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5th Grade Veterinary Medicine Activity Book - English Edition

Sandy F. Amass
Purdue University

Becky Bierman
Purdue University

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Purdue University

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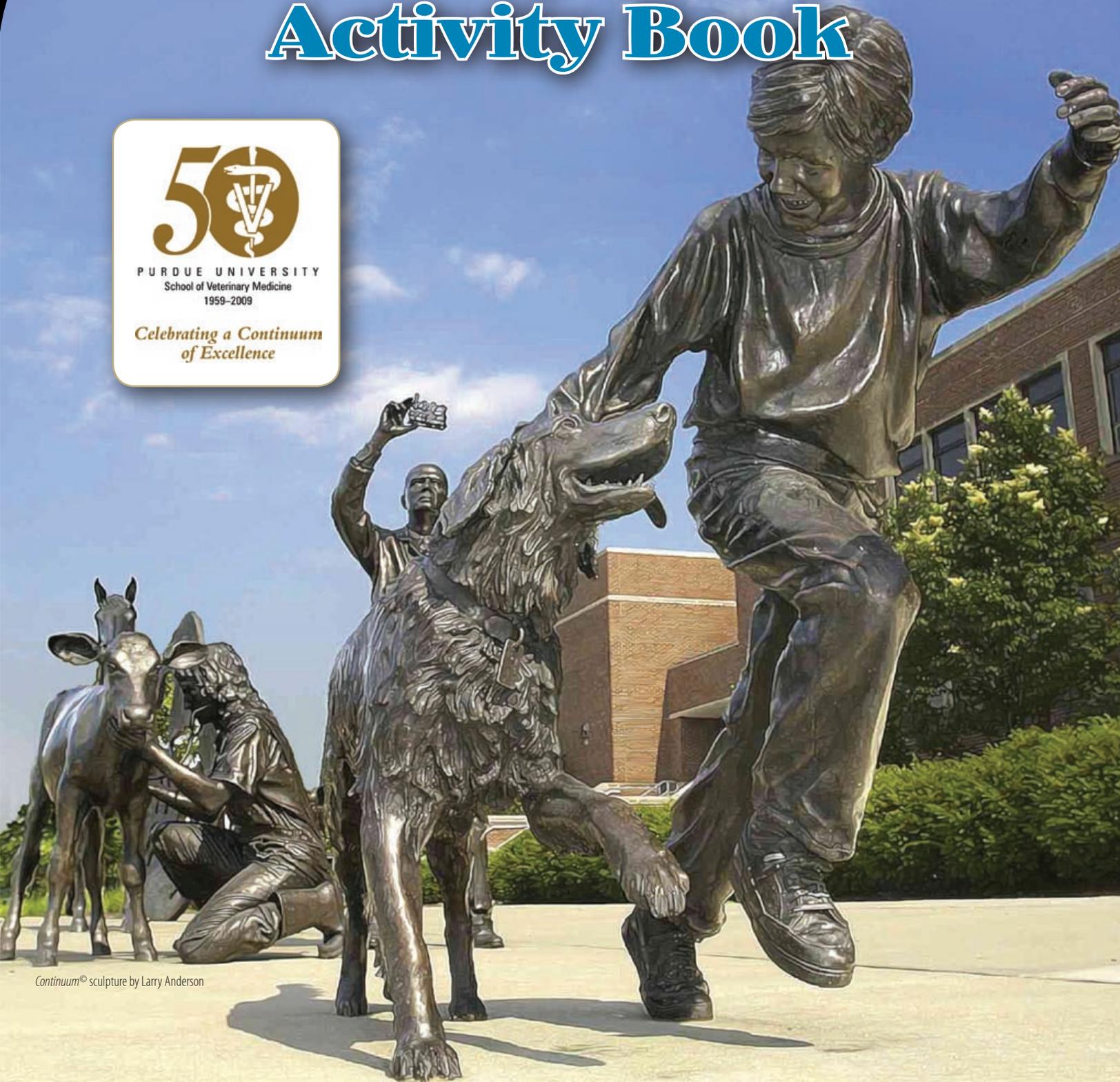
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Veterinary Medicine Activity Book



PURDUE UNIVERSITY
School of Veterinary Medicine
1959-2009

*Celebrating a Continuum
of Excellence*



Continuum® sculpture by Larry Anderson

Grade 5



Teachers

The objective of this book is to provide career-based activities for students in grade 5. This book incorporates Indiana Academic Standards for Math, English/Language Arts, and Science.

Parents

We hope that your children enjoy the activities in this book and will consider veterinary medicine as a potential career choice.

Kids

We hope that you will have fun learning about caring for animals and the different careers in veterinary medicine.



Thank you to our donors

Indiana Veterinary Technicians Association

Indiana Veterinary Medical Association

Dr. James Bradford

Pfizer Foundation



Written by: Sandy Amass, Becky Bierman, and Jessica Schneider

Design: Dan Annarino, Kay Hagen

Reviewed by: Jill Bahler and Kauline Davis

Contributors: Danielle Buchanan, Laurent Couëttil, Kim Dreher, Donna Griffey, Walter Gruenberg, Lynn Guptill, Henry Green, Heather Hayes, Pam Kirby, Jeff Ko, Sheryl Krohne, Carrie Lacombe, Gary Lantz, Darryl Ragland, Rose Raskin, Debbie Stevenson, and Ramesh Vemulapalli,

Please visit: www.vet.purdue.edu for more information

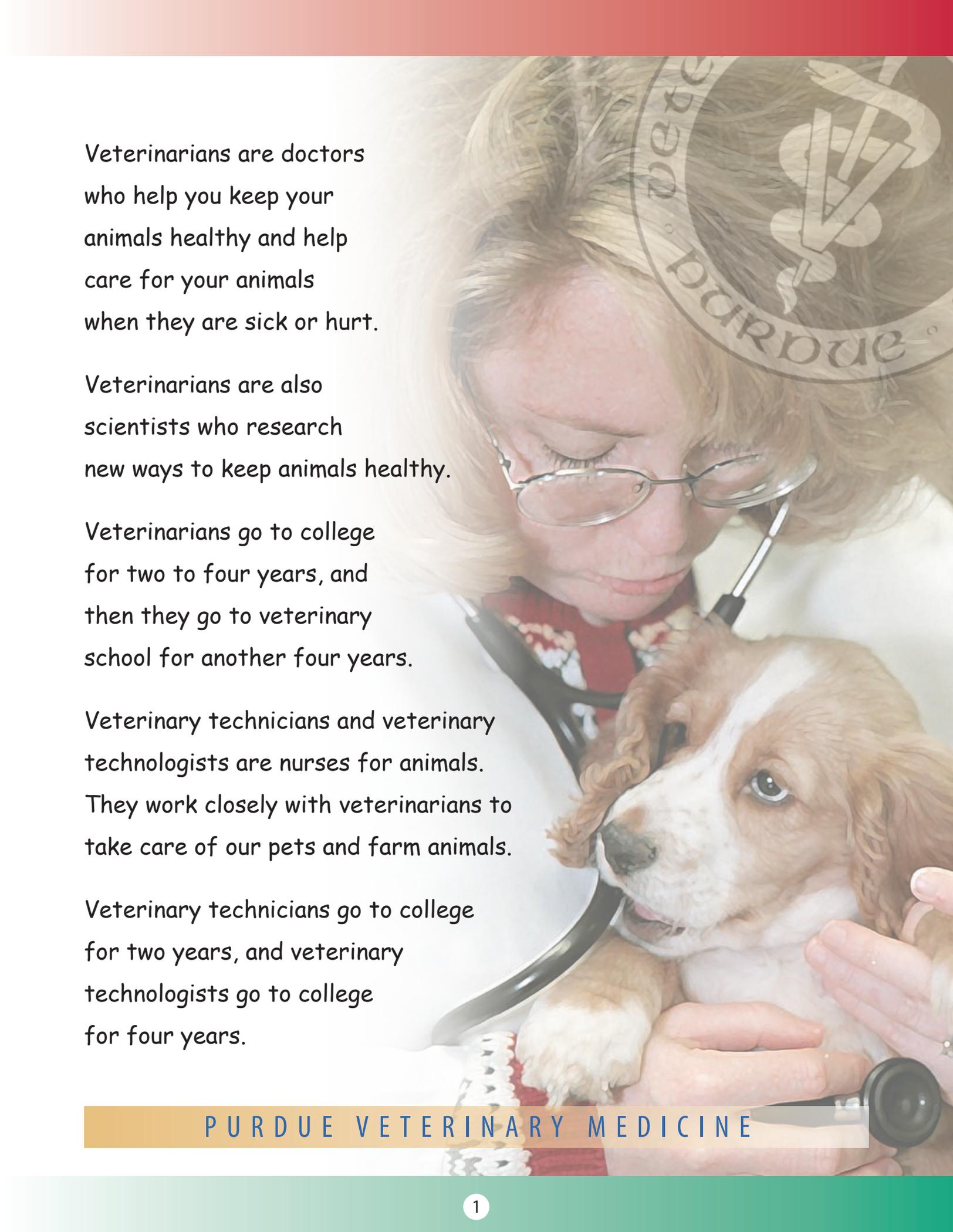
Veterinarians are doctors who help you keep your animals healthy and help care for your animals when they are sick or hurt.

