OVERVIEW

This activity will enable students to explore what makes a species the best *Model Organism* and choose the best species from a list of plants & animals endemic to the Four Corners region.

KEY CONCEPTS

• Model organisms are any non-human species that are widely studied in the laboratory setting and have a very particular experimental advantage.
• Model organisms are easy to maintain and breed in a controlled environment.
• Model organisms are Domesticated for empirical studies but can also be found in the wild.

OBJECTIVES

• Students will review concepts about what qualifies a species as a *model organism*.
• Students will choose one species from the provided list as the best Model Organism candidate based on their background knowledge and justify why that is their choice.
• Students will create an infographic material that will explain their reasoning why they chose the species as their Model Organism.

WHO WANTS TO BE A MILLION DOLLAR MODEL?

Part 1: *Click and Learn*

Now that you know what qualifies a species as a *model organism*, imagine that you are a Space Biologist and you happened to land on the planet Tsé Bit'a'í that has very limited but unique biodiversity. Click all the links that correspond to the Model Organism candidate from the table below to know more about them, then decide which is the best model. You may also search for more online information about each of these candidates to help you decide.

Table 1.

CANDIDATE	SOURCES OF INFORMATION
Russian Thistle (Tumbleweed) *Genus Salsola*	→https://www.desertusa.com/flowers/tumbleweed.html →https://www.desertusa.com/flowers/tumbleweed.html →http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=129079

Fig. 1 Russian Thistle, Adapted from *Invasive.ORG* (2018), retrieved from https://www.invasive.org/browse/subinfo.cfm?sub=6375	
Gunnison's Prairie Dogs (*Cynomys gunnisoni*) Fig. 2 A Gunnison Prairie Dog. Adapted from USGS (2017), retrieved from https://www.usgs.gov/news/technical-announcement/taking-bait-majority-prairie-dogs-are-consuming-plague-vaccine	→https://animalia.bio/gunnisons-prairie-dog →https://web.archive.org/web/20050424211652/http://sevilleta.unm.edu/data/species/mammal/sevilleta/profile/gunnison-prairie-dog.html →https://academic.oup.com/gbe/article/12/5/618/5819143
Stink Bug (Beetle) Genus *Eleodes* (*Coleoptera, Tenebrionidae*) Fig. 3. Stinkbugs (aka "clown beetles or darkling beetles). Adapted from DesertUSA (2022), retrieved from https://www.desertusa.com/insects/stinkbug.html	→https://beetleidentifications.com/desert-stink-beetle/ → https://zookeys.pensoft.net/article/3838/ →https://www.insectidentification.org/insect-description.php?identification=Desert-Stink-Beetle →https://www.youtube.com/watch?v=nFeh9VfV0z8 →https://pubmed.ncbi.nlm.nih.gov/26016880/#:~:text=The%20genome%20is%2015%2C828%20bp,and%2013%20protein%2Dcoding%20genes.
Blue Corn (*Zea mays*)	→https://pubs.nmsu.edu/_h/H226/index.html →https://homeguides.sfgate.com/germination-hopi-blue-maize-74048.html

Fig. 4. Blue Corn (a.k.a. Blue Hopi Corn). Adapted from HOSS (n.d.). Retrieved from: https://hosstools.com/product/blue-hopi-field-corn/	→https://academic.oup.com/g3journal/article/11/2/jkaa062/6080733 →https://www.geochembio.com/biology/organisms/maize/
Western diamondback rattlesnake (*Crotalus atrox*) Fig. 5. A Western diamondback rattlesnake. (2011) "westerndiamondback2.jpg" (On-line), Animal Diversity Web. Accessed July 08, 2022 at https://animaldiversity.org/collections/contributors/usfws/westerndiamondback2/	→https://www.desertmuseum.org/kids/oz/long-fact-sheets/Diamondback%20Rattlesnake.php#:~:text=Identifying%20Features,with%20a%20triangular%20shaped%20head. →https://www.nps.gov/band/learn/education/upload/Western%20Diamondback%20Rattlesnake%20FACT%20SHEET.pdf →https://animaldiversity.org/accounts/Crotalus_atrox/pictures/collections/contributors/usfws/westerndiamondback2/ →https://animaldiversity.org/accounts/crotalus_atrox/ →https://www.sciencedirect.com/science/article/abs/pii/S1055790314004242

Part 2: *The X-files.*

The table below lists some of the general key features of model organisms. After reading about your candidates in Part 1, type an "x" mark in the column where these features apply to the organism. Type "NI" if there is no information provided from the table in Part 1 or in any online research that you did.

Table 2:

Features	Russian Thistle	Gunnison Prairie Dog	Stink Bug	Blue Corn	Western Rattlesnake
Easy to maintain					
Easy to breed					
High reproductive rate					

Short generation time (birth to reproduction)				
Small (or manageable) in size				

Part III. *Love it or Leave it.*

Use the data from Table 2 and your background knowledge about Model Organisms in choosing the best candidate. Once you have your top species, log in to your Canva.com account through your FMS email and create an infographic that shows why your chosen species is the best candidate.

Below is a rubric that will guide you on what should be discussed in your infographic:

Model Organism Infographic

	Proficient *5 Points*	Emerging *3 Points*	Beginning *1 Points*
Content	Shows all the key features that makes species the best Model Organism: > Maintenance > Breeding > Reproduction > Generation Time > Spatial	1 to 3 key features are missing. (Refer to the list under proficient column).	More than 3 key features are missing. (Refer to the list under proficient column).
Visual Aids	Includes clear and relevant diagram/figures that explain why this species is the best Model Organism.	Some diagram/pictures are clear but some are hard to see or understand.	Some of the diagram/pictures are unclear and/or hard to see due to their size, quality or position.
Clarity & Neatness	> The message that the infographic wants to convey is clear and precise. > Big, easy to read fonts were used that has a good contrast to the background color.	Information is present but the presentation is good to average due to color and/or organization of texts and images.	Information is present but the presentation is fair due to color and/or organization of texts and images.
Sources	At least 5 sources listed in a visible portion of the infographic material.	There are only 3 - 4 listed sources in a visible portion of the infographic material.	There is less than 3 listed sources in a visible or vague portion of the infographic material.

Once done with your infographic material, please upload it in Canvas, under the submission tab with the title: *Who Wants to Be the Model Organism?*

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