

Lesson Name: Vet for a Day

Grade Level Connection(s)

NGSS Standards: 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs

FOSS CA Edition:

*Note to teachers: Detailed standards connections can be found at the end of this lesson plan.

Teaser/Overview

Advertise your lesson to teachers with a fun and interesting overview! In 2-3 sentences, what is your lesson about? (This will be sent to teachers when your lesson is advertised to them). Example:

• Wispy, puffy, grey, white... clouds come in all sorts of shapes and sizes! Did you know there are different types of clouds that have different properties and functions? With "Clouds, Clouds, Everywhere," your students will learn all about them!

Right now, our country is facing a shortage of vets. There are 339 universities in California, but only 2 of those have veterinary schools, and these schools can only accept a small number of students. Additionally, being a vet is a really hard job! However, the U.S. has a population of approximately 335 million people, and almost 200 million pets- and all 200 million of these pets need veterinary care! They need to get vaccinated so they don't get sick and spread their disease to other animals or people. They need to see a vet if they get sick or injured, so they can get treated and get better. These animals rely on vets for their health and happiness- and we, as humans, rely on vets to take care of our animals, our best friends.

In this lesson, students will learn about veterinary medicine, basic **mammalian anatomy**, and the importance of hand-washing to prevent the spread of **germs**. Students will first be given an overview of veterinary medicine and what it is a veterinarian does. They will then get the opportunity to practice taking care of a "patient" like a veterinarian would, learn about and color a diagram of **mammalian anatomy**, and do a hands-on demonstration of the importance of washing their hands.

Lesson Objectives

What **meaningful scientific experiences** will students gain from your lesson? If possible, think about what <u>questions</u> students will be <u>figuring out</u> (as opposed to topics they will be "learning about"), and what <u>scientific practices</u> they will use to figure it out. Examples:

- Students will discover the three states in which water is found on Earth (solid, liquid, gas) and how water changes between them
- Students will explore the three main types of clouds found in the atmosphere, and be able to identify them in nature
- Students will understand what a scientific model is and how it can help them learn, remember, and share knowledge about clouds
- Students will learn about and mimic veterinary tools and practices when treating injured animals
- Students will create a model of **mammalian anatomy** and compare it to human bodies
- Students will be able to identify the importance of washing their hands and how **germs** work

Vocabulary Words

Include a bulleted list of 3– 6 important (new) words with definitions that will help students gain the most from your lesson. Definitions should be grade level appropriate.

- Symptom
- Diagnosis
- Treatment
- Mammalian
- Organ
- Germs

Materials

Scientist Volunteers will bring:

What will you bring with you? (Include a detailed list so that interested teachers can use this lesson plan to teach the lesson on their own, too!)

- Nametags
- 3 stuffed animals (2 dogs, 1 cat)
- Thorn
- Cleaning wipes
- Bandages (2 rolls, because 2 stations will need them)
- Syringe
- Eye drop container
- Paper bowls
- Pepper
- Soap



- Napkins/towels
- Double-sided sheets with medical chart on one side and cat anatomy coloring pages on the other (1 for every student)
- Image of broken leg x-ray (1)
- Human anatomy diagram (1)
- Phone or iPad to act as an "X-ray machine"

Photos:

Broken leg x-ray:

Human anatomy diagram:





Medical chart & Cat Anatomy Coloring page:

https://docs.google.com/document/d/1f7B4dbnpE6vh8co3y9d4FuDX0eKfRcTrrTjD9FMTEw0 /edit?usp=sharing

Materials teachers should provide:

What basic materials, if any, should students have ready when you arrive (pencils, paper, scissors, etc.)?

