Instructor's Notes
"Eddie Kit" #1
Spiders—Our Friends

Subjects: Math, writing, science, social studies, reading, critical thinking and life skills

Activities:

1. Use the "If you could…" worksheet to discuss how different creatures have special characteristics which enable them to perform spectacular feats. On the first example, a female spider can scurry 33 times her body length in one second. As a math extension, ask students to find how fast they could scurry the length of a football field using their own body length if they had the same ability. An example of this using an average female height of 5'5" (65 inches) would be to multiply 65 inches X 33 (length a spider can scurry in one second). Have students interchange inches for feet and also figure the reverse or change all the measurements to metric.
2. Brainstorm fears they may have. Then discuss spiders as a common fear. Have students complete the "Have no Fear" worksheet as a practice in algebra in a "non-fearful" setting.
3. Divide the class into groups. Have each group read the handout on arthropods entitled, "Spiders and Insects: What's the Difference?" Each group will then complete the venn diagram comparing Spiders (Arachnids) to Insects. Put the facts that are only about Spiders in the Spider circle. Put the facts that are only about Insects in the Insect circle. Put facts that are common to both in the center. Use the transparency of the venn diagram to write the answers of all the groups on it.
4. Have the class work in groups and complete the "Let Spiderlings Fly" experiment.
5. Read the poem, "Psychoanalysis of a Spider". Discuss the scientific aspects of the poem as well as the author's dramatic use of symbolism. Ask students to write a poem about spiders or about a fear they have. A haiku or an acrostic poem may be a good way to start. An example of a feeling poem is included and is a good type of poem to use for this activity.
6. Look through the handout on tarantulas throughout the world or research types of spiders and where they are found using the internet as a resource. Have the students locate these different countries on a globe. Discuss how environment and evolution may affect different types of spiders and where

they are located. Ask students to speculate how a spider could move from continent to continent.

7. Have the students do the "Spider Venom Makes Bug Soup!" spider experiment.
8. In pairs, do the spider experiment "Spiders' Feet Don't Stick to their Webs!"
9. Working in pairs on the laminated geoboard, have the students make as many paths as they can for a spider to get to its prey. You can't go back or retrace a step. How many paths did you make? Can there be more? Additional activities are provided if you would like to explore more activities with geoboards.
10. Review the handout on the origins of "Little Miss Muffet". Discuss how our societies' values concerning females have changed. Branch out into a discussion on the 19th amendment (women's suffrage) and the impact on our way of life. Further extensions could be geography—where is England; or who ruled England during this period (Queen Elizabeth I) and the difference between a monarchy and a democracy. *(There is a home visit activity that corresponds with this activity.)*
11. Use the spider diagram as a graphic organizer to start a "webbing" activity for writing. Students could write a 5-paragraph essay describing spiders or they could write about a fear they have and how they have or would like to overcome this fear.
12. Talk with students about which spiders in our area are dangerous, how to minimize the presence of spiders in a home and how to determine if you or your child has a spider bite. Read and discuss the "Spider Bite Safety Sheet". *This handout is also included in the Home Visits Packet.*
13. Read and discuss the handout "A Spot of Speed Puts Spiders in a Spin". An extension of this handout could be the effects of drugs on: driving a car, memory, taking care of children, etc.
14. Encourage reading by making a spider bookmark. *This activity is also in the Home Visits packet.*

Activity #1 (Part 1 of 2)

If you could….

scurry like a spider

- a female house spider can move 33 times the length of its own body in 1 second

lift like an ant

- an ant can lift 50 times its own weight

leap like a frog

- a frog can hoop 20 times its body length

eat like a shrew

- a shrew can eat 3 times its weight daily

jump like a flea

- a flea can jump 70 times its own height

grow like a fetus

- an average human fetus increases its weight about 3½ billion times from the time of conception to the time of birth (about 9 months)

This information was adapted from the book, If You Hopped Like a Frog, by David M. Schwartz.

Activity # 1 (Part 2 of 2)

Considering its length, a female house spider is faster than any other animal, even a cheetah. It can move 33 times the length of its own body in 1 second!

1. How far could you move if you had the same ability to move 33 times your own length in 1 second?

2. How long would it take you to run the length of a football field? (100 yards)

3. How fast could you run a mile? (5,280 feet)

4. How far could you run in a minute if you could keep up that pace?

Activity # 3 (Part 1 of 2)

ARTHROPODS
Spiders and Insects: What's the difference?

