

Model Science – Gastrointestinal (GI) Physiology

LEVEL:	Grades 7-8
TYPE OF CONTEST:	Individual/Team
COMPOSITION OF TEAMS:	1-2 students per team
NUMBER OF TEAMS:	3 teams per Center
SPONSOR:	Ben Louie, Associate Director, USC MSP Center
OVERVIEW:	Students will construct an original model of the human gastrointestinal tract and will answer questions drawn from an assigned list using reading material provided in the MESA Day curriculum.
MATERIALS:	The following materials will be provided by the student:

- “Items that are not perishable” with which to build their model

RULES:

1. The display/model should be clearly labeled with student name(s), school and center. ***If display/model is not clearly labeled with student name(s), school and center, a 3.6 point penalty will be deducted from the grand total score.***
2. Designated materials that are not perishable must be used in the model’s construction. Use of any other items will result in disqualification. Commercial models may NOT be use. **Violation of this rule and only this rule will result in disqualification.** Students are encouraged to fully incorporate a variety of designated materials in the model.
3. The display and model should meet minimum and maximum size requirements.
(See JUDGING #1)
4. The display should be freestanding.
5. A labeled hand-drawn diagram of the GI tract should be attached to the front of the display.
6. A materials table should be attached to the display.

7. The model of the GI tract should be clearly labeled.
8. The competitors will attempt to answer five randomly drawn questions, plus unpublished tiebreaker questions. (See JUDGING #6 – 10)

JUDGING:

The competition will be judged in two components. Judges will receive the “Score Sheet for Model Science – GI Physiology” from the MESA Day Host Center.

Component I: Display and Model of the GI Tract

1. One point will be awarded for each of the following: **(4 points maximum)**
 - a. The display including the stand and all of its components fits into a space that is 3 feet high by 3 feet wide by 2 feet deep. The model of the GI tract is no larger than 2 feet high by 2 feet wide by 2 feet deep and no smaller than 1 foot high by 1 foot wide by 1 inch deep. The model may be attached to the display board, but it also may need not.
 - b. The display is freestanding at the time of judging.
 - c. The display has a clearly labeled (10 required elements), hand-drawn diagram of the GI tract on the front.
 - d. The display has a table of all materials utilized. Points will be awarded to models that most fully incorporate a variety of designated materials. A sample follows:

Model Science – GI Physiology – Materials Table

Element	Material
1. Mouth	Sponge
2. Esophagus	Rubber Tubing
3.	
4.	

2. One point will be awarded for each of the 10 required elements listed below: (0.5 points if the element is present and an additional 0.5 points if the element is labeled, **10 points maximum**)

Element	Present (0.5 points)	Labeled (0.5 points)
Mouth		
Esophagus		
Stomach		
Duodenum		
Jejunum		
Ileum		
* Colon <i>(if ONLY the “colon” is presented and labeled, a total of 1 point will be awarded only)</i>		
Ascending		
Transverse		
Descending		
Sigmoid		

3. Bonus points may be awarded for up to 4 additional elements other than the required elements listed in Judging #2. These extra elements must aid in GI function and must be correctly placed, labeled, and listed on the materials table. (1 point per additional element, **4 points maximum**)

MESA DAY CONTEST RULES 2009– 2009

Master Set

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4. Points will be awarded for accuracy. Is the overall model a realistic and true representation of the GI tract? Is the model accurate in anatomical location and size of various elements? **(4 points maximum)**
5. Points will be awarded for creativity. Do the model and various elements display characteristics of originality and creativity in terms of overall composition? Are the different elements variable with different colors, textures, length and dimensions? Is the use of materials used to depict the different elements creative? **(4 points maximum)**

Component II: Understanding GI Physiology

6. Students will answer five questions from an assigned list based on information provided in the MESA Day curriculum. **(10 points maximum)**
7. Judges will determine the order of teams by a random drawing.
8. Students will randomly select the 5 questions.
9. Each correct answer will be awarded 2 points. Partial points may be awarded for partial answers.
10. There will be a set of 5 previously unpublished tiebreaker questions available on the day of the competition. Each tiebreaker question will be worth 2 points each. **(10 points maximum, depending on number of tiebreaker questions used)**

AWARDS: Awards will be given for 1st, 2nd and 3rd place.