- Markers ٠
- **Colored Pencils** •
- Water Station/Sink

Classroom Set-Up

Share anything the teacher should know about how the classroom should be set up prior to this lesson (this info is shared with the teachers in their confirmation email). For example:

- Do you want the students split up into groups?
- Will your introduction start with students at their desks or seated in a central area of the classroom, such as on the classroom rug (common in younger grades)?
- Will you need access to a sink/projector/power outlet? Etc.
- Students should be divided into 3 equal groups at the beginning of class to rotate • around the stations
- Rearrange desks to make:



- 4 small tables for station 1 (1 for each patient, 1 for medical supplies)
- 1 big table for station 2
- 1 big table for station 3
- We will start the lesson with students sitting on the classroom rug.

Classroom

1. Introduction (10 minutes)

The introduction will be given to students while they sit on the rug.

Role Model Introduction:

Introduce Cal Pre-Vet Club:

We are college students from UC Berkeley! We're all studying biology because we want to go to veterinary school and become veterinarians!

Individual Introductions:

- Name and age
- What veterinary/scientific work you're doing now, and what kind of vet you want to be Being a role model for students is an important part of being a BASIS volunteer. Begin your lesson by introducing yourselves! Every team member should take a moment to explain who they are and what they study/do as a scientist. A bonus will be to tell your "story," as if giving an elevator pitch to 8-year-olds: Why did you become a scientist? What made you interested in your topic? Why should students relate to you, or be interested in you? Feel free to draft a script of what you will say, here. And remember, you can also weave your story throughout your lesson through examples from your own life, and/or return to it with Q&A at the end.

One volunteer gives the topic introduction while the other volunteers set up the stations. Station set-ups:

- Patient station: put all medical supplies on one desk, place stuffed animals on the other 3
- Anatomy station: put stack of coloring pages on table, put colored pencils out
- Germ station: prepare a bowl of pepper water for every student in the class

Topic Introduction:

The introduction should be a clear overview of what the lesson will be about, giving the students whatever info they'll need in order to understand, complete, and take meaning from the hands-on

portion of the lesson. Since BASIS lessons help support the transition from the old, content-based science standards to the new, question- and practice-driven Next Generation Science Standards in

COMMUNITY RESOURCES FOR SCIENCE East Bay schools, think about your BASIS lesson as a **question-driven exploration** of a natural phenomenon. How will you prepare students for that exploration? Think about:

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- What general phenomenon are student scientists going to explore? (Eg our heart rate increases after we run around at recess; clouds have different shapes; different beetles look similar to one another, but also have differences; when you drop a ball, it falls to the ground; etc.)
- Ask students what they already know about this phenomenon, and what observations can they make about it. This is important to engage students in the inquiry process, and also to get a feel for what they already know (in case you need to adjust a bit).
- Think about what questions students can ask about the phenomenon, and which of those questions will they be trying to figure out through your lesson. Eg:
 - After it rains, puddles form on the sidewalk but when the sun comes back out, the puddles disappear. How and why does that happen?
 - Trees have much more mass than the seeds they started from. Where does all that mass come from? How does it increase so much?
 - My siblings and I (or other siblings I know) look like our parents, but also look different from one another. How come we don't look exactly the same?
- What vocabulary will you need to share with students to take their understanding to the next level?
- Why should students care enough to figure out the answers with you? ("the big picture")
- When you get sick, who do you visit? When your pet gets sick, who do they visit? (Field answers) That's right! They visit the Vet! Today, we will be talking about veterinarians and what they do. Everyone say veterinarian with me now!
- Does anyone have any ideas what vets do every day? How is it different from doctor visits? How is it the same?
- Vets do a lot of the same things that doctors do, from vaccines, to check-ups, and even surgeries! Does anyone know any procedures that vets do? Does anyone have any ideas of what specific surgeries that vets do that doctors don't?
- One thing that's different about vets and doctors is that doctors get to talk to their patient, and their patient can tell them what they think is wrong. Animals can't talk to the vets, so the vets have to figure out what's wrong with the animal themselves! So, how do they do this? First, they give the pet an exam. They look at it, listen to its heart, its lungs, look in its ears, and look for **symptoms**. A **symptom** is a problem/issue that acts as a clue for what is wrong with the animal (for example, a sore throat is a symptom of COVID-19). Then, the vet uses the **symptoms** to make a **diagnosis**. A **diagnosis** is the vet's decision of what is wrong with the animal (or human), such as a sickness or an injury, decided by using **symptoms** as clues. (example: if a person has a sore throat and a fever, the doctor will probably diagnose them with COVID-19). Then, once the animal has a **diagnosis**, the vet will decide on a **treatment**, which is what they give to the animal, such as a medicine, or a cast, to fix the illness or injury (example: when you are sick, you take medicine to feel better).



