

Association of Future Science Educators

What did you do last summer? Model lessons from Science Camp

9/25/08 in LA5-261

Tonight's Presenters: YSC 2009 Staff

Shane Philips, Ayn Cleveland, Angela Lewis

AGENDA

Overview of Young Scientist Camp, GEAR UP and SEE US Succeed!

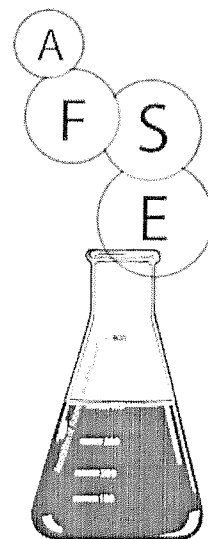
SEE US Succeed! – Creepy Crawlers

SEE US Succeed! – Backyard Biologists

GEAR UP – Submariners

CSI – mini investigations (chromatography, blood typing)

How to apply to teach at YSC



SAVE THE DATES FOR UPCOMING AFSE & SCIENCE EDUCATION EVENTS

- October 19 (Monday) - The Ocean Institute Presents.... join us LA5-265
- November 5 (Thursday) - **Science in Space: Educational Materials from NASA** LA5-267
- December 1 (Tuesday) - Cabrillo Marine Aquarium shares lessons for **Teaching Marine Science K-12** (room TBA)
- December (week of 12/7 – date & room TBA) - Getting a science teaching job - tips for interviewing and making yourself marketable

RSVP for all AFSE events on-line at www.scienceteaching.org

Do you like science?

Can you imagine yourself teaching science at the middle school level?

There are lots of middle school science teaching jobs available every year. Consider getting an added subject matter authorization for teaching science or a Foundational Level (K-8) Single Subject Science Credential.

If you have a Multiple Subject Teaching Credential (or are you working towards earning your Multiple Subject Teaching Credential) and are excited about the idea of teaching middle school science we are here to help!

AFSE Events are open to everyone interested in teaching K-12 science. Attending AFSE helps you professionally and financially!

\$ Attend two AFSE events per semester to receive a certificate of active membership.

\$\$ Attend 3 AFSE or club suggested events/year and receive \$5 off your CSTA membership, attend 6 AFSE or club suggested events/year and receive \$10 off your CSTA membership! (at least one event/semester must be an AFSE event)

AFSE is a NSTA Student Chapter For more information about the club and science education events visit www.scienceteaching.org

AFSE is supported in part by a grant from the National Science Foundation (DUE-0501326)

THE CASE OF THE MISSING RESEARCH REPORT

Campus security reported that a term paper had been stolen earlier today. Seventh grader Sandy Shaw was supposed to submit her research paper during 4th period English class. When she went to her locker to retrieve her paper she found the locker pried open and the paper missing.

There were muddy footprints leading up to her locker. Security called in the police. They are looking at the footprints to see if they might provide clues as to who took her paper. Also found at the scene of the crime was a taunting note. Police seem to think that the perpetrator is not looking for ransom. What appears to be blood was found on the edge of the locker door.

Ms. Shaw is particularly upset as she has been doing poorly in English class. She worked extra hard on this paper which would count for 25% of the class grade. Ms. Shaw needs to bring up her grade in order for her parents to let her go to the school dance. Now that the paper is gone she won't be able to go to the dance.

Campus Security and the Police are hoping someone may have seen something suspicious. If you have information which may help please call them at 596-6115

Suspect Profiles

Sandy Shaw – 7th grader

Sandy has been struggling with English all term. She has also gotten in trouble at school for being the class clown. She's been sent to the office and had in-school suspensions a couple of times this semester. Her parents have put her on restrictions until she raises her grades and her behavior improves. Recently she admitted to having a crush on Peter. She says that she's been working really hard in English so that her grades will go up. Then she'll be allowed to go to the school dance with him. Sandy is pretty and has lots of friends. She's been close friends with Angela since kindergarten.

