A Guide for Acquiring and Caring for Tarantulas Appropriate for the Middle School Science Classroom

by Ron Wagler

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Acquiring your Classroom Tarantula

Always purchase a captive-bred (often labeled CB) tarantula instead of a wild-caught tarantula (often labeled WC). If the tarantula is not identified as CB or WC, ask the seller if the tarantula is captive bred. Purchase a captive-bred tarantula that is at least 2.5 cm (1 in.) in leg span. Tarantulas that are less than 2.5 cm in leg span tend to have a higher mortality rate. The Resources section provides recommended companies where you can purchase captive-bred tarantulas, but there are other online companies that sell captive-bred tarantulas. The best captive-bred tarantulas for a classroom are from the *Aphonopelma*, *Brachypelma*, and *Grammostola* genera. These species are from the Americas and are bred frequently. These slow-growing ground tarantulas tend to be calm and very hardy, and females can live for decades in a simple enclosure. Males grow much quicker and can live approximately six years. When full

grown, most have a 12.7 to 15.2 cm (5 to 6 in.) leg span. The only exception is the highly recommended *Grammostola pulchripes* (Chaco Golden Knee tarantula) in which older females can have a 15.2 to 17.8 cm (6 to 7 in.) leg span. In any case, having a large, calm spider in the classroom is something most students and teachers find exciting. Figures 9 and 10 present examples of tarantula species that are recommended for the classroom.

Figure 9

Examples of tarantulas recommended for the middle school science classroom (from left to right: *Aphonopelma sp.* [Brown tarantula]; *Brachypelma smithi* [Mexican Red Knee tarantula] and *Grammostola pulchripes* [Chaco Golden Knee tarantula])

Photographs by author

Figure 10

Recommended tarantulas for the classroom

Genus	Scientific name	Common name
Aphonopelma	*Aphonopelma chalcodes*	Arizona Blonde tarantula
Aphonopelma	*Aphonopelma hentzi*	Oklahoma Brown tarantula
Aphonopelma	*Aphonopelma seemanni*	Costa Rican Zebra tarantula
Brachypelma	*Brachypelma boehmei*	Mexican Fire Leg tarantula
Brachypelma	*Brachypelma emilia*	Mexican Red Leg tarantula
Brachypelma	*Brachypelma smithi*	Mexican Red Knee tarantula
Grammostola	*Grammostola pulchra*	Brazilian Black tarantula
Grammostola	*Grammostola pulchripes*	Chaco Golden Knee tarantula
Grammostola	*Grammostola rosea*	Chilean Rose tarantula

Many other captive-bred tarantulas can be purchased, but they are not appropriate for a middle school science classroom. These tarantulas require more complex enclosures, more complex care, are not hardy, are too venomous, or possess other characteristics that do not make them appropriate for a classroom. Common examples from the new world and old world include spiders of the genera *Acanthoscurria, Avicularia, Haplopelma, Heteroscodra, Lasiodora, Nhandu, Poecilotheria, Pterinochilus, Tapinauchenius* and *Theraphosa.* Figure 11 presents examples of tarantula species that are not appropriate for the classroom.

Figure 11

Examples of tarantulas not appropriate for the middle school science classroom (from left to right: *Acanthoscurria geniculata* [Giant White Knee tarantula]; *Poecilotheria regalis* [Indian Ornamental tarantula], and *Pterinochilus murinus* [Orange Baboon tarantula])

Photographs by author

Setting Up your Classroom Tarantula Enclosure

Before setting up your classroom tarantula enclosure, check your school's policy regarding live animals in your classroom. Also consult with your school nurse and with students' parents to make sure none of your students are allergic to any allergen that may result from the tarantula being in the classroom. For further guidelines on the responsible use of living animals in the classroom, see the NSTA position statement at *www.nsta.org/about/positions/animals.aspx*.

