How do we know this (e.g., what evidence do we have?).
   B. Work in your groups to complete Table 2.

   Abundance is the number of total plants and animals.
   Richness is the number of different kinds of plans and animals.
   An area has less **biodiversity** if it has low abundance AND low richness.

Time check! This is a good place to **stop** in Lesson 4 if you are out of time.

Directions for Least Biodiverse Zone:

1. High biodiversity means that an area has high richness AND high abundance.

2. Use the key terms box and pictures to explain the biodiversity:
   Abundance is the number of total plants and animals.
   Richness is the number of different kinds of plans and animals.
   An area has less **biodiversity** if it has low abundance AND low richness.

3. Which of our zones has the highest biodiversity?

4. How do you know? (what is your **evidence?**). Use class data sheets.
   A. Most/Least abundant.
   B. Highest/Lowest richness.

5. Complete the statement: "My class observed that Zone _____ is the most **biodiverse (richness + abundance)**."

6. Using the richness bar graph, which zone had the highest richness?

7. Using the abundance bar graph, which zone had the highest abundance?

8. Guide students to work in their groups to complete a claim and evidence to address the question:
   A. Which schoolyard zone is the least biodiverse?

9. Activity Sheet 5: Least Biodiverse Zone.
   A. Complete the claim "My class observed that Zone _____ is the least **biodiverse**."
   B. Using the richness bar graph, which zone had the highest richness?
   C. Using the abundance bar graph, which zone had the highest abundance?

10. Lesson 5 wrap-up.
    A. Review the term biodiversity.
    B. Ask students to observe the biodiversity on their way home.

Key Terms -

Biodiversity: Variety of life based on richness and abundance.

- Abundance – The number of animals in a particular location.
- Richness – The total number of species recorded in a given location.

Habitat: The natural home or environment a living thing, or plant or animal, needs to survive, including food, water, and shelter.
Zoologists try to create a natural habitat for zoo animals sometimes including treats and toys.

Abundance
There are a lot of living things but only a few different types.

Richness
There are a lot of different types of living things but not very many.

Biodiversity
High biodiversity is when there is high abundance (many living things) and high richness (many different kinds).

Lesson 4: Activity Sheet 1 - Least Biodiverse Zone

Use your class data and complete the table below.

	Zone A	Zone B	Zone C	Zone D
Abundance: Total number of living things.				
Richness: Total number of different kinds of living things.				
Biodiversity: Variety of life based on richness and abundance.				

1. **Which zone has the lowest abundance? Zone _____**

2. **Which zone has the lowest richness? Zone _____**

Investigation Question: What neighborhood zone has the lowest biodiversity?

Claim: *Fill in the blank.*

Zone ____ has the lowest biodiversity.

Evidence: *Use your data to find two pieces of evidence to support your claim.*

1:

_____

2:

_____

LESSON 5

Title: Energy Tracking in a Food Chain.
Learning goals: Students analyze and interpret their own data to create a food chain.
Career Awareness Alignment: Students use technology for data analysis.
Investigation Question: What does your animal eat?

	**Lesson Overview:** • Students discuss energy flow in food webs using producers, consumers and decomposers. • Students use the food web to identify a living animal that was not observed. • Students create a food chain for their selected animal.
	**Total Time:** 90 min or two 45 minute periods.
	**Materials:** • 1 Field Guide per 2-4 students (from collection bags). • 1 printout of schoolyard data for each group. • 1 poster display of Philly Food Web for class. • BrainPop video on Food Chains. • 1 portfolio per student. • Activity Sheet 5: Philly Food Web: Producers • Activity Sheet 5: Philly Food Web: Consumers. • Activity Sheet 5: Philly Food Web: Decomposers. • Colored pencils/ Crayons/ Markers.
	**Before you Begin:** • Prepare one class data summary for each group from Philly Scientist website (printout or display). • Review the video and prepare display.
	**Tips:**

Directions: Producers, Consumers, Decomposers and the Philly Food Web.

1. Lead the class discussion around "How do animals get energy?"
   A. How do we get energy?
   B. What do you eat for energy?
   C. What do you think birds eat for energy?
   D. What do you think plants eat for energy?

2. Show the video-
   https://www.youtube.com/watch?v=33pC31rw9bM&feature=youtu.be

3. Using the Philly Food web, lead class in discussion about how energy moves through a food web.

4. Using the Philly Food web: Producers explain how producers get their energy from the sun.

5. Explain how energy flow is shown by the direction of the arrow
   A. For example, the sun provides energy to plants.

6. Using the Philly Food web: Consumers, explain how consumers get their energy from eating other living plants or animals. Circle the consumers.

7. Using the Philly Food web: Decomposers, explain how decomposers get their energy from dead plants or animals.

8. Looking at class data, have students complete Activity Sheet 6: Building Food Chains.

9. Have students identify three living things that were producers. How do you know?

10. Have students identify three living things that were consumers. How do you know?

11. Have students list any decomposers observed. How do you know?

Time check! This is a good place to **stop** in Lesson 5 if you are out of time.

Review video to provide examples of food chains and building food chains.

1. Review how living things get energy and food.
   A. You can use examples like pac man to relate food and energy.

2. Relate pac man to predator and prey.

3. Using the Philly Food Web and group data.

4. What is a food web?

5. What do the arrows mean in a food web?

6. Have students identify one animal in the Philly food web that they did **not** observe in their group data.

7. Try to have the student groups pick different missing animals.

8. Have students use the food chains in the Field Guides, to identify
   A. What does their animal eat?
   B. What eats their animal?

9. Have students complete the food chain activity.

10. **Lesson 5 wrap-up**
    A. Lead class discussion about the missing animal.
    B. Why do you think this animal is missing?
    C. What could bring this animal to the schoolyard?

Key Terms –

Consumer: An animal that gets its energy by eating other living things, like plants and animals.

