Science Learning Packet
Grade 8: Natural Selection, Lesson 1

science learning activities for SPS students during the COVID-19 school closure.

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While Seattle Public Schools endeavors to only post documents optimized for accessibility, due to the nature and complexity of some documents, an accessible version of the document may not be available. In these limited circumstances, the District will provide equally effective alternate access.

Due to the COVID-19 closure, teachers were asked to provide packets of home activities. This is not intended to take the place of regular classroom instruction but will help supplement student learning and provide opportunities for student learning while they are absent from school. Assignments are not required or graded. Because of the unprecedented nature of this health crisis and the District’s swift closure, some home activities may not be accessible.

If you have difficulty accessing the material or have any questions, please contact your student’s teacher.
Hello Families,

We hope you and your family are well and safe during this time. During this unprecedented out-of-school time, the SPS middle school science team will be offering instructional opportunities for students that align with the district’s adopted middle school science instructional materials. This work is optional and non-graded.

This investigation packet is the first part in a series of district-aligned lessons about Natural Selection, an 8th grade life science unit developed by AmplifyScience. While AmplifyScience lessons are designed to be done in the classroom with peers, there are some activities that students can complete at home. In this packet you will find activities to accompany lesson 1 of the unit. **Accompanying lesson videos will be aired on SPS TV and posted the SPS webpage under Grade 8**, however this packet can be used with or without the accompanying video.
The videos can be accessed either online or through Seattle’s Public television programming, [https://www.seattleschools.org/district/calendars/news/what_s_new/coronavirus_update/resources/spsv](https://www.seattleschools.org/district/calendars/news/what_s_new/coronavirus_update/resources/spsv) on SPS TV (local channel 26), social media (Facebook and Instagram: @SeattlePublicSchools, Twitter: @SeaPubSchools), and our SPSTV YouTube channel. KOMONews.com will also host on-demand videos under the tab “Lesson Plan” and broadcast on channel KOMO 4.3. These supplemental learning videos feature short segments supporting a variety of subjects and grade levels. All videos will be close captioned on YouTube. For more information regarding the SPS TV broadcast schedule and to find the videos, please visit the following website: [https://www.seattleschools.org/departments/media_operations_center_sps-tv/broadcast_schedule](https://www.seattleschools.org/departments/media_operations_center_sps-tv/broadcast_schedule)

For students who have access to the internet and the following devices and browsers may wish to log-in to their AmplifyScience account from home are welcome to do so. See below for guidance on which browser

- **Desktops and Laptops** (Windows 7+, Mac OS 10.11+) - *Suggested browsers: Chrome & Safari*
- **Chromebooks** - *Suggested browser: Chrome*
- **iPads that support iOS11.3+** (iPad5+) - *Suggested browser: Safari*

Additionally, we wanted to suggest that you make a schedule at home. A few parents have discovered after three or four days that their kids do much better with a set schedule, kind of like school, but certainly not as long each day. But this way they can keep some kind of order. For example, a student could do 30 minutes of math, followed by 30 minutes of science, followed by 30 minutes of reading and then an hour-long break to play outside. Certainly, these things are up to you, but if you are finding the lack of structure disruptive, this may help.

Sincerely,

Seattle Public Schools Science Department
Natural Selection Part 1 suggested materials to accompany the video:

- This packet
- A piece of paper and something to write with
- A person to share ideas with
- Optional: Computer logged into Amplify
- Optional: 12 small objects that can be sorted into groups (ex. Coins, building cubes, grains)

1.2- The mystery of the poisonous newts

Unit question: Why do populations change over time?
Chapter 1 question: What caused this newt population to become more poisonous?

Warm-Up: Observing a Population

Below is an image of a rain forest in Ecuador. The frogs (also pictured below) live there and are all the same species, a type of dart frog. Observe the frogs closely and describe them below.

Describe the group of frogs in the image.

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
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______________________________________________________________________________
Watch the video about the newts. In the video, we learn that the newt population in Oregon State Park has become more poisonous over the past years. Most of the newts in the park are extremely poisonous, even though their ancestors many years ago were not. Park visitors and scientists working in the park want to know why this is happening.

Observe the butterflies.

![Butterflies](image)

Record your observations.

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Make sure you have recorded the following vocabulary words in your journal (or on a sheet of paper that you can bring with you when we get back to school).

- **Population**: A group of the same organisms (living things) living in an area
- **Trait**: Something specific we can use to describe an organism (hair color, swimming speed, poison level, etc.)

