

PRINTING INSTRUCTIONS

Family Science Night Student Workbook



IF MAKING **SINGLE-SIDED** COPIES

Print and staple in order of page numbers.

Please print one manual for each student or family expected to attend the event. We suggest printing extras in case additional students attend.

You may print in color or black & white.

Please provide the number printed before the event begins and the number remaining after the event is over. This will help us determine total student attendance.

IF MAKING **DOUBLE-SIDED** COPIES

BE CAREFUL

Three of the pages in this workbook **MUST BE PRINTED SINGLE-SIDED.**

Print and staple in this order by page number:

1 (cover page, single-sided)

2-3

4-5

6-7

8-9

10 (single-sided)

11 (single-sided)

The Discovery Center

For Science and Technology

www.discoverycntr.org



Family Science Night

Student Workbook

Student Name: _____

Grade: _____

**You may keep this workbook.
Try some of the activities at home with your parents.**

Family Science Night is Sponsored In Part By:



The City Of Thousand Oaks
The City Of Agoura Hills
The City Of Westlake Village



Baxter

Mystery Smells



Can you identify the smells in the containers?

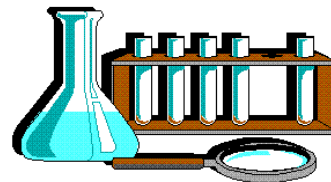
Use your sense of smell to determine which container has which smell. Write your answers below, then check them with the **“MYSTERY SMELLS ANSWER KEY.”**

WATCH OUT! There are more smells listed below than there are in the experiment!

<u>SAMPLE NUMBER</u> Write your answers below	<u>SMELL</u>
	Cinnamon
	Peppermint
	Vanilla
	Banana
	Lemon
	Orange
	Cherry



Mystery Powders



Here you have five powders. The **MYSTERY POWDER** is the same as **ONE** of the other four.

YOUR MISSION – using testing methods and observations, you are going to determine the characteristics of the MYSTERY POWDER and determine which of the four it is.

Check your results with the “**MYSTERY POWDERS ANSWER KEY.**”

Observations (write your observations in squares)	Powder #1	Powder #2	Powder #3	Powder #4	Mystery Powder Is it the same as 1, 2, 3 or 4?
Appearance: Color?					
Texture: How does it feel?					
Reaction: With water					
Reaction: With vinegar					





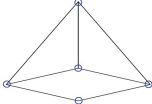



GEOPANES / BUBBLES

Use the toothpicks and carrot pieces to build some simple 2-D shapes: a square, a triangle, a rectangle.
Use a toothpick in the top carrot as a handle and dip the shapes into the soapy water. What do you observe?

What do you think will happen when you build a 3-D shape and make a bubble? Try it!

Record your observations below.

2D SHAPES	Square 	Triangle 	Rectangle 
How many points/vertices (carrots)?			
How many line segments (toothpicks)?			
How many faces (sides)?			
3D SHAPES	Cube* 	Pyramid 	Cuboid 
How many points/vertices (carrots)?			
How many line segments (toothpicks)?			
How many faces (sides)?			

*Did you know that a cube is a special case of a cuboid where all sides are equal in length? Now you know!



OUBLECK / GOO-YUK / SLIME

Your hands are probably going to get very **MESSY**, so you do not have to write down anything for this activity.

Instead, use your eyes, hands, and nose to observe the Oobleck and answer these questions.

WHAT IS OUBLECK?

It is cornstarch and water. When the two are mixed, the result is something called a **COLLOID**: particles suspended in a liquid. This colloid can change how it reacts to a physical force: this is called a **NON-NEWTONIAN FLUID**. Why? Because the molecular bonds are so strong that they resist a quick force, but a slow force can make the bonds separate more easily.

Does Oobleck have a smell?

What does the texture feel like? Is it smooth or rough?

What happens when you give a **QUICK POKE** to the Oobleck with your finger?

What happens when you let your finger poke into the Oobleck **SLOWLY**?

When your finger is as deep as it can go into the Oobleck, try pulling it out **QUICKLY**.

Now try pulling it out **SLOWLY**.