Veterinarians are also scientists who research new ways to keep animals healthy.

Veterinarians go to college for two to four years, and then they go to veterinary school for another four years.

Veterinary technicians and veterinary technologists are nurses for animals. They work closely with veterinarians to take care of our pets and farm animals.

Veterinary technicians go to college for two years, and veterinary technologists go to college for four years.



PURDUE VETERINARY MEDICINE

Dr. Darryl Ragland grew up in New Jersey. He is a pig veterinarian. He visits farms and helps make sure that the pigs stay healthy.



Debbie Stevenson is a registered veterinary technologist from South Carolina. She helps Dr. Ragland on herd visits and helps farmers with their questions.



Pigs do not like to eat unless they have plenty of water to drink. A pig that weighs one hundred pounds must drink one gallon of water every day to stay healthy.

1. If a pig weighs 200 pounds, how much water does it need to drink every day?

_____ Gallons

_____ Quarts

_____ Cups

2. If a pig weighs 50 pounds, how much water does it need to drink every day?

_____ Gallons

_____ Quarts

_____ Cups



HINT BOX:

1 Gallon = 4 Quarts

1 Quart = 4 Cups

1 Minute = 60 Seconds

You test the waterer (device pigs drink from) during a visit to the farm. One quart of water comes out of the waterer every minute.

1. How long will it take for one gallon of water to come out of this waterer?

_____ Minutes

_____ Seconds

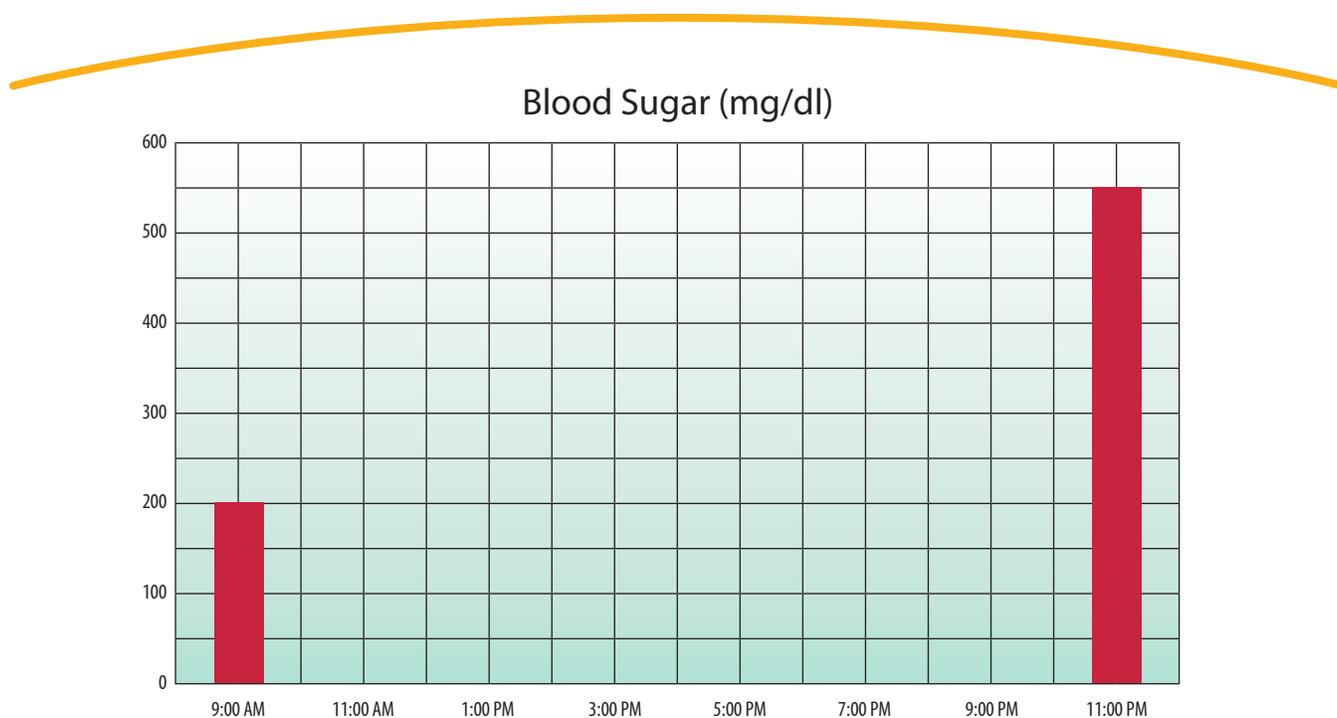
2. How long will it take for two cups of water to come out of this waterer?

_____ Minutes

_____ Seconds



Diabetes is a problem that animals have when they cannot control their blood sugar (blood glucose). People and pets can get diabetes. Normal blood sugar for a cat is between 80 and 150 mg/dL. To check a cat for high blood sugar, we took samples every few hours and recorded them in the table (below). Make a graph of this cat's blood sugar test results, and mark if they are normal, too low, or too high.



1. At 3:00 PM, this cat's blood sugar is:
(Circle one)

Too low Normal Too high

2. At 9:00 PM, this cat's blood sugar is:
(Circle one)

Too low Normal Too high

Cat Blood Samples

TIME	BLOOD SUGAR
9:00 a.m.	200
11:00 a.m.	150
1:00 p.m.	90
3:00 p.m.	50
5:00 p.m.	150
7:00 p.m.	250
9:00 p.m.	400
11:00 p.m.	550

Dr. Lynn Guptill grew up in Connecticut. She is a dog and cat veterinarian. She makes sure that your pets stay healthy.



Danielle Buchanan is from Pennsylvania. She is a registered veterinary technologist who works in the small animal hospital. She helps veterinarians examine their patients.

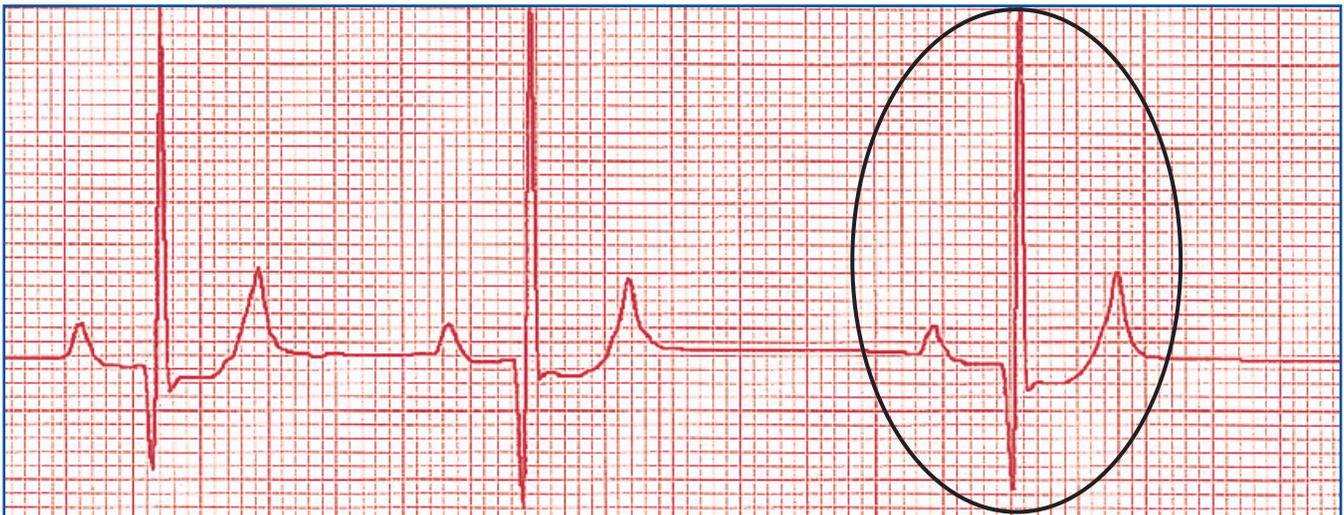




The heart beats many times every minute. One way to check if the heart beat is normal is to look at an electrocardiogram (ee-lek-troh-car-dee-oh-gram).