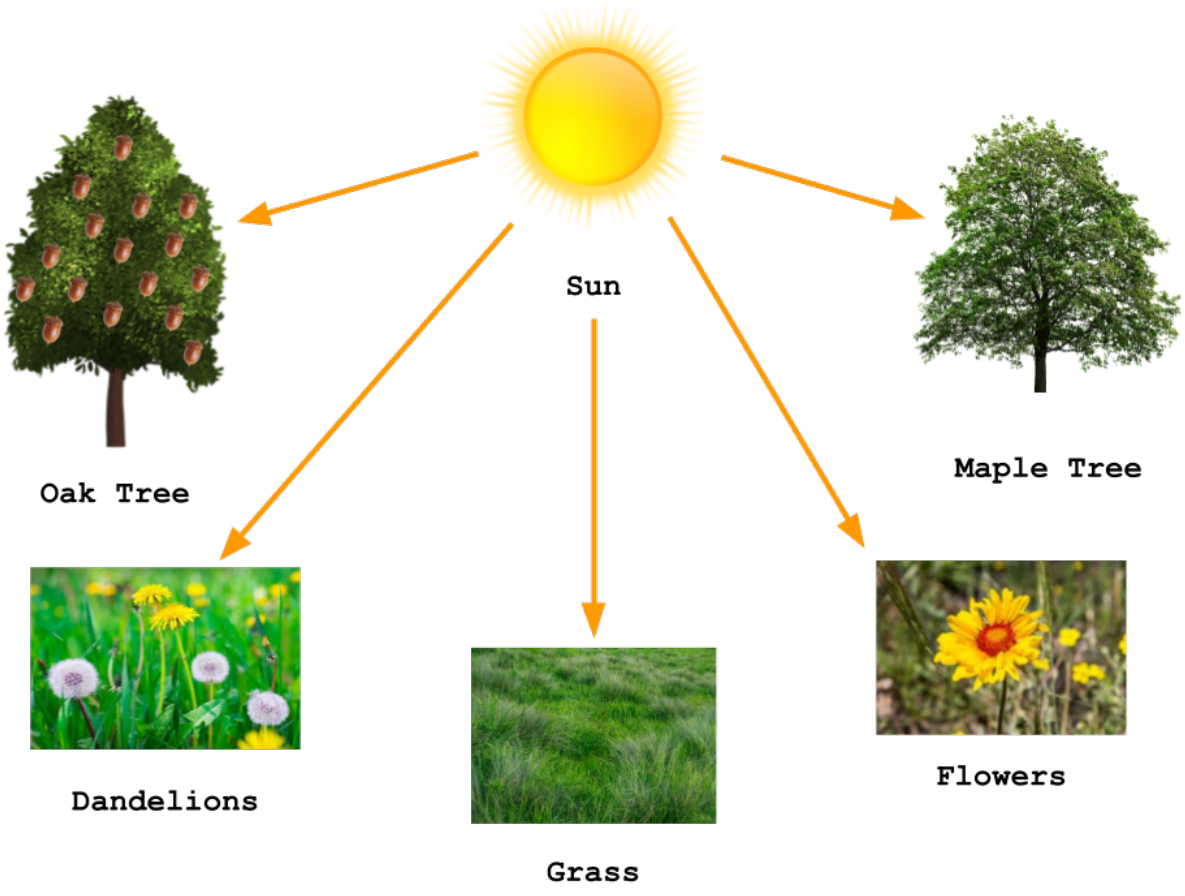
Producer: A plant that uses the energy from sun to make its own food.

Decomposer: Living things that eat dead plants and animals.
A producer makes its food from the energy from the sun while a consumer has to eat either plants or animals to get energy. A decomposer gets its energy by eating dead plants and animals.

Philly Food Web: Producers

Producers get their food from the *sun*'s energy.
Plants are producers!

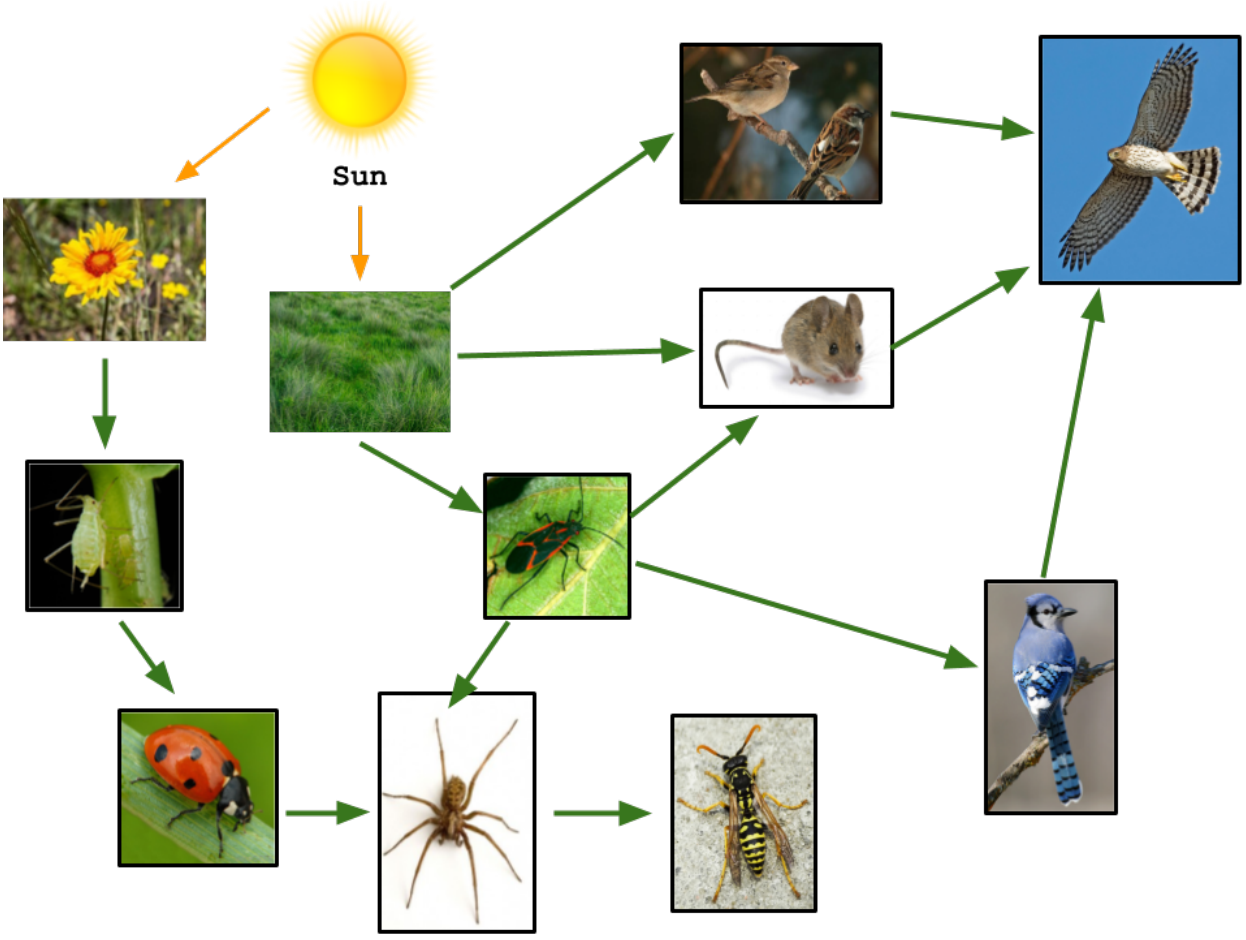
Circle the producers.



Philly Food Web: Consumers

Consumers get their food by eating other *living plants* or *animals*.
Animals are consumers!

Circle the consumers.



Consumers can eat producers and other consumers!

Philly Food Web: Decomposers

Decomposers eat *dead plants* and *animals*.
Mushrooms, millipedes, pill bugs, snails, earthworms, and slugs are decomposers!