Try rolling a ball of Oobleck between the palms of your hands. What happens when you **STOP** rolling?





EARTHWORMS



LOOK AT THE EARTHWORM WITH A MAGNIFYING GLASS:

Does your earthworm have eyes? _____

Does your earthworm have ears? _____

Does your earthworm have tiny hairs on its body? _____

How many segments does your earthworm have? _____

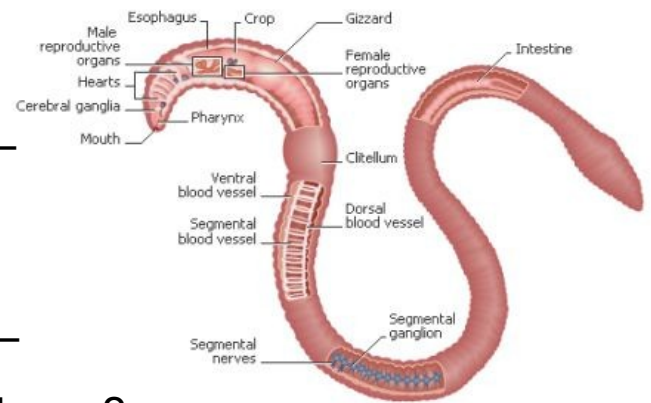
USE A RULER:

How long is your earthworm? _____

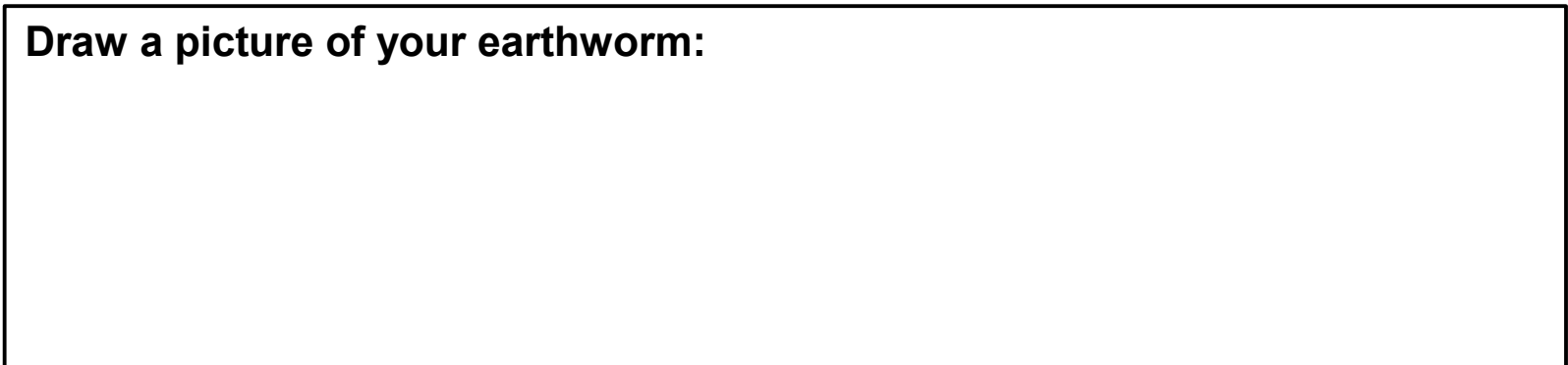
USE THE FLASHLIGHT:

Does your worm react to the light? _____

What do you think would make a good earthworm home? _____



Draw a picture of your earthworm:



EARTHWORMS

Earthworms are often called "Nature's Plowman" because they live in the ground and tunnel their way through the ground mixing up the different layers of the soil.

WHAT DO EARTHWORMS EAT?

Earthworms eat decayed leaves and plant material. They also swallow soil and little bits of animal material.

HOW DO EARTHWORMS MOVE?

Earthworms have 2 sets of muscles:

1. Circular Muscles around each segment.
2. Long Muscles that run the length of the body.

When the circular muscles tighten the earthworm becomes longer and thinner. When the lengthwise muscles tighten, the earthworm becomes shorter & fatter.

HOW DO EARTHWORMS HELP THE SOIL?