The veterinarian attaches a machine to the dog and looks at the dog's heart beat. It doesn't hurt at all.

This is an electrocardiogram from a dog. One normal heart beat is circled.



How many heart beats do you see? _____



Dr. Henry Green grew up in Louisiana. He is a veterinarian who specializes in heart problems. His specialty is called cardiology. In Greek, "kardia" means heart.



Kim Dreher is from Massachusetts. She is a registered veterinary technologist that works in the cardiology section. She helps puppies with heart problems so they can go home to the kids who own them.

We usually count the number of times a heart beats each minute. A normal dog's heart will beat between 70 and 120 times each minute. The electrocardiogram on page 6 shows the number of heart beats in two SECONDS.

1. How many times did this dog's heart beat in one minute?
(Remember, there are 60 seconds in one minute.)

2. This dog's heart is beating:
(Circle one)

Too Slow Normal Speed Too Fast



HINT BOX:

Dog Heart Rate

Less than 70 – Too slow

70-120 – Normal

121 and higher – Too fast

**Can you help
Dr. Gruenberg
with these milk
production questions?**

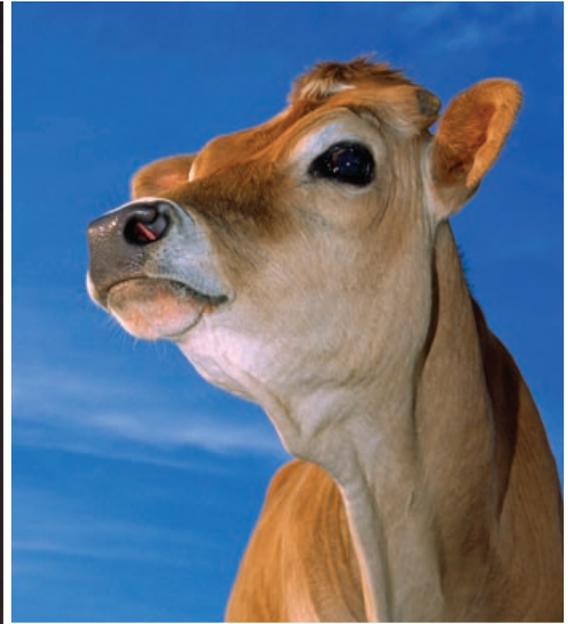
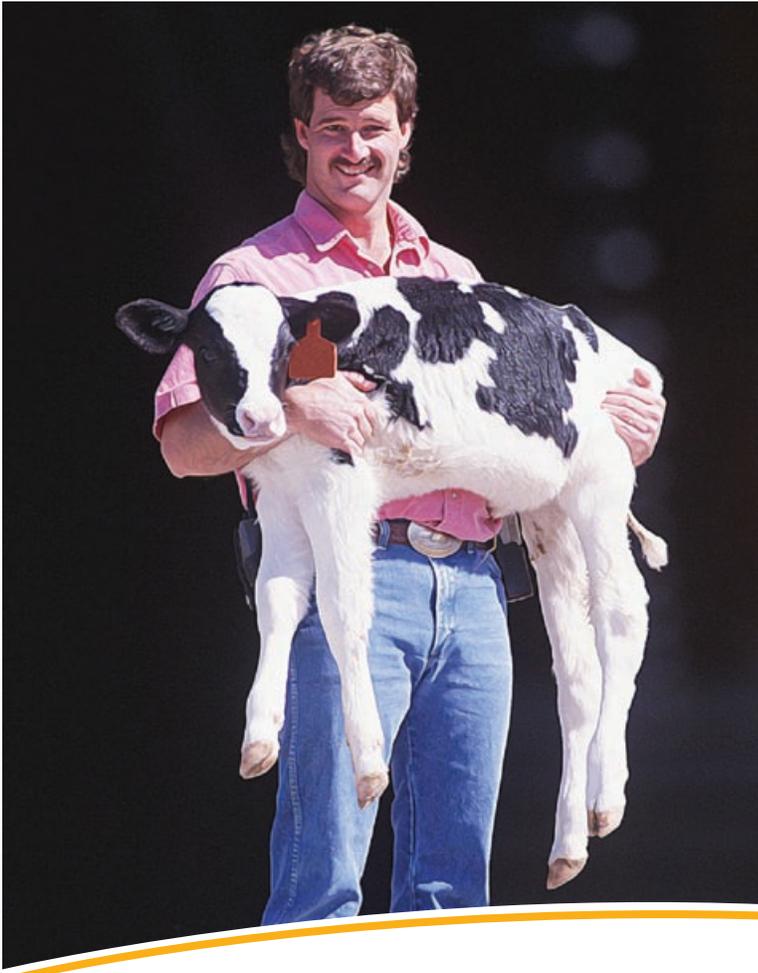


Dr. Walter Gruenberg is from Germany. He is a veterinarian that specializes in dairy cattle. Dairy cattle produce the milk that people drink.

1. Herd 1 has 60 dairy cows. Each cow produces 15,000 pounds of milk in one year. How much total milk does Herd 1 produce in one year?

2. Herd 2 has 10,000 dairy cows. Each cow produces 19,000 pounds of milk in one year. How much total milk does Herd 2 produce in one year?





One dairy cow produces about 20,000 pounds of milk every year!

3. A dairy farmer wants to buy enough cows to produce 300,000 pounds of milk in one year. He finds some cows for sale that produce 17,000 pounds of milk each year. How many cows does he need to buy?

