Big Zoo Lesson: Veterinary Diagnostic Activity

Recommended Time: 1 hour

(All information in italics is a suggested script based on previous iterations of this activity. Feel free to add on to this as much as you would like/are comfortable with!)

Prep before the session

Print the following:

* Exam forms
* Patient stickers (optional but recommended)
* Diagnosis labels (optional but recommended. If you’re not using these, allow enough time to discuss all 16 diagnoses at the end of the activity)
* NOTE: Stickers/labels may be printed on paper and glued into notebook, but will take more time, be sure to account for this with planning.

Setup

Use sticky tack to put diagnostic cards (light blue/purple) up on the walls around the room.

Set up the orange, yellow, and pink cards and green cards/parasite supplies on tables around the room. Recommended setups are included with directions for each table. Set up the plastic signs that go with each station. Give the appropriate instructions cards to your adult helpers who will be running each station so they can read through them. Italics are a script that can be read that contains all the directions for the station. (Ideally, you want a parent/volunteer running each station so that you can circulate and problem-solve. If parents are helping students get patient info, you can wait to assign stations and have them dive right in, reading the script to the students without previewing them ahead of time. Judge based on your helpers and what works best for your group!)

At the urinalysis station, prep the refractometer. Directions are on the back of the parent card under the heading “If the refractometer dries out”.

Recommended: Have students glue exam sheets into their notebooks on a left-hand page. If using white glue, you may want to glue these in far enough ahead to dry before activity or after the activity so that they are not trying to write on soggy paper. Leave the facing page blank to stick in the diagnosis description and write reflections, etc.

Getting Started/Patient Information

**Make sure each student has a pencil.**

**Give each student an exam sheet.**

*Our next activity is about vets at the zoo. What is a vet? What do vets do?*

*Vets have many jobs, including making sure our animals stay healthy, helping them if they get hurt, and helping them if they get sick. If an animal is hurt or sick, can it tell the vet what’s wrong? So how do vets figure out what’s wrong when their patients can’t tell them?*

*Vets can do lots of tests to collect clues they use to figure out what’s wrong. They can test an animal’s blood, listen to their heartbeat, and even look at their feces to get clues. (“Feces” is a science word for poop…) The vet can use these clues to figure out what’s wrong.*

*For our activity, you will be the vets! You’ll be collecting clues and trying to figure out what’s wrong with your patient. Go ahead and write your name on the line that says “Doctor’s Name”.*

**Distribute the blue patient cards.** Your choice whether you prefer to hand them out to each student or let them pick.

*The blue card you just got has a picture of your patient. On the back of the card is your patient’s information. At the top of the card is your patient’s name, so write that on your form where it says “Patient’s Name”. Under the name is your animal’s species. What is a species? (What kind of animal it is.) Fill in your animal’s species on the next line, where it says “Species”. At the bottom of your card is your patient’s age, which is important to know because baby animals can have very different problems than old animals, just like with people. So check your animal’s age and fill it in on the line that says “age”.*

*The back of your card also has a paragraph about why the animal is at the vet today. This is what the owner or zookeeper has noticed about the animal or its behavior that made him or her think that the animal needed to see the vet today – Things like if the animal has been acting differently or hasn’t been eating or has been vomiting. (What is vomiting?) These are different symptoms – different things that we can observe that let us know an animal is sick or hurt. Do you think this information is important for figuring out what’s wrong with the animal?*

*It is important! So now you need to read through that paragraph and figure out what are the most important parts that could be clues for the vet. Write those important clues in the “Notes” section on your form. Make sure you’re writing the most important clues, not copying every word. Some of the descriptions are pretty long.*

While students fill in this information, distribute stickers with pictures of their patients so that they have a picture of their patient on their form. If you prefer to print them on paper and glue them onto the form you can either do that step here or before/after the activity. If you do it before, you’ll just have to make sure they get the correct blue card at that step. Or you can skip this step and if they finish a step early, they can draw in a picture of their animal, but this has the potential to be distracting.