1. They mix up the different layers of the soil.
2. They add nutrients to the soil by depositing their waste products or castings into the soil.
3. They help to decompose dead plant and animal material into simpler parts that can be used again by new organisms.



MOTION 1



INERTIA

SETUP: Place the water bottle on the strip of paper. You are going to quickly pull the paper out from under the bottle.

HYPOTHESIS: What do you think will happen to the water bottle? _____

EXPERIMENT #1: Very quickly, snap the paper out from under the bottle.

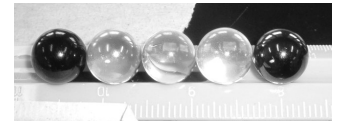
OBSERVATION: What did you see happen? _____

EXPERIMENT #2 : This time, try to move the paper very slowly.

OBSERVATION: What happened this time? _____

QUESTION: If there was a difference, why do you think this is so? _____

MOMENTUM



SETUP: Place three marbles in the track made by the yardsticks. Place two marbles (just touching) near the center. You will be shooting the third marble towards the two in the center.

HYPOTHESIS: What do you think will happen when the one marble hits the two marbles?

EXPERIMENT #1: Take one marble to either end of the track and roll it towards the two in the middle.

OBSERVATION: What did you see happen? _____

EXPERIMENT #2: Repeat the above but have one marble hit three marbles, then have two marbles hit three marbles.

OBSERVATION: What did you see happen when you changed the number of marbles?



MOTION 2

Ruler is balanced
on the finger



BALANCE

SETUP: You are going to try to balance the ruler on your finger.

HYPOTHESIS: What number (at how many inches) do you think you will have to place your finger to make the ruler balance? _____

EXPERIMENT #1: Try it.

OBSERVATION: Where did it balance? _____

EXPERIMENT #2: Add a paper clip to one end of the ruler and try to balance it again.

OBSERVATION: Where did the ruler balance this time? _____

QUESTION: Why do you think the balance point changed? _____

FRICITION

SETUP: Place an index card on top of the glass. On top of the card, place a coin or a washer.

HYPOTHESIS: What do you think will happen if you flick the card off the top of the glass?

EXPERIMENT #1: Quickly flick the card off the top of the glass.

OBSERVATION: What happened to the coin or washer?



EXPERIMENT #2: Replace the index card with a piece of sandpaper, rough side up. Place the coin or washer on the sandpaper. Flick the card away.

OBSERVATION: What happened to the coin or washer this time? _____

QUESTION: If there was a difference between the card and the sandpaper, why do you think this was? _____



ROTOCOPTERS

CUT OUT THESE SHAPES and fold per the instructions.

Do you think that the smaller Rotocopter will spin differently than the large Rotocopter? Why?

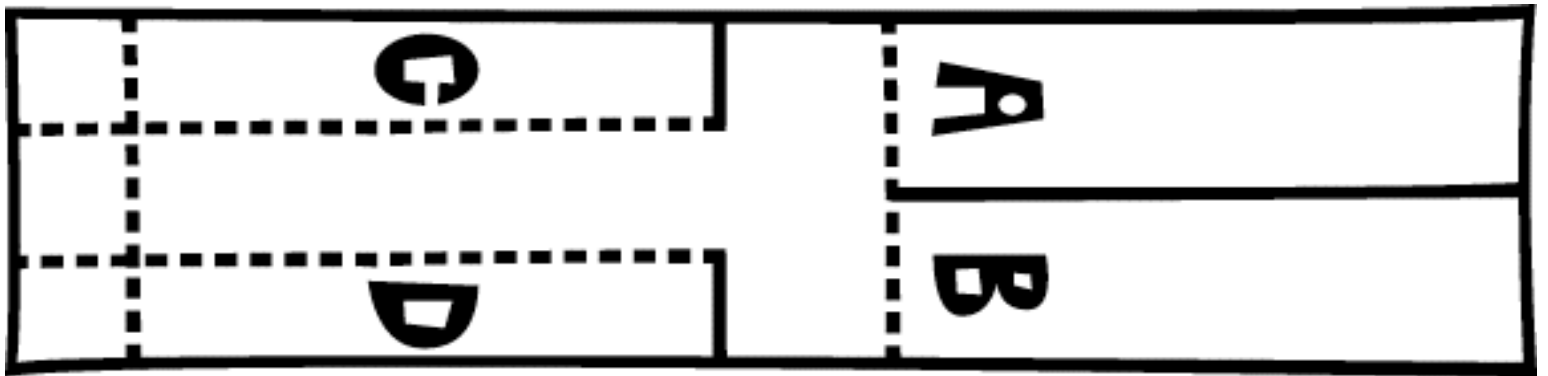
Cut out both sizes and try it. Did your answer match what you observed?