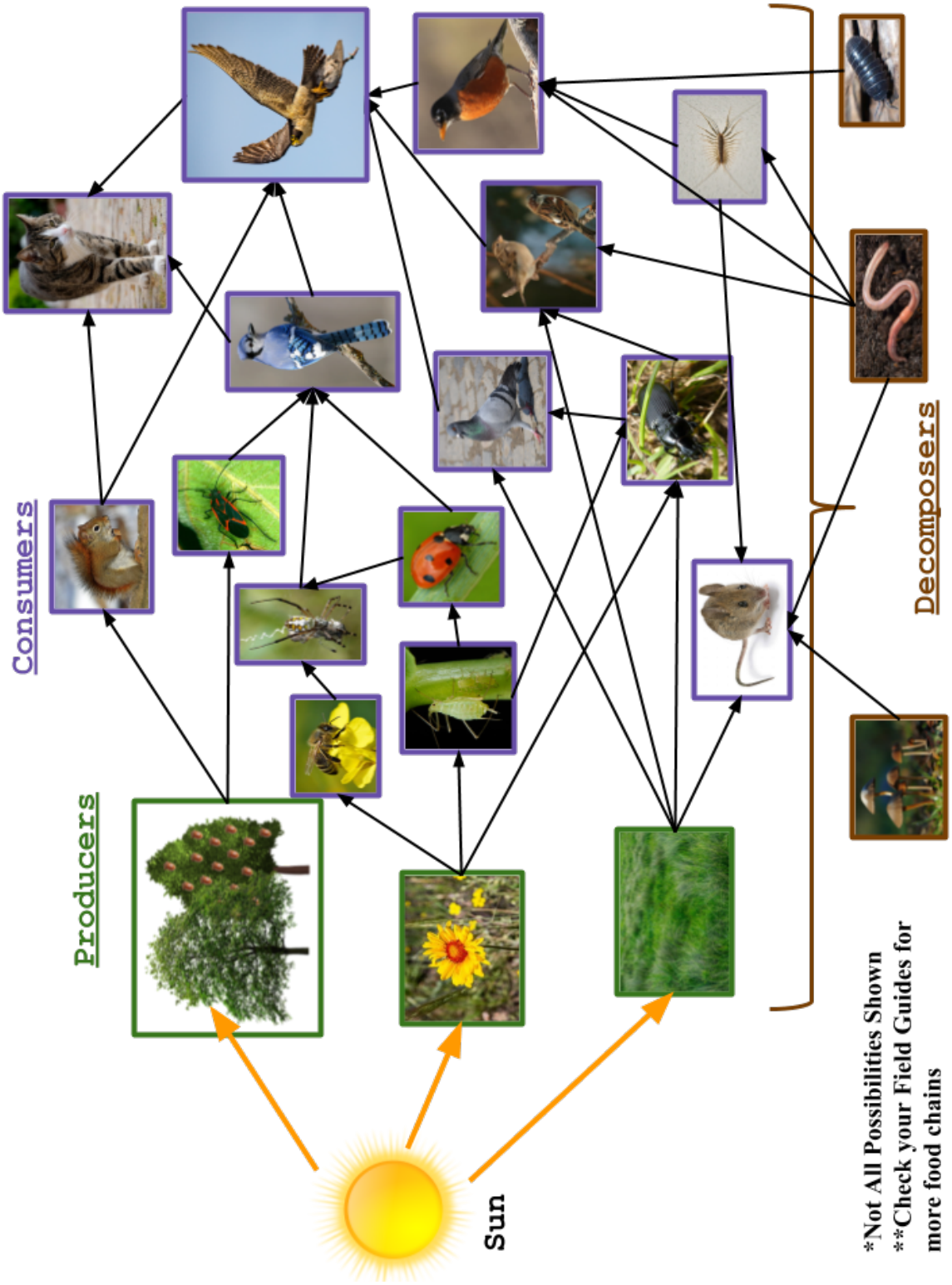
Lesson 5: ***Activity Sheet 1*** **-** Producers and Consumers from your Schoolyard.

1. Using your class data, list three producers and three consumers.

Producers	**Consumers**
Ex: Maple Tree	Ex: Earthworm, Robin
1.	1.
2.	2.
3.	3.

2. Using your class data, list any decomposers observed:

Philly Food Web



Lesson 5: ***Activity Sheet 2*** - Building Food Chains.

1. Identify an animal missing from your schoolyard by using your class data and the Philly Food Web.

   _____

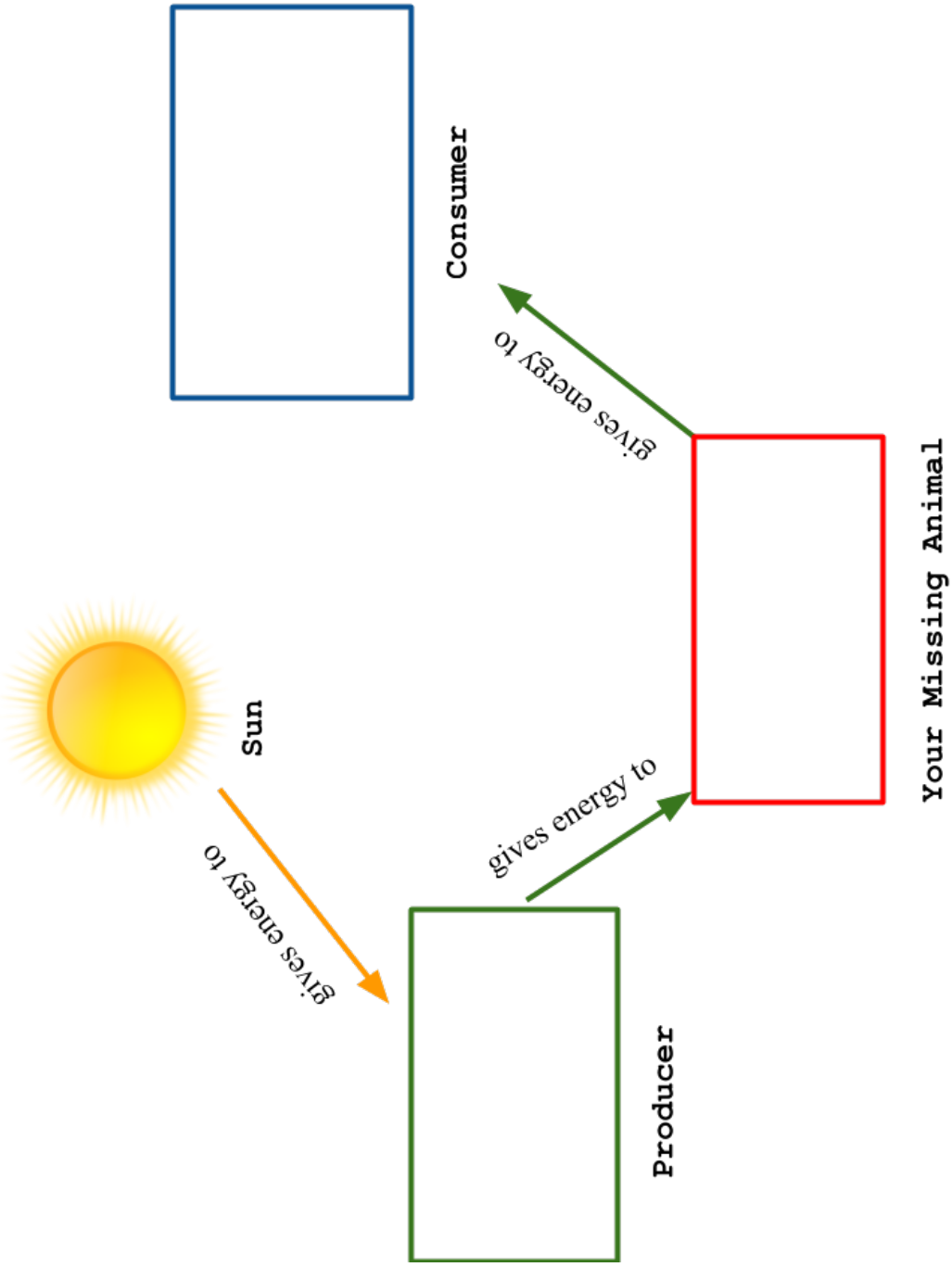
2. Looking at the Philly Food Web, what does your missing animal eat?