**Collect the blue cards.**

*Now that we’ve gotten your patient’s information, we’re going to collect information on your animal’s health at each of our lab stations. Our [parent helpers/teaching assistants] will give you directions at each station, so in a minute when you get to your table, you need to get settled quickly and quietly and listen for directions so we make sure we all have time to finish.*

**Split the students into four groups and have them go to the four “lab stations”. Parents/Assistants will provide directions at each station.**

**Allow about five minutes for each rotation.** Students should give the cards back to the adult helpers at most stations, so you can use this as an indicator of how quickly groups are moving through the activities. When it looks like everyone has finished at their first station, have students shift one table to the (left/right). The end table will circle around to the first table in the rotation. Repeat until each group has visited all four tables.

Diagnosis

After students have rotated through each information station, provide the following directions for diagnosis or explain in your own words.

*Ok, now that you have collected all of your information, we have to use that information to figure out what’s wrong with your patient. When we figure out what’s wrong, we call that a diagnosis. There are purple sheets posted around the room. They have information about signs and symptoms that we see when an animal gets sick (What’s a symptom again?). You are going to take your exam forms and compare the information you collected with the information on the top half of the purple sheet. When you find one that matches your patient’s info, that’s your diagnosis! That’s what is wrong with your animal. Write that name on your “Diagnosis” line at the bottom of your form. Each purple sign has a paragraph that explains a little bit more about what each condition or disease is and why it is bad for the animal.*

Option A (Preferred): *Once you have figured out what you think is wrong with your animal, come up to the teacher table and check with the teacher (and/or parent helper) to see if you’re correct!*  **If correct, give the student a copy of the paragraph description of what that diagnosis means. If incorrect, use the answer key to give them a clue about what “key symptoms” they should look for on the diagnostic sheets and have them keep looking.**

Option B (If short on time): *Once you have figured out what’s wrong with your patient and written your diagnosis on your form, go back to your seat.*

If you have time, you can go over the diagnostic key and discuss the diagnoses for the animals and what they mean. Recommended format:

*Ok, who had Patient’s name? What was wrong with Patient’s name? Good! [description] or That was a very good guess! Patient’s name* *had condition. [description]*

TPR – Orange Station

*What do you think are some of the first things a vet checks when they examine an animal?*

(Allow students to guess a couple things – Can guide them toward the answer if they are close)

*Good! They’ll check the temperature, pulse and respiration, or TPR.*

*What is temperature? (How warm an animal’s body is.)*

*What is pulse? (How quickly an animal’s heart is beating.) Right! Pulse is how many times an animal’s heart beats in one minute.*

*What is respiration? (How quickly an animal is breathing.) Good! Take a big breath in and a big breath out. That counts as one breath. So respiration is how many times an animal breathes in and out in one minute.*

*At this station, we’re going to see what your animal’s temperature, pulse, and respiration are. Then we’re going to compare them to what is normal for that animal to see if your patient has a fever, or is breathing quickly, or anything else that might tell us what’s going on.*

**Hand cards out to students or spread them out and let the students find theirs.**

*Find the card with your patient’s name on it. [pause] If you flip it over, you’ll see your animal’s temperature, pulse, and respiration. Write those numbers down on your form where it says “Temperature, Pulse, and Respiration”.* (bpm = beats per minute or breaths per minute)

**Wait for students to fill in the information.**

*There are some boxes next to those lines on your form. What do they say?*

*We need to know what a normal temperature is for your animal so we can see if your animal has a fever or is too cold. Do you think every kind of animal has the same normal body temperature? (No) What about pulse and respiration? (No) These signs in the middle of the table have the normal numbers for each kind of animal. Look at your form and see what species your animal is. Flip the signs up and find the sign in the middle of the table that has the normal numbers for your animal.*