While most people think arachnids (the group that includes spiders) are insects, they're actually altogether different creatures. However, insects and arachnids are both *arthropods* (segmented animals).

Arthropods include an incredibly diverse group of animals such as insects, crustaceans, spiders, scorpions, and centipedes. The phylum takes its name from its distinctive jointed appendages. By nearly any measure, the most successful animals on the planet are the arthropods. They have conquered land, sea and air, and make up over three-fourths of all currently known living and fossil organisms.

So…what are the differences between insects and spiders? In school, we are taught that insects have six legs and spiders have eight, and that insects have three body parts while spiders have only two. Otherwise, these two animals seem pretty similar. Right? As a matter of fact, many people call all of them insects.

Let's make a comparison between spiders and insects. All arthropods have a stiff cuticle made of chitin and proteins, forming an exoskeleton. Insects have antennae but spiders never do. Both insects and spiders are small terrestrial animals. Insects possess jawlike mouthparts (mandible), whereas spiders have clawlike mouthparts (chelicerae) for killing or handling food and a sucking pump for drinking fluids. All spiders have fangs and most kinds have poison glands. Insects as well as spiders have a body cavity filled with blood that is pumped by a heart. They also have the same type of nervous system and muscles.

Spiders have a cephalothorax (combined head and thorax) and an abdomen. Insects have a separate head, thorax and abdomen. Spiders have appendages on their abdomens, such as spinnerets, whereas insects do not. All spiders spin silk and most create webs so they can catch insects for their food. Most spiders possess "book lungs" which are internalized and modified gills. Insects use tracheae or branching tubes that lead directly to their interior tissues. Most insects have wings, but spiders never do. Spiders are helpful to people because they eat harmful insects that can destroy crops. Spiders also eat flies and mosquitoes that carry diseases.

Activity # 4

Let Spiderlings Fly

Objective: To demonstrate how baby spiders use air currents to disperse.

Have you ever gone out in the early morning and seen fine, glistening threads throughout the lawn? These are trails of silk produced by very young spiders. Many common spiders produce eggs that hatch in fall, and the young, known as spiderlings, typically disperse by an innate behavior called "ballooning." Ballooning involves production of threads of silk that are attached to the spiderling. These threads produce enough drag to catch the wind and carry the young spiders, sometimes for very long distances.

For example, spiderlings have been known to drift onto boats more than 200 miles offshore, and others have been picked up by airplanes in samples taken 10,000 feet above ground.

The silk produced by young spiders is sometimes referred to as "gossamer." When a very large hatch of spider eggs occurs, the gossamer may mat over large areas, appearing as a thin sheet. Spiders that hunt, including wolf spiders and jumping spiders, usually produce eggs that hatch in fall. Other spiders produce egg masses that hatch in spring.

Materials:

- Scissors
- Sewing thread
- Ruler
- Glue
- Six ¾" tissue paper bits of different colors

Procedure:

1. Working in groups, cut 18 pieces of thread, each about 6 inches long.
2. Glue 3 threads to each tissue bit. Fold the tissue over on itself and let the glue dry. *These are your six spiderlings.*
3. Lay the spiderlings together on the table. Lean toward the table so that your mouth is close to but not touching the spiderlings. Blow hard! Watch those baby spiders fly!

Go one step further: Your breath gusted the spiderlings to new areas, some farther than others. Now simulate a gusty spring or fall wind by using a hair dryer (set on cool) on the spiderlings. How were the results different than when you just used your breath?

This activity was adapted from one found in *Janice VanCleave's Play and Find Out about Bugs* (John Wiley & Sons, 1999)

Activity # 5 (Part 1 of 2)

PSYCHOANALYSIS OF A SPIDER

Just observe him, the center of attraction
Confident of his prowess, shown by his action.
An unparalleled charisma, judging by the results
his prey, they come to him, their integrity he insults

Balanced upon a thread of life
his movements are sure, they bear no strife
having eight eyes, and eight legs, how bizarre!
He is the king of his realm, a self made Tzar.

When he meets with a yen to mate with a wench,
she paralyzes him, an action of stench
an eggsack, she places upon his chest
conscious he is of his sordid rest
This sack of eggs, they are her brood
to which he becomes their very first food
subject to such a grievous offence
I would too be filled, with vehemence

Of another life and death struggle, I dare to speak
To lose this one will result in the same, let's peek...

