Alignment of Potential Monarch Waystation Activities with Middle School NGSS*

Some Questions to Explore: How can we attract monarchs and other pollinators to our Waystation?
What plants are growing in our Waystation? What are their needs?
What pollinators do we observe in the Waystation? What is their behavior?
How can we use the Waystation blog to connect with other Waystations?
Where do monarchs go when they migrate?
Why do monarchs need Waystations?

Grade level/subject: Middle School Science

NGSS (Next Generation Science Standards) Performance Expectations

MS - LS1.4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction.

MS – LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS – LS2.4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS – LS2.5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

What NGSS Dimensions do Waystation projects support?		Potential student activities for Waystation projects
Science & Engineering Practices	S1. Ask questions and define problems. S3. Plan and carry out investigations S4. Analyze an interpret data S5. Use mathematics and computational thinking S6. Construct explanations and design solutions S7. Engage in argument from evidence S8. Obtain, evaluate, and communicate information.	• Schools create blog posts about their Waystation and the pollinators observed. • Students observe, record, and identify plants and pollinators in their school garden. Use resources on http://www.monarchwatch.org/waystationnetwork • Use classroom iPads and other devices ○ Use cameras to photograph milkweed and other plants and pollinators in the Waystation. ▪ How many visitors to a given flower in 5 minutes? How many types of insects in a designated area in 5 minutes? ▪ Students compare and contrast which plants attract more monarchs and pollinators, and form hypothesis as to why ▪ Conduct a scientific experiment involving various milkweed or flower species ○ Use compass apps to vector migrating monarchs ○ Use citizen science apps (Ex. citsci.org; iNaturalist) • Students raise monarchs and observe, document and graph their life cycle (http://monarchwatch.org/rear/index.htm) • Students tag migrating monarchs (http:www/monarchwatch.org/tagmig/tag.htm) • Students track the annual monarch migration using maps on the Journey North website (https://www.learner.org/jnorth/maps/monarch.html) • Students learn about the effects humans have on monarchs and other pollinators, brainstorm
Disciplinary Core Ideas	LS1. B Growth and development of organisms LS2.A Interdependent relationships in ecosystems LS2.C Ecosystem dynamics, functioning, and resilience LS2.D Biodiversity and humans ETS1.B Developing possible solutions	
Crosscutting Concepts	Cause and effect Structure and function Patterns Stability and change	

	resolutions and create a final product/plan incorporating one resolution • Students explore the reproductive functions of flowers by participating in a flower dissection lab (http://school.discoveryeducation.com/lessonplans/programs/plantpollination/) • Use the Monarch Watch challenge questions as a foundation to a research project (http://monarchwatch.org/class/challeng.htm)

*Next Generation Science Standards