Can you think of a way to make your Rotocopter spin in the opposite direction? Try it.

WHY THESE WORK

When the Rotocopter falls, air pushes up against the blades, bending them up just a little. When air pushes upward on the slanted blade, some of that thrust becomes a sideways, or horizontal, push.

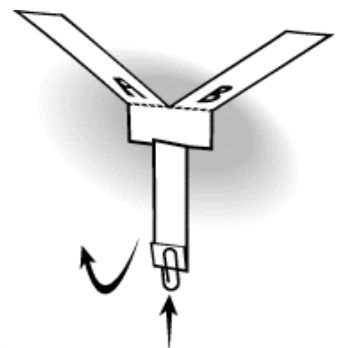
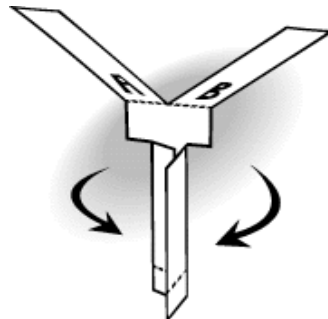
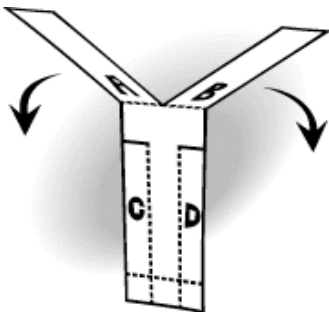
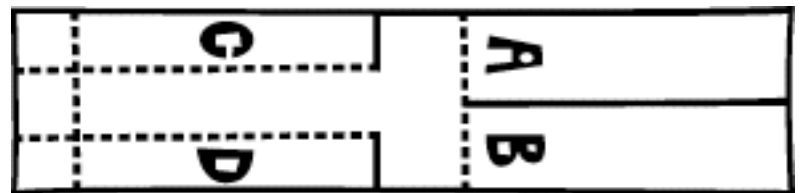
Why doesn't the copter simply move sideways through the air? That's because there are two blades, each getting the same push, but in opposite directions. The two opposing thrusts work together to cause the toy to spin.



CUT on solid lines.