Set up your tarantula enclosure before you acquire your tarantula. The Resources section provides recommended companies for the purchase of enclosures, but there are many online companies that sell tarantula enclosures. In most cases, simple, clear, inexpensive containers can also be used as an enclosure for your tarantula. It is recommended that the enclosure have a lock; if a lock is not possible, keep the enclosure in a secure place where students are not able to open it, but they are able to view the enclosure. Science classrooms often have locking cabinets with glass fronts. This is an ideal secure place to keep multiple tarantula enclosures for classroom viewing. If none of these options are possible, consider keeping the enclosure in a secure location and periodically bringing it out for students to view while under the supervision of the teacher.

The size of your enclosure will depend on the size of the tarantula you purchase. Captive-bred tarantulas from the *Aphonopelma, Brachypelma,* and *Grammostola* genera are best kept in small, simple enclosures with a length and width that is two to three times the leg span of the tarantula. The height of the enclosure should be appropriately the leg span of the tarantula. This will protect the spider from falls that may rupture its exoskeleton. Because of these simple requirements, small spiders can be kept in small, inexpensive containers with air holes. Figure 12 shows two simple, inexpensive enclosures for tarantulas with leg spans from 1 to 3 inches. Note that the enclosure lids have been removed to show the inside of the enclosures. Even though lids are not shown in Figure 12, your enclosure should have a secure lid. The enclosures pictured have 1/16 inch holes on the sides. If your enclosure does not have these holes, make them on the sides of the enclosure. Enclosures for tarantulas with leg spans from 2.5 to 5 cm (1 to 2 in.) should have a coir substrate (see Figure 12: Left enclosure). Coir (often marketed as loose coconut fiber) can be purchased online or at pet stores in both brick and bag form. Also provide a 16-ounce soda-bottle cap water dish filled with three small pebbles and water. Use the spray bottle (see Figure 14) to fill the water dish. Do not use sponges, water gels, or cotton balls as ways to provide water to your tarantula. Bacteria and fungi can grow in any of these materials and these organisms can potentially harm your tarantula. Periodically clean the water dish when it is dirty or the water is dirty. Always provide a full, clean water dish for your tarantula. Using the spray bottle (see Figure 14) also moisten a small area of the coir around the water dish, but no more than one third of the existing substrate (see Figure 12). Smaller tarantulas of the *Aphonopelma, Brachypelma,* and *Grammostola* genera are more susceptible to dehydration than larger tarantulas, but do not like to stand on moist substrate for extended periods of time. By providing these requirements, your spider will not dehydrate and will also be able to stand on dry substrate.

Figure 12

Example tarantula enclosures: Left (a 11.4 cm [4.5 in.] diameter enclosure for tarantulas with 2.5 to 5 cm [1 to 2 in.] leg span); Right (a 19 cm [7.5 in.] diameter enclosure for tarantulas with 5 to 7.6 cm [2 to 3 in.] leg span)

