

“Horse Guts And Math”



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Artwork by World Renowned Artist
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Cornell Cooperative Extension offers equal program and employment opportunity.

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PLEASE NOTE: Feel free to print and/or make copies of any of the pages for handouts as needed.

*Thank you for using the “Horse Guts and Math” curriculum!
We hope you will enjoy it and have FUN!!*

INTRODUCTION

Welcome to the “**Horse Guts and Math**” curriculum!! This curriculum was designed to be a user friendly, no frills, low cost, **experiential learning activity** using the **magnet of the horse** to entice children to develop math and science skills...and have a whole lot of **FUN** doing it! We promise that the adults involved with this project will have **FUN** too!!

The project is designed to be picked up and used with **minimal teacher/leader preparation time**. Supplies for this project are already available in most class rooms, homes, or picked up at the local store.

The project includes different activities that should be appropriate for **Grade Levels 1st-6th**. Knowing that each state’s curriculum requirements and learning standards vary across the nation – it is hoped that this project will fit easily into **most school’s curriculum requirements** for science, mathematics, technology, language arts, communications, creativity, listening, problem solving, and team building skills development.

It is hoped that this project will also be used by many youth groups such as Boy Scouts, Girl Scouts, 4-H clubs, Pony Club, YMCA, community groups, etc.

Good luck and have FUN!! Who said learning had to be boring!

ACKNOWLEDGEMENTS

Special thanks to reviewers:

- Participants at the Science Connections Conference, Cornell University 2000
- Participants at the American Youth Horse Council Symposium, Rock Hill, South Carolina 2002
- Participants at the Strengthening 4-H Conference, Cornell University 2003
- Steve Billings, Kelly Ann Radzik – Cornell Cooperative Extension Educators
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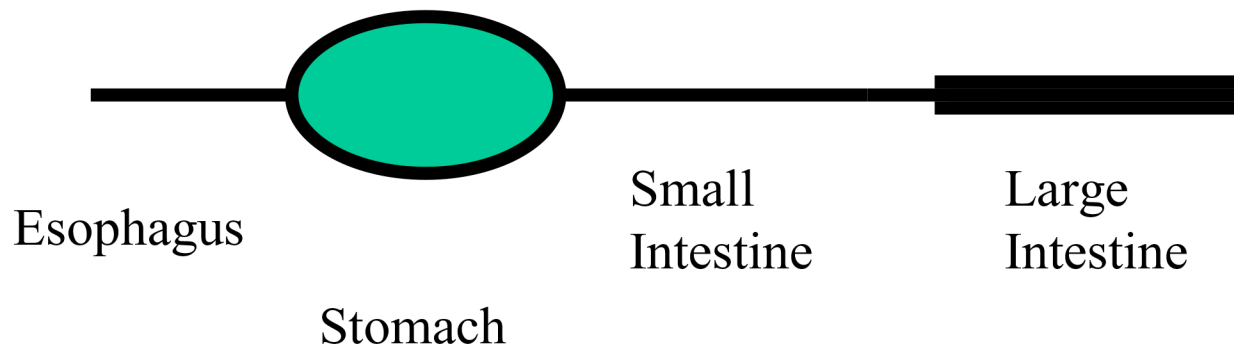
- Susan E. Harris

CONTACT INFORMATION

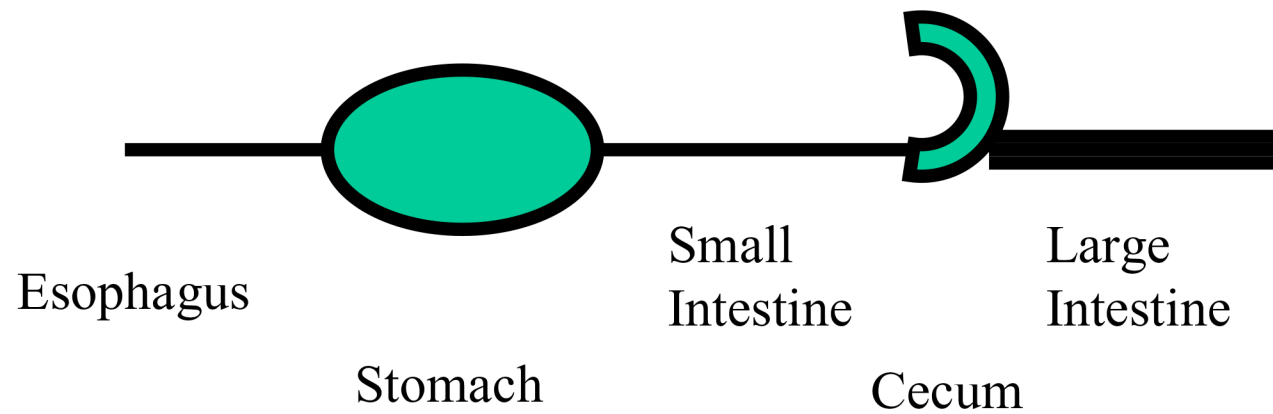
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“Horse Guts and Math” is posted to the
Department of Animal Science/
NYS 4-H Horse Program website at
<http://4h.ansci.cornell.edu/animal-programs/horses/>