4. Your friend says that her 5 cows can produce 350,000 pounds of milk each year. Explain why you think she is wrong.

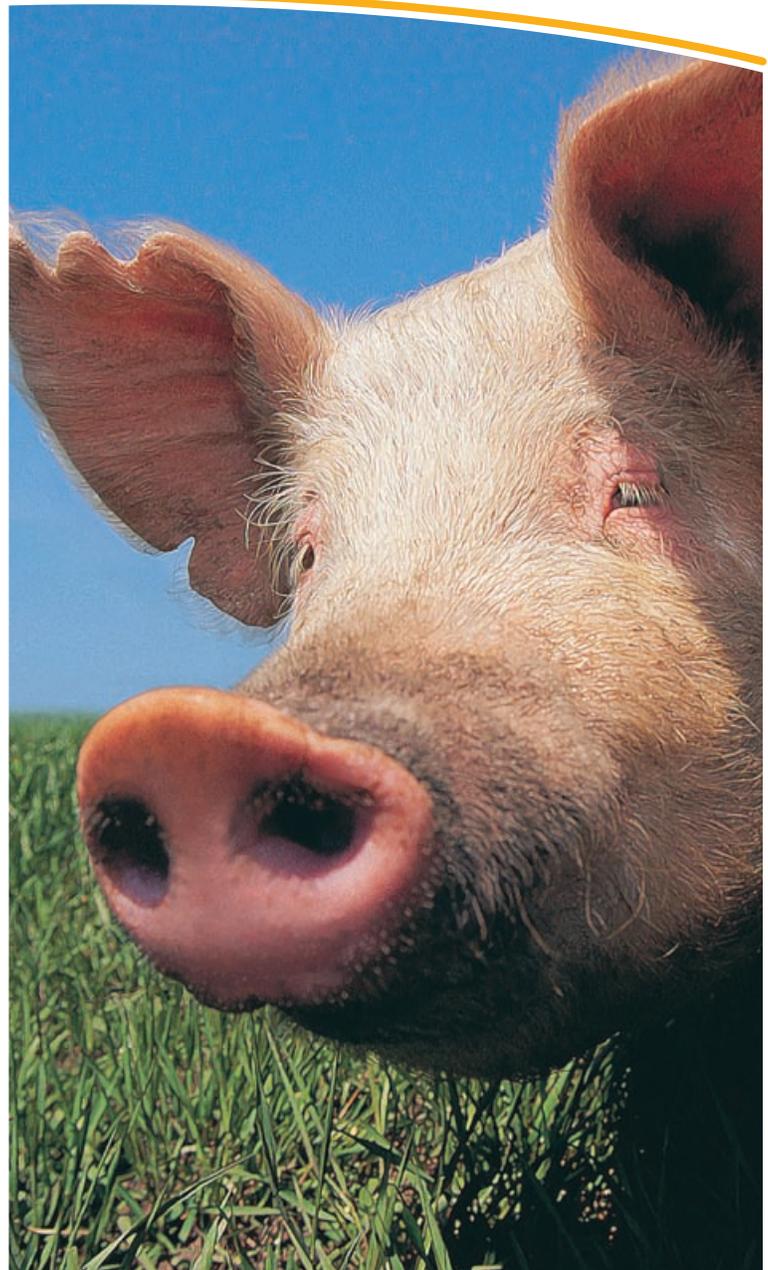
Jessica Schneider grew up in Ohio. She is a registered veterinary technologist. Sometimes she helps care for animals, sometimes she helps with research, and sometimes she helps teach.



**Can you help
Jessica
with her project?**

Jessica wants to test if a disinfectant will work to clean a pig feeder. Jessica mixes the disinfectant with water according to the directions on the label of the bottle. The label directs Jessica to add one half of an ounce of disinfectant to one gallon of water.

1. How many ounces of disinfectant should Jessica add to 5 gallons of water?





There are thousands of germs on the dirty feeder. Jessica cleans the feeder and then applies the disinfectant. She waits 10 minutes to let the disinfectant kill the germs. Next, Jessica samples the feeder for germs. Jessica will consider that the disinfectant worked if there are less than 10 germs per square centimeter of the feeder surface. Jessica samples a 10 centimeter long by 5 centimeter wide area of the feeder. To calculate square centimeters, you multiply the length and width of the area sampled.

1. How many square centimeters did Jessica sample?

2. Jessica took her sample to the lab, spread it on culture plates, and put it in a warm incubator overnight to let the germs grow. The next morning she counted 100 germs on the plate. Using your answer from number 1, how many bacteria grew per square centimeter of feeder sampled?

3. Using your answer for number 2, did the disinfectant work?

Dr. Gary Lantz grew up in Ohio. He is a veterinarian who specializes in dentistry. Dentists for animals clean, polish, x-ray, and pull teeth, just like dentists for people.

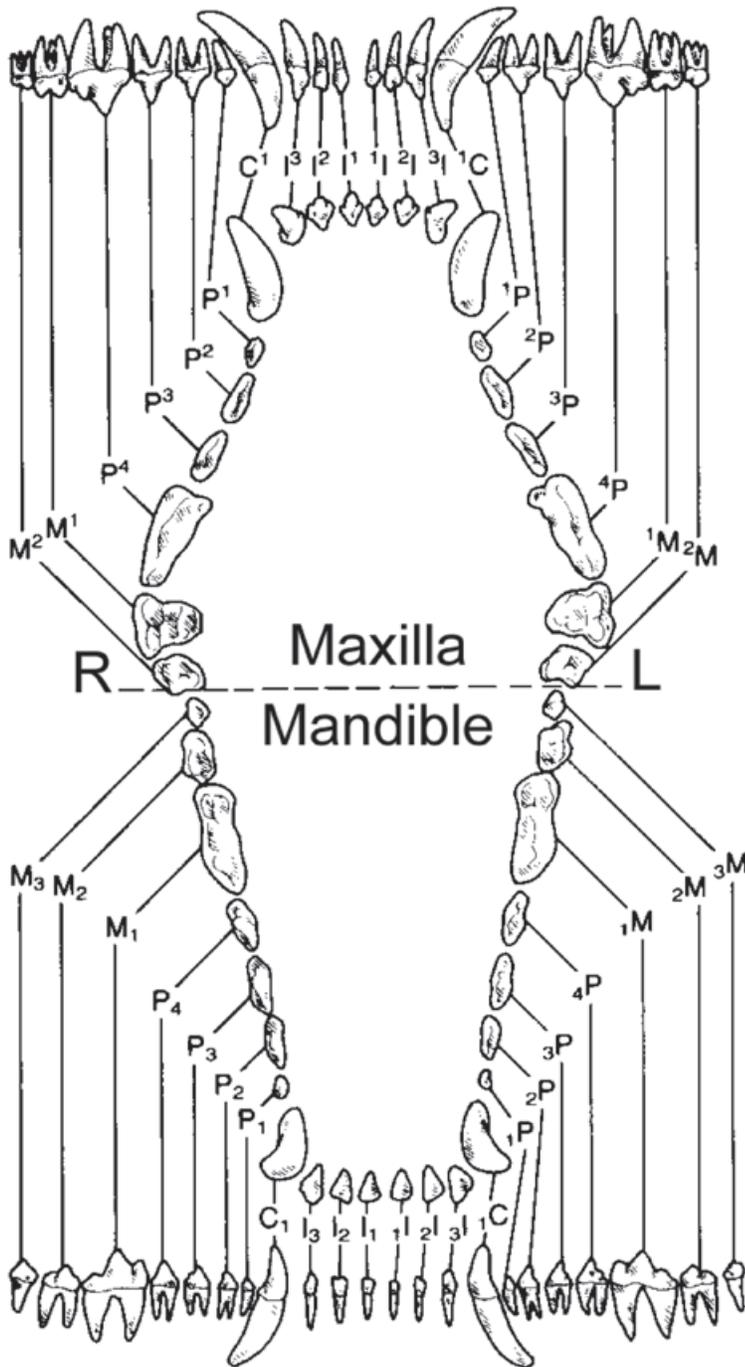


Heather Hayes is from Indiana. She is a dental technician. She helps take care of animals during their trips to the dentist. She makes sure that owners understand how to take care of their pets' teeth.



On the next page is a drawing of the teeth in the mouth of a dog. The maxilla is the top of the mouth. The mandible is the bottom of the mouth. The picture shows two views of the teeth. In one view, the teeth are lined up straight and you can see the root of each tooth. The root is the part that is in the gums. In the other view, the teeth form a circle like you would see them in an open mouth.

Dog Teeth



M = Molar
 P = Premolar
 C = Canine
 I = Incisor

1. How many teeth does the dog have on top? _____
2. How many teeth does the dog have on the bottom? _____
3. How many total teeth does the dog have? _____
4. What fraction of the dog's teeth are molars? _____
5. What fraction of the dog's teeth are premolars? _____
6. What fraction of the dog's teeth are canine teeth? _____
7. What fraction of the dog's teeth are incisors? _____

Dr. Rose Raskin grew up in New Jersey. She is a veterinarian who specializes in clinical pathology. She interprets laboratory tests to help diagnose disease.



Can you help Dr. Raskin interpret these results?

Today, Dr. Raskin is looking at blood test results for a litter of puppies that have diarrhea. People and animals that have diarrhea can lose a lot of water from their body and become dehydrated. One test to see if a puppy is dehydrated is to see how much protein is in the puppy's blood. Too much protein can mean that the puppy is dehydrated. Normal Total Protein for a dog is between 4.8 and 6.9. The test results for 4 puppies are listed below. First, mark the test results on the number lines. Then, mark if the Total Protein is too low, normal, or too high for each puppy.



PUPPY	PROTEIN
Daisy	6.1
Buster	7.5
Flower	8.2
Candy	8.6

Becky Bierman grew up in Indiana. She is a registered veterinary technologist. She helps veterinarians do research to improve animal health.