   _____

3. Looking at the Philly Food Web, what eats this animal?

Lesson 5: ***Activity Sheet 2 -*** Building Food Chains (Cont.)

Using your information about your missing animal, fill in the boxes to make a food chain from the animal identified. Draw and label *your animal*, the *producer* it eats, and the *consumer* that eats it.



LESSON 6

Title: **Improving Biodiversity in my Neighborhood**
Learning goals: **Students create a solution (claim) backed with evidence to increase neighborhood biodiversity.**
Career Awareness Alignment: Students generate a solution to the problem of how to increase neighborhood biodiversity.
Investigation Question: What solution (claim) would increase your neighborhood's biodiversity?
Badge 4: Solution Generator – *Create a display of your biodiversity solution using written text, tables, diagrams and/or charts.*

	**Lesson Overview:** • Students read story (modeling solution creation). • *Create a display of your biodiversity solution using written text, tables, diagrams and/or charts.*
	**Total Time:** 90 min or two 45 minute periods.
	**Materials:** • Student workbooks. • Schoolyard Map. • 1 copy of Activity Sheet 2 for each group. • Not in student workbook.
	**Before you Begin:** • Go to the Critter Catalog and (provide instructions of what teachers have to review prior to the lesson). • One class data summary for each group (printout or display). • One Philly food web for each group (printout or display).
	**Tips:**

Directions:

1. Introduce habitat as the home or environment of a plant, animal, or other organisms.
   A. Animals need space like humans do. Space to live, eat, and sleep.
   B. 3 components of habitats: food, water, shelter.

2. Discuss with students the types of habitats from the schoolyard map.
   A. Detail if/how the habitat supported the animals and plants found there.
   B. Use a bee as an example. Open **Critter Catalog website** to that animal's entry.

3. Have students follow along a hypothetical story as an example of data collection, data analysis, and solution generation.
   A. Make sure the students are able to connect what group Mkalli did with what they have been doing in class.
   B. Discuss what Mkalli found.

4. Introduce resources for solution creation
   A. **Critter Catalog http://www.biokids.umich.edu/critters/** (can use iPads).
   B. Philly Food Web.
   C. Field Guide.

5. Students go through the process of generating a solution from their data by reading Tracking Solutions: Mkalli's Story.

6. Students complete **Lesson 6: *Activity Sheet 1 -*** Creating a Solution.
   A. What animal or plant is missing from the food web?
   B. Teacher and Drexel support approve animal for each group.
      i. Ensure students are not choosing invasive species.

7. Use the **Critter Catalog website** to identify the kind of **habitat** does it need.
   A. Type of **food** it needs:
   B. Type of **shelter** it needs:
   C. What **one change to the habitat, or solution,** will provide food or shelter?
      i. Can be bringing food for the animal.
      ii. Creating a better habitat.
      iii. Low lighting at night.
      iv. Have less concrete/blacktop pavement.
      v. Protected areas.

8. **Lesson 6 wrap-up**
   A. Prepare their picture selection for the posters.
   B. Fill in Lesson 6: *Activity Sheet 2* - Pictures needed for poster.

***Tracking Solutions*: Mkalli's Story**

Rasheda is a 5th grader in West Philly. Like you, she has used the Philly Scientists' App to make observations in her neighborhood. Her group name was Mkalli and her group members were Aleeyah and Chris. Her group, Mkalli observed 24 animals and plants!

The group Mkalli worked together to build food chains, label producers and consumers, and make notes about the habitat from the location map. Using the West Philly food web, the group observed many connections in their data. The most biodiverse area of their neighborhood is where the Mkalli group was, the far right corner of the park, near the grass and a dumpster. The most abundant plant was grass and the most abundant animal was squirrels.

While looking at her group's data, Rasheda pointed out that **(1.) the animal they did not see during data collection** was bees. The bees were shown in the Philly food web as food for other consumers. The group decided to **(2.) use the Critter Catalog website to find out what shelter and food** (habitat) bees need. The **Critter Catalog website** said the bees **need to eat** pollen and drink nectar from flowers. For **shelter**, the bees like to place their nests, or hives, in hard to reach places and near their food source.

Chris said, "The **(3.) changes to the habitat** would be adding flowers for food and trees to nest. Maybe we can plant lots of flowers and trees that bees like."

Aleeyah added “I wonder what kinds of flowers and trees bees would like. I’m going to search Critter Catalog.” Chris found that marigolds, poppies, and zinnias all make pollen and are very brightly colored flowers that will attract bees. Rasheda found out that bees make their hives in fruit trees then asked the group “Do we have enough information to solve how to bring and keep bees in our neighborhood?” Aleeyah looked over their responses then said, “We have a place for them to build their hives safely from predators in fruit trees. We have a food source: marigolds, poppies, and zinnias. We have what we need to make a solution!”

Mkalli had all of the pieces needed to make a claim about a solution based on the data. They filled out their worksheet.

Solution Creation

1. What animal or plant is missing from the food web? Bee.

2. Use the **Critter Catalog website** to identify the kind of **habitat** does it need.
    - Type of **food** it needs: pollen and nectar from flowers.
    - Type of **shelter** it needs: fruit trees.

3. What **one change to the habitat, or solution,** will provide food or shelter?
Add more trees and pollinating flowers like marigolds, poppies, and zinnias so that more bees would be attracted and then observed in my neighborhood.

Team Mkalli arrived at a great solution to bring more bees to the area. They filled in their claim and evidence chart below.

Investigation Question: What solution would make your neighborhood habitat more biodiverse? ***Claim:*** My group's solution to make the neighborhood more biodiverse is to bring more bees to the West Philadelphia neighborhood by planting pollinating flowers near trees.
Evidence: 1. Bees need pollen and nectar from flowers for food. 2. Bees need trees to put their nests in for shelter.

Lesson 6: Activity Sheet 1 **-** Creating a Solution

1. Identify the animal or plant missing from the food web. What **animal in the foodweb is missing from** your data collection?

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2. Use the **Critter Catalog website** to identify what kind of **habitat** does it need?

   http://www.biokids.umich.edu/critters/

   - Type of **food** it needs: _____
   - Type of **shelter** it needs: _____

3. What **changes to the habitat** will provide the food it needs or changes to the habitat?

_____

Lesson 6: Activity Sheet 1 **-** Creating a Solution (Cont.)

Investigation Question: What solution would make your neighborhood habitat more biodiverse?

Claim:

My group's solution to make the neighborhood more biodiverse is to

_____

_____

Evidence:

1:

_____

_____

2:

_____

_____

Lesson 3: Activity Sheet 2 **-** Pictures needed for poster

Group's name:

_____

Group members:

_____

My group's animal:

_____

My animal eats:

_____

My animal gets eaten by:

_____

My animal lives:

_____

Key Terms –

Habitat: The type of environment in which a plant or animal live with the resources and shelter that it needs to survive.

