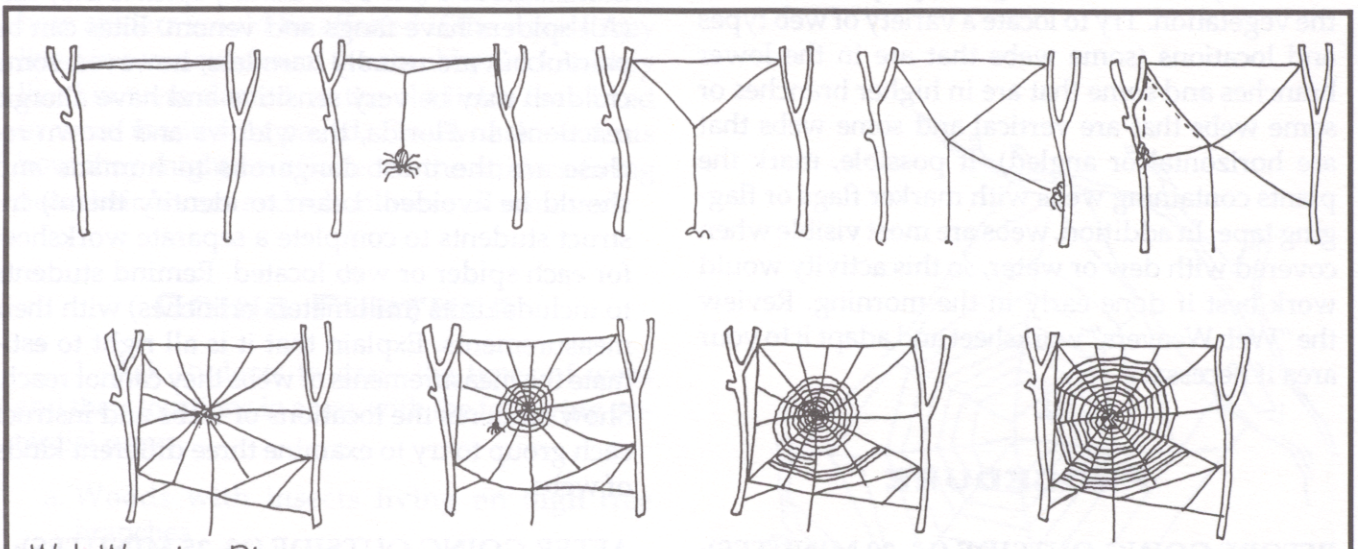
WEB WEAVERS



Web Weaving Diagram

KEY QUESTION

Where do spiders build their webs and why?

CURRICULUM FRAMEWORK TOPICS:
I.B.2. Spatial Scale
I.C.3.b. Finding Food, Water, and Favorable Temperatures—Animals
II.A.2. Traits of Animal Predators and Animal Prey
II.D. Competitive Interactions

RELEVANT HANDBOOK ENTRIES:
Spiders

TARGET AUDIENCE: GRADES 3–5, AGES 8–10
Suitable for visual learners. Appropriate for all academic ability levels.

SCIENCE PROCESS SKILLS USED:
BASIC: Observation, Communication, Classification, Measurement, Inference

CORRELATED STATE PERFORMANCE OBJECTIVES:
Primary Minimum Standards: 18 73 102
Primary Standards of Excellence:
1037 1041 1042 1047 1470
Elementary Minimum Standards:
2 3 20 23 27 29 32 118
Elementary Standards of Excellence:
1031 1037 1041 1042 1047 1159 1161 1170 1470 1488

TIME REQUIRED TO COMPLETE LESSON:
In-class: 35–45 minutes. In-field: 20–25 minutes.

BEST TIME OF YEAR FOR LESSON:
Fall, late spring

BEHAVIORAL OBJECTIVES

As part of this activity, students will:

- (C) 1. observe and describe the different orientations, placements and sizes of spider webs in plants.
- (C) 2. use observations to make inferences regarding the influence of web orientation, placement, and size on spider survival.
- (A) 3. explain how humans directly influence spider survival.