Angela Smith – 7th grader

Angela and Sandy have been best friends since kindergarten. They go to school together, do their homework together, and they take art classes together. Angela is quiet and doesn't have many friends other than Sandy. She does well in school and never gets in trouble. She has a secret crush on Peter but she hasn't told this to anyone, not even Sandy.

Peter Perfect – 7th grader

Peter is the quarterback of the football team. He does really well in school but doesn't have many friends because he just moved here. He has become good friends with John, another player on the team. His friend John Shiman has told him that Sandy has a crush on him but he doesn't really believe it. He likes Sandy but doesn't have any interest in going out with her and he wasn't planning on going to the dance with her.

John Shiman – 7th grader

John is on the football team and he's pretty good friends with Peter. He is very popular and he was just elected to be next year's team captain. He and Sandy have started to become friends. Both of them like to joke around in class. A couple of times they've been sent to the office together. He thinks she's really funny.

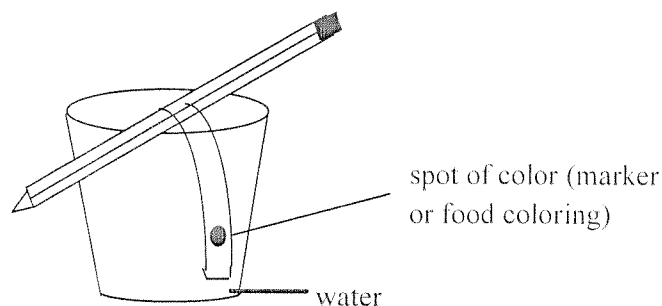
David Jones – 7th grader

David lives to play football. He's been playing since he was little and he has hopes of going to college on a football scholarship. Then, who knows – maybe the NFL! He was the quarterback until Peter moved to town. He is hoping that Peter will either move away or get in trouble so that he gets kicked off the team. If that were to happen David would get to be the quarterback again.

Paper Chromatography

Materials:

- small cup and water
- markers and/or food coloring
- strips of coffee filters or paper towels (about 1 inch wide)
- pencil



Procedure:

Make a spot on the bottom of the paper strip with the marker (or food coloring). The spot should be about 1 inch from the bottom.

Pour water into the bottom of the cup (about 1/2 an inch).

Place the pencil across the top of the cup.

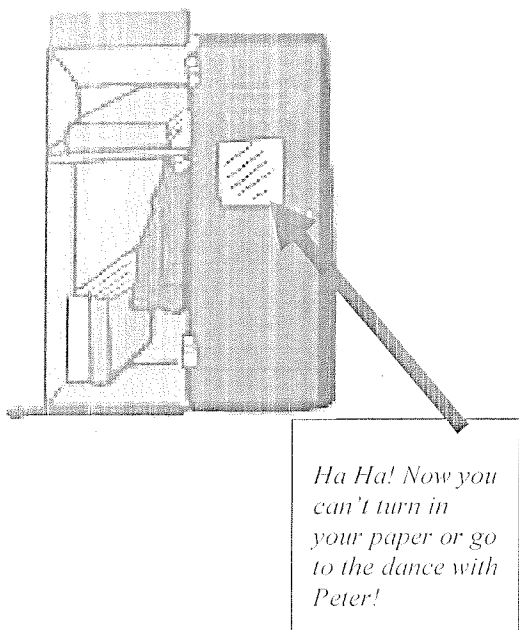
Hang the paper strip over the pencil so that the very bottom of the paper is in the water.

YOU DO NOT WANT THE SPOT OF COLOR TO BE IN THE WATER!

Let it sit for a few moments. Observe what happens to the colored spot as the water travels up the paper.

Note: mixtures of food coloring can be used.

Science Background: The ink or food coloring is a mixture of different colored chemicals. As the water climbs up the paper, it dissolves the chemicals. Some chemicals (or colors) are able to rise higher than others. Separating the colors in this way is called **chromatography** which means *color writing*. When the colors are separated they give a 'fingerprint' of the pen or food coloring that created the mixture. Compare the 'finger print' of different types of pens which are the same color. They will be different!