Solution: A claim backed by evidence.

LESSON 7

Title: **Create Presentation for Symposium.**

Learning goals: **Students create a display of their biodiversity solution in written text, tables, diagrams, and/or charts.**

Career Awareness: Students utilize technology to refine a solution.

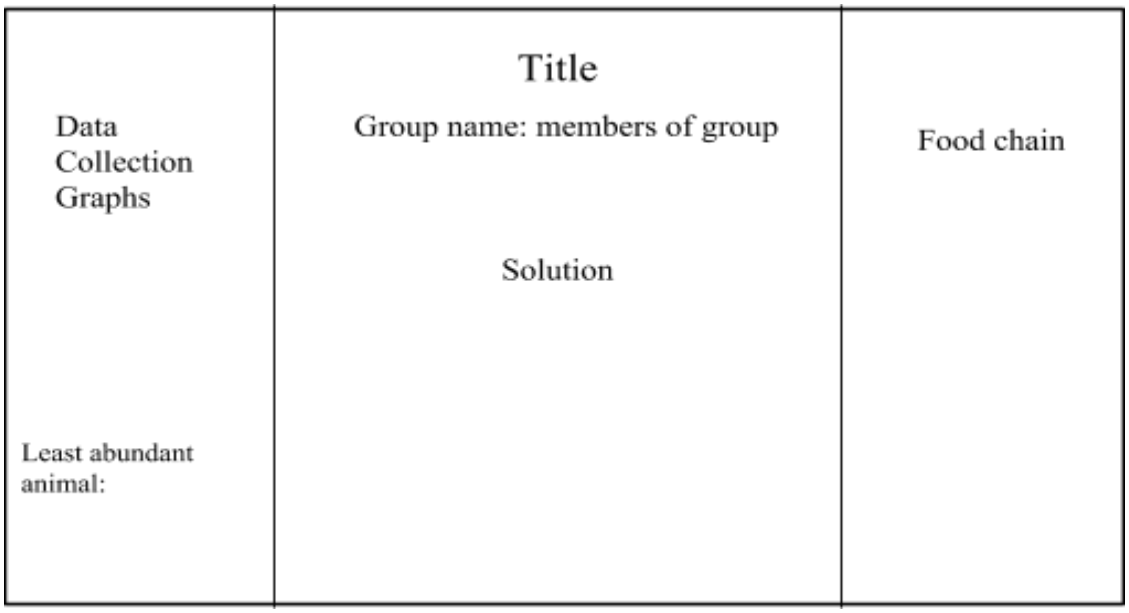
Investigation Question: What is your group's solution to increase biodiversity in your neighborhood?

	**Lesson Overview:** • Students work on graphical and textual content for presentation of data. • Students practice presenting their data to their peers.
	**Total Time:** 90 min or two 45 minute periods
	**Materials:** • Pencil and Markers. • Student Workbooks. • Poster boards. • Construction paper. • Scissors. • Markers. • Glue or Tape. • Each group's picture form. • Each group's pictures.
	**Before you Begin:**
	**Tips:**

Directions:

1. Lead the class in a discussion about scientific communication and why it's important for the scientific and non-scientific communities
   A. Communication is a big part of science. In order for new findings to be shared scientists write papers and present their findings at conferences.
   B. The importance of organizing your data into graphs in order to visualize the biodiversity of your zone.
   C. Encourage them to create neat and accurate graphs to be able to identify the most abundant plant and animal.
   D. Remind the students that they will be presenting their solutions to city planners and scientists.

2. Explain Lesson 7's activity.
   A. The students can present their solution with a poster.
   B. The students will work in groups to create a poster display of their solution generation.
   C. Suggest the students include the following things on their poster:
      i. Their observed area of the neighborhood.
      ii. Data graphs.
      iii. Food relationships.
      iv. Their solution to increase biodiversity.



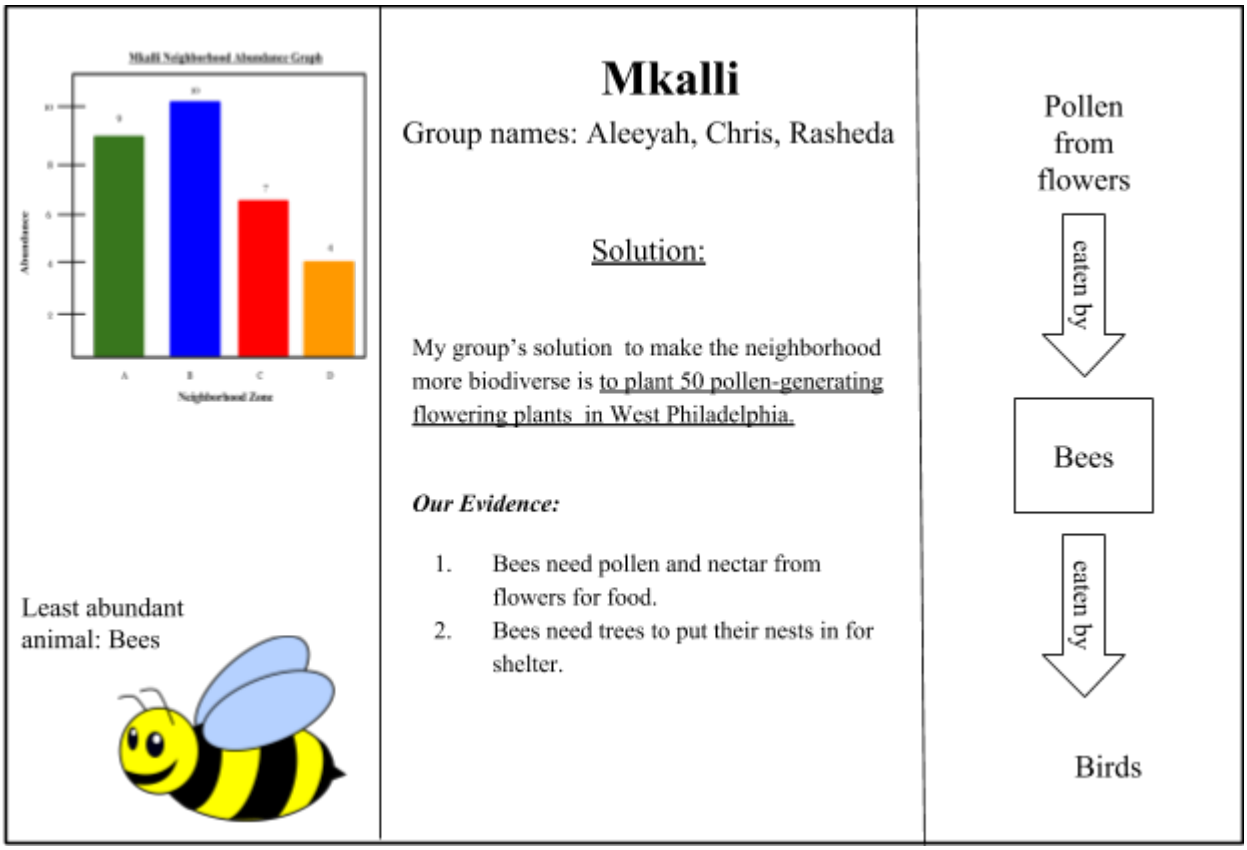
3. Create the presentation:
   A. Use the space on the worksheet to develop a draft of the poster before working on the actual poster.
   B. Work together to cut and place pieces on the poster.
   C. Encourage the students to work together to decorate their poster using the team name or their least abundant animal or their solution as a theme.
      i. Team name: Mkalli- She chose a fish as her icon because she loves to go fishing and she loves to eat fish.
         - Poster Theme: fish.
      ii. Least abundant animal: bees.
         - Poster Theme: bees.
      iii. Solution: more trees and flowers.
         - Poster theme: trees and flowers.

