Suggested Learning Activities for Grade 8 students during the COVID-19 school closure.

Seattle Public Schools is committed to making its online information accessible and usable to all people, regardless of ability or technology. Meeting web accessibility guidelines and standards is an ongoing process that we are consistently working to improve.

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.
# Week of May 25 – 29

**Grade Level: 8th Grade**

<table>
<thead>
<tr>
<th><strong>8th Broadcast Schedule</strong></th>
<th>ያጆጆች ከፋዳራት ምክንያት</th>
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<td><strong>Jadwalka Warbaahinta</strong></td>
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<td>Lịch Trình Phát Sóng</td>
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## Tuesday, May 26th

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<td>Historia Tribal del estado de WA</td>
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## Thursday, May 28th

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<th>Language 3</th>
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<td>Saynis</td>
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## Friday, May 29th

<table>
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<th>Language 2</th>
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</tr>
</tbody>
</table>

- **SPS-TV Channels in the City of Seattle**: Comcast 26 and 319, Wave 26 and 695, Century Link 8008 and 8508.
- **蹇鴥誦 Nakon ηή μη SPS-TV Channels**: Comcast 26 ၃ 319 ၃ Wave 26 ၃ 695 ၃ Century Link 8008 ၃ 8508 ၃ Century Link 8008 ၃ 8508.
- **Mawjadaha aad ka heli karto telefishanka dugsiyada dadwaynaha Seattle waa**: Comcast 26 iyo 319, Wave 26 iyo 695, Century Link 8008 iyo 8508.
- **Los canales SPS-TV en la ciudad de Seattle son**: Comcast 26 y 319, Wave 26 y 695, Century Link 8008 y 8508.
- **SPS-TV Channels trong thành phố Seattle**: Comcast 26 và 319, Wave 26 và 695, Century Link 8008 và 8508.
Grade 8 Science
Week of May 25 – 29, 2020
Evolutionary History Unit Lessons 6 & 7
Instructional Materials for Amplify Chapter 2, Lessons 2.2-2.3

AmplifyScience

Student Name: ____________________________________________
School: __________________________________________________
Grade Level: _____________________________________________
Science 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 investigation packet is part of a series of district-aligned lessons for middle school science developed by AmplifyScience and adopted by SPS in 2019. While Amplify Science 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 the lesson videos being aired this week through Seattle’s Public television programming on SPS TV (local channel 26). The videos and packets are also posted to the, SPS Science webpage under their corresponding grade level. These lesson videos, developed in collaboration between SPS teachers, Denver Public Schools teachers, and Amplify Science, feature teachers going through the information in the lessons. The work in this packet is intended to be completed alongside the viewing of the video of the corresponding videos.

Closed captioning for the videos is available many home languages if this helpful to your family.
   o Click CC (bottom right of video)
   o Click Setting (the gear next to CC)
   o Click Subtitles/CC
   o Click Auto-translate
   o Choose your language

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. Chrome and Safari are the recommended browsers to use for full functionality of the Amplify digital tools and features.

Sincerely,
Seattle Public Schools Science Department
Hola Familias de Secundaria de las Escuelas Públicas de Seattle,

Esperamos que usted y su familia estén bien y seguros durante esta temporada. Durante este tiempo sin precedentes fuera de la escuela, el equipo de ciencias de la escuela secundaria de SPS ofrecerá oportunidades de instrucción para los estudiantes, que se alinean con los materiales de instrucción de ciencias de la escuela secundaria adoptados por el distrito.

Este paquete de investigación es parte de una serie de lecciones extraescolares remotas alineadas con el distrito, desarrolladas por AmplifyScience. Si bien las lecciones de Amplify Science están diseñadas para realizarse en el aula con sus compañeros, hay algunas actividades que los estudiantes pueden completar en casa. En este paquete encontrarás actividades para acompañar los videos de las lecciones que se transmiten esta semana a través de la programación de televisión pública de Seattle en SPS TV (canal local 26). Los videos y paquetes también se publican en la página web de SPS, https://www.seattleschools.org/academics/curriculum/science.