Ha Ha! Now you can't turn in your paper or go to the dance with Peter!

Suspect	Pen Type	Blood Type
Sandy	Colorific	O+
Angie	Colorific	AB-
Peter	Crayola	A+
John	Crayola	O+
David	Foohy	B+
<i>School – all access</i>	Vis a vis Expo	All types
<i>Crime Scene Data</i>		

Lenses & Ladybugs

Ladybug, ladybug, fly away home,
Your house is on fire and your children are alone...

Some people think this is a warning to ladybugs because in September farmers used to burn the hop fields, which were full of ladybugs.

Topic

Observing ladybugs

Key Question

What does a ladybug look like through a hand lens and microscope?

Learning Goal

Students will use a hand lens and a microscope to observe features of a ladybug.

Guiding Documents

Project 2061 Benchmarks

- *A lot can be learned about plants and animals by observing them closely, but care must be taken to know the needs of living things and how to provide for them in the classroom.*
- *Magnifiers help people see things they could not see without them.*
- *Animals eat plants or other animals for food and may also use plants (or even other animals) for shelter and nesting.*
- *Draw pictures that correctly portray at least some features of the thing being described.*

NRC Standards

- *Employ simple equipment and tools to gather data and extend the senses.*
- *Simple instruments, such as magnifiers, thermometers, and rulers provide more information than scientists obtain using only their senses.*

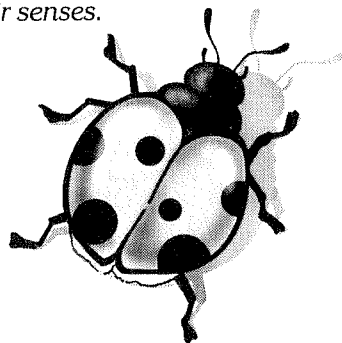
Math

Graphing

Science

Life science

insect anatomy
ladybugs



Integrated Processes

Observing

Recording

Comparing and contrasting

Materials

For the class:

ladybug habitat (see *Management*)

a supply of ladybugs

microscope

raisins

floor graph

For each student:

one ladybug

portion cup with lid (see *Management 6*)

raisins

hand lens

science journal

two 6" paper plates

one piece of 6" x 6" tissue paper

one paper fastener

black sticky dots or construction paper dots

2 paper flower stamens (from craft store, see *Management 9*)

three chenille stems (see *Management 9*)

scissors

glue

crayons or paint

Background Information

Ladybird beetles, commonly called ladybugs, are found in most parts of the United States. They are usually located in neglected garden areas where their main food supply, the aphid, is busy feeding on plants. This common garden insect makes a wonderful vehicle for students to investigate the anatomy of an insect. It also serves as a great specimen to use when teaching the use of science tools such as hand lenses and microscopes.

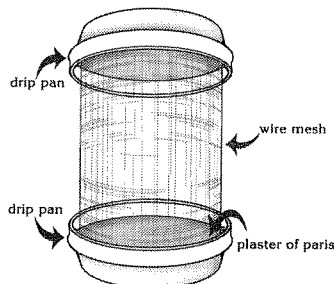
Ladybugs are quite diverse in their appearance. They vary in color, but are usually bright red, orange, or yellow with black spots. This coloration serves as a warning to their predators that they have an unpleasant taste. The location and number of spots also varies. One species alone has been found to have anywhere from two to six spots, and has also been found completely black. Students will

enjoy comparing the spot patterns of their ladybugs with the spot patterns of others.

While observing the ladybug through a hand lens and then a microscope, students will discover the insect's three major parts: head, thorax, and abdomen. They will also be able to observe the placement of the legs, wings (hard outer wings that serve as a covering to protect the transparent inner wings used for flight), eyes, and antennae.