Word Bank

Analyze
Hypothesis
Lafayette
Method
Question
Technician
Veterinary

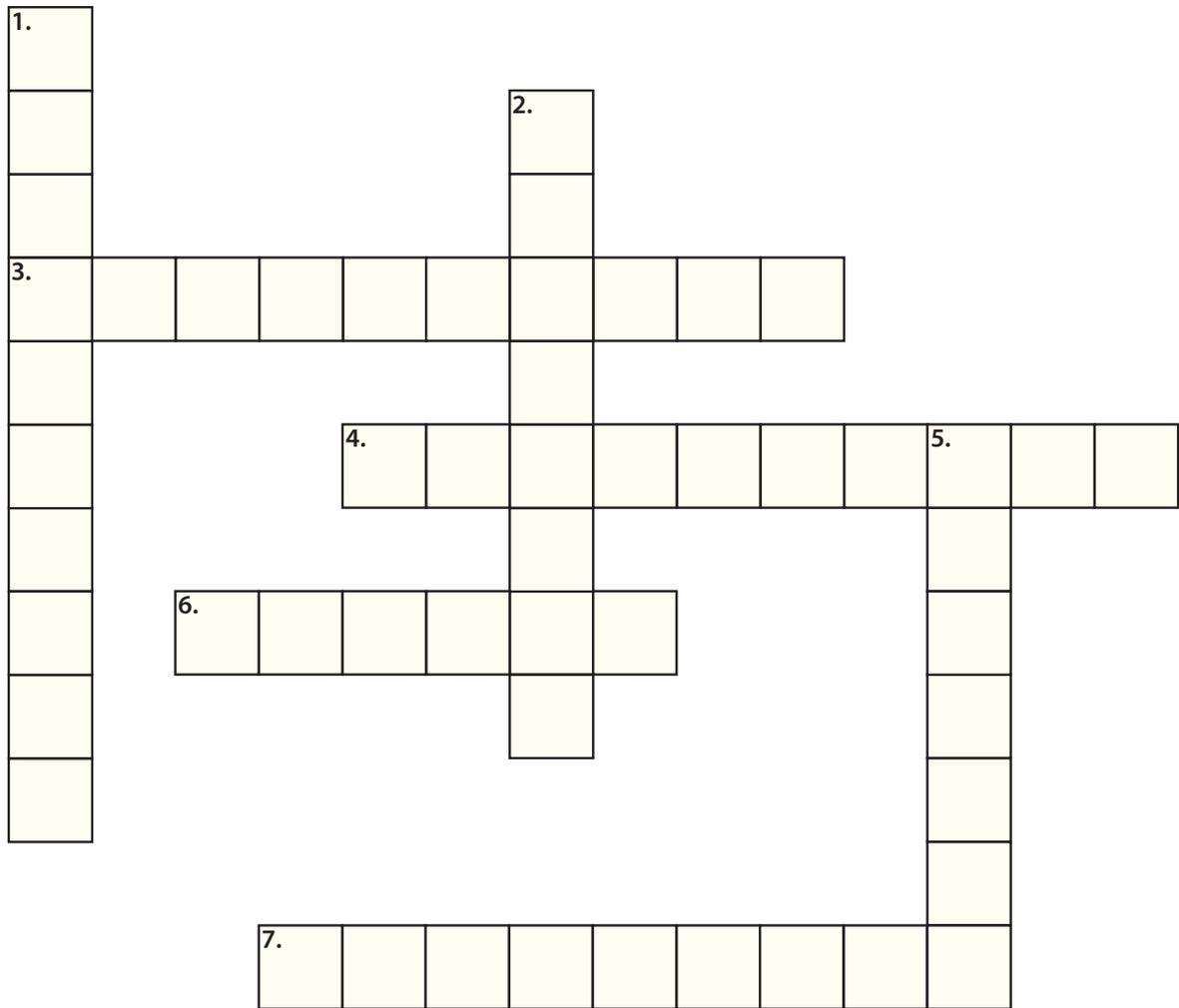
Research tries to solve a problem. The steps that you use to do research are called the **Scientific Method**. The first step in the **Scientific Method** is to ask a question.

The next step is called the hypothesis (hi-pah-thuh-sis). The hypothesis is an educated guess about how things work. For example, if your question is "What will happen if I water this plant once every week for one month?" Your hypothesis might be: "The plant will grow one inch."

Then, you would do research by watering some plants and not watering other plants. You would measure the plants after one month and write down how tall each plant was.

At the end of your experiment, you would look at your measurements for plants that you watered, and compare them to measurements for plants that you did not water. This is called analyzing your data. You proved your hypothesis if the plants that you watered grew one inch, but the plants that you did not water did not grow one inch.





1. A veterinary _____ helps a veterinarian, just like a nurse helps a doctor.
2. The first step in the scientific method is to ask a _____.
3. A _____ is an educated guess about how things work.
4. Purdue University has a School of _____ Medicine, where you can learn to be a veterinarian, a veterinary technician, or a veterinary technologist.
5. After finishing an experiment you should _____ the data and draw a conclusion.
6. The scientific _____ is a way to ask and answer scientific questions.
7. Purdue University is located in West _____, Indiana.

Dr. Laurent Couëtil grew up in France. He is a veterinarian who specializes in large animal medicine. He uses the scientific method to help animals with breathing problems.



Donna Griffey is from Indiana. She is a registered veterinary technician. She helps Dr. Couëtil and trains horses to run on a treadmill.

