

Setting Up Your Lizard's Home

Lizards can thrive when provided with a proper diet and an enclosure that is designed to recreate the conditions that they would encounter in the wild. The vivarium that you create should meet the minimum species-specific requirements of your lizard, including temperature and humidity, lighting, as well as cage size and materials that meet the animal's need to climb, burrow, or swim.

Cage size and construction

The enclosure should be made from a smooth, nonabrasive **material** that is easily cleaned and disinfected and does not absorb water or organic material, such as plastic-coated wood or wire mesh, plastic or fiberglass, plexiglass, stainless steel, or synthetic decking material.

Wood enclosures

- Bare wood is difficult to clean and nearly impossible to disinfect.
- Pressure-treated wood contains potentially toxic chemicals
- Seal wood with stains and polyurethane or synthetic decking material; seal seams and corners with silicon caulk. Then allow the cage air out for several days.

Glass aquaria

- Although commonly available, glass aquaria do not make good enclosures for most reptiles.
- The open exposure can be quite stressful.
- Even with screen tops, ventilation can be poor
- Glass is also a poor insulator, which can promote dramatic temperature fluctuations.
- Glass tanks can serve as adequate cages for juvenile lizards or small adults, like anoles.

The most common cage **shape** is rectangular. Provide vertically-oriented caging for species that live in trees (arboreal), and horizontally-oriented caging for terrestrial or ground-dwelling species.

Refer to species-specific information for minimum cage **size** recommendations. The ideal cage size will vary with the adult size for each species as well as its natural history. Generally, the larger the enclosure the better as long as proper temperature and humidity levels are maintained.

Temperature

Most reptiles are “**cold blooded**” or ectotherms. They draw the vast majority of their body heat from outside heat sources. Many reptiles bask in the sun to warm their bodies during the morning and midday. As the temperature falls, the reptile's body temperature will also decrease. These daily variations in body temperature are normal, however, each species has a **preferred optimum temperature range** that is essential to maintain normal health by promoting immunity, supporting circulation, aiding digestion and other bodily functions. Although guidelines are listed below, the temperature range for your reptile's enclosure should be based on species-specific information:

General guidelines for reptiles species commonly kept in captivity

Reptile category	Daytime temperature	Basking spot temperature	Nighttime temperature	Relative humidity
Most tropical species	27°C-38°C (80°F-100°F)	38°C-40.5°C (100°F-105°F)	Should not drop <21°C (70°F) during the active season	80% to 90%
Desert species	29.4°C-35°C (85°F-95°F)	38°C-40.5°C* (100°F-105°F)	22°C-25.5°C (72°F-78°F)	30% to 50%
Temperate zone species	20°C-35°C (68°F-95°F)	30.6°C-37.8°C (87°F-100°F)	18°C-24°C (64°F-75°F)	35% to 60%
Nocturnal or mountain-dwelling	21°C-27°C (70°F-80°F)	32°C-35°C (90°F-95°F)	24°C-25.6°C (75°F- 78°F)	50% to 60%

*Uromastix prefer basking areas of 49°C-54.5°C (120°F-130°F)

Provide a **temperature gradient** to every captive reptile, where the temperature is higher under a heated basking area or “hot spot” and progressively cooler as the distance from the heat source increases. The target temperature for the **basking spot** is the upper end of the preferred optimum temperature zone. Ground-dwelling (terrestrial)

lizards move in a more horizontal plane, therefore the “hot spot” should be placed at one end of the vivarium. Tree-dwelling (arboreal) lizards thermoregulate in a vertical plane. So, heating elements should be placed at the top of the enclosure.

There are a variety of heat sources that can be used, including reptile heat strips or undertank heating mats, warming cables, ceramic heat emitters, tubular heaters, radiators, convector heaters, incandescent bulbs, and/or radiant heat panels.

- For terrestrial animals, an undertank heat often serves as a **primary heat source** that is left on at all times and is used to maintain the baseline cage temperature. Undertank heaters should cover no more than 30% of available cage space. Alternative heat sources include radiant heat panels, which provide broad areas of heat to arboreal species, use of a radiator in the room, or even natural sunlight, depending on the climate,.
- Use **secondary heat source(s)** to increase the daytime temperature in some areas of the enclosure, thereby by creating a thermal gradient. Create a basking area using an incandescent bulb, infrared heater, or mercury vapor lamp, which also provides some ultraviolet light (*see Lighting below*). Place heat sources more than 45 cm (18 in) above the floor substrate and protect reptiles from direct contact with heat sources.
- Use a ceramic heater or night heat light that emits a red or purple glow to heat the enclosure at night. These bulbs can also be used to generate high-heat sites for nocturnal or burrowing species.
- Do not use heating pads, which are not designed to be placed beneath a cage. “Hot rocks” are also not recommended because the heat they provide is inconsistent and may cause severe burns.