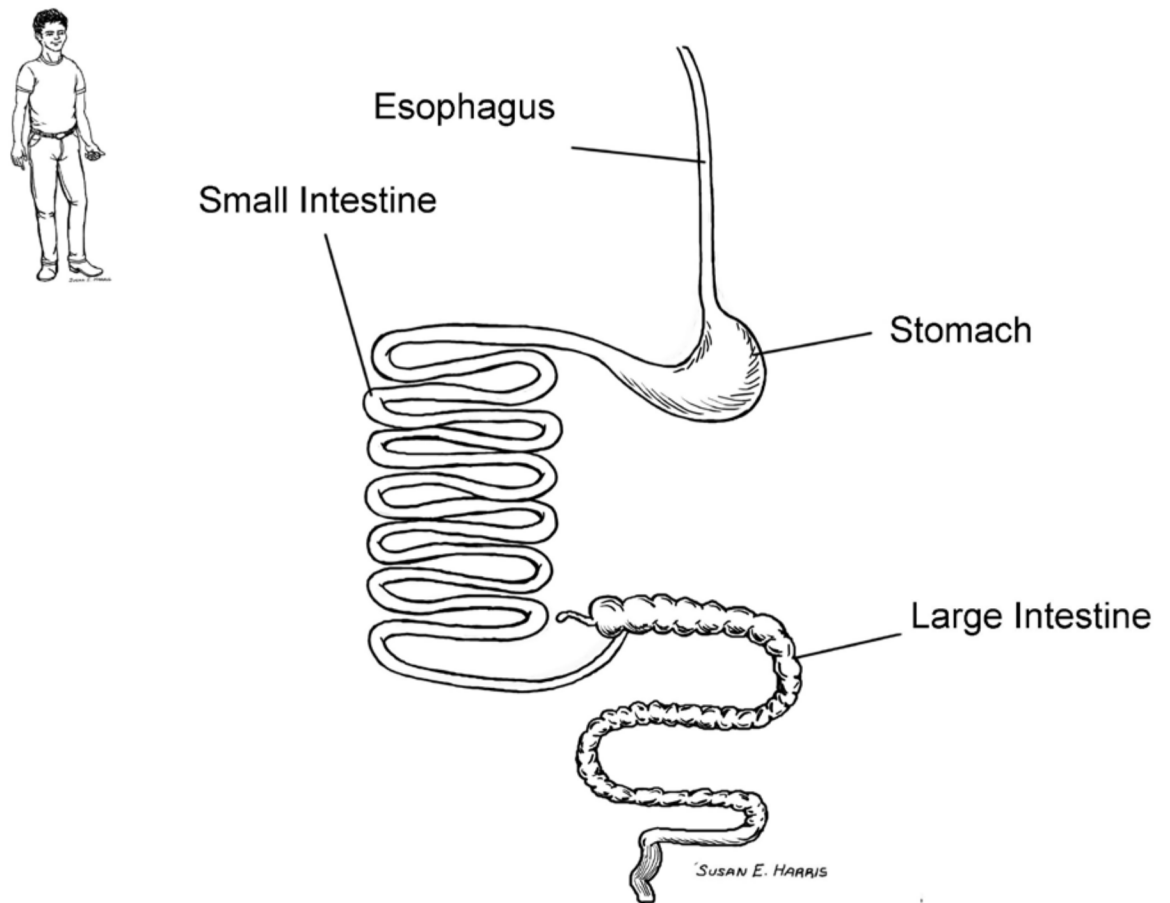
**So what are the major parts
of the Digestive Tract
of a Human???**



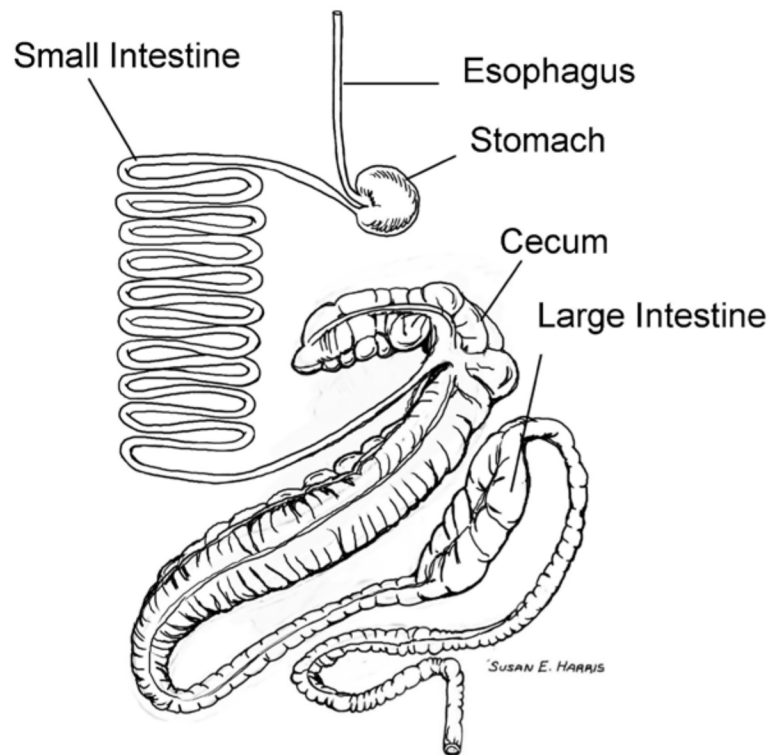
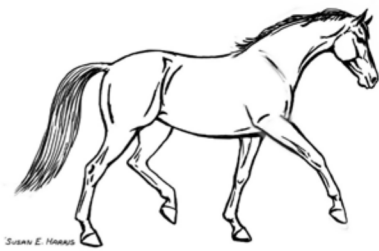
**So what are the major parts
of the Digestive Tract
of the Horse???**