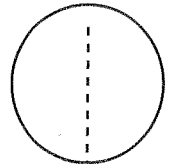
Management

1. If ladybugs are not available in your area, you can order live specimens from one of the companies listed in the *Resources*.
2. If you are collecting ladybugs from your area, be sure to include leaves from the plants where you find them. These leaves may have aphids and aphid eggs on them. Raisins can also be used for ladybug food.
3. A simple-to-make critter cage can be fashioned for observing and storing the ladybugs in the classroom. To do this, stand a sheet of fine wire mesh in and around the perimeter of a drip pan from a potted plant container. For example, use a 3-foot tall piece of wire mesh inside two 20" round plastic drip pans. Glue the edges of the wire mesh with a hot glue gun or weave nylon fishing line between the two edges. To provide access to the habitat, do not permanently attach the top pan to the wire mesh. Pour prepared plaster of Paris into the bottom pan and insert and secure wire mesh. Let dry. Be sure to include a food source of leaves with aphids and/or raisins. To provide water for the ladybugs, simply sprinkle a few drops at the bottom of the container each day.



4. This activity assumes that students have been introduced to the proper use of a hand lens and microscope.
5. This activity is divided into three parts: *Part One* utilizes observations made with hand lenses; *Part Two* allows students to look at ladybugs with a microscope; *Part Three* has students make paper plate ladybug models for graphing purposes.
6. For making observations, place one ladybug for each student in a small, transparent container with a lid that will fit under a microscope. The small portion cups found at restaurant supply stores, or small clear plastic boxes will work.

7. Place a raisin in the container with each ladybug.
8. Prepare a large class graph that will accommodate the paper plate ladybug models the students will be making.
9. The chenille stems will be used for the ladybug's legs in *Part Three*. If students are able, let them determine how to make six legs from the three chenille stems. If they are not developmentally ready for this, precut the legs before doing *Part Three*. The flower stamens are used to represent the antennae. If they are not available, use another chenille stem.
10. It may be easier for the students if the tissue paper wings are precut. To do this, trace around the paper plate and cut out the circles. Fold the circles in half. Cut up this center fold to within 2 cm of the upper edge.



Procedure

Part One

1. Direct the students to draw a picture in their science journals of what they think a ladybug looks like.
2. Allow the students to share these drawings with each other and discuss similarities and differences.
3. Tell the students that they are going to compare their drawings with actual ladybugs. Introduce the ladybug collection.
4. Distribute a small container which houses one ladybug and a raisin to each student.
5. Tell them that you are going to give them a science tool that will help them observe their ladybugs. Distribute the hand lenses. Tell the students to be very careful with their living creatures. After some observation time, discuss how the ladybugs appear larger through the hand lens.
6. Direct them to draw a second picture of a ladybug, incorporating what they observed.
7. Have students compare and contrast their pictures with others and with their own previous drawings made without the hand lenses.
8. Allow the students to share what they saw. Make a list on a large wall chart as to all the things the students observed.
9. If the students saw things that they couldn't identify (like the aphids) or simply wanted to know more, take time to discuss these things. This may be a good time to stop and to send someone or a group of students to the library to conduct some research. Depending on the grade level of your students, you may want to assign this research for homework.

Part Two

1. Bring out the microscopes.
2. Direct the students to use the same ladybug they used with the hand lenses. Distribute the microscopes or set up a station where students can take their ladybugs to the microscopes for observation.
3. Allow the students to rediscover that, as with the hand lens, a microscope makes the ladybug appear larger than it really is. Suggest to the students that they will be able to see many more interesting things about the ladybug that they could not see with just their eyes or the hand lens. Allow the students a period of free exploration followed by a time to again draw their ladybugs with a closer eye on the subject!
4. Continue the discussion of how their drawings are changing with the use of the science tools of a hand lens and microscope.

