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# DINOPET®

a living bioluminescent pet



**INSTRUCTIONS** PLEASE READ

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# CONGRATULATIONS!

You are now the proud owner of the coolest, smartest, bioluminescent-est pet on the planet:



The **Dino Pet** houses living organisms from the ocean (creatures called **Dinoflagellates** or dinos as they're nicknamed). The Dino Pet requires proper care and attention to stay healthy just like a pet or house plant. Carefully reading and following these instructions will enable you to have the best experience with your Dino Pet.

But, before your new friend is ready to show off his skills, there's some important stuff to learn to ensure your Dino Pet stays happy and bright.

Before you introduce the suspended dinoflagellates to their new home (the Dino Pet), carefully read the **SUPER IMPORTANT INFO** below.

## ABOUT biopop®

BioPop has a passion for science, art and design. Our work can be seen in the Smithsonian National Museum of Natural History and in homes and offices around the world. BioPop is focused on developing living art concepts that fuel the imagination, provide new answers for the way we live and enrich our understanding of the relationship between nature, science and humanity.

We guarantee that your dinoflagellates will arrive alive and healthy.

Please visit

**biopop.com/dinocare**

for a list of common questions.

Reach out to us at

**contact@biopop.com**

with any additional questions or requests for assistance.



## SUPER IMPORTANT INFO

PAY CLOSE ATTENTION, THIS INFO IS VITAL TO YOUR DINO PET'S VITALS

### 1. UNPACKING YOUR DINOS

Remove the white bag labeled *Dinoflagellates* from the shipping box (it may be in foil). Follow the temperature and lighting instructions below. Your dinoflagellates may be kept in the white bag they arrive in for several days or transferred directly to your Dino Pet (either way follow the temperature and lighting instructions).

### 2. TEMPERATURE

Dino Pet is happy at room temperature, ideally **68°F (20C)**. Keep the dinos within a temperature range between **63-77°F (17-25C)**.

### 3. LIGHTING

Place Dino Pet in a well lit room during daytime hours (avoid direct sunlight and light

bulbs that get too hot). At night, ensure Dino Pet is in a relatively dark area. Occasional light at night will not interfere with Dino Pet's circadian rhythm (see **Photosynthesize** section for more information).

### 4. BE PATIENT

Your Dino Pet may not light up on the first or even second night. The shipping process can be a little rough. You may need to give Dino Pet a day or two of light (as described above) before it glows when you shake it and play with it at night. **(NOTE: Dino Pet does not spontaneously glow—you must interact with your Dino Pet to see bioluminescence)**. If your Dino Pet doesn't light up by the third night, email us at [contact@biopop.com](mailto:contact@biopop.com) for troubleshooting tips!

## OPTIMAL PERFORMANCE TIPS

Dino Pet will not light up during daytime hours even if taken into a dark room. It is best to view Dino Pet's luminescence later in the evening in a very dark room (after it has been in the dark for at least 30 minutes). **You must shake the Dino Pet to view the bioluminescence.** Dino Pet will only light up while Shaken... At Night... **IN A DARK ROOM.**



**It's one big cycle:** chemical energy is transformed into light energy.

Sunlight is turned into chemical energy through photosynthesis and stored as ATP, and the chemical reaction in the microspheres turns the chemical energy in ATP back into light energy.

### PURPOSE OF BIOLUMINESCENCE

The Burglar Alarm Theory—Being at the bottom of the food chain stinks. Many scientists believe that *P. fusiformis* combats this unfortunate food chain placement by emitting light when they're disturbed by predators. The bioluminescence acts as a Bat Signal of sorts, spotlighting the attacker so any bigger-badder creatures in the area can swoop in for the save.

### TRIVIA

It is estimated that there are over **2,000** living species of dinoflagellates including marine, freshwater, and parasitic.

Just large enough to be seen by the naked eye, *P. fusiformis* is named for the botanical term for a cell or plant structure with a spindle-like shape that tapers at both ends (like an American football).

*P. fusiformis*' chloroplasts transform the cell shape by moving inward towards the nucleus at night and outwards towards the cell wall to photosynthesize during the day. Moving in the opposite direction are vacuoles and their thousands of microspheres that move outward at night to emit light.

## THE BASICS

The dinoflagellates used in the Dino Pet are a species of marine plankton, named *Pyrocystis fusiformis*, that have the ability to bioluminesce in response to mechanical agitation.

## BIOLUMINESCENCE

The blue-green bioluminescence emitted by *P. fusiformis* is a product of a chemical reaction in microsomes surrounding the cell's vacuoles. Each cell has an average of **4,500** microsomes where the protein luciferin is oxidized by the enzyme luciferase in the presence of *Adenosine triphosphate (ATP)* and oxygen—both are by-products of photosynthesis.

## LIFE CYCLE

*P. fusiformis* reproduces asexually by generating *aplanospores* or *zoospores* inside the cell wall. These new cells then grow to the size of the parent cell, divide, and become a pair of new cells.

## CIRCADIAN RHYTHM

*P. fusiformis* produces bioluminescence on a circadian rhythm. To obtain energy, *P. fusiformis* photosynthesizes during the day and releases that energy at night when mechanically stimulated.