Photograph by author

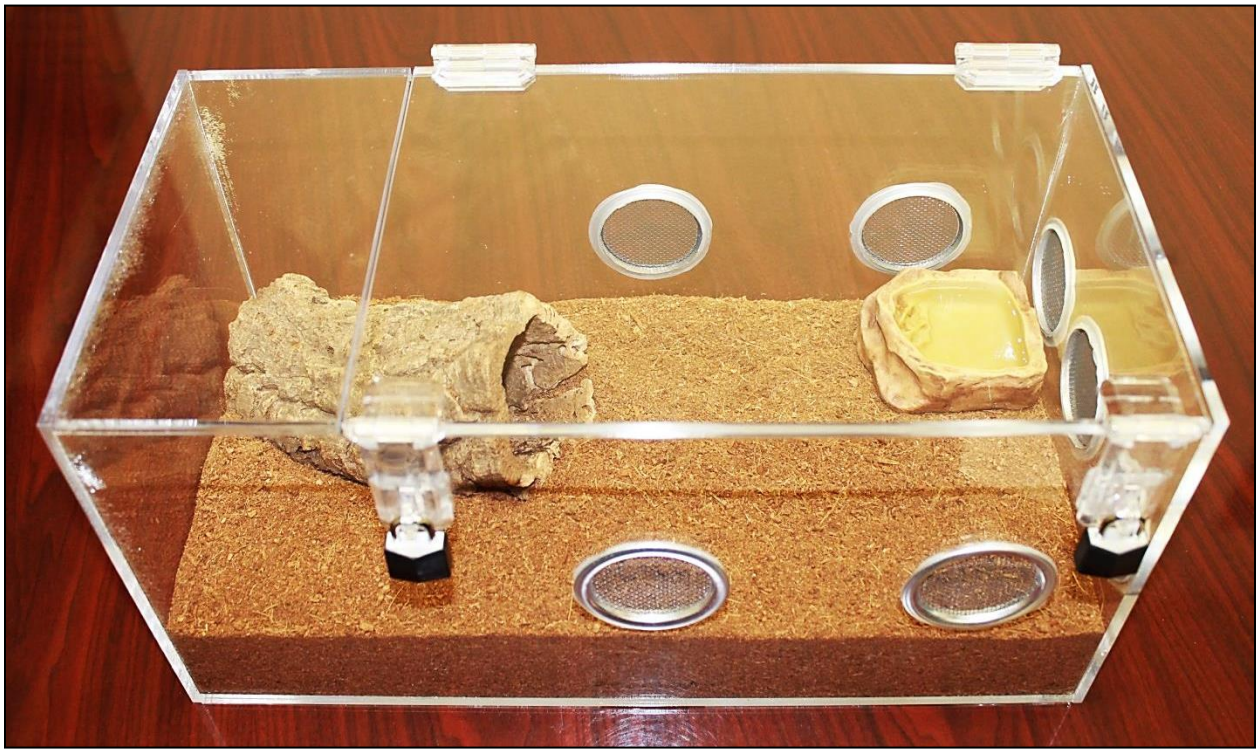
Enclosures for tarantulas with leg spans from 5 to 7.6 cm (2 to 3 in.) (see Figure 12: Right enclosure) should have a completely dry coir substrate and a slightly larger bottle-cap water dish with no pebbles. The water dish in Figure 12 is from a small bottle of milk. A small retreat (often called a hide) should also be provided. The one in Figure 12 is a plastic disposable cup that has been cut in half (top to bottom) and then trimmed down to fit in the enclosure.

Enclosures for tarantulas with a leg span of 7.6 cm (3 in.) or larger (see Figure 13) should have a completely dry coir substrate and a water dish with no pebbles. The water dish pictured in Figure 13 is marketed for reptiles and can be purchased online or at local pet stores. Also include a hide for your tarantula. The hide pictured in Figure 13 is a cork bark tube that can be purchased online or at local pet stores. A full-sized plastic disposable cup that has been cut in half (top to bottom) or not cut and half buried in the substrate can also be used. Often ceramic flower pots that are half buried in the substrate are used, but these are not recommended because if they are dropped on your tarantula, they can harm the spider. Do not add rocks or branches to the enclosure as they can also fall or may be dropped on your tarantula. The example enclosure also has two locks and the depth of the substrate in the enclosure has been raised so that if the

tarantula falls while climbing, it will not be harmed. Note that the depth of the substrate has been raised in the enclosures in Figure 12, but this is not visible. Many other types of enclosures and aquariums exist for the recommended tarantulas when they are over 7.6 cm (3 in.) in leg span. These may also be used in your classroom, but do not use an enclosure with a screen lid. Tarantulas can climb on the underside of the screen lid and get the tarsal claws on the end of their legs stuck in the screen. This can be very harmful to your tarantula.

Figure 13

An example tarantula enclosure for a tarantula 7.6 cm (3 in.) or larger (20.3 cm width x 20.3 height x 40.6 cm length [8 x 8 x 16 in.])