Hunting for food, a wasp attacks
sensing trouble, the spider reacts
The wasp strikes, parries and stings
"the result is waking death"
to the spider it sings.

A reflexive pounce
to the wasp's dismay
the spider bites in
with his chelicerae
the venom dissolving the wasp from within
becomes a liquid the spider drinks in
casting away the now empty shell
the spider pauses...
contemplating...
heaven... ...or hell...

by Nicholas, October 21, 1991 (USA)
From the website:
http://www.eng.iastate.edu/explorer/topics/spiders/Explorer%20Page_files/Poems.htm

Activity # 5 (Part 2 of 2)

"FEELING" POEMS

Name the feeling.
Give it a color.
Tell how it sounds.
Tell how it feels.
Tell how it smells.
Tell how it tastes.
(& variations)

FEAR

FEAR IS BLACK..
IT SOUNDS LIKE THE WIND WHIPPING THE SIDE OF THE HOUSE.
IT SMELLS LIKE A DAMP BASEMENT.
IT FEELS LIKE YOUR SOUL IS GOING TO LEAVE YOUR BODY.
IT TASTES LIKE BITTER HERBS.

Activity # 7

How Do Spiders Work?

Spider Experiments

Spider Venom Makes Bug Soup!

To learn more about how spiders' venom makes its insect victim into a kind of bug "soup", here is an easy experiment.

Objective:
Students observe a simulation of the effect of a spider's venom on its prey.

Materials:

- Styrofoam cup—one per group
- Sugar cube
- Eye dropper
- Hot water

Procedure:

1. Give each pair of students a Styrofoam cup with a sugar cube inside it. Ask them to draw an insect on the cup because it represents the insect. Explain that the sugar cube is like the inside of an insect's body—hard!
2. Then one student should be the spider and take an eyedropper full of hot water. The hot water represents the spider's venom. Take the hot water and put it into the cup, like the spider biting the insect. What will happen to the insect's insides (the sugar cube)?
3. The students should notice that the water dissolves the sugar cube just as the spider's venom dissolves the insect's body when the spider spreads venom into the insect's body. Discuss what each item in the experiment represented and what conclusions could be drawn from this experiment. The students should be able to understand that when the spider bites an insect its insides turn into a liquid and then the spider is able to suck up the liquid! So a spider can eat without chewing!

Activity # 8

Spiders' Feet Don't Stick to Their Webs!

To understand why spiders don't stick to their own webs, here is an inexpensive and easy to do experiment.

Materials:

- Masking tape
- Lotion

Procedure:

1. Begin by placing two pieces of masking tape on a table or desk with the sticky side up. State that the masking tape represents the sticky threads of the web. Ask the students to use their hands and walk like a spider over one piece of the masking tape. They will discover that they stuck to the tape.
2. Then have the students put hand lotion on their fingertips and walk like a spider over the other piece of tape. This time they won't stick! The lotion represents spider saliva.

Explanation – Spider's feet (tarsi) are anointed with a non-stick secretion from the mouth parts. They also avoid walking on the sticky parts of the web (the sticky globules); however, if a spider is picked up and thrown back onto its own web it will become stuck.

Spider experiments adapted from an activity on *Units 4 Teachers* website http://www.theeducatorsnetwork.com/main/forward/unit2.htm

