Discovery Quest:
Adaptations
Above and Below

Kim Duffek
**Chaperone Instructions – Adaptations Quest – Above & Below**

The Quest activity is about exploration, and figuring things out as you go. Many of the questions have more than “one right answer.”

The students will read the movement and story clues in the quest. They will use their map and clues to discover the quest locations. The student map has a marked route, but it does not have the locations marked. **Your chaperone map has both the route and the locations marked.**

*Behavior Expectations for Students*
- A quest is about exploring – it is not a race, please don’t run
- Stay together as a group and stay with your chaperone
- Stay on the marked trails - please don’t climb rocks and walls
- Be respectful of people, plants, animals, and materials

*Notes for Helping Students*
- Please help students with reading if needed, and try to have students help each other with it
- When students are writing answers, please don’t worry about spelling
- There can be more than “one right answer” – let students think through possibilities

*Time Checkpoints: please remember to check in with the student Time Keeper*
- By 10 minutes, you should complete Location 1
- By 14 minutes, you should complete Location 2
- By 21 minutes, you should complete Location 3
- By 27 minutes, you should complete Location 4
- By 45 minutes, you should complete Locations 5 & 6

At the end of 45 minutes, please return to the school group ramada in front of the museum.

The students will keep their individual worksheets. At the end, please help the students use the checklist to ensure all quest materials get returned.
**Above & Below Quest Theme:**
- Burrowing is an adaptation to escape heat and to hide from predators/prey
- High places help animals look out for predators or prey

<table>
<thead>
<tr>
<th>Your Quest Locations are:</th>
<th>Topics &amp; Helpful Hints along the way:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>If students need help along the way, you can use the following information to help them. You might want to wait first to see what they can do on their own.</td>
</tr>
<tr>
<td><strong>Location 1: Prairie dog exhibit in grasslands</strong></td>
<td>Burrowing is an adaptation to escape heat, dryness &amp; predators. What are some things prairie dogs might listen for? What rooms would you build in an underground house?</td>
</tr>
<tr>
<td><strong>Location 2: Owls and snakes in grasslands</strong></td>
<td>The burrowing owl can be difficult to see in the exhibit - look on the ground around the back of the exhibit or around the bushes.</td>
</tr>
<tr>
<td><strong>Location 3: Coyote exhibit viewing before you reach the coyote ramada</strong></td>
<td>Predators have adaptations for catching prey such as good sense of smell and hearing and chasing. If the coyote can't retract its claws, would you expect to see them in the tracks?</td>
</tr>
<tr>
<td><strong>Location 4: Outside the arch entrance to Life on the rocks, viewing plants in landscape</strong></td>
<td>Some plants save water during droughts by losing their leaves. Cacti have widespread, shallow roots to collect fast-moving rain. If the bushes have had rain lately, would they have some leaves? If the bushes haven't had rain lately, what would they look like?</td>
</tr>
<tr>
<td><strong>Location 5: Harris' antelope ground squirrel in Life on the Rocks</strong></td>
<td>Using shade and ways to cool off helps some animals be active in the daytime. Some prey animals have eyes on the sides of their heads to look out for predators. Does the deer see better in the front or on the side? How might that help the deer hide from the mountain lion?</td>
</tr>
<tr>
<td><strong>Location 6: Gila Monster exhibit in Life on the Rocks</strong></td>
<td>Burrowing is an adaptation to escape heat and predators. Prey have adaptations to escape and defend against predators. Sign: Students can use their worksheets to get a rubbing of the gila monster skin.</td>
</tr>
</tbody>
</table>
Desert Discovery Quest Student Roles

You need the following jobs to be filled:
- Quest Manager
- Map Navigator
- Backpack Manager
- Materials Manager

For larger groups, you can add the following jobs:
- Activity Manager
- Time Keeper
- Communication Manager

