Lesson Plan for Science, Grade 4  
**Topic:** Living Systems: Structural Adaptations in Animals

>This is a lesson that does a nice job of helping show that you are really thinking about the Before-During-After framework, and I see how you’ve also sought to be strategic in putting the pieces together and supporting the types of thinking that you want students to engage in as they work their way through this. I’ve given you a few things to mull over and think about, which should not seem overwhelming but it is there just to help keep pushing you along in your thinking about effective design of instruction. I see here pretty ample evidence that you are on the right track!

**Essential Questions:** “Why are animals’ bodies shaped, covered, or colored in a certain way? How do an animal’s physical features help it meet its needs?”

**SWBAT:** cite an example [As you are learning this week in the module on vocabulary, “examples” are only a part of meaning. A concept is also represented by its traits or characteristics, and it also has meaning because of the category to which it belongs. That’s the idea behind the Concept of Definition map. Be mindful of this: We do not learn or understand only by example(s)…] of an animal with a physical adaptation, explaining how the adaptation helps the animal meet its needs. [I’m wondering about limiting this to just the citing of a single animal. Is it more to the point to have students describe adaptation and provide various examples of and reasons for it? What are you really after?]

**Assessment:** Each student will complete an Exit Slip. He/she will name one animal that has a physical adaptation, describe the adaptation, and tell how the animal uses it to meet its needs. The student may choose to illustrate [Necessary? Useful and worth the time it would take for them to do this drawing?] the example. [What makes me nervous here is that this assessment would mean a student could sit through a whole lesson about the concept of adaptation and, as long as he remembered that thicker fur keeps you from being cold when you live closer to the poles than to the equator, he’ll be indistinguishable from the kid who really “gets” what adaptation means, in its many relative aspects. What we want is to be able to clearly differentiate kids who get it from those who don’t. I don’t think that would. It would be like allowing students in EDIS 771W to tell me you can use a Venn diagram for comparing, and me accepting that as evidence that they understand how to create lessons that cause comprehension according to what we know about learning from things like the information processing model…]

**Before:**  
The teacher will activate prior knowledge by asking students the following question: “What equipment do you use to protect yourself? If you are having trouble coming up with an example, think about your favorite sport and the protective gear that you use to play that sport.”  
Students will engage in a Think Pair Share. The teacher will direct students to use their science journals, listing as many means of protection as they are able. They should spend about one minute thinking and writing about protection, one minute discussing their ideas with a partner, and then the teacher will call on several groups to generate a list of ideas on the board. (If the teacher needs to give an example, she can begin by saying, “I apply sunscreen before going to the pool to protect my skin.” Or “I wear a helmet when I ride my bicycle.”)

[You’ll pardon me, I hope, for not having studied adaptation lately. I’m thinking, though, that adapting to meet one’s needs would fall into different types or categories, ranging from protection (a shell for a turtle) to movement (huge leg muscles in a cheetah) to habitat construction (teeth on a beaver) and so on… If the thing you really want students to get is the overall concept of “adaptation,” you might want to break it down into its constituent types in order to see how you want to shape and direct students’ thinking. Your background knowledge activation is about only one element of adaptation]
The teacher will show [ Uh oh! That sounds like a DURING, doesn’t it? As in: During Viewing?] students a photograph or replica of an animal and ask students to write down something on the animal that provides protection or assistance (i.e. the shell of a turtle or the camouflage fur of any animal). This is an opportunity for the teacher to “think audibly,” modeling [ Modeling, as stated in the modules, is a DURING activity, because students need to be listening or viewing] for students how to observe features of an animal’s body [ Does this suggest you are teaching something different from merely the concept of adaptation? There are a lot of features on an animal’s body but not all of them are taken into consideration as examples of adaptation to meet needs …] . The teacher will explain [ Definitely a DURING] that the purpose [ Purpose-setting is a part of the BEFORE but it seems you are going more into explanation: you are defining a key concept ( ‘physical adaptations’) which is absolutely essential in the lesson, and yet the students are sitting there passively, they do not know what to listen to or how to be thinking about it, and they do not have a strategy that supports their conceptualizing what you are explaining to them] of the lesson is for students to understand that every animal has special features that help it meet its needs, called “physical adaptations.” Just like humans can add or make changes to our bodies, animals have some body features that help protect them [ The central notion of the lesson, and it is buried here as a passive delivery of information to students, when it should be the DURING with a supporting concept/vocabulary strategy to help them pay attention to the idea of adaptation! ] . The teacher will set the purpose by stating that during the lesson, students need to look and listen for body parts and body features that help animals. The teacher can write the objective on the board or refer to a pre-written sign/chart.