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**WARNING!**

**NOT FOR CHILDREN UNDER 5 YEARS OF AGE**

**CHOKING HAZARD**  
CONTAINS SMALL OBJECTS

**DO NOT DRINK**  
CONTAINS LIVING ORGANISMS AND SALTWATER

IMPORTANT STEPS TO FILLING YOUR DINO PET

1. Thoroughly wash your hands to make sure your icky human germs don't make the dinos sick.
2. Give the white plastic bag labeled **DINOFLAGELLATES** a few shakes and then carefully unscrew the cap. Set the bag upright next to a sink or drain. Repeat this process for the black **Dino Food Bag**.
3. Turn Dino Pet upside down over a sink or drain. Use a coin, lucky or otherwise, to remove the cap from the Dino Pet's belly by rotating counter-clockwise.
4. Insert the spout from the white **DINOFLAGELLATES** bag into the Dino Pet's belly and carefully empty the contents of the bag into the Dino Pet.



Insert spout into Dino Pet's belly and carefully empty.

**INSTANT EXPERT**

THE SCIENCE BEHIND THE DINO PET

- Species:** *Pyrocystis fusiformis*  
(*P. fusiformis*)
- Domain:** Eukaryota
- Kingdom:** Chromalveolata
- Phylum:** Dinoflagellata
- Order:** Gonyaulacales
- Suborder:** Goniodomineae
- Family:** Pyrocystaceae
- Genus:** Pyrocystis
- Size:** Up to 1mm in length



## DAYTIME DINOS

Are you an educator who wants to show the magic of the Dino Pet off to your pupils (new class pet!). Or do you just want to be able to show off your Dino Pet's skills during the day? You can flip the Dino Pet's circadian rhythm on its head by placing the Dino Pet in an area that receives no natural light, and hooking up LEDs or a fluorescent lamp to a timer set to give it light during the night. You'll want to make sure to keep it in the dark during light hours, so be mindful of where and how you choose to show it off. The darker the room, the better the show.

Note: It takes about two weeks for the dinos to adjust to a new schedule (i.e. flipping their circadian rhythm).



Visit [BIOPOP.COM/EDUCATION](http://BIOPOP.COM/EDUCATION) for lesson plans and more!

- Continue to fill your Dino Pet with the black Dino Food bag by inserting the spout into the belly until you've reached your desired fill level.
- Replace the cap in the Dino Pet's belly and tighten firmly with your coin of ambiguous luck.
- Wipe any spilled contents from the exterior of the Dino Pet, and voila! Your Dino Pet is almost ready to glow (See: **BE PATIENT** on page 01).



Intense bioluminescence but gets dim quickly.



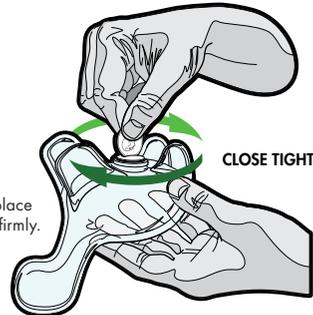
Lots of light—perfect!



Great light—allows for long shake times.



Subtly awesome cells of light—a starry night all night.



After filling, replace cap and tighten firmly.

**CLOSE TIGHTLY**

Much like larger dinosaurs (and other pets, humans, and even plants), Dino Pet has a sleep-wake schedule (**circadian rhythm**). A consistent schedule is essential to the health and bioluminescence (glowing light) of the Dino Pet.

## AVOID DIRECT SUNLIGHT



Placing your Dino Pet in direct sunlight can cause it to overheat and drive your dinos to the brink of extinction.

The Dino Pet wants to be in the light during the day and in the dark during the night. Without adequate light during the day,

upright position to empty approximately 1/5 the Dino Pet's contents (no need to be exact!). Turn your Dino Pet upside down again once the desired amount has been emptied.

NOTE: You may empty the contents into a clean clear container. Or you may also pour the contents into a new Dino Pet Aquarium (product SKU DP311) to expand your Dino herd or grow one for a friend.

4. Insert the DINO FOOD bag spout into the Dino Pet's belly and carefully fill the Dino Pet until you've reached your desired fill level.
5. Quickly replace the cap in the Dino Pet's belly and tighten firmly with a coin.
6. Replace the cap on the DINO FOOD BAG.
7. Store DINO FOOD in a cool dry place\*\*.

\*\*—If you store your DINO FOOD in the fridge or freezer, it's very important to let it return to room temperature before feeding your Dino Pet. If the food is too warm or cold it can kill your dinoflagellates by shocking them.

## NO SUN, NO WORRIES!

If you live in a place that doesn't see much sunlight, most home and office lights will work just fine. Just make sure not to use a lamp that will heat the Dino Pet's contents, like high pressure sodium and high wattage incandescent bulbs. LEDs and Fluorescent lights tend to be the safest. Place your Dino Pet ~ 2-3 feet away from the light source.

## IN REVIEW

LEDs and fluorescent bulbs = **GOOD**.  
Lighting that heats the contents of the Dino Pet = **BAD**.