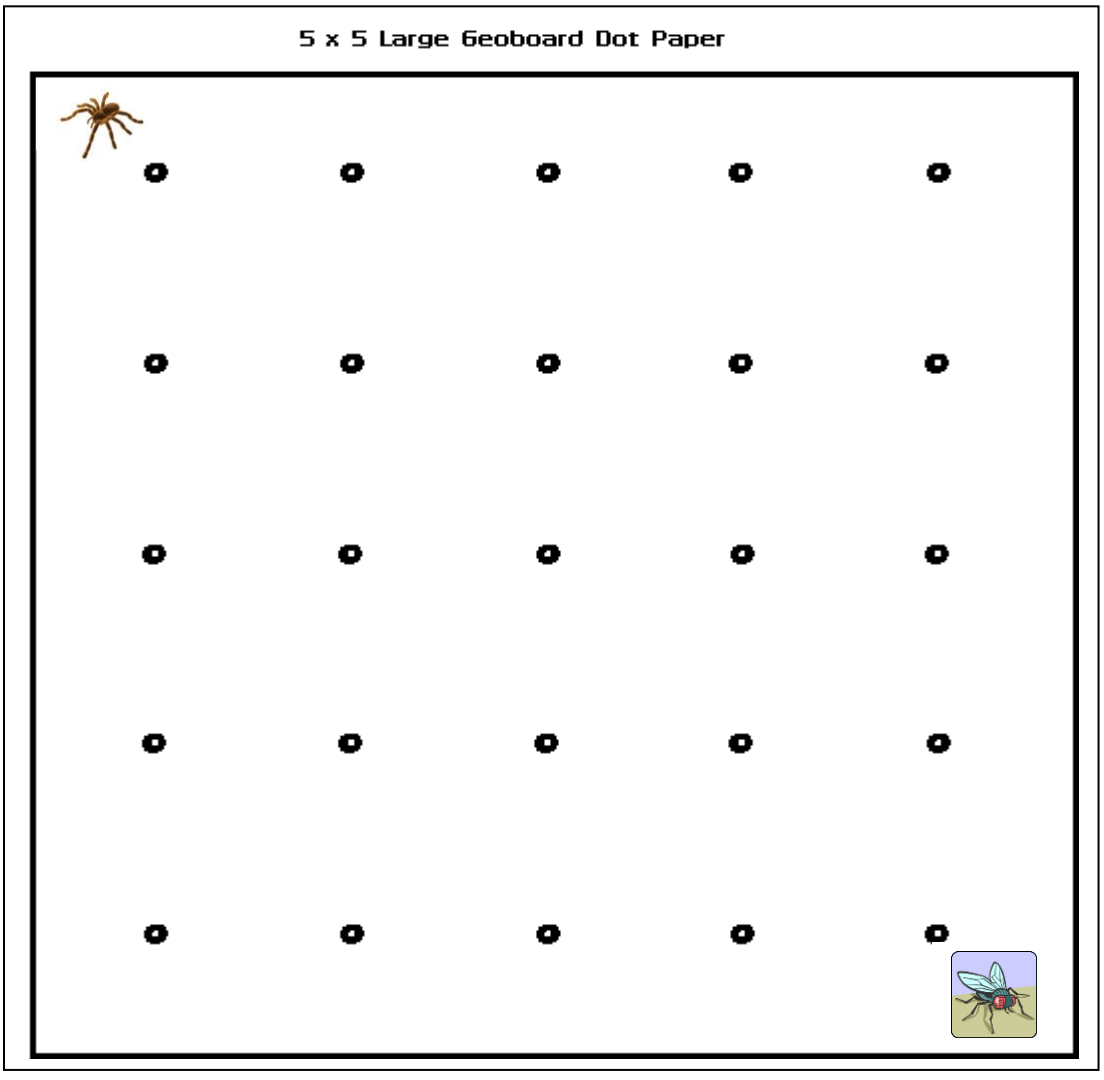
Activity # 9 (Part 1 of 2)

Spider Paths—Geoboards in the Classroom

Materials:

- Laminated geoboards.
- Vis-à-vis markers
- Wet paper towels

Procedure:
Working in pairs, have students draw as many paths as they can for the spider to go to its prey. **Rule:** You can't go back or retrace a step. You can erase the Vis-à-vis markers with a wet paper towel.



Activity # 9 (Part 2 of 2)

Additional Geoboard Activities—Rectangles

Objectives

- to develop a sense of area on the geoboard
- to realize that all squares are rectangles
- to experiment with geometric pattern making

Materials

- 5 x 5 laminated geoboards
- Vis-à-vis markers
- Wet towels
- Overhead projector
- Transparency of 5 X 5 geoboard

Warm-up

The instructor can do the activities along with the students on the overhead transparency.

- Draw a rectangle on your geoboard and find the area (Length X Width).
- How many rectangles are there with a base 1 unit long?
- How many rectangles are there with base 2 units long?

Activity

- Find all possible rectangles on a 5 x 5 geoboard. *Answer: There is a total of 16 rectangles, half of which are squares.*
- Find the area of each of the 16 rectangles. *Answer: The non-square rectangles have area 2, 3, 4, 4, 6, 6, 8, and 12 square units.*
- Find the perimeter of each of the rectangles.
- Make a rectangle with area 2 square units. Can you find another rectangle with this area?
- Can you find a rectangle and a square with the same area?
- There are three rectangles with area 4 square units. Can you find them?

Activity # 10

Little Miss Muffet

<u>Denise</u> from Kenosha, Wisconsin has found some information on Miss Muffet which is really interesting:

Here in Wisconsin we have a Renaissance Faire, set in 16th century England. We are portraying approximately 1574, during the reign of Elizabeth Tudor.