For smaller groups:
- Backpack Manager and Materials Manager can combine into one job
- Activity Manager and Time Keeper can combine into one job
- For small groups, the chaperone can be the Time Keeper

How to assign roles:
- Decide how many and which jobs your group needs.
- Pull out the role cards for the jobs you plan on using.
- You can assign jobs randomly by having each person randomly pick a card.
  or
- You can assign jobs based on student choice

*Please return the cards to the bag after assigning roles

*Please Consider*
All students should help the Quest Manager and take turns reading
Your group may choose to trade roles partway through the quest.
<table>
<thead>
<tr>
<th>Quest Manager</th>
<th>Map Navigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold and read quest to group</td>
<td>Hold and read laminated map</td>
</tr>
<tr>
<td>Show quest pictures to group</td>
<td>Before moving to each location, you should pair up with the quest reader while he/she reads the movement clue, and trace the route on your map. Then the group walks to the next location.</td>
</tr>
<tr>
<td>Before moving to each location, you should pair up with the map navigator while you read the movement clue. Then the group walks to the next location.</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Backpack Manager</th>
<th>Materials Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carries back pack</td>
<td>Gets materials in and out of pack</td>
</tr>
<tr>
<td>At the end of the quest, work with the Materials Manager and your chaperone to use the checklist for checking in all materials.</td>
<td>Return materials to back pack at the end of each activity</td>
</tr>
<tr>
<td></td>
<td>At the end of the quest, work with the Backpack Manager and your chaperone to use the checklist for checking in all materials.</td>
</tr>
<tr>
<td>Activity Manager</td>
<td></td>
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<tr>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Keeps team on task</strong></td>
<td></td>
</tr>
<tr>
<td>Can check in with the Time Keeper to see if the group is on track.</td>
<td></td>
</tr>
<tr>
<td>Things you can say:</td>
<td></td>
</tr>
<tr>
<td>• “How are we doing on time, should we get back to work?”</td>
<td></td>
</tr>
<tr>
<td>• “We’re falling behind, we better get back on track.”</td>
<td></td>
</tr>
<tr>
<td>“That was great, let’s keep going.”</td>
<td></td>
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<table>
<thead>
<tr>
<th>Communication Manager</th>
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<tbody>
<tr>
<td><strong>Makes sure team members are sharing ideas with each other.</strong></td>
</tr>
<tr>
<td>Help teammates communicate by asking questions.</td>
</tr>
<tr>
<td>Things you can say:</td>
</tr>
<tr>
<td>• “I think STUDENT NAME was trying to say something, what did you want to say?”</td>
</tr>
<tr>
<td>• “Does everyone have a partner to talk to?”</td>
</tr>
<tr>
<td>• “STUDENT NAME has a great idea - listen”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Keeper</th>
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</thead>
<tbody>
<tr>
<td><strong>Carries timer and keeps track of time</strong></td>
</tr>
<tr>
<td>Can check in with the Time Keeper to help the group stay on track.</td>
</tr>
<tr>
<td>Things you can say:</td>
</tr>
<tr>
<td>• “It’s ___ time, we should be done at this location by ___minutes”</td>
</tr>
<tr>
<td>• “We have time to look around in this area for ___minutes”</td>
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Desert Discovery Quest: Adaptations – Above & Below

The adaptations quest is a way to explore the Arizona-Sonora Desert Museum and learn more about plant and animal adaptations to the desert.

As a team you will:
- Follow movement clues to locations around the museum
- Read story clues to learn information at each location
- Work together to make observations, complete activities and answer questions
- Use materials and tools in your back pack
- Complete the quest within 45 minutes

Before you start the quest:
1. Pick roles
2. Look over your quest materials/ see what is in the back pack

Reading the quest:
- Movement clues will lead you around the museum grounds
  - Bold underlined words are extra clues for your map
- Story clues will tell the adaptations stories
- Highlighted words are items in your backpack
- Vocabulary words are defined in the glossary at the end of the quest
*Please remember*

- A quest is about exploring - it is not a race, please don't run
- Stay together as a group and stay with your chaperone
- Stay on the marked trails - please don't climb rocks and walls
- Be respectful of people, plants, animals, and materials

Ready to Begin?