- Can anyone explain to me what a **symptom** is? Can anyone explain what a **diagnosis** is? What about a **treatment**?
- Go through example exam! Have another volunteer act as the pet owner.

Owner: Hello Doctor, this is my cat Jax. He's been coughing a lot, I think he's sick.

Vet: Okay, I'm going to listen to his lungs with my stethoscope to listen tohisbreathing. [Vetlistens to lungs.] His breathing sounds raspy, like this: [vet does a raspybreath, to show class.] Ialso notice that his eyes and his nose are a little runny and crusty.

Owner: Oh no, what does this mean? Will he be okay?

Vet: Due to Jax's **symptoms** of raspy breathing and runny eyes and nose, I can give him a **diagnosis** of an upper respiratory infection- which basically means a cat cold! So, for his **treatment**, I will give him this antibiotic medicine!

Owner: Okay, thank you so much Doctor! [Pretend to give the cat the pills]

Okay, pretend a whole week has passed.

Owner: Okay, I gave him all his pills like you told me to, and he seems to not be coughing anymore!

Vet: Okay, let me take a listen. [Vet listens to lungs.] Wow, his lungs sound great! He's super healthy now!

Owner: Yay! I'm so happy he's better. Thank you so much!

- Review: What were Jax's symptoms? What was his diagnosis? What was the treatment?
- You all can be vets! Being a vet takes a lot of school, so pay attention and do your best!
- Today, you'll all get a chance to practice being vets! We will see what techniques and procedures that vets utilize that human doctors utilize as well! We're going to give exams to animals like you just saw us do with Jax, learn about something called **mammalian anatomy**, and learn about **germs!**

2. Learning Experience (40 minutes)

Describe the hands-on portion of the lesson. Now that you've introduced the topic, how will students go about exploring it? <u>Make sure it's clear WHY students are doing these activities</u>, and how each



activity connects to the question they're trying to figure out. Include a detailed description (including instructions) of any:

- Demonstrations and images
- Hands-on activities
- Experiments
- Games
- Discussion/Writing
- Different stations students will rotate through

The more details, the better! That way, the lesson can be used by teachers to prepare, to follow-up, and even possibly to teach the lesson themselves.

(*Remember to leave time for clean-up!*)

Station 1: Patient Stations (12 minutes)

(3 volunteers at this station)

- 1. Before splitting into mini-groups: 1 volunteer will show the students all of the medical supplies and explain what they are used for.
- 2. The students at this station will be split up into 3 groups. Tell students that veterinarians often work together in groups! It's a lot easier to help an animal when you have multiple people working together, and everyone shares their ideas. It's for the good of the animal.
- 3. Each group will be paired with one volunteer to treat a stuffed animal patient. Students will spend the whole 15 minutes with the ONE volunteer/patient they are paired with, so they are not rushed. They will NOT go to all 3 patient scenarios.
- 4. First, the volunteers will go over all the supplies and explain what they are used for.
 - 1. This is a cleaning wipe- it is used to **disinfect** and clean up any wounds or scratches the patient has.
 - 2. These are bandages- these are used to stop bleeding and protect an injury- we can also use them to make a cast to heal a broken limb.
 - 3. This is a syringe full of fluids- we give these to a patient when they are dehydrated.
 - 4. These are a new special eyedrop that causes the patient to vomit, if it's needed.
 - 5. This is the x-ray machine- we use it to look at the patient's bones.
- 5. Students will each get their own medical chart (linked in images), and be introduced to the patient and fill out the patient's medical chart with the following information:
 - 1. Name (we will tell them)
 - 2. Species
 - 3. Vet's Signature (their name)
- 6. The volunteer will present the scenario to the animal. There will be 3 different scenarios.
 - 1. Dog with thorn stuck in paw
 - "Volunteer will say "This dog's owner said it is having trouble walking! It keeps dragging its foot!"
 - 2. Volunteer will guide students to examine the dog, where they will notice a thorn stuck in the dog's paw.