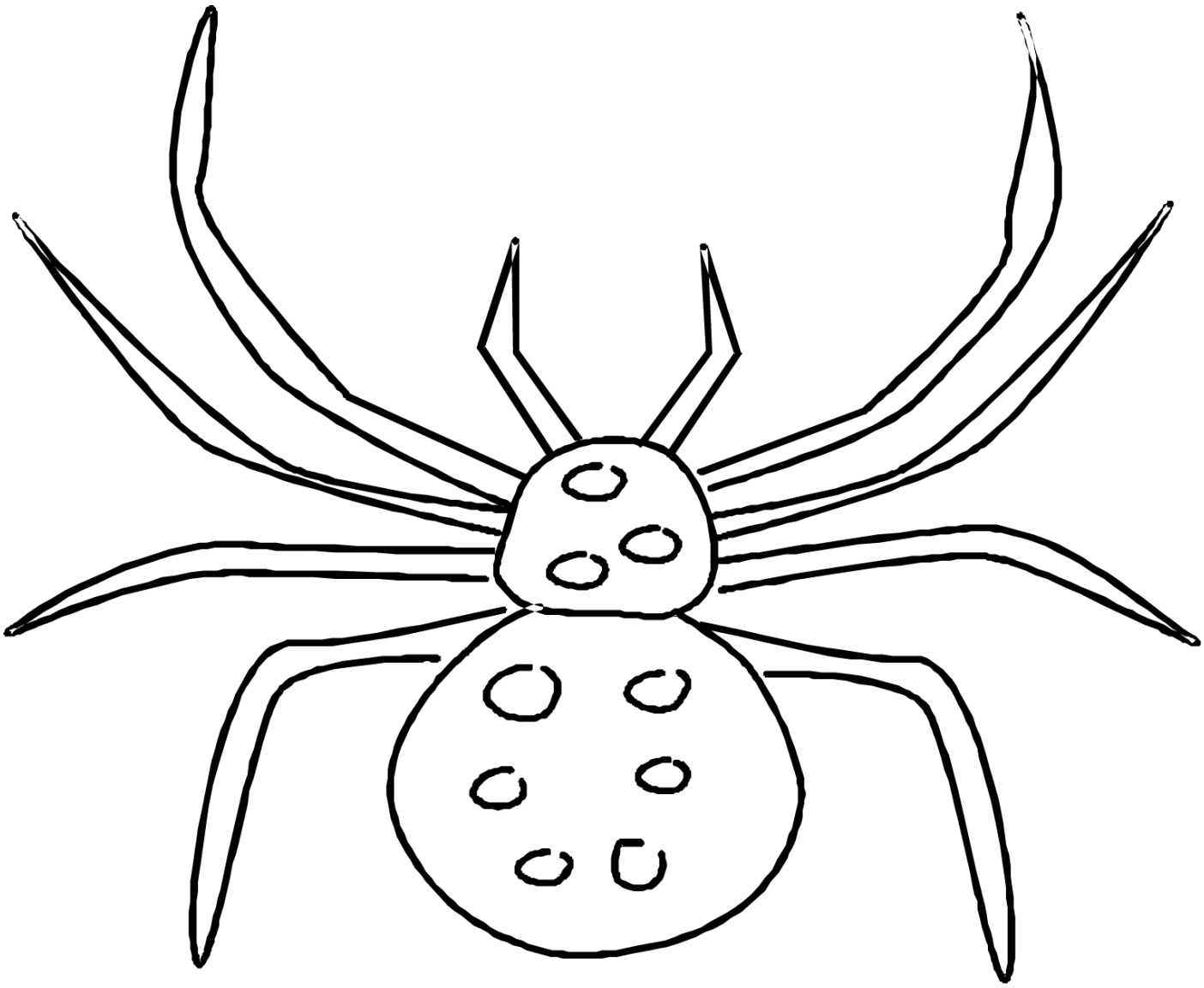
Having worked at the Faire for 10 years now, I was very interested in playing a character that I could use my spider knowledge with. I knew Little Miss Muffet was a real person and I thought she was from the 16th century. So I started some research. I came across a book that listed the "Who's Who" of London at the time. In that book I found the Reverend Doctor Thomas Muffet. It listed his daughter Patience and I was all set to play Little Miss Muffet. Her father was a family friend to the sea captain Sir Phillip Sidney, who had very close ties with the Queen.