Read the article on the rough-skinned newt. Remember our active reading guidelines:

- Think carefully about what you read. Pay attention to your own understanding.
- As you read, annotate the text to make a record of your thinking. Highlight challenging words and add notes to record questions and make connections to your own experience.
- Examine all visual representations (pictures) carefully. Consider how they go together with the text.
- After you read, talk with someone about what you have read to help you better understand it.
The Rough-Skinned Newt

Rough-skinned newts may not appear dangerous: they are no longer than 20 centimeters (8 inches), with stubby legs and teeth that look like tiny bumps. However, some of these newts are the most poisonous animals in the Pacific Northwest. One rough-skinned newt can have enough poison in its body to kill dozens of humans!

Rough-skinned newts have brown, bumpy skin on their backs, with bright orange skin on their bellies. When threatened by predators, newts curl their bodies to show the orange underside of their necks and tails. The orange color warns predators to stay away, and most predators do. The only predators that regularly eat rough-skinned newts are common garter snakes.

Newts hatch in the water, but they spend most of the lives on land, often hiding under fallen leaves or bark. At night, they hunt for insects, tiny fish, and other small prey. When they are ready to mate, rough-skinned newts return to the water, where males and females swim together in pairs. The females lay poisonous eggs and attach them to underwater plants.

Rough-skinned newts have brown, bumpy skin on their backs and orange skin on their bellies.

Rough-skinned newts spend most of their time on land, but return to the water when it's time to mate.
Based on the article “The Rough-Skinned Newt”, answer the following questions below.

1. What are some of the traits present in the newt population described in the article?

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

2. How might these traits change from individual to individual? (Hint: Do you think the newts are all exactly the same color or size?)

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
1.3– Exploring Variation and Distribution in Populations

Part 1: Exploring the *Natural Selection* Simulation

Open the *Natural Selection* Simulation and explore the Sim with your partner. Share what you both notice.

Part 2: Changing Populations in the *Natural Selection* Simulation

**Goal:** Set up and observe different populations in the Sim.

**Do:**
- Open the *Natural Selection* Simulation and open the mode: Explore Variation.
- Complete the missions below.

**Tips:**
- It is not necessary to enter Run or Analyze to complete these missions.
- Turn off organisms that you are not investigating by pressing the INCLUDE THORNPALMS / OSTRILOPES / CARNITHONS toggles.

Complete each mission below by adjusting the trait-level and variation sliders. Zoom in to the environment to observe the individual organisms. Write a check mark next to each mission after you complete it.

_____ **Mission 1:** Set up a thornpalm population where all the thornpalms have medium thorns.

_____ **Mission 2:** Set up a thornpalm population where the thornpalms have many different thorn sizes.

_____ **Mission 3:** Set up a thornpalm population with many short thornpalms, a few medium-height thornpalms, and no tall thornpalms.

_____ **Mission 4:** Set up an ostrilope population that has blue, green, and yellow ostrilopes.

_____ **Mission 5:** Set up an ostrilope population where one feature has high variation and another feature has no variation.

_____ **Mission 6:** Set up a carnithon population where most of the carnithons have high levels of fur, but some have medium levels of fur.

_____ **Mission 7:** Choose one of the carnithon features. Set up a carnithon population with the highest level of variation possible.
Watch the video about histograms. Make sure you have recorded the following vocabulary words in your journal (or on a sheet of paper that you can bring with you when we get back to school).

- **Variation**: Differences between individuals
- **Distribution**: How many individuals (of one type of organism) have each trait
- **Histogram**: A graph showing the variation and distribution of a population

Use this grid to practice making histograms with your 12 small objects.

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Record the following key concept (if you don’t already have it).

- A population can be described by the traits it has (variation) and the number of individuals who have those traits (distribution). **OR**
- A population can be described by its variation and distribution of traits.

**Practice: Drawing Histograms**

Draw your own histograms for newt poison level based on the different prompts.

1. A population with no variation.

<table>
<thead>
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<th>Number of newts</th>
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<td>0 1 2 3 4 5 6 7 8 9 10</td>
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<tr>
<td>Poison level</td>
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</table>
2. A population with a medium amount of variation.

3. A population with a high amount of variation.

4. A population with a high amount of variation, but a different distribution than in number 3.
Test yourself: Use the following histograms to answer the questions.

1. Which histogram shows a population that’s all one color? (circle one)
   - Histogram A
   - Histogram B
   - Histogram C
   - Histogram D

2. Which histogram shows a population with a lot of variation? (circle one)
   - Histogram A
   - Histogram B
   - Histogram C
   - Histogram D

3. Which histogram shows a population with mostly yellow ostrilopes and some variation? (circle one)
   - Histogram A
   - Histogram B
   - Histogram C
   - Histogram D

4. Which histogram shows the same variation as Histogram B, but a different distribution of traits? (circle one)
   - Histogram A
   - Histogram B
   - Histogram C
   - Histogram D