Los subtítulos para los videos están disponibles en muchos idiomas caseros si esto es útil para su familia.

- Presione CC (abajo a la derecha del video)

Evolutionary History, Lesson 6&7 Weekly Video Broadcast Student Packet, SPS Science & S. Weigle, 4-2020
Evolutionary History, Lesson 6&7 Weekly Video Broadcast Student Packet, SPS Science & S. Weigle, 4-2020
Unit Question: Why do species, both living and extinct, share similarities and have differences?

Chapter 2: Investigating Body Structure Differences

Lesson 6 (Amplify 2.2)

Reading: “Where do Species Come From?”

Directions: Answer the questions with evidence gathered from each chapter as you read the article.

Active Reading Strategies:

- Title Pre-Think and Pre-Scan
- Highlight unit science words
- Circle unfamiliar words and ideas and write definitions/notes about them that you find out in the text
- Write in the margins to identify questions, and “a-ha!” moments
- Underline evidence that helps us answer: How do environmental changes influence changes in body structure?

The Galápagos Islands are remote islands off the coast of South America. Organisms that made their way to the islands became separated from the populations on the mainland.
Chapter 1: Speciation
Evolution is not just a thing of the past—it’s happening all the time. That means new species are still evolving today. There are many ways in which species can evolve, but one type of evolution occurs when one species is divided into more than one population living in different environments. If these populations live in different environments for many, many generations, they may evolve so many differences that they are no longer the same species. What used to be populations of the same species become populations of different species.

The process of one species evolving into two or more different species is called speciation. Speciation often starts when populations are separated by a barrier, such as a body of water or a mountain range. After they are separated, the populations don’t encounter one another regularly anymore. They become separate populations, and over time they may evolve into different species. To learn more about some populations that were divided into very different environments and became different species, choose one of the chapters that follow.

Chapter 2: Galápagos Tortoises

Tortoises have lived in South America for many millions of years. About 3 million years ago, some tortoises living in South America floated about 1,000 kilometers (more than 600 miles) across the Pacific Ocean from the mainland of South America to the Galápagos Islands. Unlike turtles, tortoises can’t swim—so once they arrived on the islands, the tortoises never left! The population of tortoises that floated to the islands became permanently separated from the population of tortoises on the mainland.

The islands had different environments than the mainland environment, so different traits were adaptive—helpful for survival—for the island tortoises than for the mainland tortoises. Some of the islands had desert environments, where food was scarce. Over many generations, the population of tortoises on the Galápagos Islands evolved specialized shells, as well as changes to some other body structures. Meanwhile, the environment on the South American mainland didn’t change much over time, so the structures of the tortoise population there remained relatively stable. They stayed about the same as the structures of their common ancestors. Today, the structures of Galápagos tortoises are so different from the structures of mainland tortoises that they would not reproduce with each other even if they were brought back together. These two populations that once came from a shared common ancestor population are now different species.
Natural selection acted on the populations of tortoises in mainland South America and in the Galápagos. All tortoises have a random chance of being born with a mutation that can change the shape of their shells. Millions of years ago, some Galápagos tortoises were born with this mutation and had shells that curved upward at the neck. The curved shape made more space for the tortoises’ necks and allowed them to reach up high. This mutation was an adaptive trait on the Galápagos Islands with desert environments where food was scarce: it helped tortoises with the curved shell structure survive by reaching leaves higher up and getting more food. As the mutation for the curved shell was passed down by tortoises that had been born with it, curved shells became more common in the Galápagos tortoise population over many generations.

Changes that result in one species becoming two do not happen with just one generation. The Galápagos tortoises did not become a new species as soon as they arrived at the islands; it took a long time. Speciation takes place slowly as mutations build on one another, adding up to big changes in structure.