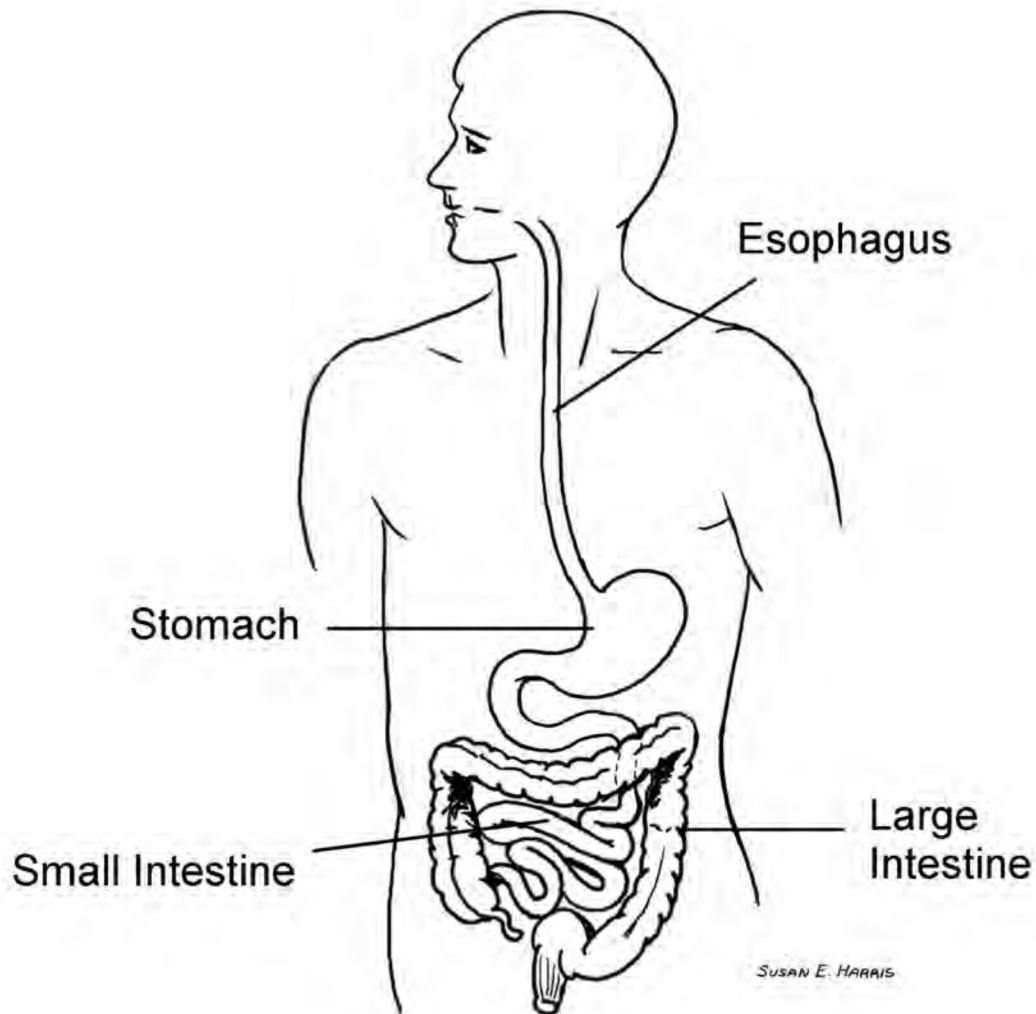
What does the digestive tract of a human really look like??



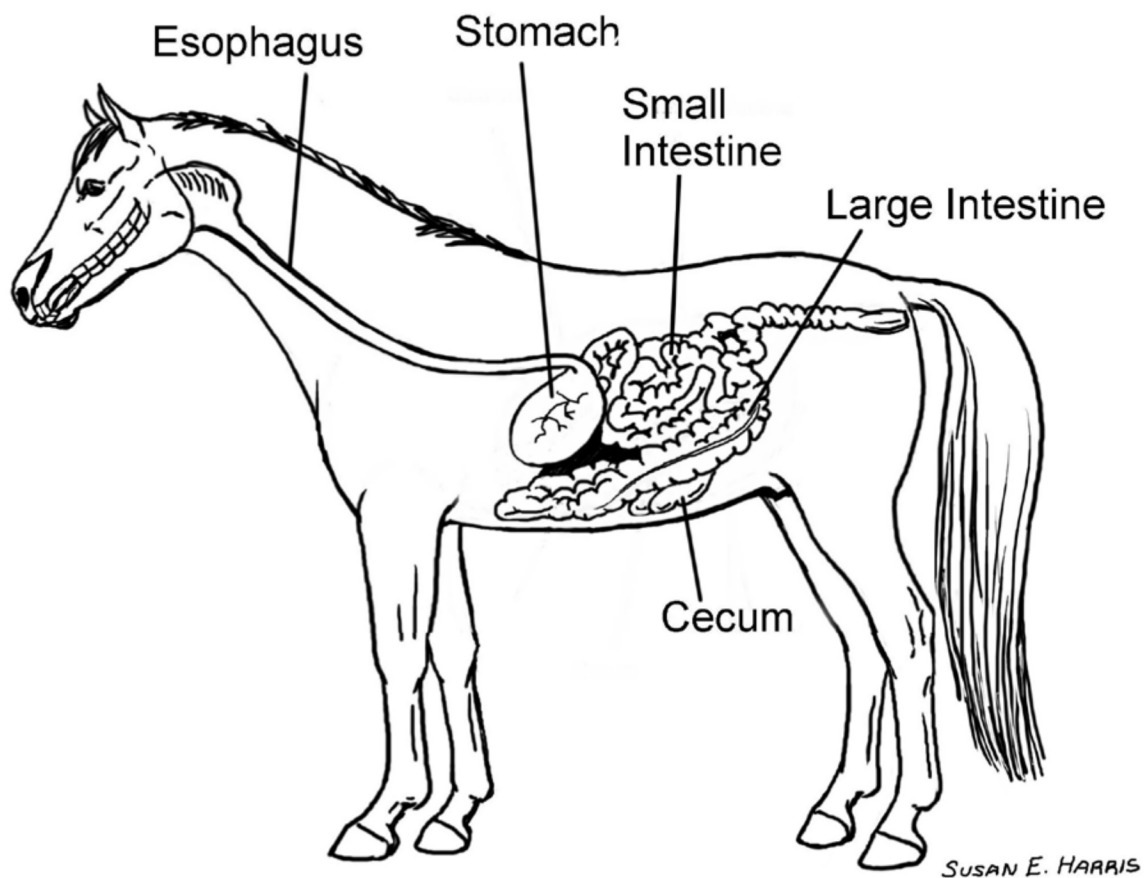
What does the digestive tract of a horse really look like??