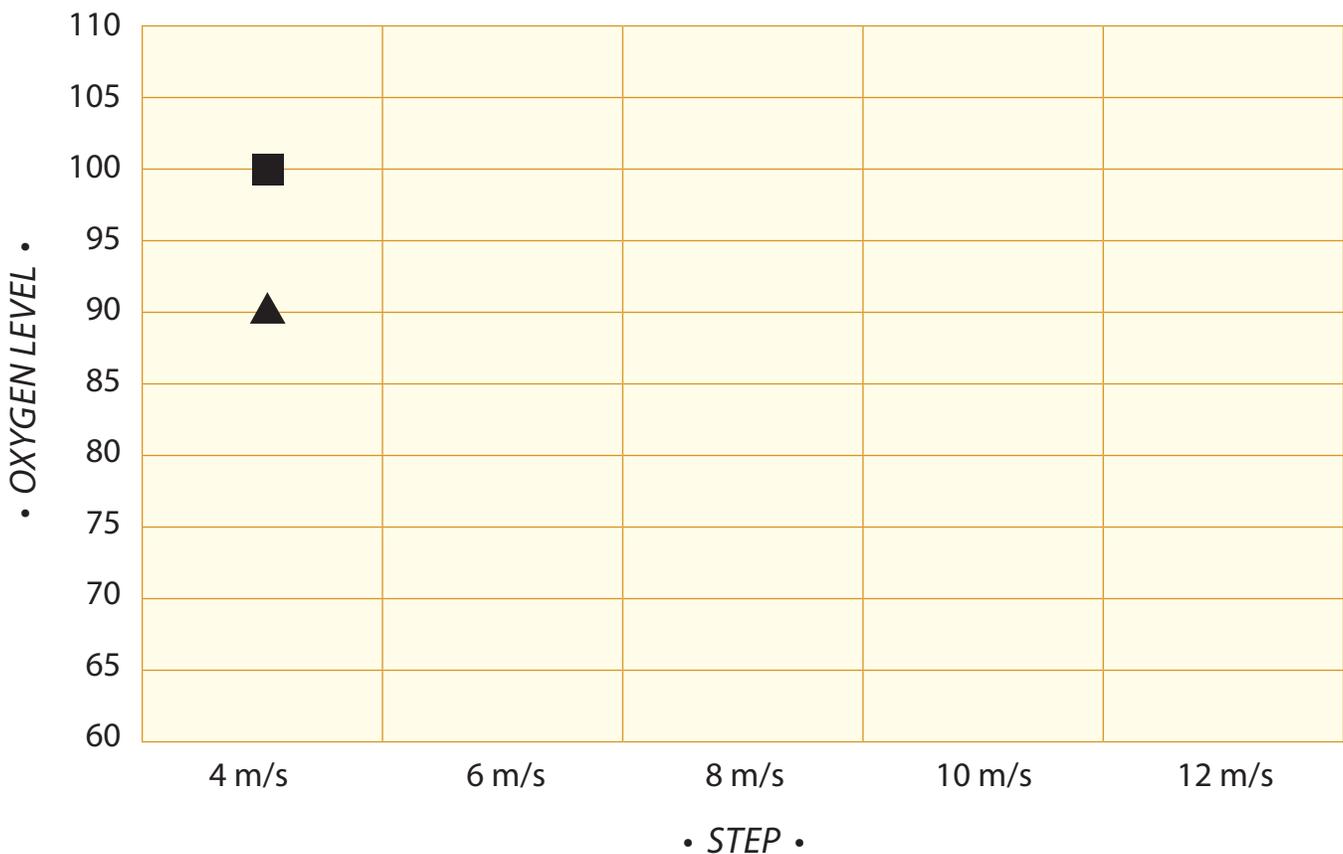


Dr. Couëtil is studying ways to treat and prevent “heaves” in horses. Heaves is just like asthma in people. Horses with heaves can cough and have trouble breathing. Dr. Couëtil’s research has the potential to help both horses and people with breathing problems. Today, he is measuring how well horses breathe by watching the horses run on a treadmill. He tests how much oxygen the horses can get into their lungs and blood. He examines two horses. One horse is normal. The other has heaves. The horse with heaves has lower oxygen levels than the normal horse.

Can you graph the oxygen levels for the two horses and figure out which horse has heaves?

Step	Horse 1 (Square) ■	Horse 2 (Triangle) ▲
4 m/s	100	90
6 m/s	95	85
8 m/s	90	80
10 m/s	85	75
12 m/s	80	70

Heaves Results



Which horse has heaves? _____

Dr. Sheryl Krohne grew up in Illinois. She is a veterinarian who specializes in eyes. Dr. Krohne is an eye doctor for all types of animals from dogs to horses.

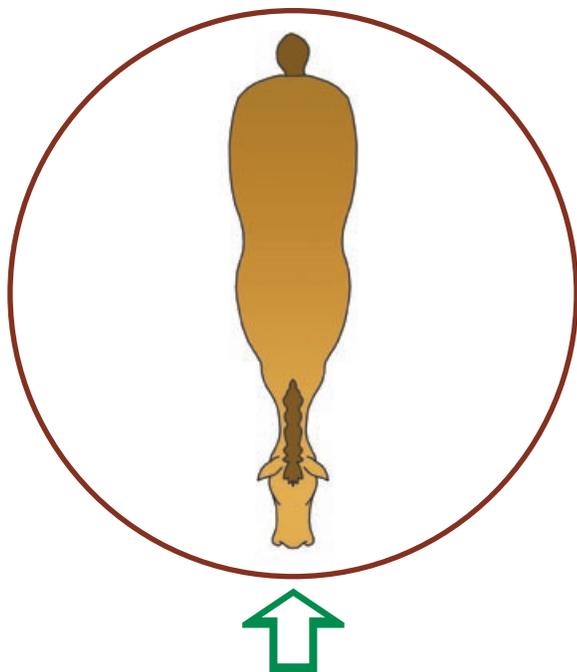


Pam Kirby is from Indiana. She is a registered veterinary technician who helps take care of animals during their eye exams.



Healthy horses can see in almost every direction. However, horses cannot see people standing directly behind them. On the next page are two pictures showing a horse facing the bottom of the page. Follow the directions to mark on the diagram where you would be standing, and if a healthy horse should be able to see you.

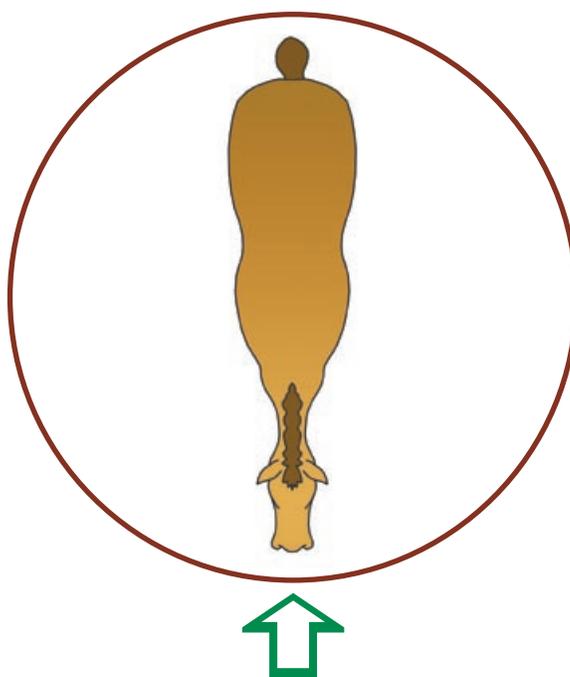
1. You start facing the horse and then you move 180 degrees to your left around the circle.



Can the horse see you?

2. You start facing the horse and then you move 90 degrees to your right around the circle.

Can the horse see you?



Dr. Jeff Ko grew up in Taiwan. He is a veterinarian who specializes in anesthesiology (an-is-thees-zee-ol-o-gee). He makes sure that animals do not wake up during surgery.



Carrie Lacombe is from Maine. She is a veterinary technician specialist in anesthesia. She helps monitor patients during surgery and teaches students about anesthetizing patients.

Sometimes animals have to have surgery just like people. The animal is anesthetized during surgery. This means that the animal sleeps through the surgery and can't feel anything. The animal is watched very closely while it is asleep. Breathing, heart rate, and body temperature are a few of the things that are monitored and recorded during the entire surgery. The normal body temperatures for some animals are listed in degrees Fahrenheit on the next page. Can you convert these temperatures to degrees Celsius?



Hint: Degrees Celsius = $\frac{5}{9} \times (\text{Degrees Fahrenheit} - 32)$



Fahrenheit Temperatures to Celsius Temperatures

	Fahrenheit (°F)	Celsius (°C)
Human	97.5 to 99.5	36.4 to 37.5
Dog	100.5 to 102.5	_____ to _____
Cat	101 to 102.2	_____ to _____
Cow	101 to 102	_____ to _____
Horse	99.5 to 101.4	_____ to _____
Sheep	101 to 103	_____ to _____
Goat	102 to 103	_____ to _____
Pig	101.5 to 102.5	_____ to _____

Dr. Ramesh Vemulapalli grew up in India. He is a veterinarian who studies better ways to test for diseases. He also researches how to make better vaccines to prevent diseases.

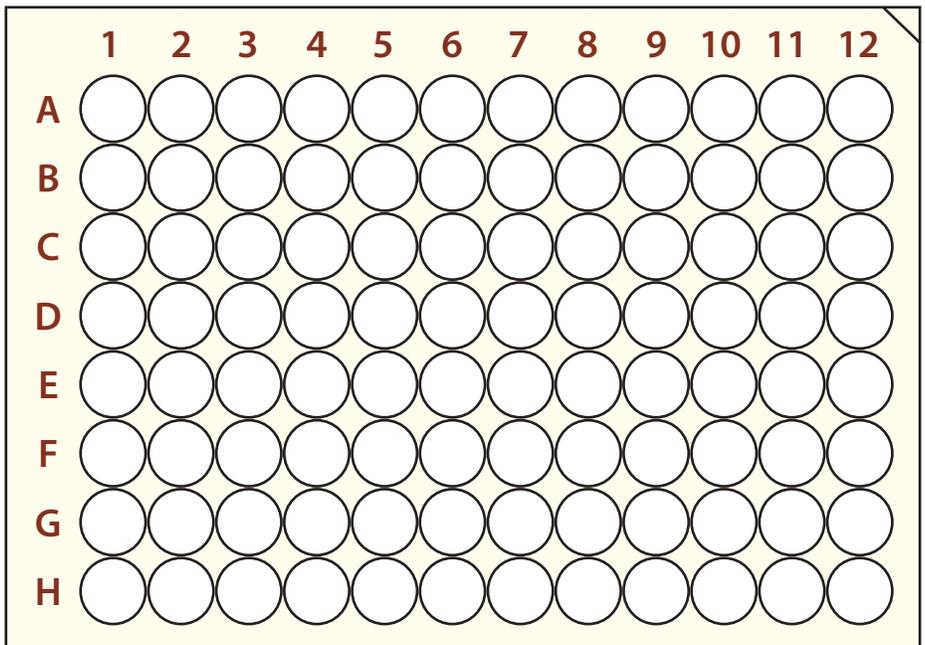


Can you follow the directions on the next page and color in the 96 well plates?