MATERIALS

ESSENTIAL:

- "Web Weavers" worksheet (three per group of two-three students)
- Meter sticks, rulers, or measuring tapes (one per group of two-three students)
- Clipboards or other hard writing surface (one per group of two-three students)
- Hand lenses (one per student)

SUPPLEMENTAL:

- Tennis racquet and ball
- Marker flags or flagging tape

Getting Ready

Scan the school grounds and locate a shrubby or woody area containing many spider webs in the vegetation. Try to locate a variety of web types and locations (some webs that are in the lower branches and some that are in higher branches or some webs that are vertical and some webs that are horizontal or angled). If possible, mark the plants containing webs with marker flags or flagging tape. In addition, webs are most visible when covered with dew or water, so this activity would work best if done early in the morning. Review the "Web Weavers" worksheet and adapt it to your area if necessary.

Procedure

BEFORE GOING OUTSIDE (15–20 MINUTES):

1. Ask students what spiders eat. Make sure students realize that all spiders are carnivorous and eat other animals, usually insects. Ask students how most spiders capture their food (prey). Students should realize that most spiders use webs to catch prey. Ask students if all spider webs are alike. Ask them why they think there are so many different types of spider webs.

2. Conduct a brief demonstration using a tennis racquet and ball. Get a student volunteer to throw the ball at the tennis racquet you are holding and show students that the racquet needs to be oriented "just right" to catch and return the tennis ball. In addition, demonstrate that the racquet also needs to be at the right height to catch and return the ball properly. Finally, ask students what kind of racquet would be needed to catch a bowling ball.

3. Relate these ideas to the ideas of spider web orientation (horizontal, vertical, or angled), stratification (distance from the ground or location in a plant), and strength. In order to capture prey properly, spiders weave webs at certain heights in plants, build them at certain angles and tailor the size and strength of their webs to the type of prey they are trying to catch.

WHILE OUTSIDE (20–25 MINUTES):

Divide students into groups of two to three and distribute three "Web Weavers" worksheets, a meter stick, ruler, or measuring tape, and a clipboard to each group. Give each student a hand lens. Review the worksheet with students and caution them **NOT TO TOUCH** any spiders they see. (All spiders have fangs and venom. Bites can be painful but are usually harmless; however, some children may be very sensitive and have allergic reactions. In Florida, the widows and brown recluse are the most dangerous to humans and should be avoided. Learn to identify them!) Instruct students to complete a separate worksheet for each spider or web located. Remind students to include units (millimeters or inches) with their measurements. Explain that it is all right to estimate the measurements of webs they cannot reach. Show students the locations of webs and instruct each group to try to examine three different kinds of webs.

AFTER GOING OUTSIDE (20–25 MINUTES):

1. Have each group briefly summarize its results for the rest of the class. First, focus on the types of spiders observed, then discuss the types of webs observed.

2. Conduct a whole-class discussion addressing the following questions:

- What kinds of webs caught the largest prey? The smallest prey?
- What kinds of webs seemed to be designed to catch flying insects? Falling insects? Crawling insects?
- How does the location of a spider's web in a plant influence the type of prey it captures?
- How does the orientation of a spider web influence the type of prey it captures?
- How does the size of a spider's web influence the type of prey it captures?
- Why don't all spiders living in a given area weave the same types of webs?

Students should realize that larger, sturdier webs can catch larger prey and that vertical, high webs are designed to catch flying insects while horizontal, low webs are designed to catch falling or crawling insects. Webs on the tops or outer edges of plants are more likely to capture flying insects while webs near the bottom or interior areas of plants are more likely to catch falling or

crawling insects. To avoid competition in a given area, different types of spiders weave different types of webs to catch different types of prey.

3. Conclude the lesson by asking students how spiders would be affected if the woods they lived in were cut down, the shrubby thickets they lived in were cleared, or the old fields they lived in were mowed or paved. Finally, ask students how they might be affected if the spiders living near their homes and school were all removed.