Photograph by author

Caring for your Classroom Tarantula

Once you have acquired your captive-bred tarantula from the *Aphonopelma*, *Brachypelma*, or *Grammostola* genera, it is time to place it in your classroom enclosure. Never keep more than one tarantula from the recommended genera in an enclosure. Never allow students to touch the enclosure. The teacher should be the only one that touches, opens, or works in the enclosure (e.g., provide food, provide water, clean the enclosure). Whenever the teacher needs to put something in or get something out of the tarantula's enclosure (and the tarantula is present in the enclosure), always use tweezers (see Figure 14). The teacher should never put their hand in the enclosure when the tarantula is in the enclosure. The teacher should never touch or hold the tarantula. The best way to transfer your tarantula from the container it was purchased in to its permanent classroom enclosure is to simply place the container in the classroom enclosure.

Position the container so that the tarantula can climb out and into the enclosure and remove the lid from the container with your tweezers. Put the lid on your enclosure and when the tarantula has left the container, open the enclosure lid and remove the container with your tweezers. Finally, put the lid back on your enclosure.

Figure 14

Simple tools for the care of your classroom tarantula (Top to bottom: A spray bottle, a soft paint brush taped to a bamboo skewer, 12-inch tweezers, and gloves for cleaning the enclosure)

Photograph by author

Even though these tarantula species tend to be calm, all of these tarantulas possess mild urticating setae (often referred to as urticating hairs). *Urticating setae* are the "hairs" on these tarantulas' abdomens that they can push off of their body. In these three genera, the tarantulas push off their setae by quickly rubbing their last set of back legs against their abdomen. They will only do this if they are threatened when the teacher is working in their enclosure. In rare cases, if the setae touch the teacher, they can cause a mild irritation. If the teacher is working in the enclosure and observes the tarantula quickly rubbing its last set of back legs against its abdomen, they should simply shut the lid of the tarantula's enclosure. This simple but effective safety technique will ensure that the teacher never comes in contact with the setae. After a few minutes, the setae will settle onto the substrate and the lid of the enclosure can be opened again. For this reason, no one should ever touch or hold the tarantula. Furthermore, holding a tarantula is stressful for the tarantula and the potential exists for dropping and harming the tarantula.

Keep your tarantula's enclosure at a minimum temperature of 65°F and a maximum temperature of 85°F. Because of these flexible temperature requirements, the tarantula enclosure can be kept in the science classroom year-round. Never use a heating pad, heating light, heating element, or place the enclosure in direct sunlight. All of these situations can cause the internal temperature of the enclosure to get too high and kill your tarantula.

Feed your tarantula crickets or roaches. Crickets can be purchased at local pet stores or online. Roaches can be purchased at some local pet stores and online. *Blaptica dubia* (Guyana spotted roach) and *Blatta lateralis* (red runner roach) are common roaches fed to tarantulas. Note that it is illegal to buy roaches and have them shipped to Florida and Tennessee. Never feed your tarantula wild-caught insects or other animals, as these can have residual pesticide on them that can kill your tarantula. Never feed your tarantula mice or lizards or any other vertebrate. If your tarantula is 2.5 to 7.6 cm (1 to 3 in.) in leg span, feed it prey that is approximately half the size of its leg span twice a week. If your tarantula is 7.6 cm (3 in.) or larger, feed it two to three prey once a week. Place one prey at a time near the tarantula using tweezers. Using a soft paint brush taped to a bamboo skewer (see Figure 14), touch the back of the prey and guide it toward the front legs of the tarantula. If, after attempting this two or three times the tarantula has not eaten the prey, remove the prey with tweezers. Never leave prey in with your tarantula for extended periods of time as these animals can bite your tarantula and harm it. The exception to this rule is *Blaptica dubia* (Guyana spotted roach). These roaches may dig into the substrate of your tarantula's enclosure and are often hard to locate. Even though they will remain in the enclosure for extended periods of time, they are not known to bite tarantulas. The tarantulas of the recommended genera of *Aphonopelma, Brachypelma,* and *Grammostola* will often not eat for long periods of time. If you make sure the spider has a full water dish, it will remain healthy and not die.