**Note: If you have more than one student with animals of the same species, they may have to move to stand where they can both see the normal values, because we only have one sign for each species.**

*Compare your animal’s numbers to the ones on the sign. If the sign gives a range, like 99-102, that means that any temperature between 99 and 102 is normal, but if your animal had a temperature of 103, that would be too high, and we would say your animal has a fever.*

*Go ahead and compare your numbers for all three values, then mark your forms. Let me know if you need any help.*

*When you’re done, put your card face down so I know that you’re done.* **Collect cards.**

Bloodwork – Pink Station

*An animal’s blood can tell us a lot about its health. It can tell us if different parts of their bodies are working correctly, it can tell us if they’re getting enough water, it can even tell us if they have an infection.*

*At this station, we’re going to look at a few things that vets can check in an animal’s blood. We’re going to look at how much sugar, protein, and iron they have in their blood.*

**Hand cards out to students or spread them out and let the students find theirs.**

*Find the card with your animal’s name on it.*

*Flip the card over. On the back is a graph showing the results of some of the blood tests we can do. What kind of graph is this? (Bar graph)*

*Let’s look at the first bar on our graph. What does it say at the bottom of the bar? (Sugar)*

*Good! This bar shows how much sugar the animal has in its blood. If the bar is really tall, does that mean that the animal has a lot of sugar in its blood or a little sugar in its blood? (A lot)*

*Look at how tall the bar on your graph is. The section that is shaded in with light blue is how much sugar a normal animal should have in its blood. So if the top of your bar is in that blue area like this* (**Sugar**)*, that means that your patient has a normal amount of sugar in its blood. If the top of your red bar is above the shaded area like this* (**Protein**)*, what do you think that means? (Too much sugar in the blood)*

*What about if it is below the shaded area like this* (**Iron**)*? (Not enough sugar in the blood)*

*Good! If an animal or person doesn’t have enough sugar in their blood, that is a condition called “Hypoglycemia”. What do you think animals’ bodies use sugar for? (energy.* If students are struggling to get to this answer, ask what happens if they eat lots of candy.*)*

*So if an animal doesn’t have enough sugar in its blood, it gets really tired and doesn’t have enough energy to move around or do things.*

*Look at your red sugar bar now and mark high, normal, or low on your form based on how tall the bar on your graph is.*

*Let’s look at the second bar. What does that one say? (Protein)*

*Good. Protein is the stuff you find in meat and eggs and beans. Human and animal bodies use it to make muscles and chemicals that they need. If the blue area is normal again, does your patient have too much protein, a normal amount of protein, or not enough protein? Look at your chart and decide, then mark high, normal, or low on your form.*

*What about the third bar? What does that one say? (Iron)*

*Animal bodies use iron to move oxygen around in the blood. What is oxygen? (Air) Animals need oxygen to make their bodies work, so they need iron in their blood to carry it. Look at your third bar and decide whether your patient has high iron, normal iron, or low iron, then mark it on your form.*

*When you’re done, put your card face down so I know that you’re done.* **Collect cards.**

Urinalysis – Yellow Station

*Welcome! At this station, we’re going to do some urinalysis. Urinalysis is studying the urine to see what it can tell us about an animal’s health. What is urine? (It’s our science word for “pee”).*

*One of the main things urine can tell us is if an animal is getting enough water, or if their bodies are using water properly. To check that, veterinarians use an instrument called a refractometer (ree-frak-tom-iter – You can have students repeat this word with you if you want).*

**Pick up the refractometer. Show the students.**

*This is a refractometer. It’s the same kind the vet here uses and your vet at home uses. This lets the vet check to see how watery an animal’s urine is. They do that by putting a couple drops of urine on it here (point to the blue area) and then looking through it like this. (Note: This is not real urine, so if a student gets some on their hands, it’s fine. It’s just salt water.)*



**Look through the black eyepiece end of the refractometer as shown. You should be able to see blue at the top of the view and white at the bottom of the view. If the view is all blue, the sample has dried out and you will need to put 1-3 drops of “urine sample” on the blue glass as shown on the back of this form.**