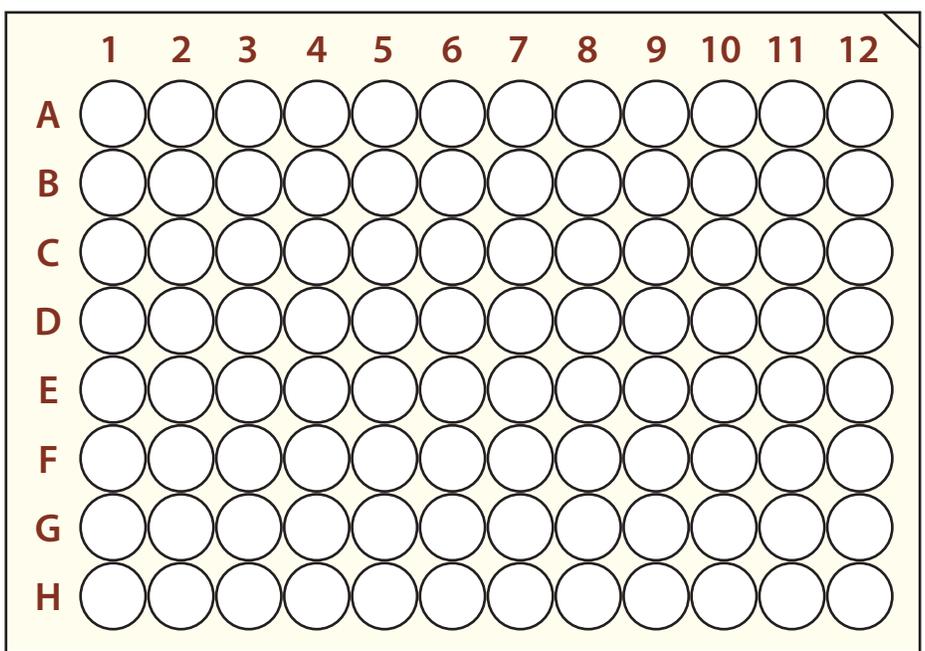


The Animal Disease Diagnostic Laboratory is a state lab where veterinarians can send samples to see if animals have certain diseases. Dr. Vemulapalli is in charge of the Molecular Diagnostics Laboratory. This is one laboratory that is part of the larger Animal Disease Diagnostic Laboratory. One of the diseases that Dr. Vemulapalli's lab tests for is influenza, or flu for short. Animals can get the flu just like people get the flu. Dr. Vemulapalli's lab can test many samples for flu at the same time. Each sample is put in a well on a single, special plate that has 96 wells. Yes, he can test 96 samples for flu at the same time! If a sample is positive, the well turns purple. If the sample is negative, the well stays clear.

Test 1: Color in the sample wells so that $\frac{1}{3}$ of the samples show a positive result. What percentage is this? _____



Test 2: Color in the sample wells so that 50% of the samples show a positive result. What fraction is this? _____



ANSWERS

Dr. Darryl Ragland grew up in New Jersey. He is a pig veterinarian. He visits farms and helps make sure that the pigs stay healthy.



Debbie Stevenson is a registered veterinary technologist from South Carolina. She helps Dr. Ragland on herd visits and helps farmers with their questions.

Pigs do not like to eat unless they have plenty of water to drink. A pig that weighs one hundred pounds must drink one gallon of water every day to stay healthy.

- If a pig weighs 200 pounds, how much water does it need to drink every day?
2 Gallons
8 Quarts
32 Cups
- If a pig weighs 50 pounds, how much water does it need to drink every day?
1/2 Gallons
2 Quarts
8 Cups



HINT BOX:
 1 Gallon = 4 Quarts
 1 Quart = 4 Cups
 1 Minute = 60 Seconds

PURDUE VETERINARY MEDICINE

2

You test the waterer (device pigs drink from) during a visit to the farm. One quart of water comes out of the waterer every minute.

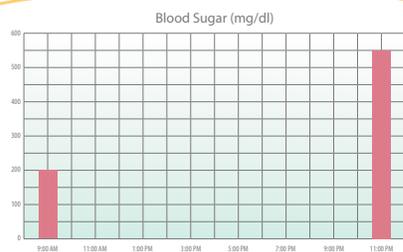
- How long will it take for one gallon of water to come out of this waterer?
4 Minutes
240 Seconds
- How long will it take for two cups of water to come out of this waterer?
1/2 Minutes
30 Seconds



Math 5.2.4, 5.3.7; Science 5.2.1

3

Diabetes is a problem that animals have when they cannot control their blood sugar (blood glucose). People and pets can get diabetes. Normal blood sugar for a cat is between 80 and 150 mg/dL. To check a cat for high blood sugar, we took samples every few hours and recorded them in the table (below). Make a graph of this cat's blood sugar test results, and mark if they are normal, too low, or too high.



- At 3:00 PM, this cat's blood sugar is:
 (Circle one)
 Too low Normal Too high

- At 9:00 PM, this cat's blood sugar is:
 (Circle one)
 Too low Normal Too high

Cat Blood Samples

TIME	BLOOD SUGAR
9:00 a.m.	200
11:00 a.m.	150
1:00 p.m.	90
3:00 p.m.	50
5:00 p.m.	150
7:00 p.m.	250
9:00 p.m.	400
11:00 p.m.	550

PURDUE VETERINARY MEDICINE

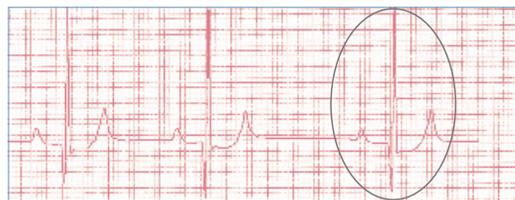
4



The heart beats many times every minute. One way to check if the heart beat is normal is to look at an electrocardiogram (ee-lek-troh-car-dee-oh-gram).

The veterinarian attaches a machine to the dog and looks at the dog's heart beat. It doesn't hurt at all.

This is an electrocardiogram from a dog. One normal heart beat is circled.



How many heart beats do you see? 3



PURDUE VETERINARY MEDICINE

6

ANSWERS

Dr. Henry Green grew up in Louisiana. He is a veterinarian that specializes in heart problems. His specialty is called cardiology. In Greek, "kardia" means heart.



Kim Dreher is from Massachusetts. She is a registered veterinary technologist that works in the cardiology section. She helps puppies with heart problems so they can go home to the kids who own them.

We usually count the number of times a heart beats each minute. A normal dog's heart will beat between 70 and 120 times each minute. The electrocardiogram on page 6 shows the number of heart beats in two SECONDS.

- How many times did this dog's heart beat in one minute? (Remember, there are 60 seconds in one minute.)

90 times

- This dog's heart is beating (Circle one)

Too Slow **Normal Speed** Too Fast



HINT BOX:
Dog Heart Rate
Less than 70 – Too slow
70-120 – Normal
121 and higher – Too Fast

Math 5.3.2; Science 5.2.1

7

Can you help Dr. Gruenberg with these milk production questions?



Dr. Walter Gruenberg is from Germany. He is a veterinarian that specializes in dairy cattle. Dairy cattle produce the milk that people drink.

- Herd 1 has 60 dairy cows. Each cow produces 15,000 pounds of milk in one year. How much total milk does Herd 1 produce in one year?

900,000 pounds

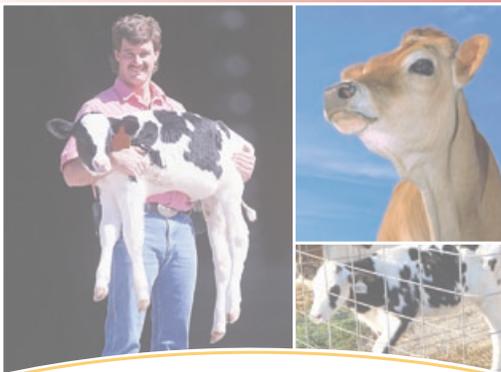
- Herd 2 has 10,000 dairy cows. Each cow produces 19,000 pounds of milk in one year. How much total milk does Herd 2 produce in one year?

