

# ANDREW LOST SCIENTIFIC EDUCATORS GUIDE

GRADES 2-4

Engage students with the hilarious Andrew Lost series while implementing science curriculum objectives

## ABOUT THE BOOKS



### ANDREW LOST #1: ON THE DOG

When Andrew's latest invention, the Atom Sucker, goes haywire, Andrew and Judy are shrunk down to microscopic level!

PB: 978-0-375-81277-4 (0-375-81277-6)



### ANDREW LOST #2: IN THE BATHROOM

When Andrew and Judy's neighbor gives her dog a bath, microscopic Andrew and Judy find themselves washed off the dog and lost in the bathroom!

PB: 978-0-375-81278-1 (0-375-81278-4)  
GLB: 978-0-375-91278-8 (0-375-91278-9)



### ANDREW LOST #3: IN THE KITCHEN

Andrew, his cousin Judy, and super-smart robot Thudd escape the bathtub—only to get flushed down the toilet!

PB: 978-0-375-81279-8 (0-375-81279-2)  
GLB: 978-0-375-91279-5 (0-375-91279-7)



### ANDREW LOST #4: IN THE GARDEN

Andrew and crew hitch a ride out of the kitchen on the back of a fly and end up in the garden.

PB: 978-0-375-81280-4 (0-375-81280-6)



### ANDREW LOST #5: UNDER WATER

While making modifications to Uncle Al's latest invention—the submarine-like Water Bug—Andrew ends up stranding himself, Judy, and Thudd underwater!

PB: 978-0-375-82523-1 (0-375-82523-1)



### ANDREW LOST #6: IN THE WHALE

After escaping an underwater volcano, Andrew, Judy, and Thudd drive their submersible vehicle, the Water Bug, right down a whale's throat!

PB: 978-0-375-82524-8 (0-375-82524-X)



### ANDREW LOST #7: ON THE REEF

Andrew, Judy, and Thudd are out of the whale, but not out of trouble, when the Water Bug gets caught on the Great Barrier Reef!

PB: 978-0-375-82525-5 (0-375-82525-8)  
GLB: 978-0-375-92525-2 (0-375-92525-2)



### ANDREW LOST #8: IN THE DEEP

Andrew, Judy, and Thudd drive the Water Bug deep into the ocean, where the trusty Water Bug loses power!

PB: 978-0-375-82526-2 (0-375-82526-6)  
GLB: 978-0-375-92526-9 (0-375-92526-9)



### ANDREW LOST #9: IN TIME

The evil Dr. Kron-Tox has kidnapped Uncle Al and whisked him away in his time machine!

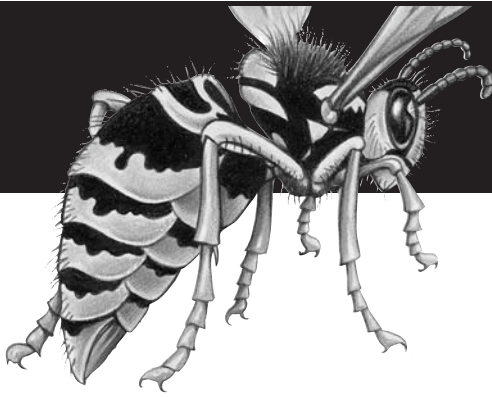
PB: 978-0-375-82949-9 (0-375-82949-0)  
GLB: 978-0-375-92949-6 (0-375-92949-5)



### ANDREW LOST #10: ON EARTH

Andrew, Judy, and Thudd have escaped the Big Bang only to find themselves trapped inside the Earth as it forms all around them!

PB: 978-0-375-82950-5 (0-375-82950-4)  
GLB: 978-0-375-92950-2 (0-375-92950-9)



### ANDREW LOST #11: WITH THE DINOSAURS

Andrew, Judy, and Thudd have fled primordial Earth only to find themselves surrounded by huge—and hungry—dinosaurs!

PB: 978-0-375-82951-2 (0-375-82951-2)  
GLB: 978-0-375-92951-9 (0-375-92951-7)



### ANDREW LOST #12: IN THE ICE AGE

Andrew, Judy, and Thudd have broken away from the dinosaurs, but are now surrounded by the woolly mammoths of the Ice Age!