What does the digestive tract really look like inside of a human??



What does the digestive tract really look like inside of a horse??



“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

	<u>HUMAN</u> * (approximate in feet)	<u>HORSE</u> ** (approximate in feet)
Esophagus	1	5
Stomach	½	1
Small Intestines	18	70
Cecum	none	4
Large Intestine	5	23

* *Foods and Nutrition Encyclopedia*

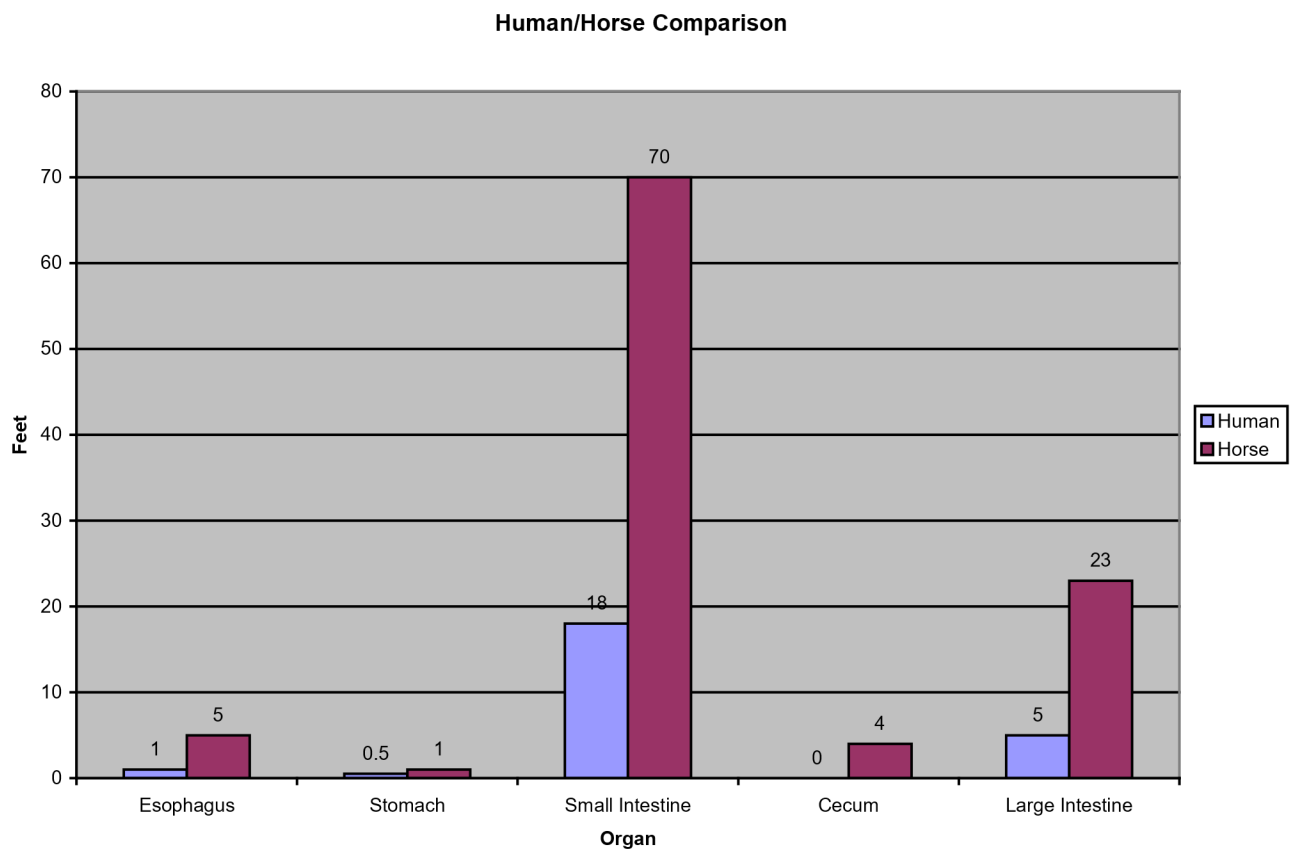
** *Equine Science, Basic Knowledge for Horse People of All Ages*

PLEASE NOTE: This project is being presented in feet, not in meters – due to the ease of the mathematic comparisons. This will be a good learning experience for the youths to learn about the measuring system that was and still is so widely used in the United States. A teacher/leader could expand this project and also work the solutions in the metric system if desired.