- 3. Volunteer will guide students to take out the thorn, clean the wound (with a cleaning wipe), and bandage it up.
- 4. Volunteers will not make the decisions for students. They will present the materials available to the students, ask guiding questions, and help the students figure it out.
 - After students take out the thorn, if they try to bandage it without cleaning it, the volunteer would guide by saying something like "Wait a minute, that thorn was probably pretty dirty, right? If we bandage it now, we're leaving that dirt in there. What do you think we should do before we bandage it?"
- 5. What should we tell the owner?
 - 1. Take suggestions from students
 - 2. Also tell the owner to keep an eye on their dog when they're walking it outside!
- 6. Great job! You just helped this animal feel better! Allow students to ask questions/talk about what they've learned.

2. Cat with broken leg

- 1. Volunteer will say "This cat's owner said it is having trouble walking! It keeps dragging its foot!"
- 2. It looks normal on the surface, right? But if it's having trouble walking, what could be the problem? (Students may say it has a broken leg)
- 3. Let's x-ray to confirm! Students give x-ray (Show photo of broken leg).
- 4. Does this look broken to you? Have any of you ever broken a bone? How do we fix broken bones? (We put it in a cast!) Students use the bandage to make a cast around the cat's leg.
- 5. What should we tell the owner?
 - 1. Take suggestions from students of course
 - 2. Also tell the owner to make sure the cat doesn't run around or play too much while it's healing!
- 6. Great job! You just helped this animal feel better! If no students are waiting- allow students to ask questions/talk about what they've learned. Allow students to ask questions/talk about what they've learned.

3. Dog that ate chocolate

- 1. Volunteer will say "This dog just ate chocolate!" Is chocolate good for dogs? (No! It makes them really sick) How can we get the chocolate out of the dog?
 - 1. Accept/support students 'suggestions
 - 2. Ultimately- we need to make it vomit!
- 2. In case students don't remember from the material overview, the volunteer will tell them about the newly developed eye drops that make the dog vomit. The students will give the eyedrops, and the dog will "throw up".



- 3. After you throw up, how do you feel? (Bad, maybe thirsty.) The dog might be dehydrated now! How can we help?
- 4. The students will then give the dog "fluids" in a syringe to help it recover from vomiting. (The syringe will not be full of anything. It will be pretend).
- 5. What should we tell the owner?
 - 1. Take suggestions from students
 - 2. Keep chocolate away from the dog!
- 6. Great job! You just helped this animal feel better! Allow students to ask questions/talk about what they've learned.

Station 2: Mammalian Anatomy (12 Minutes)

1 volunteer (Volunteer to field questions at every organ)