FOLD on dashed lines

Use a **PAPERCLIP** on the bottom



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FLIPSTICKS

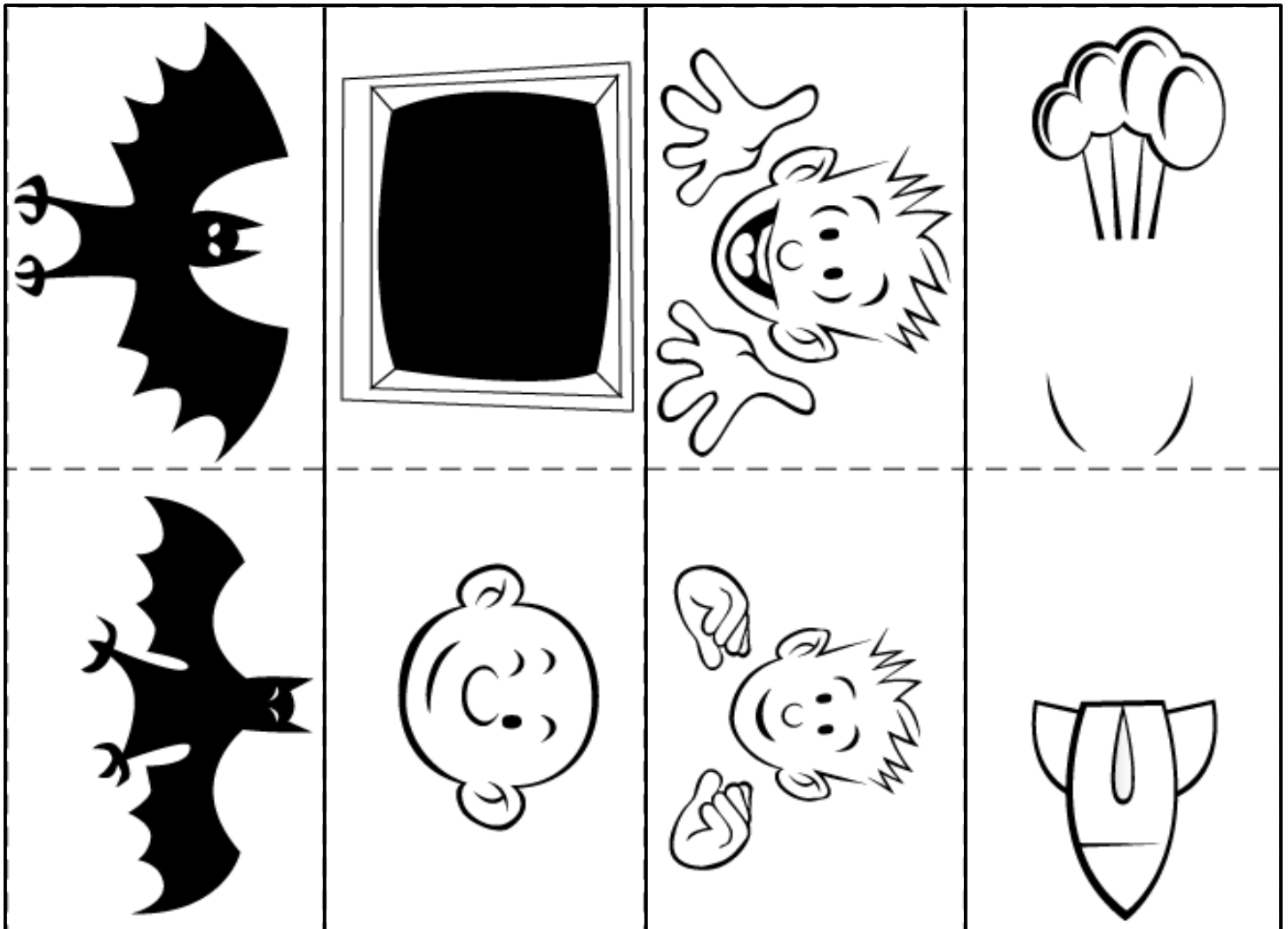
CUT OUT THESE SHAPES and tape to a straw as shown.

Place the straw between the palms of your hands and roll the straw quickly, making the image spin. Watch the image. What do you see happening? Change the speed that you spin the straw. What happens when you go slower?

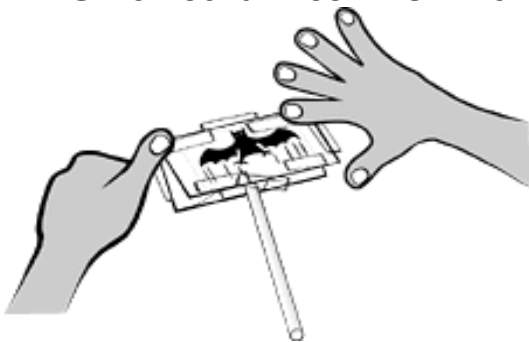
WHY THESE WORK

When you look at a picture, then quickly flip to another picture, your eye and brain remember the first picture for a fraction of a second, and blend it with the second picture. This visual ability, known as **PERSISTENCE OF VISION**, makes the pictures in movies appear to move.

When you watch a movie, the light from the projector is flickering 30 times a second. Your eye and brain blend the flickering frames of the movie to make a single moving picture.



CUT on solid lines. **FOLD** on dashed lines. **TAPE** to straw.



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