Part Three

1. Distribute the ladybug construction materials to each student. Allow students to paint or color the plates to look like their ladybugs. Use the black sticky dots or the black construction paper cut into circles to represent the dots. Have students attach the chenille stems in the appropriate places on the underside of the model as legs. The flower stamens can be used as antennae.
2. Direct the students to use the tissue paper for the transparent wings which fit under the hard red outer wings (the second paper plate cut partially in half). Attach the top paper plate and tissue paper wings to the bottom paper plates using a paper fastener.
3. Once their ladybug models have been constructed, direct the students to use them to respond to a class floor graph. A suggested question for the graph is *How Many Spots Does Your Ladybug Have?*

Connecting Learning

1. Do all ladybugs have the same pattern of spot markings?
2. Do all ladybugs have the same number of spots? How many did your ladybug have?
3. How many wings does your ladybug have?
4. Describe the way it flies. [in a straight line, up and down, darting, flapping]
5. Where do you think your ladybug would live in nature?
6. Is the head small or large? Which way does it move?
7. Does it have eyes? Where are they? How many eyes does it have?
8. Does your ladybug have antennae? What do you think these are used for?

9. How many legs does it have? Are they jointed like yours?
10. What color and shape is the body? How many body parts are there? Does the body change shape when it moves? Is it symmetrical?
11. How did your illustrations change when you used a magnifying lens and microscope to look at your ladybug?
12. Describe things about the ladybug you noticed with the hand lens/microscope that you did not notice when you just used your eyes.
13. Using our class graph, what can you tell me about the ladybugs in our classroom?
14. Using our class graph, what do you think you might know about most ladybugs?
15. What do you still wonder about ladybugs? Where do you think you could find the answers to your questions?

Extensions

1. Take the students outside to an observation area. Direct them to use their hand lenses to observe places where they think a ladybug might be. Encourage the students to imagine that they are the size of a ladybug and to discuss what the area would be like.
2. Explain to students that not all people like to live in the same types of places. Some may dislike hot weather; other people might not like the rainy weather; some may prefer to live alone, while others like to live in families or with friends. Tell students that they are going to do a habitat survey to find out where ladybugs are located. Have them use a page in their journal to list different kinds of places where they can look. (Start with these: in the air, in long grass, in short grass, in trees or bushes, under rocks, in water, on plants, in dead leaves, in soil, in dead wood, on the sidewalk.) Direct the students to take a hand lens, pencil, clipboard, and journal on a habitat-survey walk. Tell the students to put a check next to the place they have listed every time they find a ladybug. Try doing this survey more than once; on a warm, sunny day, and then on a cloudy, damp day and see if you get the same or different results. Be sure to visit the same places both days. **Warning: When you do your habitat-survey walk, remember that if you lift a rock or piece of wood, you may be lifting the roof of some critter's home. Remember to gently put it back!**
3. Have students graph the results from their habitat survey. Suggested questions for the graph are *Where Did You Find Your Ladybug?* *Where Did You Find the Most Ladybugs?*
4. Use other types of critters such as a praying mantis, mealworms, or earthworms.

5. Place flowers in the ladybug habitat. While the ladybugs are searching for aphids, they will crawl around the stamen and will gather pollen onto their bodies. Allow the students to place a ladybug under the hand lens or microscope to see the amount of pollen gathered. When the ladybug flies to another flower, some of this pollen is rubbed off onto the stigma, thus pollination occurs.
6. Maintain the critter habitats over a long period of time giving the students the responsibility for the care of the living organism.