- Do all team members have a job and understand what it involves?
- Do all team members have a worksheet and pencil?
- Do you have any questions for the Education Specialist?
- The Time Keeper needs to start the timer when you are ready to begin at the museum entrance
Above & Below Theme:

*Crevices and burrows help desert creatures hide from predators, prey, heat and dryness outside. Being up high helps animals look out for predators and prey who might be about.*
Location 1
From the entrance, down the **stairs**, right on the dirt, and
Make your way around towards the **desert grassland**.
Take a few moments to watch the **prairie dog** scene -
Above their burrow system these rodents can be seen.

In the desert grasslands you will find busy builders -
Large rodents digging tunnels and mounds that bewilder.
Prairie dogs use burrows to hide from drought and heat,
Above they look for predators, then hide so they won't meet.

Prairie dog burrows can have chambers (rooms) for food storage, waste,
raising young, sleeping, listening and turning around. Do you have these rooms in your house? What else would you need?

Questions:
1. Why do you think prairie dogs need a listening chamber - would it be far below the ground or close to the surface? Share ideas in your group.

2. If you lived in a burrow system like the prairie dogs, what chambers would you need? In the prairie dog picture on your worksheet, design a burrow system for yourself.
Location 2
Before you leave the grassland habitat and rodents, Watch their owl and snake neighbors for a few moments.

Look all around at the grassy habitat as a whole. You’ll find many animals using empty prairie dog holes.

With its noisy tail, a rattlesnake tells others beware. It’s a great warning sound that owls also now share. When the nest is disturbed, a baby burrowing owl Makes a rattlesnake-like buzz instead of a howl!

Take a moment to feel the model of a rattlesnake rattle, and turn the dial to make the rattle sound.
Location 3

From grasslands, turn left, then at the wooden field station head down
to the desert loop trail and go right to where coyotes can be found.
Stand by the 1st coyote information sign and viewing spot before the ramada.
You’ll see rocks in the exhibit and on the trail to your right the coyote ramada.

A coyote can find mice and squirrels in their burrows
With the help of its very good ears and excellent nose.
With its paws, the coyote can dig the small prey out,
Or chase and pounce above ground if they run about.

Cats claws are retractable (pull back in) and are used to catch and kill their prey. Dogs can use their claws for digging, but they can’t retract them.

Question:
3. Look at the tracks below. On your worksheet, circle the coyote paw print.
Location 4

Turn back towards the museum, and on the desert loop make your way down towards a place where creatures above and below the rocks can be found. Curve around to the right and go past the bronze deer in the desert plants. Outside the entrance arch to Life on the Rocks, look right to view plants.

To save water, some plants lose their leaves in a drought. They look like dead bundles of twigs that will never sprout. But these plants are still alive and are not struggling. When the rains come, the sticks will grow leaves again.

Question:
4. Look with your teammates at the small shrubs like brittle bush in the desert around you. How do they look to you? Do you think they've received much water lately?
Above the desert, summer rains come and go so fast. Hard ground can’t soak it all up - rushing waters flow past. Below cactus plants collect water before it goes away With wide and shallow roots to quickly get water in to stay.

Question:
5. If desert plants have adaptations to survive in a dry environment, what could happen to them if the environment became wetter and muddier? Share ideas with another person.
Location 5

Inside Life on the Rocks has many places to hide.
Find the Harris' antelope squirrel exhibit inside.

The Harris' antelope ground squirrel can be out
In the hot summer sun and keep moving about.
The squirrel uses its tail like an umbrella from the sun.
Then lays down on the ground in shade after it’s done.

Questions:
6. How are you like the squirrel? List 3 things people use to shade themselves.