Chapter 2 Questions: Galápagos Tortoises

1. How did the original tortoise population that became two descendant species first become separated?

2. One of the species had structures that changed over time. Describe the changes that happened and why they happened.

3. Why did the other population in the article stay mostly the same (stable)?
Chapter 3: Polar Bears

Where do polar bears come from? The story starts with brown bears. About 400,000 years ago, Earth experienced an unusually warm period that allowed forests to grow in far northern areas of the Arctic. Some brown bears moved north into the new forests in search of food. When colder climates returned and the land was covered in ice and snow again, the descendants of the brown bears that had moved north were stuck in the ice-covered Arctic. This population of brown bears became separated from the population of brown bears in southern regions.

The bears' new environment in the Arctic was different from the environment of forested land farther south. The Arctic is a cold ocean environment, with sheets of ice covering huge areas of water in winter. The entire landscape is often covered with ice and snow. In this environment, different traits were adaptive, or helpful for the bears' survival, than were adaptive farther south. Over many generations, the population of bears in the Arctic region changed. They evolved, for example, specialized teeth and fur that were adaptive in their new environment. Meanwhile, the forest environment farther south didn't change much at all, so the traits that were adaptive there didn't change either. The brown bear population that remained in the forest stayed similar to their ancestor population.

Today, the body structures of the bears that live in the Arctic environment are different from those of the
brown bears that live in the forest environment. The bears that live in the Arctic are a different species called polar bears.

How did all that happen? The populations of bears in the forest and in the Arctic both experienced natural selection over time. Bears have a random chance of being born with mutations that change their structures, such as teeth and fur. Some of these mutations resulted in changes that helped the bears in the Arctic to survive in their environment. For example, some of the bears were born with back teeth (molars) that were jagged instead of flat. These jagged teeth helped them chew and digest meat better than bears with flat molars that were adaptive for eating plants. In the cold ocean environment of the Arctic, bears could walk out onto the ice and catch seals resting on the ice. Seal meat was a key food source for bears in the Arctic, and jagged teeth that helped them chew and digest seal meat were an adaptive trait. Eventually, the jagged teeth mutation, which allowed the bears to thrive on a diet of seals, became a common structure in the Arctic bear population. Bears that could chew and digest seals were more likely to survive and reproduce than bears without jagged teeth.

Having jagged molars was not the only adaptive trait for the bear population in the Arctic. Random mutations also resulted in fur that appears white. (It is actually transparent!) Bears born with transparent fur had a hunting advantage because they were able to blend into their snowy background while sneaking up on prey. Scientists think transparent fur also helps bears stay warmer in cold temperatures, because transparent fur does a better job of trapping body heat than brown fur does. Staying warmer and being
able to hunt more effectively both mean having a better chance of surviving and reproducing, and passing on genes for transparent fur to offspring.

Over time, polar bears became a separate species from brown bears. Changes that result in one species becoming two species do not happen in a single generation. This process of speciation takes place slowly as adaptive mutations build on one another over many generations, adding up to big changes in body structures. Polar bears did not become a new seal-eating species with fur that appears white as soon as their environment became icy—it took a long time for the bears to adapt to that environment. As they adapted, bears born with jagged molars and transparent fur became more and more common, until the population began to look like the polar bears we see today.

**Chapter 3 Questions: Polar Bears**

1. **How did the original bear population that became two descendant species first become separated?**

2. **One of the species had structures that changed over time. Describe the changes that happened and why they happened.**

3. **Why did the other population in the article stay mostly the same (stable)?**

4. **Does speciation happen quickly or slowly? Why?**
Chapter 4: Flightless Ducks

Millions of years ago, some small ducks from North America ended up on the recently formed Hawaiian Islands. It is likely that these ducks flew across the Pacific Ocean to Hawaii. The islands are thousands of kilometers from mainland North America—so once the ducks arrived in Hawaii, they never left! The population of ducks on the islands became separated from the population of ducks on the mainland.

The island ducks’ new environment was different from the mainland environment they had left behind. For one thing, there were no duck-eating predators on the islands. Over millions of years, natural selection acted on the populations of ducks in North America and in Hawaii. Since the island ducks no longer needed to escape from predators, different traits were adaptive, or helpful to their survival, than had been adaptive on the mainland. Over many generations, their bodies got bigger and their wings got smaller, so they lost the ability to fly—after all, they no longer needed to fly away from predators!