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Digestive Tract Comparison



“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Getting Ready

WHAT WILL YOU NEED?:

- **Five different color yarns**
 Four of the colors - at least 45 feet
 One of the colors - at least 100 feet
- **A yard stick**
- **A ruler**
- **A 25 or 50 foot tape measure**
- **Masking tape**
- **Markers**
- **Paper**
- **Scissors**
- **A good dose of patience and a big dose of laughter!**
- **An ability to have FUN with kids!**

ACTIVITIES # 1 & # 2

Everyone does these 2 activities

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity # 1

WHAT ARE YOU GOING TO DO?:

- Take your box of supplies into the hallway
- Set out the different color of yarns
- Have the youth decide which color they will use for each different part of the digestive tract of the human and of the horse and record them in Chart 1
- Have the following pre-measured distances already marked for the youth in the hallway:
 - ½ foot
 - 1 foot
 - 5 feet
 - 10 feet
 - 50 feet

So...have the youth look on the floor for the markings.

- Now have the youth measure each part of the digestive tract of the human and the horse (in order and with the correct color yarn that they have selected). Tie a knot to the next color to keep the yarn in order of the parts of the digestive tract.
- Remember to do one for the human and one for the horse.
- How is your patience doing? How many questions have the youth asked so far?
- Are you having FUN yet?

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

CHART 1

(Goes with Activity #1 - make as many
copies as there are youths)

	<u>HUMAN*</u> (approximate in feet)	<u>COLOR</u> (record)	<u>HORSE**</u> (approximate in feet)	<u>COLOR</u> (record)
Esophagus	1		5	
Stomach	½		1	
Small Intestines	18		70	
Cecum	none		4	
Large Intestine	5		23	

* *Foods and Nutrition Encyclopedia*

** *Equine Science, Basic Knowledge for Horse People of All Ages*

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity # 2

LET’S MAKE SOME COMPARISONS:

Now that you are all twisted up in different colored yarn, let’s take a look at what we did.

- Using labels in the back of this booklet and a piece of masking tape, label the human digestive tract **HUMAN**
- Using labels in the back of this booklet and a piece of masking tape, label the horse digestive tract **HORSE**
- Using labels in the back of this booklet and a piece of masking tape, label all of the parts of the digestive tract of both the **HUMAN** and the **HORSE**
- Lay both out in the hallway and just look at
 - how long they are
 - how they are similar
 - how they are different
- Make some visual comparisons or observations
- Write some of the things that you observed in Chart # 2
- Are you having FUN yet?

“HORSE GUTS AND MATH”

Human and Horse Comparisons

CHART 2

(goes with Activity # 2)

(make as many copies as there are youths)

SOME THINGS THAT WE NOTICED:

(list at least 2 things that you noticed – there is room for more!!)

•

•

•

•

•

ACTIVITY # 3

This activity is for the really young ones, those who can understand simple math concepts but do not have the math problem solving skills to perform a written solution - generally 1st and 2nd grade levels.

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity # 3 (Part 1)

OK, LET’S DO SOME MATH!!:

This activity is for the really young ones, those who can understand simple math concepts but do not have the math problem solving skills to perform a written solution.

THE QUESTION:

How many times longer is the large intestine of the human than the esophagus of the human?

HOW DO YOU SOLVE THE PROBLEM?

- Cut the human esophagus section
- Cut the human large intestine section
- Have the youth decide which one is shorter
- Have two youths hold the length of esophagus (the shorter one) - with one youth on each end – stretch it out loosely...not too tight!
- Now hand one end of the large intestine to one of the youths already holding an end of the esophagus and have another youth run the length of large intestine back and forth...back and forth...thus comparing the length of large intestine to the length of the esophagus - and count how many times they can do this.
- Now make them stop and think....“which one” is longer?
- “How many times” longer?

WHAT IS THE ANSWER??:

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity 3 **(Part 2)**

LET THE YOUTH CREATE THEIR OWN SCIENTIFIC QUESTION:

This activity is for the really young ones, those who can understand simple math concepts but do not have the math problem solving skills to perform a written solution.

THE QUESTION:

How many times longer is the _____ of the _____ than the
_____ of the _____?

HOW DO YOU SOLVE THE PROBLEM?

-
-
-
-
-

WHAT IS THE ANSWER??*:

* **NOTE:** Knowing that this group of youths can not do division or work with decimal points – it is OK to have an answer **Example:** “5 times plus a little bit more”

ACTIVITY # 4

This activity is for youth that understand math concepts, decimal points, can solve a written math problem, and perform simple division – generally 3rd and 4th grade levels.

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity # 4 (Part 1)

OK, LET’S DO SOME MATH!!:

This activity is for youth that understand math concepts, decimal points, can solve a written math problem, and perform simple division.

THE QUESTION:

How many times longer is the large intestine of the horse than the large intestine of the human?

HOW DO YOU SOLVE THE PROBLEM?

- Have the youth decide which one is shorter
- Cut the human large intestine section
- Cut the horse large intestine section
- Split the youth into two problem solving groups
- Have group 1 hold the length of the human large intestine (the shorter one) - stretch it out loosely...not too tight!
- Have members in group 1 run the lengths of horse large intestine back and forth...back and forth...thus comparing the length of the horse large intestine to the human large intestine - and count how many times they can do this
- Have group 2 solve the problem by hand, on paper
- Ask group 1 what the answer is
- Ask group 2 what the answer is

WHAT IS THE ANSWER??:

How did they do? Did both groups get the same answer?