Like the prairie dog and deer, the squirrel is a prey species. They have eyes on the sides of their faces.

Find the Deer Vision Picture in your backpack - The yellow areas show what a deer can see.

7. Why do you think prey animals have eyes on the sides of their heads?
Share ideas with a partner, then draw a picture or write a sentence.
Location 6
Still at Life on the Rocks you will stay in.
Find the exhibit with the "New Tenants" sign and Gila monster skin.

In the desert the Gila Monster is famous,
Mostly for being a creature that’s venomous.
But it has an adaptation for desert heat-
It burrows, so you might not often meet.
A slow moving lizard needs protection from a predator.
So little bones under its scaly skin give it body armor.

Activity:
Place your worksheets over the Gila monster skin sign and use your pencils to get a rubbing of the beaded skin.

On a cool day, you might wear a jacket to keep warm. A Gila Monster may stay hidden in a burrow, or sun itself on a rock to warm up. On a hot day, you might wear a hat or stay indoors. A Gila Monster may retreat to its burrow.

Question:
8. If you were a Gila Monster, which tunnel and burrow would you use? Pick a burrow and use the tape measure to measure how far (in inches) you would need to travel to get there. Record the distance on your sheet.
Adaptations Quest - Above & Below

Glossary

Adaptation
• Body part or behavior that helps a plant or animal to survive in its environment

Burrow
• A hole or tunnel underground used by animals as home or hiding place
• To dig a hole for a home

Crevice
• Crack or space between rocks

Drought
• A long period of time with little or no rain

Predator
• An animal that hunts other animals for food

Prey
• An animal that is hunted by other animals for food

Retractable
• Pull back in

Shallow
• not deep

Venomous
• able to give a poisonous bite or sting

Materials Checklist
*At the end of your quest, please use this checklist to check your backpack and materials.

☐ Quest
☐ Laminated Quest Map
☐ ASDM Paper Map
☐ White Quest Timer
☐ Laminated Timer Instructions
☐ Pencils
☐ Binoculars
☐ Deer Vision picture
☐ Green tape measure
☐ Chaperone Folder
Adaptations Quest – Above & Below

ANSWER KEY

Location 1
1. Why do you think prairie dogs need a listening chamber – would it be far below the ground or close to the surface? Share ideas in your group. **ANSWERS CAN VARY** – answers should suggest prairie dogs use listening chambers to listen for predators, and that it should be close to the surface to hear better.

2. If you lived in a burrow system like the prairie dogs, what chambers would you need? In the prairie dog picture on your worksheet, design a burrow system for yourself. **ANSWERS CAN VARY** – drawing should suggest various chambers/rooms to meet human needs.

Location 3
3. Look at the tracks below and circle the coyote paw print. **COYOTE**
Location 4
4. Look at the small shrubs like brittle bush in the desert around you. How do they look to you? Do you think they've received much water lately?

ANSWERS CAN VARY - based on student observations. Answers should suggest that if shrubs appear as sticks/twigs - have not received water, and if shrubs appear with leaves - have received some water.

5. If desert plants have adaptations to survive in a dry environment, what could happen to them if the environment became wetter and muddier? Share ideas with another person.

ANSWERS CAN VARY - answers could suggest plants could die from too much water, or adaptations for dryness get replaced with adaptations for wetter environment.

Location 5
6. How are you like the squirrel? List 3 things people use to shade themselves.

ANSWERS CAN VARY - some possibilities
- Umbrella, baseball cap, hand over face, newspaper/magazine

7. Why do you think prey animals have eyes on the sides of their heads?

ANSWERS CAN VARY - answers should suggest

Prey have eyes on the side to look out for and hide from predators.

Location 6
8. As a group, pick a burrow and use the tape measure to measure how far (in inches) you would need to travel to get there. Record the distance on your sheet.

ANSWERS CAN VARY - based on student observations

___Inches