Losing the ability to fly wasn’t the only way in which natural selection affected the island ducks. All ducks have a random chance of being born with mutations that change the shape and size of their bones. Some ducks were born with larger leg bones that allowed them to travel over land more easily. Larger leg bones are heavy and make it harder to fly, but these ducks didn’t have to fly away from predators. Since the ducks no longer relied on flight for safety, larger and stronger legs were an adaptive trait—the ducks born with larger leg bones could search for food on land more easily than other ducks. These ducks got more food, lived longer, and had more chances to reproduce than ducks with smaller, weaker legs. Becoming flightless also turned out to be an adaptive trait. Having smaller wings and bones in the upper body allowed the birds to use less energy as they traveled over ground. The ducks no longer relied on flight, and those with smaller upper bodies did not need to eat as much to survive as ducks with full-sized wings did.

During that time, the North American ducks’ environment changed very little, so those ducks’ body structures stayed mostly the same. Over many generations, the body structures of Hawaii’s flightless birds,
called moa-nalos, became so different from the mainland ducks that they would not have reproduced with each other even if they had been brought back together. They were different species. Sadly, the moa-nalos have gone extinct. However, scientists have learned about them by studying fossils.

This process of becoming a new species didn’t happen right away. It took a long time for the moa-nalo to become a new species. Over many generations, because individuals with strong legs and small wings lived longer and reproduced more, the mutations that caused those changes spread through the moa-nalo population. Eventually, the specialized bones that allowed them to search for food more easily became a common structure in the population. This is an example of speciation taking place over time as mutations accumulate over many generations. As these mutations build up, they cause big changes in body structures. That’s why changes that result in one species becoming two do not happen in just one generation.

Chapter 4 Questions: Flightless Ducks

1. How did the original duck population that became two descendant species first become separated?

2. One of the species had structures that changed over time. Describe the changes that happened and why they happened.

3. Why did the other population in the article stay mostly the same (stable)?

QUESTIONS CONTINUE ON NEXT PAGE
4. Which chapter/speciation story did your find most interesting and why?

Vocabulary

ancestor: a related organism from a previous generation
ancestro: un organismo emparentado de una generación anterior

body structure: a part of an organism (for example, one or more bones)
estructura corporal: una parte de un organismo (por ejemplo, uno o más huesos)

common ancestor population: an older population from which two or more newer species descended
población ancestral común: una población más antigua de la cual descendieron dos o más especies nuevas

descendant species: a more recent species that evolved from an ancestor population
especie descendiente: una especie más reciente que evolucionó de una población ancestral evolution

shared structure: a body structure in two or more species that features the same parts (for example, the same bones)
estructura compartida: una estructura corporal en dos o más especies que tiene las mismas partes (por ejemplo, los mismos huesos)

speciation: the process by which one population evolves into two or more different species
especiación: el proceso por medio del cual una población evoluciona a dos o más especies diferentes

species: a group of organisms of the same kind (in one or more populations) that do not reproduce with organisms from any other group
especie: un grupo de organismos del mismo tipo (que viven en una o más poblaciones) que no se reproducen con organismos de ningún otro grupo

stability: when something stays mostly the same over time
estabilidad: cuando algo permanece más o menos igual a lo largo del tiempo

Unit Question: Why do species, both living and extinct, share similarities and have differences?

Chapter 2: Investigating Body Structure Differences

Lesson 7 (Amplify 2.3)

Imagine a population of frogs that live in a forest. The frogs have a green coloring on top that helps them blend in so they are not seen by predators. Most of the frogs stayed in the forest, but some moved to the hills above the forest. The hills are drier with brown grass and soil.

1. Which population of frogs is more likely to have more changes over many generations? Why?

Ostrilope populations in changing environments

✓ Ostrilopes with longer necks can reach and eat taller thornpalms.

✓ Ostrilopes with stronger jaws can eat thornpalms with larger thorns.
Part 1 - Predictions:

Environment A has taller thornpalms.