*I’m going to pass this around to let you look through it. Make sure you’re handling it carefully so we don’t break it! You should see blue on top and white on bottom. Take a quick look, then pass it to the next person on your (left/right).*

**Pass the refractometer around, helping as needed. Then hand/spread out yellow cards.**

*Now that you’ve all had a chance to look at the equipment, find the card with your animal’s name on it. Flip it over. You should see a circle that looks kind of like the one you saw when you looked through the refractometer.*

*Based on how much blue the circle has in it, we can tell if your patient has enough water in its body. If your circle is mostly blue, that means your patient has too much water in its urine. If the circle is about half white and half blue, that means your patient has a normal amount of water in its urine. If the circle is mostly white, that means that your animal does not have enough water in its urine. That might mean that it’s not drinking enough or that its body isn’t using water the right way. Does anybody know what it’s called when you don’t have enough water in your body? (Dehydrated). Can you guys say that with me? Dehydrated.*

*Check your animal’s circle and see whether it has too much water, a normal amount of water, or not enough water, then mark your form.*

*When you’re done, put your card face down so I know you’re done.* **Collect cards.**

**After the last group, (not between groups) wipe remaining water off the refractometer surface with a tissue and put it back into the black fabric case, please! Thank you!**

**If the refractometer dries out:**

**Open the hinged clear plastic cover and use the provided bottle to put 1-3 drops of liquid (as shown below) on the glass surface. Close the plastic cover and check to make sure that you’re seeing blue at the top of the view and white at the bottom.**

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or

Parasitology – Green Station

*This is the parasitology station. Parasitology is the study of parasites. Does anybody know what a parasite is? (wait for student responses).*

*A parasite is something like a mosquito that does something that helps it but hurts another animal. So when a mosquito drinks your blood, it helps the mosquito because it’s getting food, but it hurts you because it gives you an itchy red bump, right?*

*Some parasites, like mosquitos or fleas or ticks land on the outside of animals and bite their skin or suck their blood. Other parasites called mites live on the skin and make it itch. Where do you think ear mites live? (In the ears). They live on the skin in the ears of animals and make them itchy and red and smelly.*

*Other parasites live inside animals’ bodies. Some live in the animals’ bellies. They are usually worms, and they can get really long! Some people can get worms that are so long that they would reach all the way across this room if they were stretched out!*

*Worms that live inside animals usually have babies by laying eggs, kind of like a bird or a snake. So if a worm is living inside an animal’s belly and it lays eggs, where are those eggs going to come out? (In the poop!) Let’s use our science word for poop – feces.*

*So now we’re going to see if your animals have any parasites. So if your animal has a parasite like a mosquito or tick, where are you going to find it? (In the fur/on the skin.) If your animal has a parasite like a worm, where would you find it? (In the feces.) So if your animal’s name is on the card on the top of the fur, you’re going to check in the fur and find a parasite card with your animal’s name on it. If your animal’s name isn’t on the card, you’re going to check in our fecal bucket for an egg with your animal’s name on it. Inside the egg will be a card. Once you find the card, look at the back. If it says “No parasites”, that means your animal doesn’t have parasites, so you can check the “no parasites” box on your form and put your card back into the egg. If it has a parasite, look at the signs on the table and try to match up your parasite with one of the ones on the sign. When you figure out what parasite it is, write that name on the “Parasites” line on your form.*

*When you’re done, put your parasite card back into the egg, close it tightly, and put it in the bucket, or bury your parasite back in the fur on the table.*

Diagnostic Key

Midnight Whipworm

Midnight has whipworms. Whipworm are worms that live inside an animal’s belly and drink blood from inside the body. Midnight has those worms in her belly and they are making her sick.