Dr. Muffet wrote several books including a cook book that explained how to use local plants and insects in food as well as medicine. Dr. Muffet experimented on his daughter by having all the different types of spiders in England bite her to see if she had any reaction. Thankfully there were no poisonous spiders in all of England and there still aren't any today. Dr. Muffett used his daughter in this way because he considered her expendable. Sons can pass on the family name, but daughters do not, so no harm in using her in this potentially dangerous task. I am sure glad we don't still live in the 16th century today.

Dr. Muffet had another friend named Elizabeth Goose. She and her husband ran a publishing company in London. Elizabeth Goose also wrote childrens poems and later bacame known as Mother Goose. She wrote the very famous "Little Miss Muffet" that we all know to this day.

Information obtained from *Interesting Spider Facts*
website: http://www.rochedalss.qld.edu.au/spider/spider9.htm

Activity # 11 **"Webbing" Activity**



Activity # 12

BUG and SPIDER BITES

NOTE: If the person is having a severe reaction, s/he should be transported (with the bug, if available) to the hospital emergency room immediately.

- Are you having trouble breathing?
- Were you bitten by a poisonous spider?
- Is the person fainting or having severe dizziness?

- If **yes** to any of the above, the patient should be examined by a physician promptly.
- If **no**, then follow the instructions below

ACTIVITIES: Wash the area of the bite with soap and water. Apply a cold compress if there is swelling or itching. Keep the area clean.

MEDICATIONS:

- ***Aspirin*** or ***Motrin*** or ***Tylenol*** will help pain. ***Calamine Lotion*** or ***topical steroid cream*** will relieve itching. Oral ***Benadryl*** will help swelling and itching. *Follow directions on the package.*
- It has been reported that over-the-counter products such as ***ReJuveness***, ***Mederma***, or ***SyCream*** aid in soothing the pain, irritation, burning, and discoloration associated with bites.

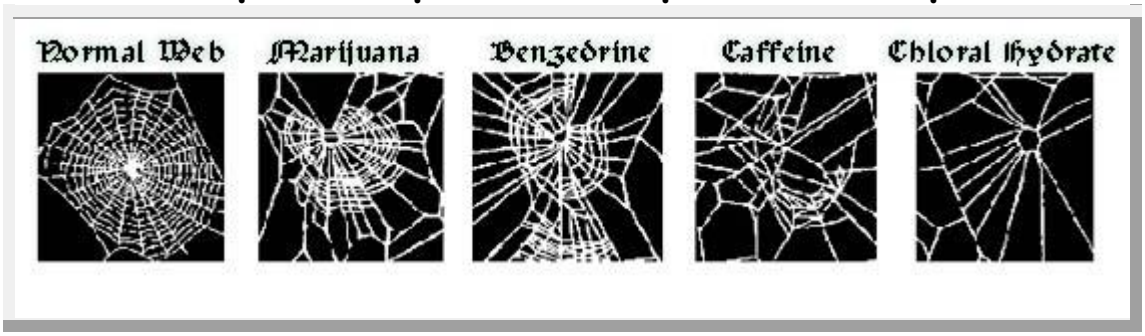
DIET: You may eat anything you desire.

CONTACT YOUR DOCTOR FOR ANY OF THE FOLLOWING:

1. You have trouble breathing or passing out.
2. There is no improvement within 3 days.
3. Any infection develops.
4. A peculiar rash appears.
5. The area(s) does not appear to be healing properly.

Activity # 13

A Spot of Speed Puts Spiders in a Spin



Scientists at the United States National Aeronautics and Space Administration (NASA) have turned their attention from the mysteries of the cosmos to a more esoteric area of research: what happens when you get a spider stoned.

Their experiments have shown that common house spiders spin their webs in different ways according to the psychotropic drug they have been given. Spiders on marijuana made a reasonable stab at spinning webs but appeared to lose concentration about half-way through. Those on Benzedrine - "speed" - spin their webs "with great gusto, but apparently without much planning leaving large holes", according to New Scientist magazine.

Caffeine, one of the most common drugs consumed by Britons in soft drinks, tea and coffee, makes spiders incapable of spinning anything better than a few threads strung together at random. On chloral hydrate, an ingredient of sleeping pills, spiders "drop off before they even get started".

NASA scientists believe the research demonstrates that web-spinning spiders can be used to test drugs because the more toxic the chemical, the more deformed was the web.