PB: 978-0-375-82952-9 (0-375-82952-0)



### ANDREW LOST #13: IN THE GARBAGE

Andrew, Judy, and Thudd have time-traveled out of an ice age only to find themselves shrunk down and tossed out with the garbage!

PB: 978-0-375-83562-9 (0-375-83562-8)



### ANDREW LOST #14: WITH THE BATS

Andrew, Judy, and Thudd have been shrunk down to the size of bugs, which is a serious problem when they get lost in a dark, bat-filled cave.

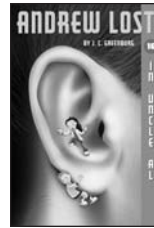
PB: 978-0-375-83563-6 (0-375-83563-6)



### ANDREW LOST #15: IN THE JUNGLE

Andrew, Judy, and Thudd have landed in the Australian rain forest. They must find a way to the river and Uncle Al, but they're still the size of bugs!

PB: 978-0-375-83564-3 (0-375-83564-4)  
GLB: 978-0-375-93564-0 (0-375-93564-9)



### ANDREW LOST #16: IN UNCLE AL

A shock from a numbfish has shrunk Andrew, Judy, and Thudd to microscopic size. Just when they think Uncle Al has rescued them, a mosquito bite injects them into his bloodstream!

PB: 978-0-375-83565-0 (0-375-83565-2)  
GLB: 978-0-375-93565-7 (0-375-93565-7)



### ANDREW LOST #17: IN THE DESERT

A dust storm just whisked Andrew, Judy, and Thudd into the Australian desert. If they don't find a way out soon, they may wind up as some desert creature's freshly toasted snack.

PB: 978-0-375-84667-0 (0-375-84667-0)  
GLB: 978-0-375-94667-7 (0-375-94667-5)



### ANDREW LOST #18: WITH THE FROGS

Available  
July 2008

Andrew, Judy, and Thudd come face-to-face with fierce larvae, giant waterbugs, diving beetles, and so-called moss animals that look like floating brains. Will they find their way out of the pond . . . before they croak?!

PB: 978-0-375-84668-7 (0-375-84668-9)  
GLB: 978-0-375-94668-4 (0-375-94668-3)

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STEPPING STONES

RANDOM HOUSE  
CHILDREN'S BOOKS

## IDENTIFY INVERTEBRATES

FOR USE WITH ANDREW LOST BOOKS 1-8, 10, AND 13-18

What exactly are those wiggling, creeping, flying, swimming creatures that Andrew, Judy, and Thudd keep running into when they are lost? It's simple! Invertebrates represent the largest number of animals on the planet, numbering somewhere around one million species! They can be found in any number of environments, from the desert to the sea. Most invertebrates are small, but some ocean invertebrates like the Giant Squid grow very large.

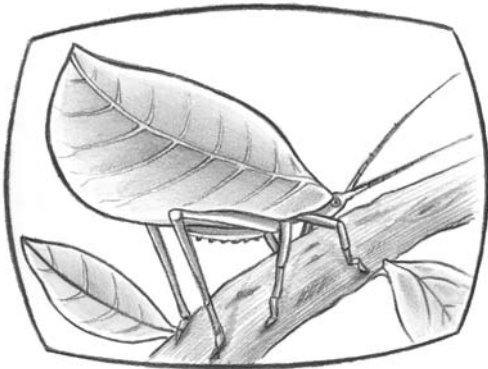


Illustration © 2007 by Ian Gerardi.

### Step 1: Create an Interactive Bulletin Board

**Technology Connection:** This is an excellent activity for the computer lab.

**Objective:** Students will be able to identify and group invertebrates into their correct scientific classifications based on their physical characteristics and environment.

**Materials:**

- Index cards
- Markers or crayons
- Reference books with lots of animal facts and pictures—specifically invertebrates
- Internet access to information and photos of invertebrates
- Push pins
- Boxes to hold completed invertebrate cards and push pins

- 1 Assign one or more of the following 64 invertebrates to each student. These are specific invertebrates encountered by Andrew, Judy and Thudd during their adventures.