4. Practice presenting.
   A. Have students practice presenting their poster to one another.

5. **Lesson 7 Wrap-up.**
   A. Make sure students clearly understand the investigation question and solution generation.
   B. Tell the students that they will be presenting to other students from different schools.
   C. Remind the students to practice presenting for the summit.

Lesson 7: Activity Sheet 1 **- Draft Poster**

Team Mkalli Example:



Once your poster is drafted, work together to create the display pieces and glue them onto the board. Make sure your team agrees with your display decisions!

Work with your group to create a draft of your poster in the blank space below.

Use the blank space below to draft your poster.

Data Collection Graphs	**Title:** ____________	Food Chain
	Group Name: ____________	
	Group Members' Names: ____________	
	____________	
	Solution My group's solution to make the neighborhood more biodiverse is to ____________ ____________	
Least Abundant Animal:	*Our Evidence:* 1. ____________ ____________ 2. ____________ ____________	Interesting Fact about your Animal:

LESSON 8

Title: **Communicating like a tracker**
Learning goals: **Students communicate scientific and/or technical information on their biodiversity solution and evaluate competing design solutions provided by other teams (patterns, systems and system models, and stability and change).**
Career Awareness: Students will communicate their scientific claims, evidence, and solutions to the science community.
Badge 5: Philly Scientist – *Communicate your biodiversity solution to city planners, local scientists, and community members.*

	**Lesson Overview:** • Students will demonstrate an understanding of what it is to be a functioning scientist. • Students present their findings at a scientific conference to inform local scientists and city planners of their research. • Students evaluate competing design solutions provided by other teams.
	**Total Time:** 90 minutes.
	**Materials:** • Completed poster boards.
	**Before you Begin:**
	**Tips:**

Directions:

1. Let students know there will be 2 presentation components.
   A. Stand at poster and explain poster to visitors.
   B. Move around the room to meet other students.

2. Have each group set up their posters.
   A. Make sure all posters have everything secured well.
   B. Re-secure any pieces as necessary.

3. Begin the summit.
   A. Encourage the audience to engage the student groups.
   B. Remind students they are presenting their solutions to city planners and scientists.
      i. Speak clearly and loudly to the people that visit your poster.
      ii. Make eye contact and thank them for listening to your solution.
      iii. Work together to communicate findings. Make sure each group member has a chance to speak.

4. Begin 2nd part of summit (30 min).
   A. Class presentations
      i. Focus on changes to make to the environment.
      ii. Identify a specific job for the students and adults to do when they walk around.
      iii. Focus on communication of ideas, listening, and summarizing as the main focal point of the lesson.

5. Badge Ceremony: Pass out badges/ pins to teachers and students for completing the summit (15 min).

6. Wrap-up the summit (10 min).
   A. Thank the audience for coming.
   B. Thank the students for their hard work in this project.

PHILLY SCIENTISTS

exploring our city

Resources

Blue = Science & Engineering Practices **Orange = Disciplinary Core Ideas** **Green = Crosscutting Concepts**

Time(s)	Activity	Lesson Overview	3D Learning Goal	Career Awareness
Lesson 1: Solving the Mini-Beast Mystery (90 min) **Badge 1: Mini-Beast Tracker**				
45 min *Engage*	**Introduction to Animal and Plant Tracking**	✓ Students use the Philly Scientist mobile app on iPads to identify Mini-Beasts. ✓ *Students input observations into the app.*	**Students construct a claim based on evidence about whether their Mini-Beast is an insect.**	Students will focus on critical thinking to identify scientific skills needed to be a tracker.
45 min *Engage*	**Tracker Letter**	✓ Students are introduced to making a scientific claim and supporting it with evidence through a tracker mystery story.		
Lesson 2: Tracker Observations (90 min) **Badge 2: Urban Tracker**				
45 min *Explore*	**Drexel science student and practice collection**	✓ With guidance from a scientist students discuss, what makes a good observation. ✓ *Students practice collecting data in their schoolyard with the app and field collection resources.*	**Students make observations of plants and animals in their schoolyard.**	Students add their observations to the Philly Scientists database.
45 min *Explore*	**Overview of making good observations**	✓ Students have a discussion (led by teacher) about the role of technology in their data collection.		

Lesson 3: Tracking Animals and Plants in your Schoolyard (90 min) **Badges 3: Field Researcher**				
45 min *Explore*	**Field data collection 1**	✓ Students have a discussion (led by teacher) about the success and challenges of their data collection. ✓ *Students collect data in their neighborhood zone with the app and field collection resources.*	**Students collect animal and plant data within a zone of their schoolyard/ neighborhood.**	Students use technology as a data organization and collection tool.
45 min *Explore*	**Field data collection 2**			
Lesson 4: Tracking the Biodiversity in your Schoolyard (90 min)				
45 min *Explain*	**What is Biodiversity?**	✓ Students are introduced to the terms richness and abundance to understand the concept of biodiversity	**Students create a claim backed with evidence about which zone has the lowest biodiversity.**	Students engage in critical thinking by making a claim supported with evidence.
45 min *Explain*	**Least Biodiverse Zone**	✓ Students make a claim using class data supported with evidence about the least biodiverse zone.		
Lesson 5: Energy in a Food Web (90 min)				
45 min *Elaborate*	**Producers, Consumers, Decomposers and the Philly Food Web**	✓ Students discuss energy flow in food webs using producers, consumers, and decomposers.	**Students create a claim backed with evidence using their own data to illustrate a food chain.**	Students use problem solving skills to explain energy flow in a foodweb.
45 min *Elaborate*	**Review video to provide examples of food chains and building food chains**	✓ Students use a class food web to identify a living thing that was not observed. ✓ Students create a food chain for their selected animal.		

Lesson 6: Improving Biodiversity in my Neighborhood (90 min) **Badge 4: Solution Generator**				
90 min *Elaborate*	**Solution generation**	✓ Students read story (modeling solution creation). ✓ *Students create a solution supported with evidence from the data to improve biodiversity in their neighborhood.*	**Students create a solution (claim) backed with evidence to increase neighborhood biodiversity.**	Students conduct research to find a solution that increases neighborhood biodiversity.
Lesson 7: Tracker Planning (90 min)				
45 min *Synthesize*	**Presentation planning**	✓ Students work on graphical and textual content for presentation of data.	**Students create a display of their biodiversity solution in written text, tables, diagrams, and/or charts (patterns).**	Students create a display of their solution.
45 min *Synthesize*	**Practice presentations**	✓ Students practice presenting their data to their peers.		
Lesson 8: Tracker Communication (90 min) **Badge 5: Completion badge**				

90 min *Synthesize*	**Solution sharing** *Final badges are presented.*	✓ *Students present their tracker findings at a scientific summit to inform local scientists and city planners of their research.* ✓ Students evaluate competing design solutions provided by other teams.	**Students communicate scientific and/or technical information on their biodiversity solution and evaluate competing design solutions provided by other teams (patterns, systems and system models, and stability and change).**	Students communicate their scientific claims, evidence, and solutions to the science community.