[Note: if during the sharing portion of the TPS students suggest a protection that is an actual human adaptation (like skin color, rather than the external act of applying sunscreen), then the instructor can go ahead and hint [ More DURING: what’s happening is that you are delivering information to them!] that animals also protect themselves and that we’ll be learning more about these features.]

**During:**

Students will read the lesson on physical adaptations (entitled “Animal Adaptations: Body Parts” pp. A48-A54)) and they will complete Column Notes (two columns) as they read. In the first column, students will record key ideas such as vocabulary and body parts or features [ I want to make sure this isn’t too open-ended…What students record on their two-column notes should be only that information that responds to the purpose that you have set: They should note the body parts or features that help animals to be protected, to be productive, or to move (or whatever the key types of adaptations are that you are going to use to help them understand the concept]. In the second column, students will elaborate with definitions and details about how the adaptation helps the animal [ Yes…that’s more to the point].

**After:**

Each student will complete a 3-2-1 activity, in each he/she will list three facts he/she had not known prior to reading, two interesting ideas, and one question he/she still has. [ What makes this the best metacognitive activity for students? It seems a bit open-ended, given your objective (or what I’m fancying to be the real objective you intended)… shouldn’t they be given an opportunity now to apply their understanding of the core concepts within the idea of adaptation, perhaps in looking at examples of animals they’ve not yet seen and talking about possible adaptation examples that could be identified for the environment they are in? I’m not saying that is the best idea, but I think you want to get students more to the heart of the matter.]
If time permits, the students can select a few ideas from their charts to share with a partner or with a small group of classmates.

Finally, the teacher will assess each child to determine if the learning occurred. Each student will complete an exit slip, which requires that he/she cite an example of an animal that has a physical adaptation and explain how the adaptation helps the animal meet its needs. The teacher will offer students the opportunity to illustrate or dramatize what they have learned. Students can draw the animal’s adaptation on their exit slips, or they could orally explain/act out how the adaptation helps the animal. [I’VE ALREADY ASKED ABOUT WHETHER THIS IS A GOOD MATCH FOR THE COMPREHENSION OUTCOME THAT I THINK YOU’RE REALLY AFTER….]

Rationale for Before:

When the teacher asks students to think about ways that they protect their own bodies, that will pull basic things that they (hopefully) do daily into their working memory. Each child should be able to relate in some way, even if they don’t make the connection until the “Share” part of the before. If sufficient examples haven’t been supplied by the class during the sharing, the teacher can even ask, “What are we supposed to buckle each time we ride in a car?” to activate prior knowledge about how we all use seatbelts for protection. Students should have heard the word “adaptation” in third grade. Students will also have learned about physical characteristics such as body coverings and appendages in first grade. Even if students have forgotten “adaptation,” the prior knowledge activation TPS activity provides a hook upon which to hang the new learning.

By writing the objective on the board, students will know exactly what is expected of them by the end of the class period. By knowing the objective and the purpose for the lesson, they will have a clear focus that unites the activities in the During and After sections of the lesson.

Rationale for During:

The Column Chart note-taking strategy compels students to remain engaged during the “meat” of the lesson. The chart not only provides students with a means for active engagement while they encounter new content, but it also provides necessary support. Parts of this particular chapter contain text that could be considered “inconsiderate.” [WHY WAS THIS TEXT CHOSEN?] The chart will help students sift through the information and then organize it in a way that will support their understanding of adaptations. This text is heavy on details, so key ideas and vocabulary (or Power One and Two ideas) will provide students with helpful scaffolding. During the next lesson about behavioral adaptations [ANOTHER TYPE OF ADAPTATION, WHICH IS AN APPROPRIATE NEXT STEP AFTER THIS LESSON. I’M GOING TO ENCOURAGE YOU TO GO BACK AND THINK ABOUT THE POWER 3 SUB-CATEGORIES JUST UNDER THE POWER 2 “PHYSICAL” UNDER THE POWER 1 “ADAPTATIONS.” THAT IS WHERE YOU SHOULD CONSIDER THINGS LIKE PHYS. ADAPT. FOR PROTECTION, MOVEMENT, TOOLS, ETC.] I would also have students complete a two-column chart. Then they will be able to create a graphic organizer with “Adaptations” as the Power One idea, “Behavioral” and “Physical” as the Power Two ideas, and the details and examples as Power Threes [CONCEPTUALLY, THE DETAILS AND EXAMPLES SHOULD PROBABLY BE POWER 4S; THE TYPES OR REASONS FOR THE DIFFERENT PHYSICAL ADAPTATIONS MAKE FOR GOOD POWER 3S, AS I’VE NOTED ABOVE] and so on. The Two Column Charts will lay the groundwork for the students to better compare the different types of adaptations in coming lessons. Additionally, this chart makes their thinking visible to the instructor and to each student.