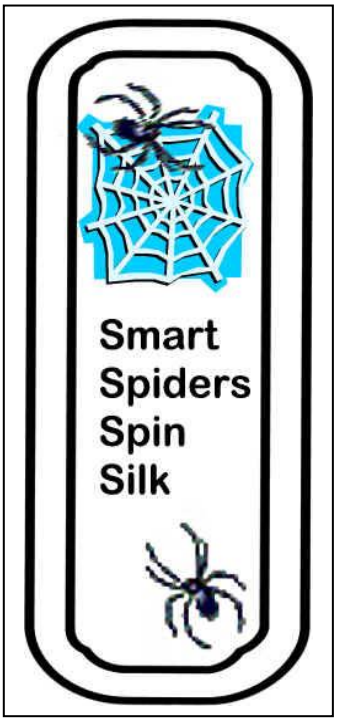
The scientists believe their previous work on the geometry of crystals will help them to devise computer programs that can analyze web-building objectively in order to predict the toxicity of new medicines. "It appears that one of the most telling measures of toxicity is a decrease, in comparison with a normal web, of the numbers of completed sides [of a web]; the greater the toxicity, the more sides the spider fails to complete", the scientists say.

Paul Hillard, spider specialist at the Natural History Museum in London, said researchers first discovered the effects of psychotropic drugs on spiders during experiments at the end of 1960s. The researchers fed caffeine to spiders in hope of making them spin webs in the late evening rather than the early dawn. The result was eccentric webs rather than earlier spinning, he said.

(By Steve Connor)

Activity # 14

Spider Book Marks



1. Laminate the printed book mark or cover with clear contact paper.
2. Cut out the laminated book mark.
3. Use a hole punch to punch a single hole in the middle of the book mark approximately ½ inch from the top.
4. Double over a piece of yarn about 6 inches in length and pull it through the hole.
5. Loop the two loose ends of yarn through the doubled end of the yarn and pull it tight against the book mark.
6. Tie a spider ring on the two loose ends of the yarn.
7. Clip off extra yarn left over after tying the spider ring.

Spiders Around the World

Curly Hair
Brachypelma Albopilosum

The Curly Hair tarantula is a burrowing species found in the tropical forests of Central America. This non-aggressive, stocky terrestrial has proven to be one of the hardiest tarantulas in captivity.

Mexican Fireleg
Brachypelma Boehmei

The Mexican Fireleg is a terrestrial species native to Mexico that prefers drier conditions. Firelegs are not particularly aggressive. However, they have nervous temperaments and never hesitate to flick urtication hairs at the slightest irritation.

Chilean Rose
Grammastola Rosea

This medium sized species from the drier regions of Chile has a subtle beauty that is enhanced by its very docile nature. It is one of the most popular pet species of all times.

King Baboon
Citharischius Crawshayi

The King Baboon is the second largest tarantula on the African continent. These animals should, however, be more accurately named the Queen Baboon, because the 8-inch or greater adults are all female. Males of this species are small in comparison, reaching no more than a 5-inch leg span. When provoked, King Baboons will rear-up on their pencil thick back legs and hiss loudly.

Brazilian Pink
Vitalius Platyomma

The Brazilian Pink is a large terrestrial species from the Amazon Rainforest. This opportunistic burrower is a gorgeous specimen for any collection. As with other Vitalius, this species can be very nervous and will readily flick urticating hairs.

Trinidad Chevron
Psalmopoeus Cambridgei

The Trinidad Chevron is native to the Caribbean Islands of Trinidad and Tobago. These animals make beautiful tube webs and live on the sides of cliffs in their native lands. Chevrons have a very sculpted look with long feathery hairs on their legs that look like the teeth of a comb. Although beautiful they are very aggressive and fast.

Goliath Bird Eater
Theraphosa Blondi

This tarantula is indigenous to the rain forest regions of northern South America. This true giant of the spider world is the largest species on earth. Adults have been known to exceed a quarter of a pound in weight with an 11-inch leg span. These animals readily flick painful urticating hairs, and when provoked will bite with their one inch long fangs!

Desert Tarantula
Aphonopelma Chalcodes

The Desert tarantula is smaller and generally grows 2 to 3 inches long and is colored gray to dark brown. It is found in the dry and warmer parts of North America and is common to the Sonoran, Chihuahuan and Mojave deserts of Arizona, New Mexico and Southern California.

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