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity # 4 **(Part 2)**

LET THE YOUTH CREATE THEIR OWN SCIENTIFIC QUESTION:

This activity is for youth that understand math concepts, decimal points, can solve a written math problem, and perform simple division.

THE QUESTION:

Let the youth create their own scientific question. Have them write the question below:

HOW DO YOU SOLVE THE PROBLEM?

-
-
-
-
-

WHAT IS THE ANSWER??:

ACTIVITY # 5

This activity is for youths that understand more complicated math concepts, decimal points, can solve written math problems, and perform division – generally 5th and 6th grade levels.

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity # 5 **(Part 1)**

OK, LET’S DO SOME MATH!!:

This activity is for youths that understand more complicated math concepts, decimal points, can solve written math problems, and perform division.

THE QUESTION:

How many times longer is the small intestine of the horse than the small intestine of the human?

HOW DO YOU SOLVE THE PROBLEM?

- Have the youth decide which one is shorter
- Cut the human small intestine section
- Cut the horse small intestine section
- Split the youth into two problem solving groups
- Have group 1 hold the length of the human small intestine (the shorter one) - stretch it out loosely...not too tight!
- Have this group run the lengths of horse small intestine back and forth...back and forth...thus comparing the length of the horse small intestine to the human small intestine – and count how many times they can do this
- Have group 2 solve the problem by hand, on paper
- Ask group 1 what the answer is
- Ask group 2 what the answer is

WHAT IS THE ANSWER??:

How did they do? Did both groups get the same answer?

“HORSE GUTS AND MATH”

Human and Horse Comparisons

Length of the Digestive Systems

Activity # 5 **(Part 2)**

LET THE YOUTH CREATE THEIR OWN SCIENTIFIC QUESTION:

This activity is for youths that understand more complicated math concepts, decimal points, can solve written math problems, and perform division.

THE QUESTION:

Let the youth create their own scientific question. Have them write the question below:

HOW DO YOU SOLVE THE PROBLEM?

-
-
-
-
-

WHAT IS THE ANSWER??:

Labels

(can be laminated or copied on stiff paper)

HUMAN

HUMAN ESOPHAGUS

HUMAN STOMACH

HUMAN SMALL INTESTINE

HUMAN LARGE INTESTINE

Labels

(can be laminated or copied on stiff paper)

HORSE

HORSE ESOPHAGUS

HORSE STOMACH

HORSE SMALL INTESTINE

HORSE CECUM

HORSE LARGE INTESTINE

TEACHER or LEADER KEY

Activity # 3 (Part 1):

Answer to Activity: The human large intestine is “5 times longer” than the human esophagus.

Activity # 4 (Part 1):

Answer to Activity: The horse large intestine is “about 4 and ½ times longer” than the human large intestine. *Another acceptable answer would be – The horse large intestine is “more than 4 times longer” than the human large intestine. Be flexible with their responses.*

Written Answer: The horse large intestine is “4.6 times longer” than the human large intestine.

Activity # 5 (Part 1):

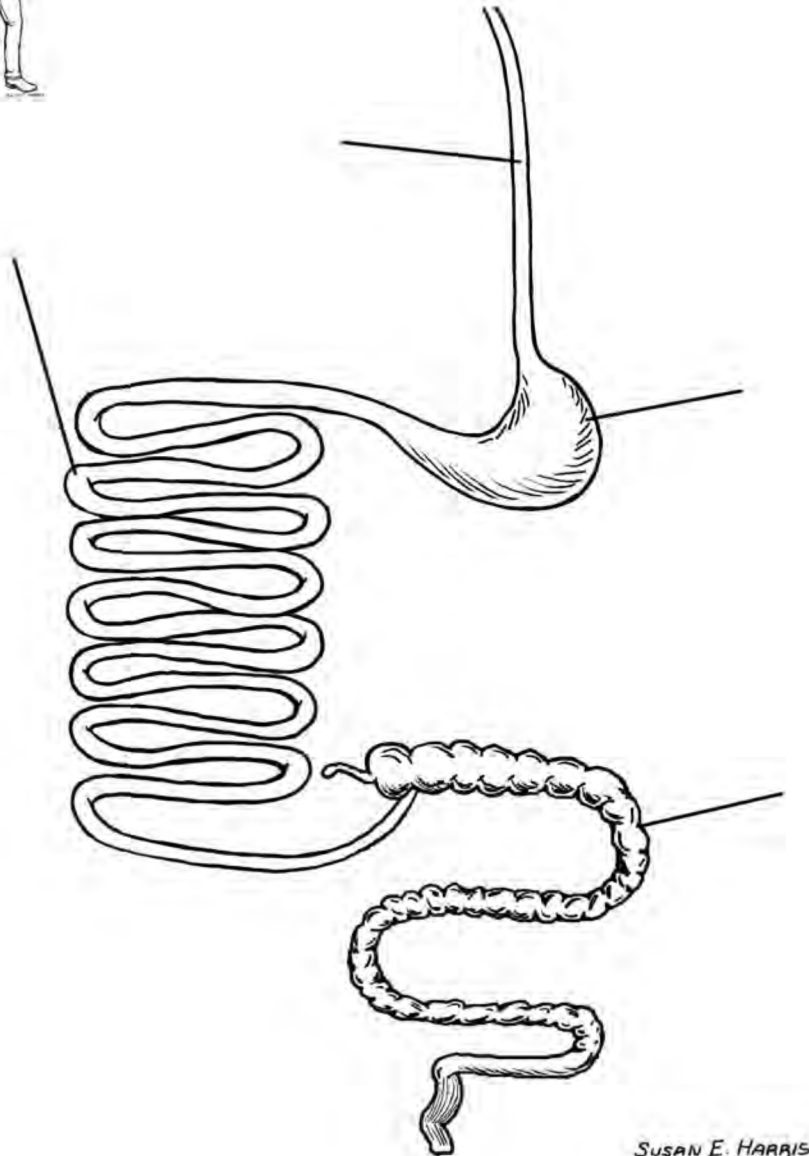
Answer to Activity: The horse small intestine is “almost 4 times longer” than the human small intestine.