After your tarantula eats a prey, a small amount of the prey will remain in ball form. The tarantula will place this ball on the substrate. The teacher should remove the ball with tweezers and throw it in the garbage. Your tarantula will also defecate on the substrate. After the feces have hardened, the teacher should remove the feces with tweezers and throw it in the garbage. Performing this general cleaning maintenance every week or two will keep your enclosure clean for very long periods of time. If you notice a large amount of substrate debris or feces you could not remove, you will want to remove the substrate and clean the enclosure. This will require that you first remove your tarantula. Begin by removing the enclosure lid and, using your tweezers, place a container (big enough for the tarantula) on its side with the opening facing the spider's front legs. Using a soft paint brush taped to a bamboo skewer (see Figure 14), gently touch the end of the tarantula's abdomen and guide it into the container. Touching the spider's abdomen will often make it walk forward into the container. Now that the tarantula is in the container, use your tweezers to place the lid on the container. Remove the container with the tarantula from the enclosure. Using a pair of disposable nitrate gloves (see Figure 14), remove the items from the enclosure and gently place the soiled coir substrate in a sealed bag. Throw this bag in the trash. The gloves are used as an added safety precaution to protect your hands just in case there are urticating setae in the enclosure. Mix a solution of 10 parts water to one part white vinegar and clean the enclosure and the enclosure items. Rinse the enclosure and the enclosure items with clean water, allow them to dry, and reassemble your enclosure. To return your tarantula to its enclosure, simply follow the same steps you took when you placed it in the enclosure after you

first acquired it. If your tarantula dies, gently put the spider in a sealed bag with your tweezers and place the bag in the trash.

Other Helpful Tarantula Information

Tarantulas have a hard, rigid exoskeleton that restricts their growth. The only way a tarantula can grow in size is to periodically remove (i.e., molt) this old exoskeleton and allow the new, underlying, soft exoskeleton to expand and then harden. As your tarantula nears a molt, it will refuse to eat. Do not be worried. This is a normal part of the molting process. Figure 15 shows a tarantula in the process of molting. The spider has spun a silk mat and has flipped over on top of the mat. It will now slowly move out of its old exoskeleton and flip back over. Note that this tarantula species is not recommended for the classroom.

Figure 15

A *Lasiodora parahybana* (Brazilian Salmon Pink Birdeater tarantula) in the process of molting

Photograph by author

Figure 16 shows two tarantulas that have just finished molting. In both cases the tarantulas spun a silk mat and then flipped over on top of the mat as in Figure 15. They then slowly moved out of their old exoskeletons and flipped back over. Both pictures show the spiders after they have just flipped back over. Note the intact silk mats in both pictures and the old exoskeleton in the bottom picture. Never disturb or touch a tarantula while it is molting. The tarantula is very vulnerable while molting and a few weeks after molting. Not all tarantulas molt on their back or on a silk mat. If your spider is molting but not on its back, do not move or disturb it. This can kill the spider. After the tarantula has molted do not offer it food for two weeks. Remember to keep its water dish full. You can then try and feed the tarantula, but if it will not eat remove the prey immediately. The old exoskeleton should be gently removed with tweezers, placed in a sealed bag, and put in the trash.