Carefully monitor temperatures within the enclosure using either an infrared laser **thermometer**, standard thermometers, or digital thermometers with probes, preferably with memories for maximum and minimum values. Place thermometers at both the “cool” and “hot” ends of the enclosure at floor level. Ideally, a third thermometer should also be placed at the highest level of the basking spot.

Use **thermostats** to control temperature and maintain a natural daily temperature fluctuation. Seasonal temperature fluctuations should also be provided for many species. During the winter months, temperature should generally be decreased for species from temperate and subtropical climates.

Humidity

Appropriate humidity levels are crucial for the health of your reptile. A dry environment (relative humidity <35%) can result in dry skin and abnormal shedding. Extremely high humidity levels (>70%) can result in skin and respiratory infections in some species. Long-term dehydration may also contribute to the high incidence of kidney disease in adult iguanas. Monitor humidity levels with the use of a **hygrometer** within the vivarium.

Cage humidity is intricately related to temperature, water levels, and **ventilation**. If the cage is poorly ventilated, humidity can reach unhealthy levels. Stagnant air can contribute to the growth of disease-causing pathogens.

- Provide greater **water surface area** with shallow water containers that are large enough for the reptile to soak. Water can also be provided using water drip or sprinkler systems, small fountains, automatic misters, and/or regular misting with a spray bottle.
- Increase water temperature by placing a heat mat beneath a shallow water container or by directing a heat source over the water’s surface to promote evaporation.
- Vaporizers or humidifiers can be used to humidify the enclosure, particularly during the winter months.
- A high humidity zone can also be provided with a humidity box (see accessories below) or moisture-retaining substrate, such as moist sphagnum moss.

Lighting

The **daily light cycle** or photoperiod impacts reptile behavior and health. Photoperiod also provides important cues for reproduction in species native to areas with seasonal temperatures. Changes in photoperiod are less important for tropical species. Use timers to provide a regular light cycle. As a general rule, day length should be decreased for species native to subtropical and temperate climates.

General guidelines for changes in photoperiod

	Reptiles native to many tropical and subtropical areas	Reptiles native to temperate zone regions*
Amount of light received during a winter day (hours)	10-12	8-9
Amount of light received during a summer day (hours)	13-14	15-16

*Temperate zone reptiles should be exposed to approximately 12 hours of light during the spring and fall.

Most lizards require **ultraviolet (UV) light**, specifically radiation within the wavelength of 295 nm (UVB). UVB light is essential for the synthesis of vitamin D₃ and the absorption and metabolism of calcium. The best source of high-quality, full-spectrum UV light is unfiltered sunlight, however, the healthful UVB rays will be filtered out by most transparent glass or plastic barriers. There are also a dizzying array of UVB lights that are commercially available. For basking species, mercury halide lamps can provide light and heat up to a distance of 1 meter. Fluorescent tube lights, compact fluorescents, and LED bulbs can provide UVB radiation without significant heat over shorter distances up to 30 cm (12 in). Visit “*UVB Lighting for Reptiles*” for additional information.

Substrate

The best cage bedding will vary with the species, but should be inexpensive, nontoxic, nonabrasive, absorbable, and easy to clean, while also meeting the species’ biological and behavioral needs.

- Newspaper, butcher’s paper, high-quality indoor-outdoor carpet, and wood chips, such as orchid bark, coconut chips or shredded coconut husks (coir), cypress mulch, aspen shavings, and recycled paper products are all potentially suitable materials. Wood chips are resistant to mold, but do retain moisture and should not be used in a poorly ventilated cage.
- Some reptile keepers also place moistened sphagnum moss at the bottom of the cage.
- Soil and natural leaf litter can also be used by experienced hobbyists but care is required to maintain hygiene and to not introduce disease. (These materials can be sterilized by baking in an oven).
- Smooth stones can be used for some species but must large enough that they cannot be ingested.

Most substrates can be accidentally ingested during feeding and some of these materials can lead to an intestinal blockage, including “digestible” calcium carbonate sand. Provide a food bowl that is deep enough to prevent spills OR feed the lizard in a separate enclosure lined with newspaper or butcher paper.

Beddings to avoid	Reason
Corncob	Can undergo severe molding when wet
Cedar, eucalyptus, or pine shavings	Vapors can result in skin or respiratory irritation and potential neurologic problems
Cat litter, gravel, pebbles	Difficult to clean and are often ingested
Sand, including so-called digestible calcium sand	Can be ingested leading to potentially severe blockages
Crushed pecan or walnut shells	Can be ingested leading to potentially severe blockages

Accessories or cage furniture

Encourage normal behaviors by providing numerous hiding, resting, and activity areas.

Climbing areas: Secure horizontal and vertical branches, sections of wood, tree roots, or cork bark slabs diagonally along the length of the vivarium for tree-living species. Artificial or natural branches may be used, but extra care is required for natural branches and rocks, which must be cleaned and disinfected beforehand.