I considered focusing on the specific term “adaptation,” perhaps using a word map, but the focus of this lesson was for students to learn that animals are structured in ways that help them meet their needs [I’M AFRAID WHAT HAPPENED, THOUGH, IS THAT YOU FELT YOU’D COVERED THE CONCEPT IN YOUR PURPOSE SETTING, BUT IT WAS JUST A CLEVER DISGUISE FOR THE FACT THAT YOU WERE, ESSENTIALLY, TEACHING THE TERM “ADAPTATION” WITHOUT BUILDING A BEFORE-DURING-AFTER FOR IT]. They will also have to learn about
behavioral adaptations. I think that an activity focused on the vocabulary would take on more meaning after the students have studied several types of adaptations and become familiar with more examples.

Rationale for After:

The 3-2-1 Chart gives students the opportunity to deepen their comprehension by practicing using new terms and ideas [Oh, not necessarily. It’s awfully loosey-goosey, really, and by itself does not force a convergent re-examination of the core concepts that the lesson is meant to address. I’m not saying it’s never a useful strategy, but here it seems to open up the possibility that students will not be coming down to the core notions that the lesson should have them arriving at…]. This activity will also allow them to reflect on their learning. It provides students with a metacognitive moment as they consider which of these ideas are new, which ideas they already owned, and how they can combine them. Like the Two Column Chart, the 3-2-1 Chart also makes students’ thinking visible so that the teacher and each child can get an idea of how they did when they encountered and digested the new content. The 3-2-1 Chart also provides support for students as they participate in a discussion about what they learned during the lesson. [What other strategies did you consider for the metacognition in the After, that were discarded in favor of the 3-2-1?]

The Exit Slip assessment matches the objective because it requires each student to call to mind a specific example of an animal’s adaptation. This activity will clearly show the instructor if new learning occurred in the student by illuminating if the student made the connection between a physical feature and how it helps the animal meet a need. The expectation of each student to “cite an example and explain” requires more than just a simple recall of knowledge. Students are invited to supplement their assessment with an illustration or dramatization in order to express if they have moved into the application domain of learning. This step is not necessary for the teacher to assess if learning has occurred, but it does provide students with an additional means of expressing their knowledge, should this apply to a student’s individual learning style.

This lesson was created for use with the following classroom textbook:


Examples of the B-D-A work:

➢ **ThinkPairShare:**

Helmets, goggles, sunglasses, face paint, shin guards, gloves, masks, seat belt, chapstick

➢ **Two Column Chart:**

<table>
<thead>
<tr>
<th>PHYSICAL ANIMAL ADAPTATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VOCABULARY &amp; BODY FEATURES</strong></td>
</tr>
<tr>
<td>adaptation</td>
</tr>
<tr>
<td>camouflage</td>
</tr>
<tr>
<td>mimicry</td>
</tr>
</tbody>
</table>
-example: a viceroy butterfly looks like a monarch so that insects won’t eat it

snake scales the overlapping scales make the snake smoother and help it to move

sharp, pointed bird beaks help birds kill and eat insects

➤ 3-2-1:

3 THINGS YOU FOUND OUT
I found out that almost everything about a bird’s body is an adaptation that helps it meet its needs!

2 INTERESTING THINGS
I think it is interesting that birds have hollow bones because that makes them light enough to fly.

1 QUESTION YOU STILL HAVE
What other animals have body coverings that change with the seasons?

➤ Exit Slip:

Write down one example of an animal that has a physical adaptation and explain how that body feature helps the animal meet a need. You may illustrate your answer if you would like.

One animal that has a physical adaptation is the snowshoe hare because its fur is brown in the summer but turns white and gets thicker during the winter. It helps the hare blend in with its surroundings and keeps it warm or cold.