190,000,000 pounds



PURDUE VETERINARY MEDICINE

8



One dairy cow produces about 20,000 pounds of milk every year!

- A dairy farmer wants to buy enough cows to produce 300,000 pounds of milk in one year. He finds some cows for sale that produce 17,000 pounds of milk each year. How many cows does he need to buy?

18 cows

- Your friend says that her 5 cows can produce 350,000 pounds of milk each year. Explain why you think she is wrong.

Normally a cow produces about 20,000 pounds of milk. Each cow would have to produce 70,000 pounds of milk for her to get 300,000 pounds. That is over 3.5 times the milk production of an average cow.

Math-5.2.1, 5.2.6 English/Language Arts 5.4.11; Science 5.1.2, 5.2.1

9

Jessica Schneider grew up in Ohio. She is a registered veterinary technologist. Sometimes she helps care for animals, sometimes she helps with research, and sometimes she helps teach.



Can you help Jessica with her project?

Jessica wants to test if a disinfectant will work to clean a pig feeder. Jessica mixes the disinfectant with water according to the directions on the label of the bottle. The label directs Jessica to add one half of an ounce of disinfectant to one gallon of water.

- How many ounces of disinfectant should Jessica add to 5 gallons of water?

$2\frac{1}{2}$



PURDUE VETERINARY MEDICINE

10

ANSWERS

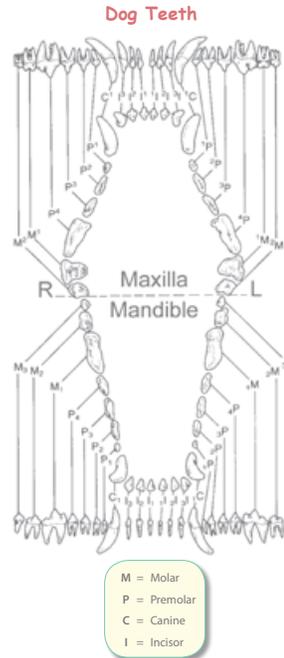


There are thousands of germs on the dirty feeder. Jessica cleans the feeder and then applies the disinfectant. She waits 10 minutes to let the disinfectant kill the germs. Next, Jessica samples the feeder for germs. Jessica will consider that the disinfectant worked if there are less than 10 germs per square centimeter of the feeder surface. Jessica samples a 10 centimeter long by 5 centimeter wide area of the feeder. To calculate square centimeters, you multiply the length and width of the area sampled.

- How many square centimeters did Jessica sample?
50 cm²
- Jessica took her sample to the lab, spread it on culture plates, and put it in a warm incubator overnight to let the germs grow. The next morning she counted 100 germs on the plate. Using your answer from number 1, how many bacteria grew per square centimeter of feeder sampled?
2 bacteria
- Using your answer for number 2, did the disinfectant work?
Yes

Math 5.2.1; 5.5.4; Science 5.2.1

11



- How many teeth does the dog have on top? **20**
- How many teeth does the dog have on the bottom? **22**
- How many total teeth does the dog have? **42**
- What fraction of the dog's teeth are molars? **10/42**
- What fraction of the dog's teeth are premolars? **16/42**
- What fraction of the dog's teeth are canine teeth? **4/42**
- What fraction of the dog's teeth are incisors? **12/42**

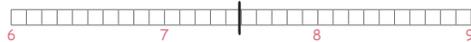
Math 5.1.5; Science 5.2.1

13

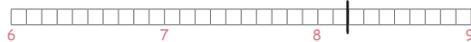
1. Daisy's Total Protein: Too Low **Normal** Too High



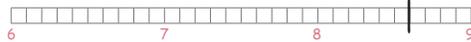
2. Buster's Total Protein: Too Low Normal **Too High**



3. Flower's Total Protein: Too Low Normal **Too High**



4. Candy's Total Protein: Too Low Normal **Too High**



Math 5.1.7

15



- A veterinary _____ helps a veterinarian, just like a nurse helps a doctor.
- The first step in the scientific method is to ask a _____.
- A _____ is an educated guess about how things work.
- Purdue University has a School of _____ Medicine, where you can learn to be a veterinarian, a veterinary technician, or a veterinary technologist.
- After finishing an experiment you should _____ the data and draw a conclusion.
- The scientific _____ is a way to ask and answer scientific questions.
- Purdue University is located in West _____, Indiana.

English/Language Arts 5.2.3

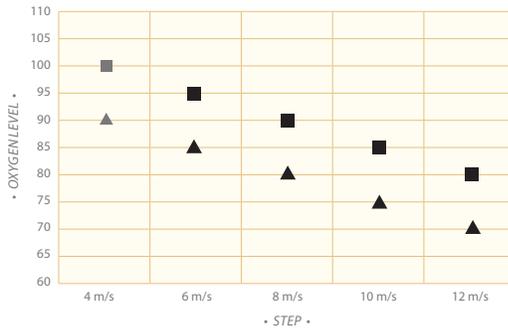
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ANSWERS

Can you graph the oxygen levels for the two horses and figure out which horse has heaves?

Step	Horse 1 (Square) ■	Horse 2 (Triangle) ▲
4 m/s	100	90
6 m/s	95	85
8 m/s	90	80
10 m/s	85	75
12 m/s	80	70

Heaves Results

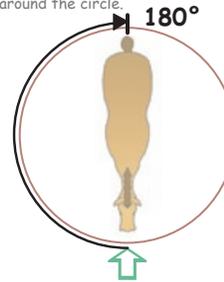


Which horse has heaves? Horse 2

Math 5.3.7, 5.7.1; English/Language Arts 5.2.1

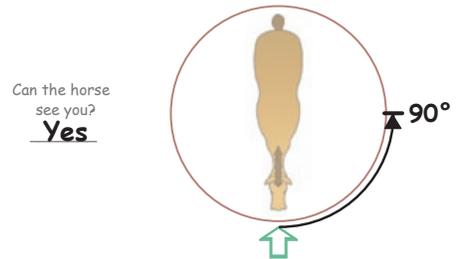
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1. You start facing the horse and then you move 180 degrees to your left around the circle.



Can the horse see you?
No

2. You start facing the horse and then you move 90 degrees to your right around the circle.



Can the horse see you?
Yes

Math 5.4.7

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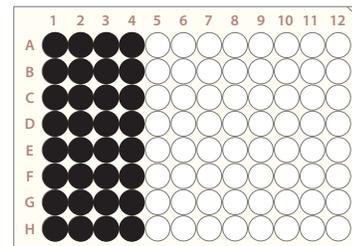
Fahrenheit Temperatures to Celsius Temperatures

	Fahrenheit (°F)	Celsius (°C)
Human	97.5 to 99.5	36.4 to 37.5
Dog	100.5 to 102.5	38.1 to 39.2
Cat	101 to 102.2	38.3 to 39.0
Cow	101 to 102	38.3 to 38.9
Horse	99.5 to 101.4	37.5 to 38.6
Sheep	101 to 103	38.3 to 39.4
Goat	102 to 103	38.9 to 39.4
Pig	101.5 to 102.5	38.6 to 39.2

Math 5.5.6; Science 5.2.1

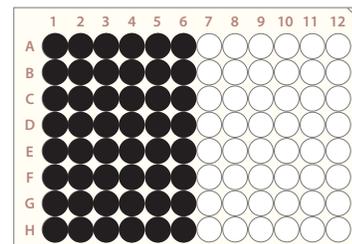
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- Test 1: Color in the sample wells so that 1/3 of the samples show a positive result. What percentage is this? **33.3%**



32 circles should be colored.
Your picture might have a different pattern.

- Test 2: Color in the sample wells so that 50% of the samples show a positive result. What fraction is this? **48/96**



48 circles should be colored.

Math 5.1.4; Science 5.2.1, 5.2.2

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**EXPERT
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