2. Will this ostrilope population change? If so, how?

Environment B has thornpalms with larger thorns.

3. Will this ostrilope population change? If so, how?

Part 2 – Test in the Natural Selection SIM:

*If you have access to a device, please go to the “Natural Selection” SIM.
*Select the “from one species to two” mode from the top left menu in the SIM.
*Follow instructions for both partners below.

<table>
<thead>
<tr>
<th>Pair A: Ostrilopes and Taller Thornpalms</th>
<th>Pair B: Ostrilopes and Thornpalms with Larger Thorns</th>
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</thead>
<tbody>
<tr>
<td>• Open the Natural Selection Simulation and use the menu in the upper left corner to open the From One Species to Two mode.</td>
<td>• Open the Natural Selection Simulation and use the menu in the upper left corner to open the From One Species to Two mode.</td>
</tr>
<tr>
<td>• Press REBUILD if you or your groupmates have made any previous changes to this mode on this device.</td>
<td>• Press REBUILD if you or your groupmates have made any previous changes to this mode on this device.</td>
</tr>
<tr>
<td>• Press the thornpalm icon.</td>
<td>• Press the thornpalm icon.</td>
</tr>
<tr>
<td>• Change the most common thornpalm height to 4.</td>
<td>• Change the most common thornpalm thorn size to 4.</td>
</tr>
<tr>
<td>• Change the thornpalm height variation to Medium.</td>
<td>• Change the thornpalm thorn size variation to Medium.</td>
</tr>
<tr>
<td>• Press RUN and observe changes to Population A over 50 generations. Tip: increase the speed to 4x.</td>
<td>• Press RUN and observe changes to Population B over 50 generations. Tip: increase the speed to 4x.</td>
</tr>
<tr>
<td>• Press ANALYZE to closely observe the ostrilope histograms.</td>
<td>• Press ANALYZE to closely observe the ostrilope histograms.</td>
</tr>
</tbody>
</table>

4. If you have access to the SIM, draw your results below.

Draw your histogram results for B (Larger Thorns)
Draw your histogram results for A (Taller Palmthorns)

Ostrilope Neck Length Distribution

*If you don’t have access to the SIM, look at the histograms below (before answering the next questions).

**Group A:** Taller Thornpalms
Ostrilope neck length after 50 generations.

**Group B:** Thornpalms with larger thorns
Ostrilope jaw strength after 50 generations.

4. What **difference in body structures** do you notice between generation 1 (□) and generation 50 (■) for each population?

**Population A:**

**Population B:**

5. **Explain:** How does an ancestor population evolve into descendant species with differences in their shared structures? Use evidence from the Sim to support your explanation.

Evolutionary History, Lesson 6&7 Weekly Video Broadcast Student Packet, SPS Science & S. Weigle, 4-2020
Key Concepts

1. Species inherit their body structures from their ancestor populations.

2. Body structures that are shared between two species are evidence that these two species inherited the shared structures from a common ancestor population.

3. In populations separated into different environments, natural selection causes different changes to happen to each population. This causes descendant species to end up with differences in their shared structures.

4. When the environments is mostly the same over time, body structures stay stable. When environment changes over time, body structures may change due to natural selection.

Checking for Understanding (Vocabulary Terms on the next page if needed)
Please do your best to answer the following question using words and/or labeled drawings to explain your thinking:

How does an ancestor population evolve into descendant species with differences in their shared structures?
**Vocabulary**

ancestor: a related organism from a previous generation
ancestro: un organismo emparentado de una generación anterior

body structure: a part of an organism (for example, one or more bones)
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a related organism from a previous generation
Middle School Math
Grade 8

Topic 6
Lesson 6-1 & 6-2

Congruence & Similarity
How to Access & Use Pearson Bounce Pages

The Bounce Page app is a place where you can access Virtual Nerd videos. These are interactive tutorial videos that go over the fundamental math concepts of each lesson.

You can download Pearson Bounce Pages from your Android or Apple store.

TIPS FOR USING BOUNCE PAGE

1. AIM the camera so the FULL page is easily viewable on your screen. For best results, flatten the page, or if scanning a screen be sure the entire page is visible on your phone screen.