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Empty approximately 1/5 of the Dino Pet's contents and refill with Dino Food.



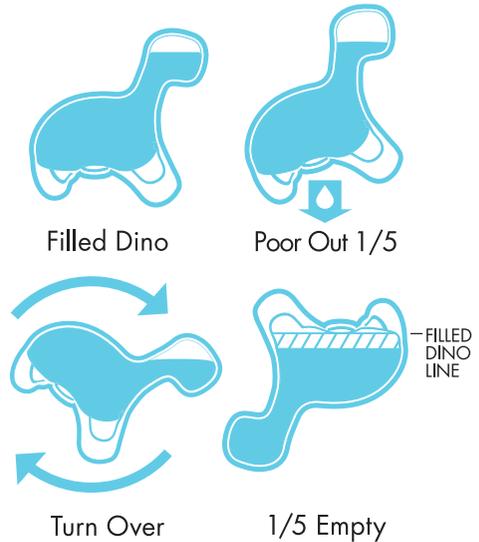
Order **Dino Food**  
at **BIOPOP.COM**

## ADD DINO FOOD EVERY 7-10 DAYS

To extend the life of your Dino Pet, you'll need to give it a little food periodically.

### INSTRUCTIONS

1. Give the Dino Pet a few Shakes to mix the contents.
2. Carefully unscrew the cap on the black plastic bag of **DINO FOOD**. Stand bag upright next to a sink or drain.
3. Hold Dino Pet over a sink or drain and use a coin or flat object to remove the cap from the Dino Pet's belly by rotating counter-clockwise. Slowly turn Dino Pet towards the



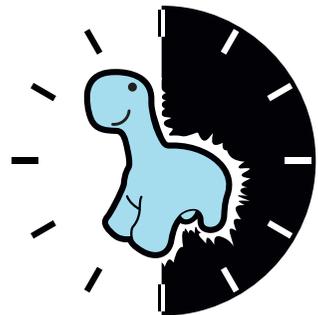
the Dino Pet will not produce light at night. And without sufficient time in the dark (**AT LEAST 30 MINUTES**), it will not light up when it's time to put on a light show. We recommend giving the Dino Pet consistent light (day) and dark (night) cycles that follow natural day/night cycles. Alternatively, you may employ a timer and light source to keep your Dino Pet on an ideal schedule of 10-14 hours of light and 10-14 hours of dark\*.

But remember, **NO DIRECT SUNLIGHT!** You want your Dino Pet to stay cool (63-77F/17-25C).

\*Until now, your dinoflagellates were raised in San Diego, California. They've been waking up at 5am and going to bed around 5pm PT. This is the routine they're used to. This routine can be changed, but you have to be aware of the schedule they've been on and be patient while they adapt to their new environment and routine (see **Tips from the Pros** for more information).

### WAKEY, WAKEY!

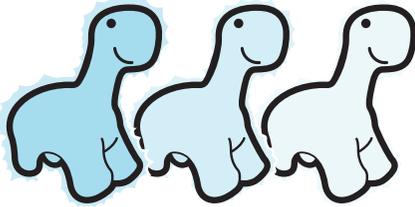
It's beneficial to lightly shake your Dino Pet at least once during the day to mix the dinoflagellates. This ensures all the cells are able to soak up some light rays!



LIGHT=10-14 HOURS

DARK=10-14 HOURS

Shaking your Dino Pet too hard can hurt the dinoflagellates within. Tipping your Dino Pet forward or rocking back and forth works best. Please help us prevent Dino cruelty by shaking carefully and respectfully.



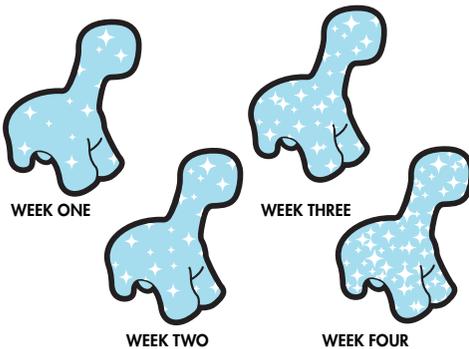
FIRST SHAKE    SECOND SHAKE    THIRD SHAKE

These are living creatures. Each night bioluminescence (light) will diminish after continual shaking.

**DO NOT SHAKE VIOLENTLY!**  
This will damage and kill the dinoflagellates!



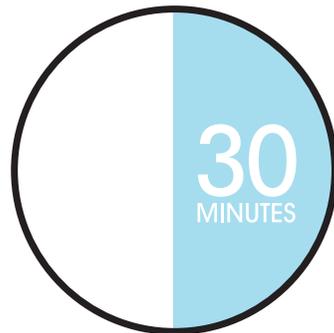
TIPS FOR ILLUMINATING YOUR DINO PET



Each week the dinoflagellates will divide and increase in number. As numbers of dinoflagellate cells increase—light will increase.

**It is important to view bioluminescence in complete darkness.**

**ILLUMINATE**



DINO must be in complete darkness for **AT LEAST 30 MINUTES** before bioluminescence (light) is viewable.