Resources

If ladybugs are not available in your area, you can order live specimens from one of many companies that sell them. Two such companies are listed here:

Insect Lore

1-800-LIVE BUG

<http://www.insectlore.com>

Carolina Biological Supply Company

1-800-334-5551

<http://www.carolina.com/>

Curriculum Correlation

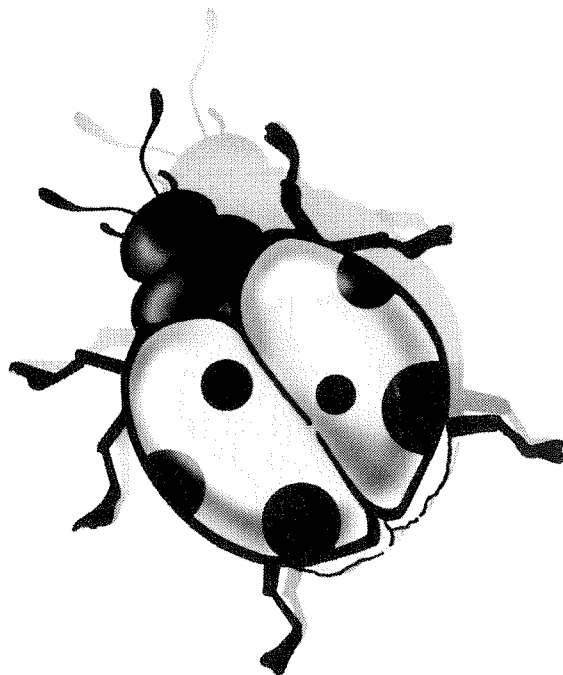
Allen, Judy. *Are You a Ladybug?* Kingfisher. New York. 2000.

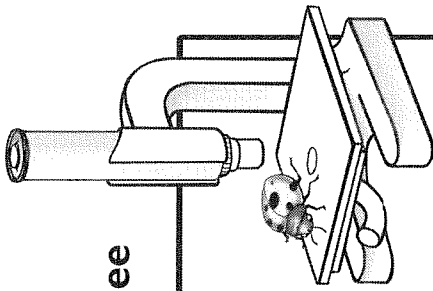
Brown, Ruth. *Ladybug, Ladybug.* Puffin. New York. 1992.

Carle, Eric. *The Grouchy Ladybug.* Scholastic, Inc. New York. 1977.

Home Link

Send the science journals home so the students can continue their ladybug-survey walk there. Ask the students to share their findings with the class.

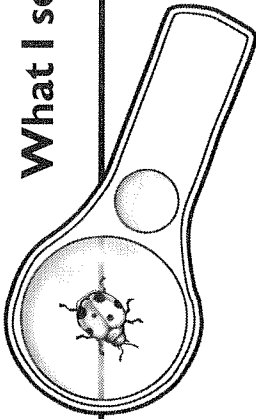




What I see

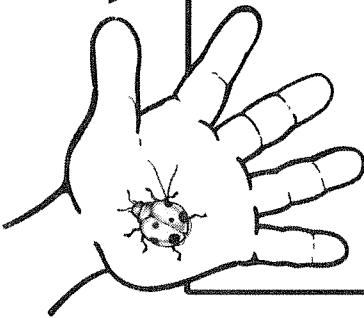
A large empty rectangular box for writing observations.

What I see

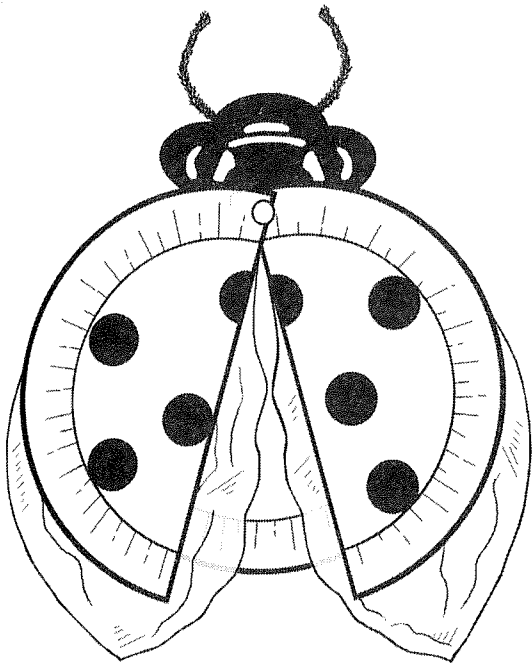


A large empty rectangular box for writing observations.