Going Further

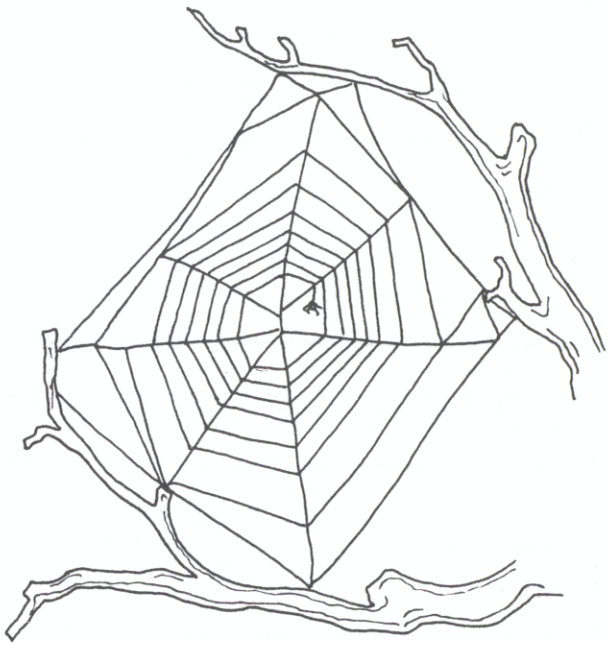
1. Ask students to draw the types of webs and their locations in areas with the following potential prey:

   a. Woods with insects living on high tree branches

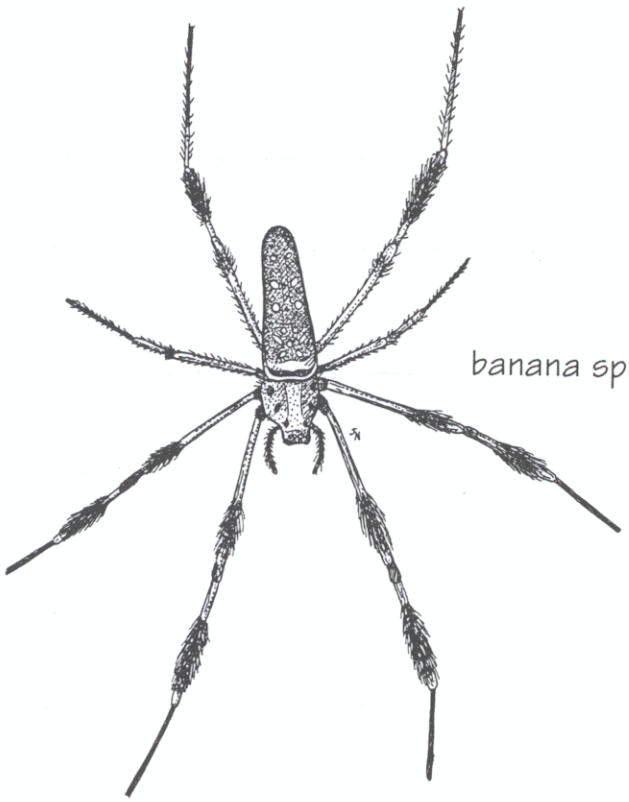
   b. Shrubby thicket with bugs that crawl on the ground

   c. Old field with many flying insects

2. Complete the activity "How Does a Spider Spell Success?"



spider web



banana spider

WEB WEAVERS

thorn spider

Name_____

Name_____

Name_____

Name_____

DESCRIBE THE SPIDER IF PRESENT:	
Color	Draw a picture of the spider
Shape	
Texture (fuzzy, shiny, etc.)	
Estimated size	

DESCRIBE THE SPIDER'S WEB:	
Number of animals caught in the web	Draw a picture of the web
Kinds of animals caught in the web	
Distance of web from the ground	
Width of the web	
Orientation of the web (like a curtain, a tabletop, or at an angle)	