2. TAP the screen to scan the entire front of the page. Scan the ENTIRE page. Scanning a single problem will not work. Scan the page BEFORE students write on the page.

3. BOUNCE the page to life by clicking your Bounce Pages program icon.

4. **If the wrong video comes up, close the app entirely and try again. It should work the second time!**

5. Update the operating system on your device and the Bounce Pages app as needed.
Graph $\triangle A'B'C'$, the image of $\triangle ABC$ after a translation 3 units up and 2 units left.

**Step 1**
Translate each vertex of $\triangle ABC$.

- From point $A$, move 3 units up and 2 units left. Graph and label point $A'$.
- From point $B$, move 3 units up and 2 units left. Graph and label point $B'$.
- From point $C$, move 3 units up and 2 units left. Graph and label point $C'$.

**Step 2**
Graph $\triangle A'B'C'$ by connecting points $A'$, $B'$, and $C'$.

Graph $\triangle C'D'E'$, the image of $\triangle CDE$ after a translation 4 units right and 1 unit down.

1. Start at point $C$. Move 4 units right and 1 unit down. Graph and label point $C'$.

2. From point $D$, move 4 units right and 1 unit down. Graph and label point $D'$.

3. From point $E$, move 4 units right and 1 unit down. Graph and label point $E'$.

4. Graph $\triangle C'D'E'$ by connecting points $C'$, $D'$, and $E'$.

**On the Back!**
$\triangle JKL$ has vertices $J(2, 3)$, $K(4, 5)$, and $L(6, 1)$. Graph and label the vertices of $\triangle JKL$ and $\triangle J'K'L'$, its image after a translation 3 units left and 5 units down.
6-1 Additional Practice

1. Graph $D'E'F'$, the image of triangle $DEF$ after a translation 1 unit right and 3 units down.

2. The coordinates of $\triangle DEF$ are $D(4, 3)$, $E(7, 3)$, and $F(6, 8)$. If you translate $\triangle DEF$ 4 units left and 3 units up, what are the coordinates of $F$?

3. Quadrilateral $Q'R'S'T'$ is the image of quadrilateral $QRST$ after a translation.
   a. If the perimeter of $QRST$ is about 12.4 units, what is the perimeter of $Q'R'S'T'$?
   b. If $m\angle S = 115^\circ$, what is $m\angle S'$?

4. Quadrilateral $W'X'Y'Z'$ is a translation of quadrilateral $WXYZ$. Describe the translation.
5. Is \( \triangle J'K'L' \) a translation of \( \triangle JKL \)? Explain.

6. Quadrilateral \( G'R'A'M' \) is a translation of quadrilateral \( GRAM \). Describe the translation.

7. Higher Order Thinking  The vertices of pentagon \( VWXYZ \) are \( V(4, 5), W(6, 5), X(6, 7), Y(5, 8), \) and \( Z(4, 7) \).
   a. Draw \( VWXYZ \) and \( V'W'X'Y'Z' \), its image after a translation 10 units left and 2 units down.
   b. Estimate the distance between \( V \) and \( V' \) to the nearest tenth.

Assessment Practice

8. The vertices of \( \triangle QRS \) are \( Q(3, 3), R(7, 3), \) and \( S(5, 8) \).
   **PART A**
   Graph and label the image of \( \triangle QRS \) after a translation 2 units left and 2 units up.
   **PART B**
   If the \( m \angle Q = 67.5^\circ \), what is the \( m \angle Q' \)?
Reteach to Build

**Tutorial**

Scan for 6-1

**Additional Practice**

1. Draw \( \triangle D'E'F' \), the image of \( \triangle DEF \) after a translation 3 units up and 2 units left.

   - **Step 1:**
     - **Translate each vertex of** \( \triangle ABC \).
     - From point \( A \), move 3 units up and 2 units left. Graph and label point \( A' \).
     - From point \( B \), move 3 units up and 2 units left. Graph and label point \( B' \).
     - From point \( C \), move 3 units up and 2 units left. Graph and label point \( C' \).

