Goal: Determine how otters play with toys and what information can be garnered from these interactions

Sources

Terry, J. (2022). Marine Mammal Health Informatics. Recent Work. Retrieved November 2, 2022 from joshterry.tech.

* Notes on previous work
* Certain otters showed anxiety playing with new toys while others had no problem
* Tested with four different designs, two of which proved not optimal for future usage, and one pursued with subsequent redesigning and testing
* Toys were played with by pushing, pawing food out, untwisting a top
* Several notes on toy expectations by otter and results to incorporate in future planning

Foster-Turley, P. & Markowitz, H. (1982). “A captive behavioral enrichment study with Asian small-clawed river otters (Aonyz cinerea).” *Zoo Biology*, 1(1), p. 29-43. <https://doi.org/10.1002/zoo.1430010104>.

* Otters like to hunt for prey as an enrichment activity.
* Otters preferred to hunt even when opportunity was not limited and hunted prey – crickets – were minor part of diet.
* For a chase toy, can look at how long they decide to play with the toy to determine engagement, depression, illness, etc

Sowa, S. (2015). “Sea Otter Enrichment at the Shedd Aquarium.” Marine Mammal Internship Shedd Aquarium. Retrieved November 2, 2022 from <https://www.researchgate.net/profile/Stephanie-Sowa/publication/273724486_Sea_Otter_Enrichment/links/5509c03a0cf26198a639a866/Sea-Otter-Enrichment.pdf>.

* Empirical data on various toys, levels of interaction (moderate to severe), and types of interactions (touching, spinning, etc)

Bandini, E., Bandini, M., & Tennie, C. (2021). “A short report on the extent of stone handling behavior across otter species.” *Animal Behavior and Cognition*, 8(1), 15-22. <https://doi.org/10.26451/abc.08.01.02.2021>.

* Stone handling behavior across otter species
* Looks at how these stones are used as tools
  + Rock-juggling, gathering, hammering

Edna M. Fisher. (1939). “Habits of the Southern Sea Otter.” *Journal of Mammalogy*, 20(1), 21–36. <https://doi.org/10.2307/1374489>.

* Particularly section on lifestyle to talk about play behavior towards one another and surrounding

Georgia Aquarium. (2021). "Sea Otters Play and Grow at Georgia Aquarium.” *Discovery*. Retrieved November 2, 2022 from <https://www.discovery.com/nature/sea-otters-play-and-grow-at-georgia-aquarium.>

* Details some of the toys used within the Georgia aquarium

Audubon Nature Institute. [Audubon Nature Institute]. (2011, Jan. 27). Sea Otters Love Ice! [Video]. YouTube. <https://youtu.be/k5gMPstOF64.>

* First toy held onto glass with suction cup
* Both toys consist of favorite food inside with ice frozen over
* Otters show bashing and biting to remove food from ice
* Unique grabbing to remove suction cups

Otter Specialist Group. (2004). Enrichment. *Otter Specialist Group*. Retrieved November 2, 2022 from <http://www.otterspecialistgroup.org/Library/TaskForces/OCT/Enrichment.pdf.>

* Environment enrichment recommendations, including toys and food

The Sacramento Zoo. [TheSacramentoZoo]. (2013, Dec. 19). River Otters Playing with New Toys [Video]. YouTube. <https://youtu.be/rlML22j_KOA>

* Shows toys mostly without food inside; plastic or silicone looking
* One looks like a bone
* They like to play fetch? As in, something is thrown in the water and they chase after it to retrieve it
* Silicone-looking frisbee – biting, grabbing, slight bashing
* Swimming around with toys, flipping and twisting around in water

Paradise Wildlife Park. [Paradise Wildlife Park]. (2020, Dec. 22). Otters Play With New Enrichment Toy! [Video]. YouTube. <https://youtu.be/8_z38pPQe_E.>

* Showcases one specific enrichment toy from amazon
* Toy has bowl base with rotating, holed green capsule overhead also containing food
* Talked about how otters will use paws to reach for food and pull it out

Oregon Zoo. [Oregon Zoo]. (2019, Jul. 30). Sea Otter Pup Tries New Toys [Video]. YouTube. <https://youtu.be/7NSBP3cIPZ4.>

* Shows mostly foodless toys
* Shows mostly grabbing and spinning in water
* Banging of large lego block
* Biting of starfish toy and handle toy
* Spinning with starfish toy
* Jumping, biting, and grabbing of kelp toy
* Grabbing and flipping with ice bucket

Notes

* If can find reason for why otters bang toys, potentially monitor stress levels depending on force of impact, frequency of banging, etc
* Gyroscope for monitoring twisties and maybe correlate with level of happiness or enjoyment wih toy?
* Would be interesting to see what can do with ice...thermoreceptors and timer to see when ice gets broken off at specific points? Would detect heat change to indicate breakage. Would need to be placed in independent chunks with own power.