Giant squid, flea, blue-ringed octopus, hookworm, meat ant, bulldog ant, flame scallop, oyster, springtail bug, maggots, katydid, giant clam, wolf spider, fly, Spanish dancer sea slug, butterfly, cricket, mosquitoes, termites, krill, mussels, cockroach, cone snail, earthworm, sea wasp jellyfish, bombardier beetle, dung beetle, rhinoceros beetle, water bug, millipede, coral, dust mite, drain fly, praying mantis, cicada, lobster, sea star, sponge, barnacles, Portuguese man-of-war, hermit crab, vampire squid, tube worms,

spaghetti worms, giant spider crab, sea cucumbers, dragonfly, scorpion, centipede, red wriggler worms, blowfly, glowworm (*not* a worm!), moth, leaf bug, peppermint-stick insect, tarantula hawk (*not* a bird!), dinosaur shrimp, witchetty grub, tarantula, whistling spider, Dumbo octopus, yellow jackets, tapeworm

- 2 Have students research their invertebrate(s) and find a picture.
- 3 Have students create one 4" x 6" or 5" x 7" index card for each invertebrate including:
  - a. common name of invertebrate
  - b. picture of invertebrate
  - c. three characteristics of invertebrate
  - d. environment where you would find invertebrate
- 4 Once cards are completed, have students take one to three minutes to share their information with the class.
- 5 After sharing, put the cards in a box near the Interactive Bulletin Board.
- 6 Teacher: Set up bulletin board and answer key (see sample layout below).

### Step 2: Using the Interactive Bulletin Board

- 1 The board may be used by individual students to challenge themselves, or by groups of students working together. The purpose is to try and match up each invertebrate with the correct scientific classification. The categories are: *arthropods*, *worms*, *mollusks*, *cnidarians*, *echinoderms*, and *porifera*.
- 2 A card is pulled from the box and attached by the student with a push pin to the appropriate spot on the board.
- 3 Students may check the answer key for immediate feedback.
- 4 When time is up, or the student has finished with Interactive Bulletin Board, all cards and push pins are put back into the box (and mixed up!) for the next student.



Illustration © 2003 by Debbie Palen.



# BIOLOGY

## Step 3: Observing Invertebrates

**Art Connection:** Scientific illustrations are a specialized art form used by scientists worldwide.

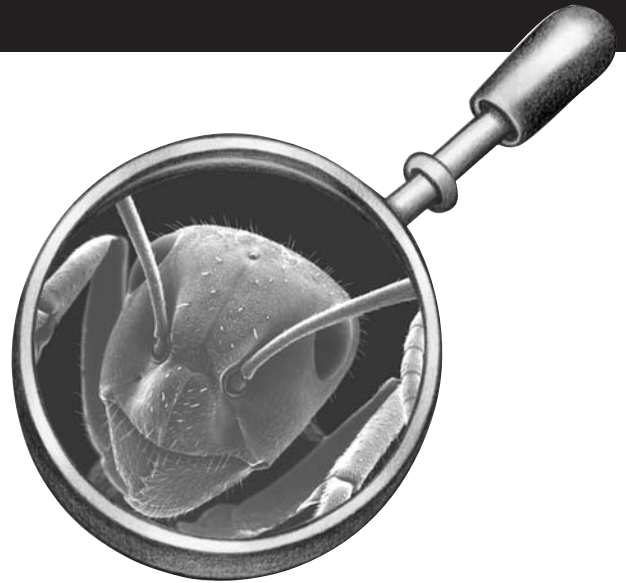
**Objective:** Students will observe invertebrates, record those observations and create a scientific illustration for their journal.