Visual security: Many lizards benefit from hiding places, such as boxes that provide a snug fit, as well as tree trunks, rocks, plants (*see Appendix I*), or other objects. Inspect plants carefully before introducing them into a vivarium. Provide a hiding place at each end of the temperature gradient. For some species, a solid black border painted on the glass wall 20 cm (8 in) from the cage bottom provides additional security.

Ground-dwelling species require horizontal shelters, such as cardboard boxes, PVC pipe, cork bark, or commercially-available hides made of concrete, plastic, ceramic, or clay. Climbing lizards require vertical shelters that may be placed on a horizontal platform or shelf adhered to the side of the vivarium using silicone sealant.

Vertical shelters can also be created by placing slabs of cork bark or rock vertically against the side of the enclosure. Anchor rocks well to prevent crushing.

Live plants recommended for reptile enclosures, from de Vosjoli 2007, Searcey 2011

	Desert vivaria	Tropical vivaria	Temperate vivaria
Plants for arboreal lizards	<i>Bougainvillea</i> spp., shrub types; caudex fig (<i>Ficus palmeri</i> , <i>F. petiolaris</i>); manzanita (<i>Arctostaphylos</i> spp.); junipers, upright (<i>Juniperus</i> spp.); <i>Lantana</i> spp.; lavender cotton (<i>Santolina chamaecyparissus</i>); sages (<i>Salvia</i> spp.); wormwoods (<i>Artemisia</i> spp.); many succulents and cacti	Creeping fig (<i>Ficus pumila</i>); <i>Hibiscus</i> spp.; weeping fig (<i>F. benjamina</i>); umbrella plant (<i>Schefflera arboricola</i>)	Azaleas (<i>Rhododendron</i> spp.); camellias (<i>Camellia</i> spp.); boxwoods (<i>Buxus</i> spp.); gardenias (<i>Gardenia</i> spp.); pineapple guava (<i>Feijoa sellowiana</i>)
Plants for some arboreal and some terrestrial species	Climbing aloe (<i>Aloe ciliaris</i>); <i>Gasteraloe</i> spp.; geranium (<i>Pelargonium</i> spp.); <i>Haworthia</i> ; lace aloe (<i>Aloe aristata</i>); oxtongue or bowtie plants (<i>Gasteria</i>); ponytail palm; (<i>Beaucarnea recurvata</i>); snake plant (<i>Sansevieria</i>)	Vine like: Ivy (<i>Hedera</i> spp.); pothos (<i>Epipremnum aureum</i>); rosary vine (<i>Ceropegia woodii</i>); split-leaf philodendron (<i>Monstera deliciosa</i>) Low-cover plants: <i>Begonia</i> spp.; Chinese evergreen (<i>Aglaonema</i>); <i>Dracaena</i> spp.; dumbcane (<i>Dieffenbachia actinophylla</i>); Earth star (<i>Cryptanthus</i>); ferns (many species); gesneriad (<i>Nematanthus</i> , <i>Aeschynanthus</i>); snake plant (<i>Sansevieria</i>); ti plant (<i>Cordyline</i> spp.); small palms (many species);	African violets (<i>Saintpaulia</i> spp.); <i>Begonia</i> spp.; <i>Cyclamen</i> spp.; ferns (many species); mondo grass (<i>Ophiopogon japonicus</i>); primroses (<i>Primula</i> spp.); turf lilies (<i>Liriope</i> spp.); violets (<i>Viola</i> spp.)
Epiphytic plants		Bromeliads (<i>Neoregelia</i> , <i>Billbergia</i> , <i>Guzmania</i> , <i>Aechmea</i>), orchids (<i>Dendrobium</i> , <i>Epidendrum</i> , <i>Haemaria</i> , <i>Oncidium</i>); tillandsias (<i>Tillandsia</i> spp.)	

Humidity box

The relative humidity within a wild reptile’s shelter or burrow is significantly higher than in the open air, particularly in drier habitats. Although high humidity retreats are commercially available, a simple humidity box may be created for captive reptiles using a plastic box filled with slightly damp mulch, sphagnum moss, or peat moss with a small hole in the lid to allow the reptile to enter or exit.

Sanitation

Cleanliness is vital for successful long-term management of reptiles.

- Spot clean the bedding regularly by removing uneaten food on a daily basis.
- Remove droppings in a timely manner. This will halt the life cycle of some internal parasites.
- Thoroughly clean water dishes at least once a week.
- Completely replace all substrate at least once a month.
- Break down and disinfect the enclosure at least every 3 months. Disinfection must always be preceded by first physically removing organic debris, such as droppings. Household bleach (sodium hypochlorite) is an effective disinfectant (dilute 30 ml bleach in liter of water or ½ cup per gallon).
- Thoroughly rinse all cleaning chemicals before returning the reptile.

If you have more than one reptile in your household, take measures to prevent the spread of potentially dangerous microbes from one cage to another. Use separate cleaning materials for each cage and do not wash cage accessories from different cages in the same soapy water. Also wash hands between cages.

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