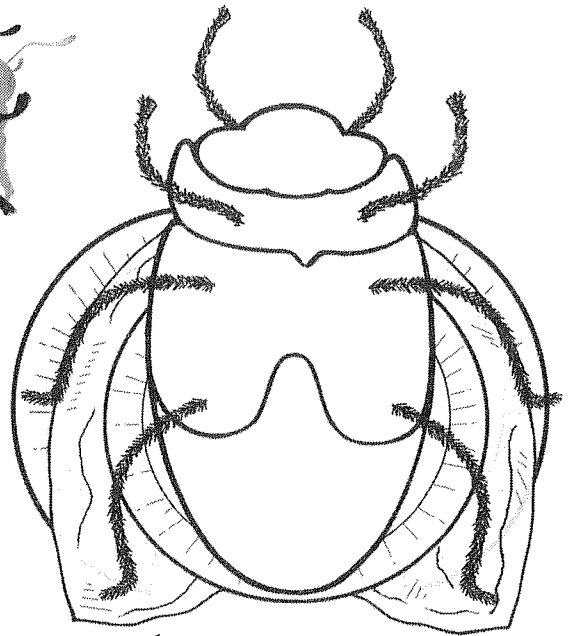
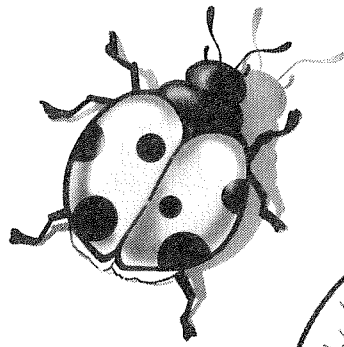
What I see



A large empty rectangular box for writing observations.