- 1. "Does anyone know what we have in common with cats?"
 - Accept all student answers of course, but then if no one else says it: "We're all mammals! A mammal is an animal that produces its own heat to control its body temperature, feeds its young with milk, and has hair or fur!"
 - 1. "Can anyone give an example of another mammal?"
- 2. "Since humans, dogs, and cats are all **mammals**, we have the same **anatomy**, which means our bodies are set up in the same way! Even though we may look very different, we all have a mouth, a nose, eyes, and ears, don't we? We also have similarities on the inside! We all have the same **organs**."
- 3. "What is an **organ**? (An **organ** is a part of the body that performs a specific job.) The human body has 78 **organs**, all with different jobs, that keep us alive! Today, we're just going to learn about 5 of them."
 - 1. The volunteer will point to them on the human diagram as they talk about each organ.
- 4. Each student will get a cat **anatomy** coloring page.
 - 1. "Don't color it yet. We are going to color a few things together first, and then you can color it however you want!"
- 5. "This is the heart. The heart pumps blood throughout the body. The body is made up of cells, which are super super super tiny little building blocks that make up everything living! Guess how many cells you have! I, an adult, have around 30 trillion, and you, a kid, probably have around 15 trillion! Every single one of these cells needs oxygen and nutrients, or fuel. Blood carries oxygen and nutrients to cells. Have you ever run really hard, and you can feel your heart beating faster? That's your heart working really hard to keep delivering oxygen and fuel to your cells, so you can keep running."
 - 1. The volunteer will help students find the heart on their coloring page, and students will color it in.
- 6. "These are the lungs. Everyone take a deep breath. You just used your lungs. When you breathed in, your lungs took in a bunch of oxygen. When you breathed out, your lungs released a bunch of carbon dioxide-something that your body doesn't need, and wants to get rid of."

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- 1. The volunteer will help students find the lungs on their coloring page, and students will color it in.
- 7. "This is the brain. Raise your hands! You just used your brain. When I told you to raise your hands, your brain heard the sound coming in from your ears, it understood what I told you to do, and then it sent a signal to your arm muscles which made you lift your hand. Your brain allows you to think, it allows you to talk and communicate with people, it allows you to feel sad and scared and happy and excited. Even though the brain is only about 2% of your weight, it uses 20% of the total energy your body uses! You know how when you're running fast, you start breathing harder and your heart beats faster, but you're not controlling that, it just happens? Your brain is making that happen! Your brain knows your body needs oxygen from your lungs, and it needs your heart to pump blood everywhere, so it speeds up your breathing and heart rate automatically!"
 - 1. The volunteer will help students find the brain on their coloring page, and students will color it in.
- 8. "This is the stomach. Does anyone want to share what they had for breakfast this morning/lunch today? Well, it's probably in your stomach right now- food stays there for 2-4 hours! The stomach breaks down the food. When you chew, you break it down a lot, but remember how I said your body was made of cells? In order for your cells to use the energy and nutrients from the food you eat, the food needs to be broken down into really really small pieces! Your stomach produces and is filled with acid, which is such a strong acid that it can dissolve razor blades! It has a super thick lining, so the acid can't get out of your stomach. But that's why when you throw up, it can feel painful to your throat. Anyways, your stomach is important because it breaks down the food into small nutrients that your body can digest."
 - 1. The volunteer will help students find the stomach on their coloring page, and students will color it in.
- 9. "These are the intestines! Once your stomach has broken down the food into the smallest it can be, the food will go through your intestines, and they will absorb the nutrients! Your intestines also absorb any water that you drink. It's important to eat food with different nutrients (fruits, vegetables, proteins like meats, carbohydrates like bread or pasta)."
 - 1. The volunteer will help students find the intestines on their coloring page, and students will color it in.
- 10. Students can spend remaining time coloring in the cat and asking any questions they have/talking more about **organs**.

Station 3: Germs and Hand Washing (12 minutes)

(1 volunteer at this station)

- 1. When students arrive at the station they will get their bowl in front of them but will be told not to touch it yet.
- 2. The volunteer will talk to the students about **germs**, interacting with them and asking them questions, and then elaborating on their answers.
 - 1. "What are **germs**?" (Microscopic organisms like bacteria, viruses, and fungi, that can make you sick.)