### Materials:

- Live crayfish, insects (such as ants), worms (earthworms) and/or snails
- Appropriate habitat(s) to house live animals
- Science journals
- Handheld magnifying lenses
- Soft-tipped swabs
- Colored pencils

### Procedure:

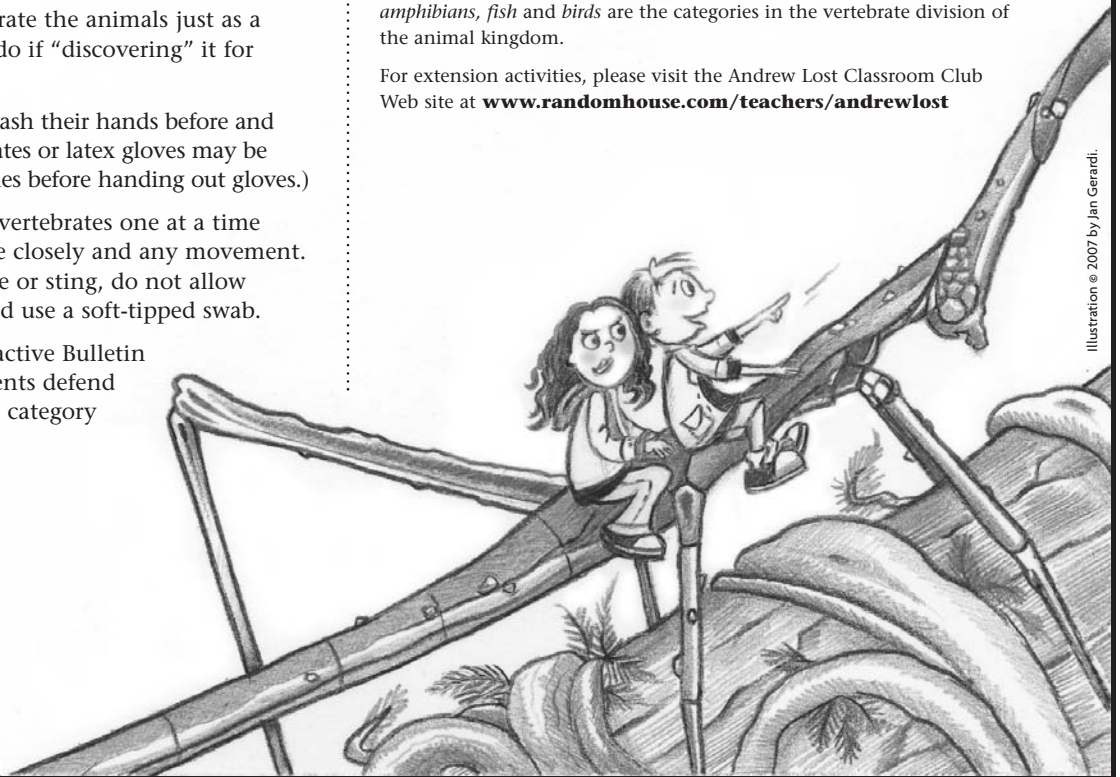
- 1 Discuss appropriate ways to handle animals that are humane.
- 2 Enforce rules frequently while students are handling the animals.
- 3 At first, allow students to observe animals without any contact and then with and without the magnifying lenses.
- 4 While observing, have students record what they see in their science journals, including description of the temporary habitat (dirt, water, etc.)
- 5 Encourage students to illustrate the animals just as a scientist in the field would do if “discovering” it for the first time!
- 6 Safety tip: Students should wash their hands before and after handling any invertebrates or latex gloves may be worn. (Check for latex allergies before handing out gloves.)
- 7 Allow students to handle invertebrates one at a time to observe their bodies more closely and any movement. If any animal is likely to bite or sting, do not allow students to handle it! Instead use a soft-tipped swab.
- 8 Using information on Interactive Bulletin Board as a guide, have students defend their choice of classification category for the animals observed.



**Teachers Notes:** Classification is used by scientists to group organisms together that have similar characteristics. In the animal kingdom, there are two major divisions: *invertebrates* and *vertebrates*. When asked to identify an animal, most students will give you examples like dog, cat, horse, cow, etc. However, the majority of animals on the planet belong to the invertebrate group. Invertebrates are animals without a backbone or internal skeleton. For scientists to study these animals, they are further divided into six categories: *arthropods*, *worms*, *mollusks*, *cnidarians*, *echinoderms*, and *porifera*. Within those categories, the arthropods contain the largest group of animals, with insects alone comprising over 70,000 named species!