Written Answer: The horse small intestine is “approximately 3.9 times longer” than the human small intestine.

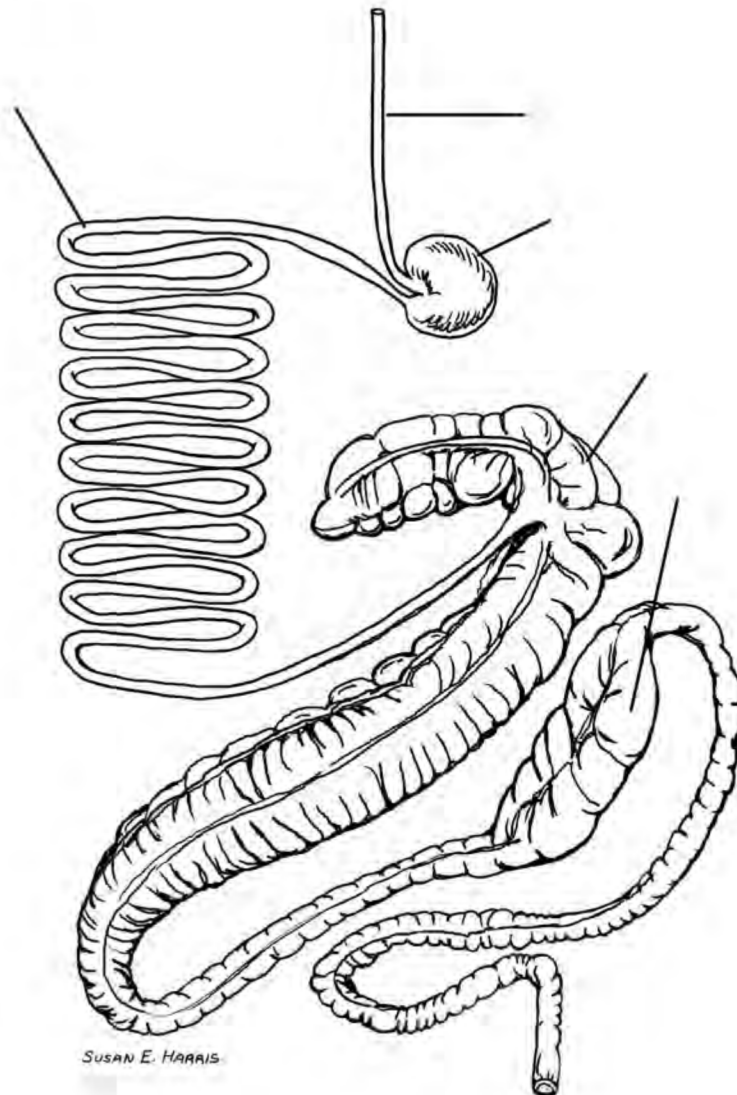
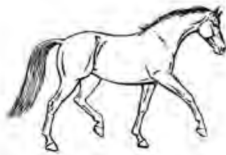
NOTE:

All other answers must be solved by the teacher/leader for the correct answer – depending upon the problem that youths have created to be solved.

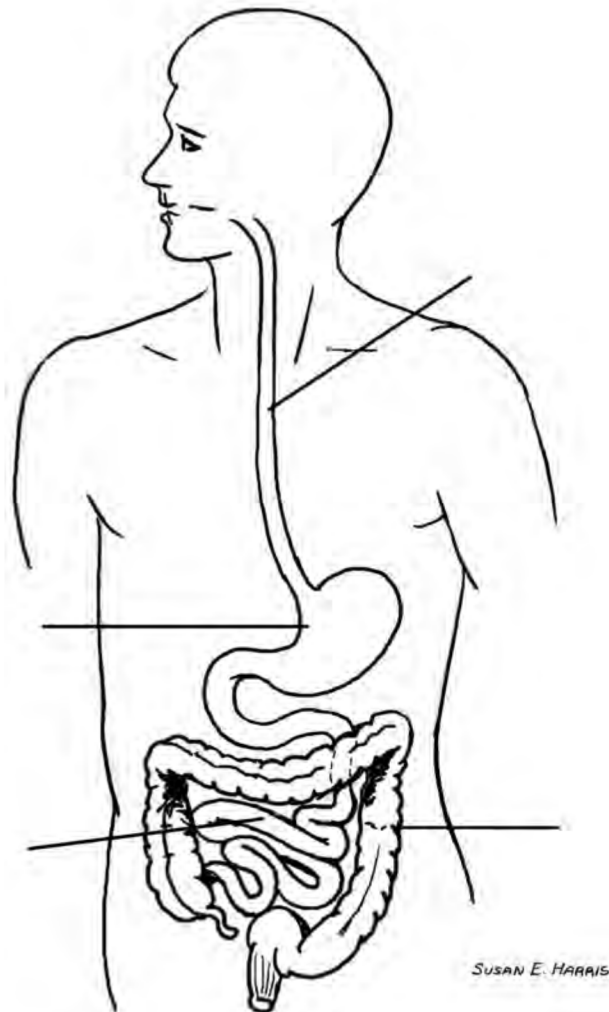
Label the parts of the digestive tract of the human.