Total: 10.5 hrs w/o summit; 12 hrs w/ summit
Total 45 minute periods: 14 w/o summit

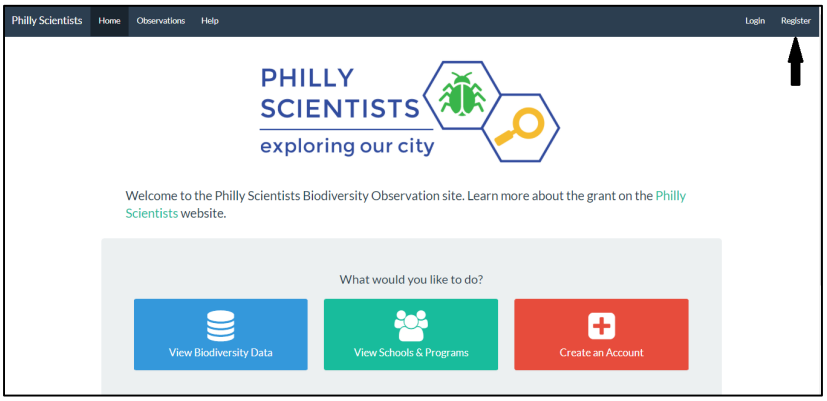
Website Guide for New Users

Description:

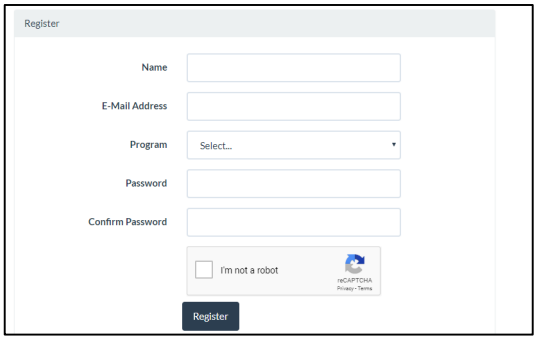
The document will guide new instructors on how to create an account, create student groups and review observations using the Philly Scientist Biodiversity Observation website.

Creating an Account:

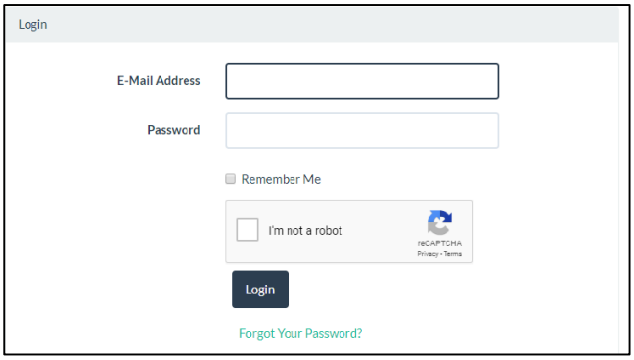
1. Go to the website https://app.phillyscientists.com/



2. A registration form will appear on the next page. Complete the registration form with the required fields. If your program is not an option in the Program field, contact astutzman@drexel.edu for your program to be added to continue registration.



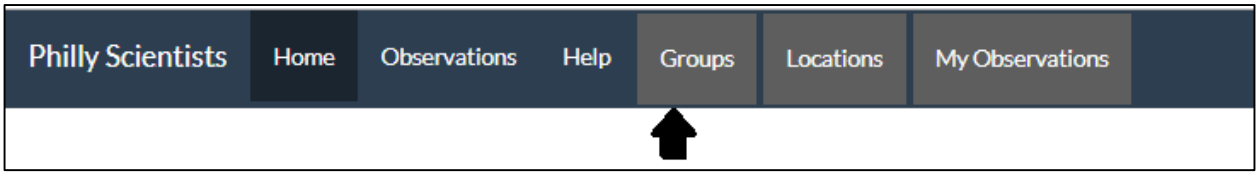
3. After completing the registration form attempt to Login to test your account.



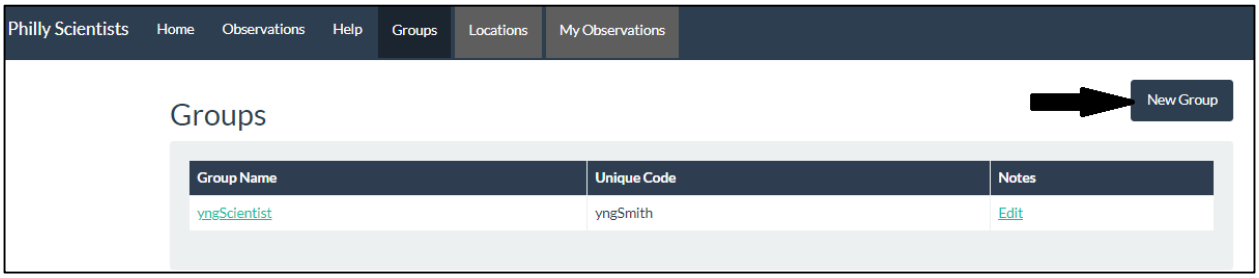
Creating a Student Group:

By creating student groups on the website, the students will be allowed to login into the Philly Scientist Mobile App without the need to create an account. Teachers can create Groups with a unique code using the unique code the students will be able to join the group using the mobile application.

1. Login in to your Philly Scientist Account to begin
2. Click on the Groups tab on the website's toolbar



3. Click the button New Group when the new window loads

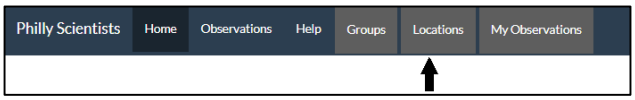


4. Complete the New Group form. Do not overcomplicate group codes as the students will need to the remember the code to use the app. The description section can be used to make notes on which number iPads were issued and which students are in a group (first names only). Do not add any personal identifiable information to the website.

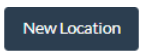
Adding Locations:

Adding locations will allow the students to track where they are collecting data when using the app. The locations you add will appear on the app when students add observations.