What about us? Humans are classified as mammals. *Mammals*, *reptiles*, *amphibians*, *fish* and *birds* are the categories in the vertebrate division of the animal kingdom.

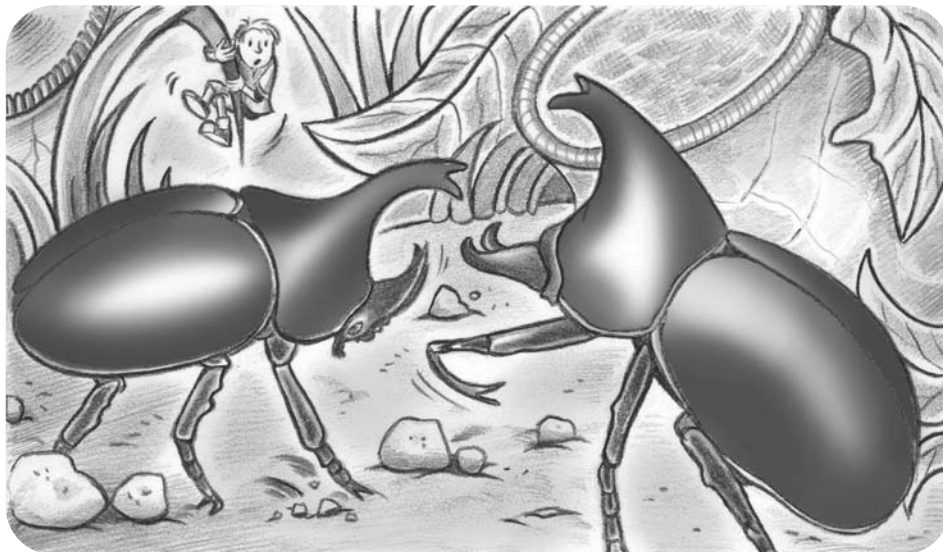
For extension activities, please visit the Andrew Lost Classroom Club Web site at [www.randomhouse.com/teachers/andrewlost](http://www.randomhouse.com/teachers/andrewlost)



# BIOLOGY

## Sample setup for Interactive Bulletin Board (answers included in *italics* for your reference):

Categories of Invertebrates	Environment	Examples	Specific animals that Andrew, Judy, and Thudd encountered <i>NOTE: WHEN RE-CREATING, LEAVE THIS COLUMN BLANK FOR STUDENTS TO FILL IN.</i>
Arthropods	Water, land, air	Insects, spiders, crabs, millipedes, centipedes, crustaceans	<i>Flea, meat ant, springtail bug, maggots, katydid, wolf spider, tarantula, fly, butterfly, cricket, mosquitoes, termites, krill, cockroach, bombardier beetle, dung beetle, rhinoceros beetle, water bug, millipede, dust mite, drain fly, praying mantis, cicada, yellow jackets, lobster, hermit crab, giant spider crab, dragonfly, scorpion, centipede, blowfly, moth, leaf bug, peppermint-stick insect, tarantula hawk, dinosaur shrimp, witchetty grub, bulldog ant, whistling spider, glowworm (insect larva)</i>
Worms	Water, land, inside other animals!	Roundworms, flatworms, segmented worms	<i>Hookworm, earthworm, tapeworm, tube worms, spaghetti worms, red wiggler worms</i>
Mollusks	Water, land	Snails, slugs, clams, octopi, squid	<i>Giant squid, blue-ringed octopus, flame scallop, oyster, giant clam, Spanish dancer sea slug, mussels, cone snail, barnacles, vampire squid, Dumbo octopus</i>
Cnidarians	Water	Jellyfish, sea anemone, corals	<i>Sea wasp jellyfish, coral, Portuguese man-of-war</i>
Echinoderms	Water	Sand dollars, sea stars (starfish)	<i>Sea star, sea cucumber</i>
Porifera (sponges)	Water	Sponges	<i>Sponge</i>



## CENTERS OF THE UNIVERSE

FOR USE WITH ANDREW LOST BOOKS 9–12

How do scientists discover fossilized remains of ancient organisms? Why can't we see stars during the day? How much damage do asteroids leave behind after they hit the earth? Why are tsunamis so powerful? Andrew, Judy, and Thudd travel far, far back in time to the genesis of the universe where they experienced many of these things and so much more!