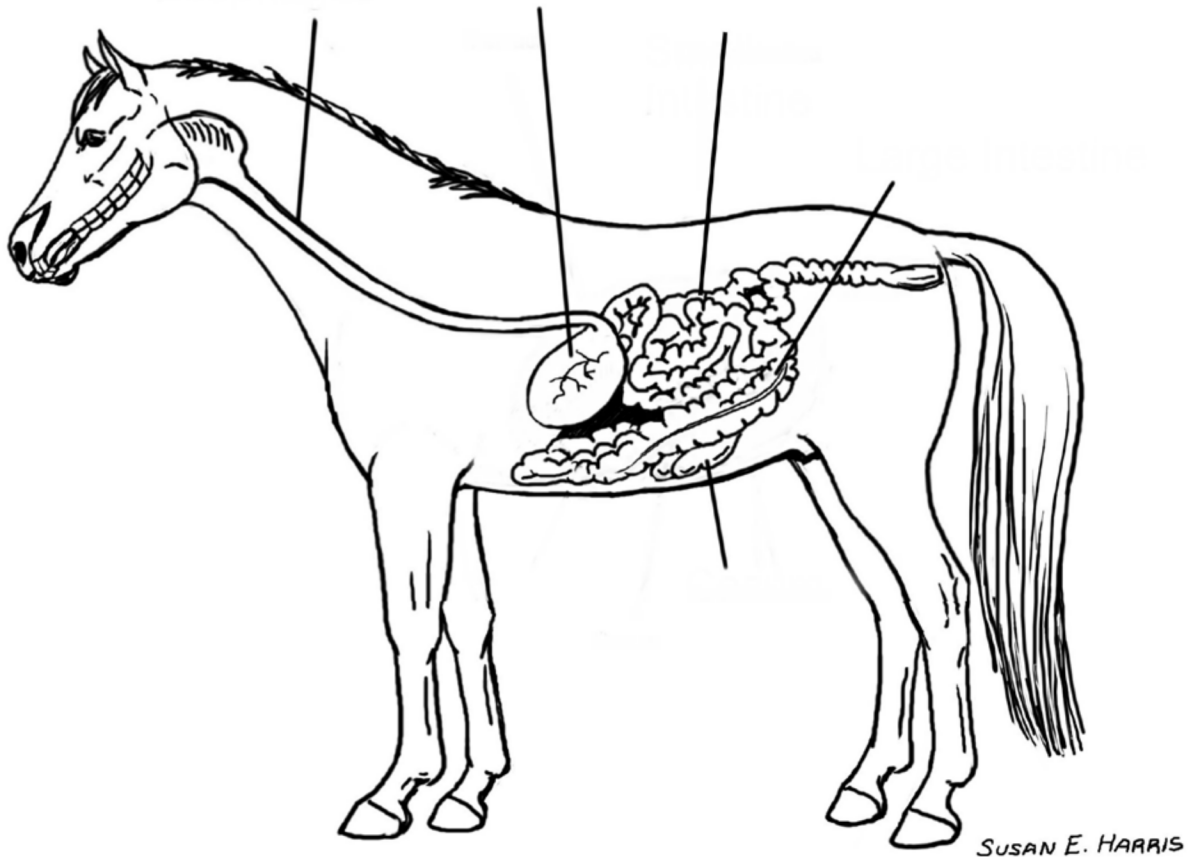
Label the parts of the digestive tract of the horse.



Label the parts of the digestive tract inside the human.



Label the parts of the digestive tract inside the horse.



Reference List

Antoniewicz, Ray A. *Horse Science: An Educational Resource (Revised and Expanded)*, Chevy Chase, MD: National 4-H Council, 2001.

Ensminger, A.M., M.E. Ensminger, J.E. Kondlande and J.R.K. Robson *Foods and Nutrition Encyclopedia*, Clovis CA: Pegus Press, 1983.

Griffiths, Jean T. *Equine Science, Basic Knowledge for Horse People of All Ages*, Gaithersburg, MD: Equine Network, 2008.

A Few Other FUN “Kids and Horses” Resources

Junior Master Horseman
Level One – 2006; Level Two - 2007
The American Quarter Horse Association (AQHA)
Junior Master Horseman TM
P.O. Box 200
Amarillo, TX 79168
806-376-4811
E-mail – jmh@aqha.org
www.JuniorMasterHorseman.com

Horse Book in a Bucket - 1999
Jean T. Griffiths
Cornell University
125 Morrison Hall
Ithaca, NY 14853
607-255-2857
E-mail – jtg4@cornell.edu
* *This educational program is available in New York State through your local county's Cornell Cooperative Extension 4-H office – please contact them directly.*

Skills for Life, Animal Science Series/Horse - 2004
Includes Levels 1, 2 3, 4, 5 and a Helpers Guide
National 4-H Cooperative Curriculum System, Inc.
E-mail – 4hcurriculum@n4hccs.org

Youth Leaders Manual - 1998
American Youth Horse Council (AYHC)
Purchase from:
www.HorseBooksEtc.com
800-952-5813

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