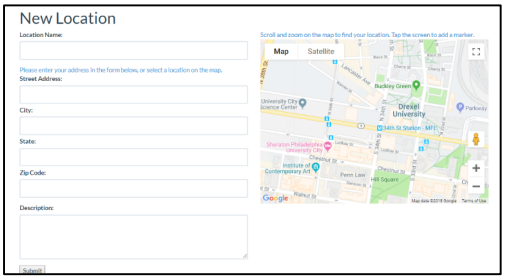
1. Click on the Locations tab on the Philly Scientist website



2. Click the "New Locations"

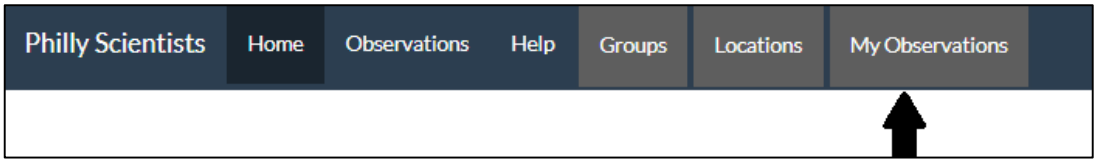


3. Complete the Locations form with the necessary information too add the location to the app **OR** Using the Google map plugin provided scroll to find your location and select it with a marker. Make sure to add a meaningful name for your location.

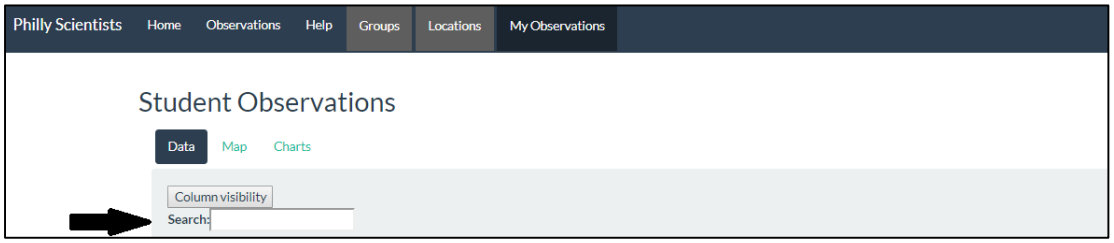


Viewing Submitted Observations:

Once the students in a group submit their observations using the Philly Scientist Mobile App, the data is sent to the profile of the teacher where it can be accessed and reviewed.
To view the observations, Login to your teacher account and click on the My Observations tab on the website's toolbar.



The data can be filtered by student group, location, program and date of submission by entering the keyword in the search bar.



On the My Observation tab users can also access charts to see the number of observations observed for a specific animal type or plant type. In addition to that a map of the location of all places visited can be viewed by clicking on the respective buttons.

User Guide for the Philly Scientist Mobile App

Description:
This document is to help new users to navigate the Philly Scientist iOS mobile app

Joining a Student Group
Using the Philly Scientist app student groups can record observations of plant, animal, insect species and different sites in their community. Students will be able to join a student group after receiving a Group Code from their teachers. Group Codes can be created by Teachers on the Philly Scientist website after creating an account. If you have not yet created an account, please visit here.

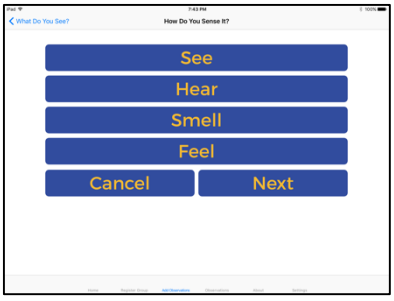
1. Enter the unique group code provided the teacher and select a Tracker name

2. To begin collecting observations click on the Add Observations button located on the toolbar on the application.

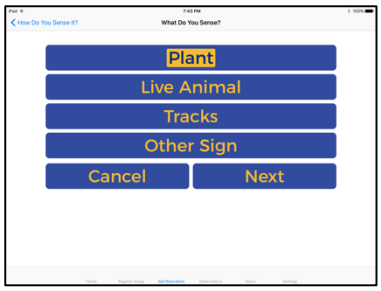
3. Click on the "Take Photo" button to take a picture of the observation subject of the group

4. Click on "Next" to continue the observation

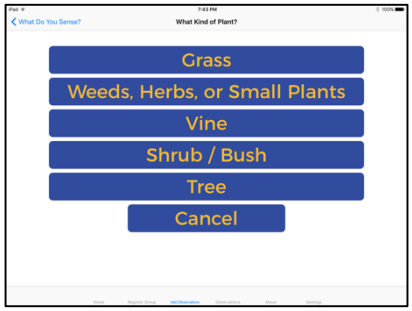
5. Select the different sense you used in your observation of the subject. If multiple senses were used, select the appropriate senses



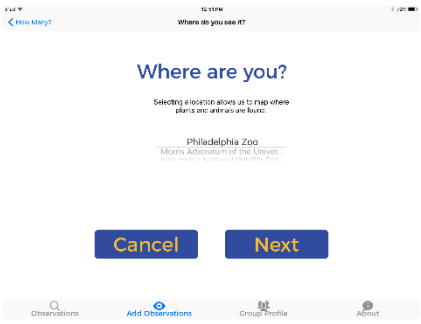
6. In the “What Was Sensed” screen. Select the species option which best matches the observation subject. Click “Next” to continue



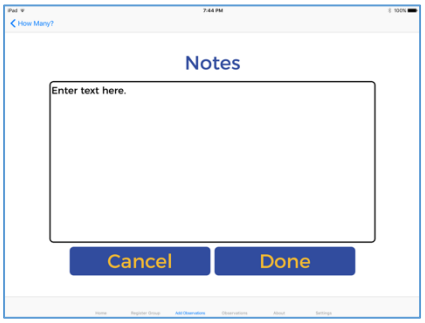
7. Continue through the app windows selecting the choices that correctly correspond with the observation subject your student group is studying.



8. Select the name of the location that the observation subject was studied and click “Next”. If the location is not displayed on the list, please check if the location address was added online. If you do not know how to add location, please see the Philly Scientist- New User Guide here.



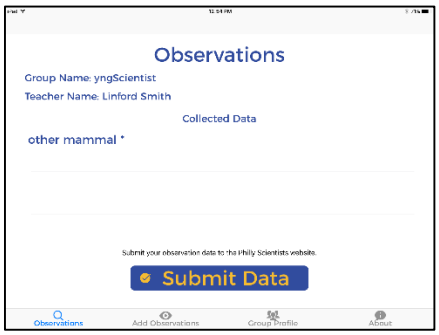
9. If any additional information was acquired during the observation that needs to be recorded that would help the observation fill the “Notes” window with this information.



10. Click the “Done” button to finish the observation

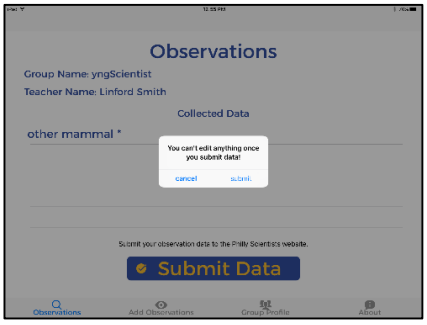
Submitting Observations to Philly Scientists Website:

Ensure before submitting the information about the observation subject to the website all information is correct. To verify all information, select the observation name on the Philly Scientist application home screen



After clicking on your observation, the user will see a screen with all the observation information displayed. On this screen you will be able to re-take a photo of the observation topic if necessary and edit other information that was entered.

Once complete select the "Submit Data" button on the "Observations" window a pop-up will appear prompting you to check the information submitted. If the information had already been verified click submit, if select cancel and following the information above verify the information.



Connect to an Internet source before attempting to submit or it will not be submitted.