### Step 1: Gather materials for the Centers of the Universe (five centers) in the classroom.

#### Materials:

- 10 plain manila folders or two each of white, blue, grey, brown, and red folders
- Permanent marker
- Laminating machine
- Five desks or small tables dedicated to being used as centers

#### Center #1: Stars

- Single-hole punch
- Plain white index cards
- Black construction paper
- Glue sticks

#### Center #2: Waves

- Large deep tub (blue if possible) half filled with water or light-colored tub with blue water
- Smooth, flat piece of wood or plastic that fits inside tub (to create waves)
- Small toy boat
- Large beach towel (placed under tub)

#### Center #3: Asteroids

- 9-1/2" x 13" x 2" pan
  - Rulers with inches and centimeters
  - Whole wheat flour
  - White flour
- Note: Either layer the two types of flour or mix together*
- Various small rocks, pebbles (some smooth, some jagged). These will be the "asteroids."

#### Center #4: Fossils

- "Loaded" cupcakes (NO frosting!)—using a boxed cake mix, make cupcakes. Gently stir in any of the following small items: chocolate chips, raisins, nuts, small colored candies, etc.
- Tweezers
- Old toothbrushes
- Large container with enough sand to bury a cupcake

#### Center #5: Solar System

- Word search (reproducible activity sheet below)

### Step 2: Writing the instructions

Write procedure for each center on manila folders. Laminate folders. Optional oral instructions: Record instructions on a tape and leave machine on table for student to playback as many times as they need in order to complete the activity.

- 1 **Color code** and write **name of center**—e.g., "Stars"—on outside of manila folders (two for each center). You may want to use colored folders instead of color-coding).
- 2 Write **directions** for each center on *inside* of folders.
- 3 Write **expected results or solutions** on *back* of manila folders.

### Step 3: Organize students and begin rotations

#### Rotation:

- 1 Give each student a copy of Centers of the Universe Activity sheet (below).
- 2 Divide students equally among centers. Students will stay with their groups the entire time as they travel from center to center.
- 3 Create a rotation pattern from center to center, including time allowed at each location. Recommended time for each center is 10 minutes.
  - a. Practice: Set the timer for 30-second intervals to practice rotating from center to center (while not touching any of the materials).
- 4 At each stop along the universe, students will take turns participating in the activity. Indicate when a minute is left so students can put their centers in order before the next group starts.
- 5 Dismantle and clean up the area at the one-minute warning.

#### Center #1: Stars (White)

**Inquiry question:** Do stars shine during the day?

**Objective:** Show the differences between visibility of stars during the day and at night.

**Activity:** Star simulation—day and night

- 1 Student will punch out 10 white holes from a plain white index card. These represent stars in the sky.
- 2 Student will glue half of the "stars" onto another white index card.
- 3 Student will look at cards while holding them straight ahead. Are the stars easily seen?
- 4 Student will then glue the other half of the "stars" onto the black construction paper. Are the stars easier or harder to see now? Why?

**Teachers Notes:** The stars are always shining, day or night. We cannot see them during the day because they become "invisible" in daylight. Our sun is the closest star to Earth. When it is shining, it keeps us from seeing the stars beyond it in outer space. When the sun is "down," the sky darkens and the other stars in the Milky Way galaxy are easier to see. When you are away from city or suburban lights at night, the stars appear *even brighter* because they are not "washed out" by ground lights. Additional question: Can you see the stars at night when clouds are out? Why or why not? Answer: The clouds are formed inside Earth's atmosphere. They block our ability to see the stars that exist outside our atmosphere.



# EARTH SCIENCE

## Center #2: Waves (Blue)

**Inquiry question:** What gives a wave so much power?

**Objective:** Demonstrate various strengths of mechanical waves by manipulating water.

**Chemistry Connection:** The two hydrogen atoms and one oxygen atom (H<sub>2</sub>O) that make up each individual molecule of water pass energy to one another by “bumping” each other. In this way, the waves continue until they eventually die out or run into land. A tsunami may not appear large out in the ocean, but gains height as the water shallows and eventually becomes enormous and very dangerous when it comes ashore.