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 2. "Are germs good or bad?" (Bad, they are what transfer disease from person to person. Even if you get sick and you end up getting better, you could pass your germs to your old grandma, or a young baby, whose immune system isn't as good, and they could get really really sick from it!)
 - 3. "How do you prevent the spread of germs?" (Washing hands!)
- 3. "A survey revealed that for people under 34 years old, only 70% of them washed their hands each time they used the toilet! That means, in a group of 10 people, 3 of them probably didn't wash their hands!"
- 4. "Germs are so incredibly small that we can't see them unless we're looking under a microscope! But, in these bowls, we have pepper that we're going to pretend is germs."
- 5. All students stick their fingers in the pepper water.
 - "Are there germs on your finger? How many flakes of pepper are on your finger? Probably too many to count!"
- 6. All students dry off their fingers and get all the germs off.
- 7. All students dip their fingers in soap.
- 8. Students dip their fingers back in the pepper water. The pepper will scatter across the surface, away from their finger.
 - 1. "This is basically how soap works! The soap is made of chemicals that repel the **germs** and make them come off your skin, and down the drain."
- 9. When should we wash our hands- or use hand sanitizer? Ask field.
 - 1. After going to the bathroom
 - 2. Before touching or eating food
 - 3. After playing outside
 - 4. After touching your pets
 - 5. When you get home from school, after touching everything all day
 - 6. After being around a sick person
 - 7. When you accidentally cough or sneeze into your hand
 - 8. If you're a vet or medical professional- before you touch an animal or clean a wound!
- 10. Teach them about zoonotic diseases!
 - 1. What is a zoonotic disease?
 - 1. A disease that is transmitted from animals to humans!
 - 2. How do you think humans can get diseases from animals?
 - 1. Animal bites human
 - 2. Human eats animal
 - 3. Contaminated environment
 - 3. Examples:
 - 1. Leptospirosis sea lions, deer, dogs
 - 2. Rabies dogs, raccoons, bats
 - 3. Covid bats
 - 4. How can we prevent against these?
 - 1. Vaccines for animals (Rabies, Lepto)



2. Vaccines for humans (Covid)

11. If leftover time: watch "What Are **Germs**" video <u>https://www.youtube.com/watch?v=7bkhoDLK_eg</u>

3. Wrap Up: Review and Discuss the Learning Experience (4 minutes)

One volunteer does this, while the others clean up the stations.

It's important to leave time to **review** and **discuss** the learning experience at the end of the lesson. This might take the form of discussing conclusions from an experiment; or review of the <u>take-away</u> of the lesson

- What phenomenon were they exploring?
- What questions did they try to answer?
- What did they do to find answers?
- What answers did they find?
- What questions do they still have that haven't been answered?
- Working with animals is a lot like working with people! Vets use a lot of the same techniques as doctors, and each technique is very important.
- Does anyone want to share how they helped their patient?
- Does anyone want to tell me about their favorite organ and what that organ does?
- Does anyone else want to share their favorite thing they learned today?

4. Connections & Close (2 minutes)

Connections to the real world around students:

Why should students care about the phenomenon they've been exploring? How does their exploration fit into the bigger picture of why scientists study it? What connections can students draw to their own lives? How can they learn more?

- Can anyone tell me when you use your heart? Lungs? Brain?
- Where do you think germs are?
- What do doctors do that are different from veterinarians?

Follow Up: After the Presentation

Teachers who wish to extend the impact of this lesson may find the following CRS web pages useful:

- <u>http://www.crscience.org/educators/helpfulreports</u>
- <u>http://www.crscience.org/educators/treasuretrove</u>



Standards Connections

[CRS will identify standards connections & discuss them with your BASIS team]

NGSS:

- Connections by Topic
 - Life Sciences: 1: Structure, Function, and Information Processing
- Connections by Disciplinary Core Ideas
 - LS1.A: Structure and Function
 - LS1.D: Information Processing
- Connections by Scientific and Engineering Processes
 - 2: Developing and using Models
 - 3: Planning and Carrying out Investigation
 - o 6: Constructing Explanations and Designing Solutions
- Connections by Crosscutting Concepts
 - 2: Cause and Effect
 - 6: Structure and Function
 - 8: Interdependence of Science, Engineering, and Technology
- Connections by Performance Expectations
 - 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.