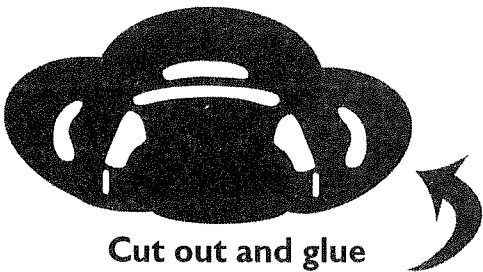
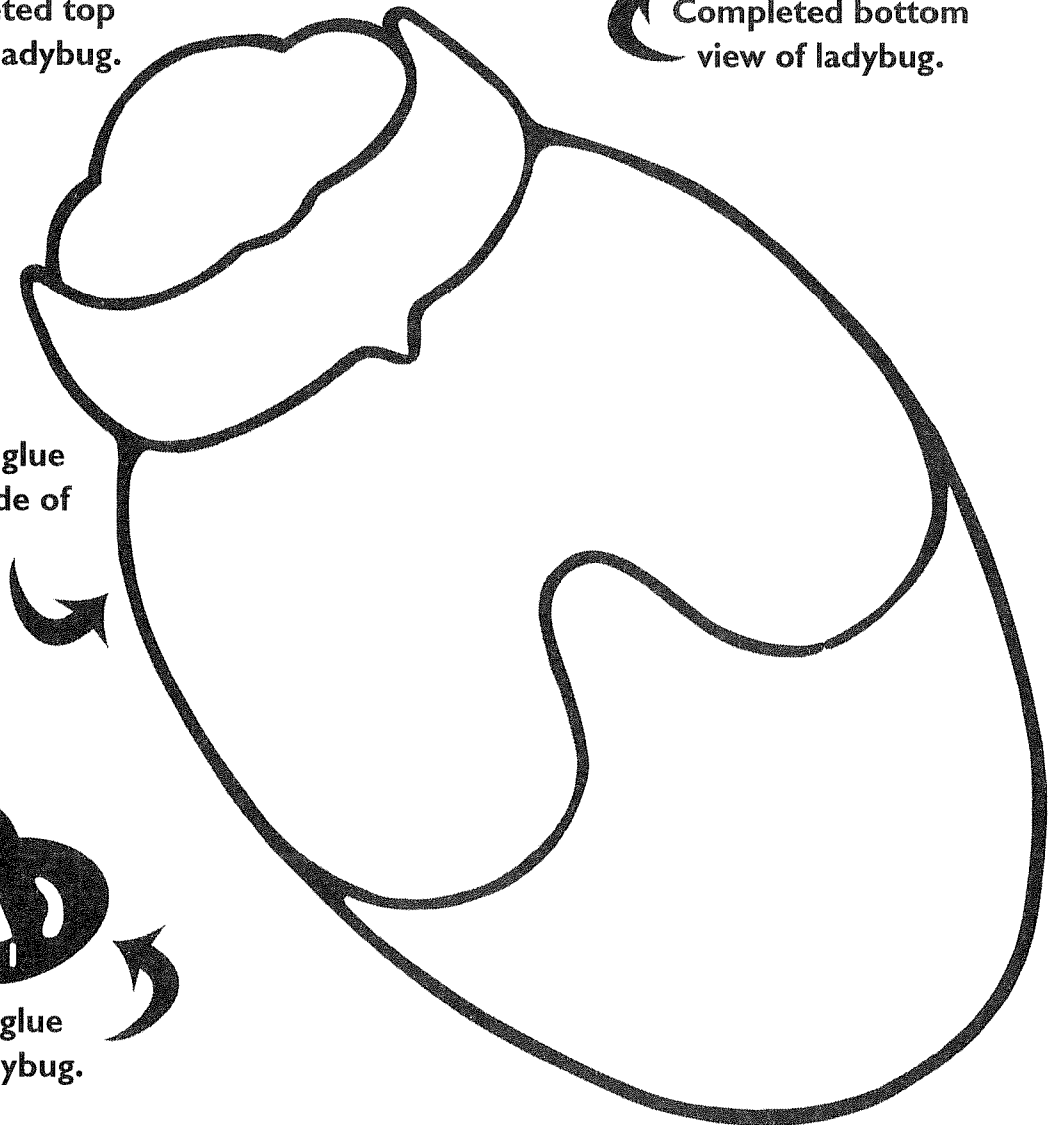


Completed top view of ladybug.



Completed bottom view of ladybug.

Cut out and glue to bottom side of ladybug.



Cut out and glue top side of ladybug.

Weird Science: Sharpie Chromatography

Written by Sunrise on KGMB9 - sunrise@kgmb9.com

August 26, 2008 08:13 AM



Things you need:

- Sharpie pens – multiple colors
- White pre-washed t-shirt, or other fabric
- Rubbing alcohol – Isopropyl alcohol
- Medicine dropper (and small cup) or squeeze bottle dropper
- Piece of cardboard
- Plastic bag or plastic wrap
- Small cup

The Experiment:

Cover the cardboard with the plastic bag or plastic wrap, this will help to keep the ink from bleeding to the other side of the shirt. Place the plastic covered cardboard in the shirt so that you have a smooth surface to work on. Then draw a small circle of unconnected dots about one inch in diameter and draw another circle in a different color slight larger around the first. Pour some of the alcohol into a small cup if you're using a medicine dropper. Then drop one drop of alcohol in the center of your circles. Keep dropping one drop every second until you've done about 20 drops. What happens? Once you've gotten the hand of it, try drawing different designs with different colors and see how the alcohol affects the colors. Let the shirt completely dry before moving on to the other side or the colors will run.

Tee-Shirt Chromatography: Tips for Success

1. Read directions carefully!
2. TAKE YOUR TIME! Drop, don't squirt the alcohol. The patterns take time to spread!
3. The alcohol will spread in a circular pattern. Think about where to put your ink dots, AND where to drop your alcohol.
4. To make small circles of color, only use a FEW drops of alcohol. You can always add more later.
5. You can add outlines to your designs when the alcohol is completely dry.