**Activity:** Re-create waves in a plastic tub while floating a small boat in the water.

- 1 Place small plastic boat on water.
- 2 Put your head down close and horizontally to the water. Blow continuously until ripples form. Observe what happens to the boat.
- 3 Next, create waves using the flat board and a motion from left to right.
- 4 Observe what happens to the boat.
- 5 Try slow waves and fast waves. Observe the differences.



**Teachers Notes:** Water waves are a form of *mechanical energy*. Wind (as simulated by blowing on the water) is one way that waves are formed. Another is an underwater earthquake often resulting in a tsunami (simulated with motion of board to displace the water).

## Center #3: Asteroids (Grey)

**Inquiry question:** What happens when an asteroid hits a planet?

**Objective:** Examine results of displacement caused by a falling object.

**Activity:** Drop various objects into a pan of flour. Use different objects and drop from different heights. This simulates asteroids hitting a planet’s surface.

- 1 Choose an “asteroid” from the pile. Hold it about 5” from the pan of flour. Drop it. Observe what happens.
- 2 Carefully remove your “asteroid.” Observe the hole left behind. Measure the width and depth with a ruler uses inches and/or centimeters.
- 3 Choose another “asteroid” from the pile. Repeat procedure above. Compare observations . . . was the effect the same or different?
- 4 Continue activity varying the height that the “asteroid” is dropped from and types of “asteroids” used.
- 5 Remove all “asteroids” and level out surface of flour for the next student.

**Teachers Notes:** This activity simulates an asteroid’s affect on the surface of the planet. Students can observe the displacement of the flour (simulating soil) and the hole left behind. This will vary depending on the size of the rock they choose, *and* the height from which it is dropped. Taking measurements is one way of validating an observation for future study.

**Extension:** Discuss what it must have been like for Andrew, Judy, and Thudd in the exciting conclusion to Andrew Lost: *With the Dinosaurs* when the giant asteroid started to fall from the sky!

## Center #4: Fossils (Brown)

**Inquiry question:** How do scientists find and isolate petrified fossil remains?

**Objective:** Discover and examine faux fossilized remains.

**Activity:** Dig up and dissect a “loaded” cupcake. This simulates the work of paleontologists when they go on an expedition to find and remove important fossils from the earth.

- 1 Bury a cupcake in the sand.
- 2 Have students dig through sand and find the “fossil” (cupcake). Once the “fossil” is removed, have students use their hands and tweezers to carefully extract the fossilized materials for further study (chips, nuts, etc.).
- 3 Once extracted, have students use the toothbrush to carefully remove any cake crumbs from their finds!
- 4 Have students remove any cake remains from the sand and bury a new cupcake for the next students to discover.

**Teachers Notes:** By digging up and dissecting a cupcake, students are simulating a scientific “dig” for a fossil with petrified remains. Removing all traces of the cupcake from the items baked inside simulates the work necessary to isolate specific petrified remains (e.g., bones) of an ancient organism.

## Center #5: Solar System (Red)

**Inquiry question:** What are common names and words we use when discussing our solar system?

**Objective:** Recognize common words from our solar system while solving a puzzle.



**Language Arts Connection:**

- 1 Find and circle all the words from the Word Search
- 2 Check for solution in manila folder

To download the reproducible puzzle, please visit the Andrew Lost Classroom Club Web site at

[www.randomhouse.com/teachers/andrewlost](http://www.randomhouse.com/teachers/andrewlost)



Name: \_\_\_\_\_

# ANDREW LOST CENTERS OF THE UNIVERSE



## Center #1: Stars

What I learned:

## Center #2: Waves

What I learned:

## Center #3: Asteroids

What I learned:

## Center #4: Fossils

What I learned:

## Center #5: Solar System

What I learned:

To read all of the books in the Andrew Lost series, visit your local library or bookstore: [www.randomhouse.com/kids/andrewlost](http://www.randomhouse.com/kids/andrewlost)

EDUCATORS: Reproduce this activity sheet to use with students.