2. Graph \( \triangle D'E'F' \) by connecting points \( A', B', \) and \( C' \).

**On the Back!**

- \( \triangle ABC \) has vertices \((2, 3), (4, 5), (4, 2), \) and \((1, 5) \). Graph and label the vertices of \( \triangle ABC \) and \( \triangle ABC' \), its image after a translation 3 units left and 5 units down.

**Check students’ work:** vertices of \( \triangle ABC' \) are \((-1, -2), (1, 0), \) and \( (3, -4) \).

5. Is \( \triangle ABC \) a translation of \( \triangle ABC' \)? Explain.

   - Sample answer: The two triangles have the same size and shape, but they have a different orientation.

6. Quadrilateral \( QRST \) is the image of quadrilateral \( WXYZ \) after a translation 3 units right and 5 units down. Describe the translation.

   - **Translation:** Right 3 units and down 5 units

7. Higher Order Thinking: The vertices of parallelogram \( VWXYZ \) are \((6, 5), (3, 6), (3, 3), \) and \((6, 2) \). A. Draw \( VWXYZ \) and \( V'W'X'Y' \), its image after a translation 10 units left and 2 units down.

8. Calculate the distance between \( V \) and \( V' \) to the nearest tenth.

   - About 10.2 units

**Assessment Practice**

6. The vertices of \( \triangle ABC \) are \((3, 2), (6, 3), (1, 0), \) and \((3, 3) \).

   - **Part A:**
     - Graph and label the image of \( \triangle ABC \) after a translation 2 units left and 2 units up.

   - **Part B:**
     - If the \( x \)-coordinate of \( A = 3 \), what is the \( x \)-coordinate of \( A' \)?

   - 13
Graph \( \triangle A'B'C' \), the image of \( \triangle ABC \) after a reflection across the line \( x = -1 \).

**Step 1** Reflect the vertices of \( \triangle A'B'C' \) across the line \( x = -1 \).

Each point in \( \triangle A'B'C' \) is the same distance from \( x = -1 \) as its corresponding point in \( \triangle ABC \), but on the opposite side.

- A is 2 units left of \( x = -1 \). Graph \( A' \) 2 units right of \( x = -1 \).
- B is 1 unit left of \( x = -1 \). Graph \( B' \) 1 unit right of \( x = -1 \).
- C is 3 units left of \( x = -1 \). Graph \( C' \) 3 units right of \( x = -1 \).

**Step 2** Graph \( \triangle A'B'C' \) by connecting \( A', B', \) and \( C' \).

Graph \( \triangle J'K'L' \), the image of \( \triangle JKL \) after a reflection across the line \( y = 1 \).

1. Point \( J \) is located how many units above \( y = 1 \)? How can you use this information to plot point \( J' \)? Plot point \( J' \).

2. Point \( K \) is located how many units above \( y = 1 \)? Use this information to plot point \( K' \).

3. Point \( L \) is located how many units above \( y = 1 \)? Use this information to plot point \( L' \).

4. Graph \( \triangle J'K'L' \) by connecting \( J', K', \) and \( L' \).

**On the Back!**

5. \( \triangle RST \) has vertices \( R(2, 1) \), \( S(-2, -1) \), and \( T(3, -2) \). Graph \( \triangle RST \) and \( \triangle R'S'T' \), its image after a reflection across the line \( x = 2 \).
6-2 Additional Practice

1. **Leveled Practice** Rectangle $ABCD$ is shown. Draw the reflection of rectangle $ABCD$ across the $y$-axis.

   Identify the points of the pre-image.
   Identify the points of the image.

   $A$  
   $B$  
   $C$  
   $D$  
   $A'$  
   $B'$  
   $C'$  
   $D'$  

   Plot the points and draw rectangle $A'B'C'D'$.

2. **Reasoning** Is $\triangle E'F'G'$ a reflection of $\triangle EFG$ across the line? Explain. 