Rose Lyme Disease

Rose has lyme disease. She was bitten by a tick, which is like an insect with eight legs that bites animals and drinks their blood, like a mosquito. Some ticks have germs called bacteria in their bodies and when they bite animals, they give them the germs, which makes them very sick.

K-9 Chocolate Toxicity

K-9 has chocolate toxicity. She ate chocolate. Chocolate is very very bad for dogs. It’s like poison for them. Does anybody know of other people food that dogs and cats should never have? (Examples include grapes, onion, garlic, avocado, cooked bones, gum, etc)

Zazzles Hyperthyroidism

Zazzles has a condition called hyperthyroidism. Most animals have something called a thyroid gland in their necks that makes chemicals they need to live. In Zazzles, that gland makes too many chemicals, so it makes Zazzles not feel good.

Rizzo Kidney Disease

Rizzo has kidney disease. Most animals have organs right here (mid back) that help them clean up their blood and get rid of waste as urine. When animals get sick or very old, sometimes their kidneys stop working properly, then they have to go to the vet and may have to eat special food or take medicine to help their bodies work better.

Mycroft Fleas

Mycroft has fleas. Fleas are little bugs that live in an animal’s fur and bite its skin. Fleas make an animal very itchy and may give them a rash where their skin turns red. Lots of animals get fleas, but your vet can give your animal medicine to keep them from getting fleas or ticks or get rid of the fleas if they do get them.

Winston Hypoglycemia

Winston has hypoglycemia. That’s a fancy name for “not enough sugar in the blood”. Since we use sugars for energy, if a person or animal doesn’t have enough sugar in their blood, that means they won’t have very much energy.

Minnie Adrenal Disease

Minnie has adrenal disease. Remember how we said Zazzles had a gland in his neck? Well animals have many glands in their bodies, and another kind they have is the adrenal glands. The adrenal glands are right by the kidneys in an animal’s back. In Minnie, those glands are not working right, so the important chemicals they make are not right. That can make their fur fall out and make them not feel good.

Rufus Twisted Stomach

Rufus has a twisted stomach. That means just what it sounds like. His stomach got twisted around, so now the food he eats can’t move through his body the right way. This makes him very very sick and he would have to go to the vet right away.

Pierre Aspergillosis

Pierre has aspergillosis. How many of you have seen mold somewhere? In aspergillosis, a certain kind of mold called *Aspergillus* gets into the lungs of a bird when they breathe. It infects their lungs and makes it very hard for them to breathe. Humans actually breathe in this kind of mold all the time, but our bodies are better at fighting it off. Sometimes different things make different kinds of animals sick, just like we can eat chocolate but dogs can’t.

Petunia Sarcoma (Cancer)

Petunia has cancer. The kind of cancer she has is called a sarcoma. With a sarcoma, animals usually get a big lump on their bodies that can cause lots of different problems depending on where it is in the body. A vet might do surgery to remove it or use other treatments like medicine or radiation (the stuff they use to do x-rays).

Gina Ulcers

Gina has ulcers. Ulcers are sores inside an animal’s stomach. And giraffes have really big stomachs, like cows, so that is very painful for Gina.

Draco Pinworms

Draco has pinworms. So he has worms, but they aren’t living in his belly. They’re actually living on his bottom! Many different kinds of animals can get pinworms and they usually make their bottoms itchy, but otherwise don’t make them very sick.

Dotty Ear Mites

Dotty has ear mites. She has tiny tiny bugs living inside her ears. They make her ears itchy and red.

Leonard Tapeworms

Leonard has tapeworms. They are worms that are long and skinny and flat, like a piece of tape. They attach themselves to the inside of the animal’s belly and live there, which usually doesn’t actually make an animal sick, but if an animal gets too many worms in its belly, then it can make them skinny or sick.

Tilly Calicivirus

Tilly has calicivirus. This is a virus that cats can get. It is like a cold in people. There are lots of different types of calicivirus, but one kind that cats like lions and tigers like Tilly can get causes sores in the mouth and paws of the animal.