Figure 16

Two tarantulas that have just molted (top: *Grammostola pulchripes* [Chaco Golden Knee tarantula]; bottom: *Brachypelma boehmei* [Mexican Fire Leg tarantula])

Photograph by author

Photograph by author

The Current Great Mass Extinction Activity

Humanity is in the midst of a self-induced great mass extinction of plant and animal life that is having and will have profound effects on Earth's biodiversity if environmental sustainability is not reached. The major human activities (i.e., direct drivers) negatively affecting global biodiversity are (1) habitat modification, fragmentation, and destruction; (2) pollution; (3) climate change; (4) overexploitation of species; and (5) the spread of invasive species and genes (Wagler 2012). The current great mass extinction has been shown to be an effective theme at producing positive outcomes in students that study the negative impacts humans are having on global ecosystems (Wagler & Wagler 2014). One of the ways to teach your students about the current great mass extinction is to integrate information about the importance of spiders and other arachnids to global ecosystems and the impact humans are having on their global numbers. This can be done by using any of the suggested resources and activities in the *Science Scope* article "The Sixth Great Mass Extinction" (Wagler 2012). This very large repository of resources and activities can be used to educate your students about the factors that are impacting global spider and other arachnid numbers and driving these species closer to extinction. Assess the products your students make from these activities by using the product rubric. Any of these activities align to the performance expectations, disciplinary core ideas, crosscutting concepts,

and other aspects of the *Next Generation Science Standard* MS-LS2: Ecosystems: Interactions, Energy, and Dynamics (NGSS Lead States 2013).

The Classroom Tarantula Website Activity

Figure 17 provides suggested content information to include on your website. Assess the components your students add to your website by using the product rubric. If you do not know how to develop a website, consult your school or district information-technology office to assist you. To ensure students' safety, be sure to follow all of your school or district student online safety protocols when developing the website.

Figure 17

Suggested content information for your classroom tarantula website

• Make a video or have a link with scientific information about your tarantula (and other classroom-appropriate tarantulas) such as the tarantula's indigenous location, growth rate, longevity, general care, types of enclosures, and other general information.
• Highlight student's tarantula work. This link may be scanned student work from the activities in this article or other tarantula-related projects they develop as extra credit.
• Link your website to Facebook to increase your visibility, network with others that keep tarantulas, and learn from them.
• Investigate scientific questions by conducting observations of your tarantula. Use your smartphone to gather data (i.e., videos) of your classroom tarantula's activity. Ask simple scientific questions such as, "What times of the day is the tarantula most active?"; "When does it go in and out of its hide?"; and "Is it more active when the room is bright or dim?" Analyze the data (i.e., smartphone videos), summarize the data, and draw conclusions. Add these videos and your conclusions to the website.
• Use your smartphone to shoot videos of special events such as the tarantula hunting, eating, drinking, and molting. Add these videos to the website.
• Get a free YouTube channel and post your videos there. Create a video link on your web page and embed the videos under that link.
• Add a real-time camera (i.e., Tarantula Cam) to your tarantula's enclosure so that viewers can watch the activity of your classroom tarantula online 24/7.

The Rubric for Assessing Students' Activity Products

Domain	Poor	Satisfactory	Excellent
Scientific knowledge of the product	Demonstrates little knowledge or application of the information	Demonstrates some knowledge, but does not correctly apply information	Demonstrates knowledge and some application of information
Creativity of the product	Shows little evidence of creativity	Shows some evidence of creativity	Shows evidence of creativity
Components of the product	No components or only one component of the product is met	Some of the components of the product are met	All or almost all components of the product are met
Mechanics of the product	There are large numbers of mechanical writing errors	There are some mechanical writing errors	There are very few or no mechanical writing errors
Organization of the product	Demonstrates no organization or a little organization	Demonstrates some organization	Demonstrates full organization

Resources

To buy captive-bred tarantulas, visit the following recommended reputable companies:

- Bugs In Cyberspace.com: bugsincyberspace.com
- Jamie's Tarantulas: www.jamiestarantulas.com
- Ken The Bug Guy.com: www.kenthebugguy.com
- NET BUG: www.net-bug.net
- Pet Center USA: petcenter.info

To buy tarantula enclosures, visit the following recommended reputable companies:

- Superior Shipping Supplies: www.superiorshippingsupplies.com/plastic-cups
- TarantulaCages.com: www.tarantulacages.com

References

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