3. Consider the graph of $\triangle ABC$ and its image $\triangle A'B'C'$. What reflection produces this image?

4. $\triangle A'B'C'$ is an image of $\triangle ABC$.
   a. How do the $x$-coordinates of the vertices change?
   b. How do the $y$-coordinates of the vertices change?
   c. What reflection produces the image?
5. The vertices of $\triangle ABC$ are $A(-5, 4)$, $B(-2, 4)$, and $C(-4, 2)$. If $\triangle ABC$ is reflected across the $y$-axis, find the coordinates of the vertex $C'$.

6. $\triangle E'F'G'$ is the image of $\triangle EFG$. What reflection produces this image?

7. Higher Order Thinking  The vertices of $\triangle ABC$ are $A(-5, 5)$, $B(-2, 4)$, and $C(-4, 2)$. $\triangle ABC$ is reflected across the $y$-axis and then reflected again across the $x$-axis to produce the image $\triangle A'B'C'$. What are the coordinates of $\triangle A'B'C'$?

8. Quadrilateral $\triangle A'B'C'D'$ is an image of quadrilateral $ABCD$.

**PART A**

What reflection produces this image?

- $A'B'C'D'$ is a reflection of $ABCD$ across the line $x = 1$.
- $A'B'C'D'$ is a reflection of $ABCD$ across the line $y = 0$.
- $A'B'C'D'$ is a reflection of $ABCD$ across the line $y = 1$.
- $A'B'C'D'$ is a reflection of $ABCD$ across the line $x = 0$.

**PART B**

If the $m\angle A = 110^\circ$. What is $m\angle A'$?
Graph $\triangle ABC$, the image of $\triangle ABC$ after a reflection across the line $y = 1$.

1. **Point $J$ is located how many units above $y = 1$?** How can you use this information to plot point $J'$? Hint: point $J'$.
   - 1 unit; This means $J'$ is 1 unit below $y = 1$; Check students' work.

2. **Point $A$ is located how many units above $y = 1$?** Use this information to plot point $A'$.
   - 3 units; Check students' work.

3. **Point $L$ is located how many units above $y = 1$?** Use this information to plot point $L'$.
   - 2 units; Check students' work.

4. **Graph $\triangle EFG$ by connecting $E'$, $F'$, and $G'$.** Check students' work. On the Back!

5. **$\triangle RST$ has vertices $(2, 1)$, $(5, -5)$, and $T'(9, 2)$. Graph $\triangle RST$ and $\triangle R'S'T'$, the image after a reflection across the line $x = 2$.** Check students' work. The vertices of $\triangle R'S'T'$ are $R'(2, 1)$, $S'(6, -1)$, and $T'(1, -2)$.

6. The vertices of $\triangle ABC$ are $A(1, -5)$, $B(2, 4)$, and $C(4, -2)$. $\triangle ABC$ is reflected across the $y$-axis, then reflected again across the $x$-axis to produce the image $\triangle A'B'C'$. What are the coordinates of $\triangle A'B'C'$?
   - $A(1, 5)$, $B(-2, 4)$, and $C(-4, -2)$

7. **Higher Order Thinking**. The vertices of $\triangle ABC$ are $A(-5, 3)$, $B(-3, 4)$, and $C(-1, 2)$. $\triangle ABC$ is reflected across the $y$-axis and then reflected again across the $x$-axis to produce the image $\triangle A'B'C'$. What is $\angle A'$?
   - $\angle A' = 150^\circ$

8. **Quadrilateral $\triangle ABCD$ is an image of quadrilateral $A'B'C'D'$.**
   - **PART A**: What reflection produces this image?
     - $A'B'C'D'$ is a reflection of $A'B'C'D'$ across the line $x = 1$.

   - **PART B**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $y = -2$.

   - **PART C**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $y = 1$.

   - **PART D**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $x = 0$.

   - **PART E**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $x = -1$.

   - **PART F**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $y = 2$.

   - **PART G**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $x = 2$.

   - **PART H**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $y = 0$.

   - **PART I**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $x = 0$.

   - **PART J**: $\triangle ABCD$ is a reflection of $A'B'C'D'$ across the line $y = 0$.