Model Science – Gastrointestinal Physiology
Specification Checklist for Students

- 2008 – 2009 MESA Day Rules were used.
- Only items which are **not perishable** have been used.
- The display/model is clearly labeled with student name(s), school and center.
- The **display** fits into a space that is 3 ft. x 3 ft. x 2 ft.
- The **model** of the GI tract is no larger than 2 ft. x 2 ft. x 2 ft.
- The **model** of the GI tract is no smaller than 1 ft. x 1 ft. x 1 inch.
- The **model** of the GI tract is clearly labeled.
- A hand drawn diagram of the GI tract is attached to the display.
- The hand drawn diagram is labeled.
- A materials table is attached to the display.

ATTACHMENTS:

Questions for Model Science – GI Physiology
Score Sheet for Model Science – GI Physiology

Questions for Model Science – GI Physiology

2008-2009

Grades 7 & 8

Students must be prepared to answer each question with a complete sentence or sentences.

1. Name two body organs that lie outside the GI tract and directly aid in the digestion of food.
2. What is mastication?
3. What are at least 3 things that saliva does?
4. Besides eating food, what 3 things can cause saliva secretion in humans?
5. Define peristalsis.
6. Name 3 parts of the stomach.
7. Name 3 functions of the stomach.
8. What is the pH of chyme?
9. Name the 3 parts of the small intestines.
10. What is the primary function of the colon?
11. Name the four main sections of the colon.
12. What is bile?
13. Bile is secreted into the bile duct by what organ? And when not in use excess bile is stored where?
14. Name three important functions of the liver.
15. What is the most important function of intestinal villi?
16. What is responsible for the brown color of feces?
17. What is defecation?
18. Define mechanical and chemical digestion.
19. What causes gastroesophageal reflux disease?
20. Digestion and absorption occur in what major portion of the GI tract?

Score Sheet for Model Science – GI Physiology

Grades 7 & 8

Copies of this score sheet will be provided by the MESA Day Host Center.

Student Name(s): _____

Center & School: _____

Judges: _____

Part I: General Display/Model Criteria (4 points total)

One point for each criterion met:

Size _____ Freestanding _____ Diagram _____ Materials Table _____

Subtotal for Part I _____

Part II: Specific Model Elements (10 points, plus 0 -4 bonus points = 14 points total)

Element	Present = 0.5 points	Correctly Labeled = 0.5 points
Mouth		
Esophagus		
Stomach		
Duodenum		
Jejunum		
Ileum		
* Colon <small>(if ONLY the colon is present and/or correctly labeled)</small>		
Ascending		
Transverse		
Descending		
Sigmoid		
TOTAL		

Bonus Points: One point per additional element present clearly labeled and included in the materials table. (0 – 4 bonus points total)

Bonus Element	Present = 0.5 points	Correctly Labeled = 0.5 points
TOTAL		

Subtotal for Part II _____

Part III: Overall Accuracy of Model (0 – 4 points total)

Up to 2 points for each of the below:

1. Accuracy of the overall model (realistic) _____

2. Accuracy of the individual elements (anatomically accurate in size and location) _____

Subtotal for Part III _____

Part IV: Overall Creativity of Model (0 – 4 points total)

Up to 1 point for each of the below:

1. Creativity in the use of materials to depict colors _____

2. Creativity in the use of materials to depict textures _____

3. Creativity in the use of materials to depict length & dimensions _____

4. Creativity in the use of materials to depict variability of the different elements _____

Subtotal for Part IV _____

Part V: Model Science Questions (10 points total)

Up to 2 points for each answer:

Question 1 _____

Question 2 _____

Question 3 _____

Question 4 _____

Question 5 _____

Subtotal for Part V _____

GRAND TOTAL _____

(Add subtotals for Part I – Part V)

Maximum score is 36

**DEDUCT 3.6 POINTS FROM GRAND TOTAL IF
DISPLAY/MODEL IS NOT CLEARLY LABELED
WITH STUDENT NAME(S), SCHOOL AND CENTER**

Tie Breaker Questions

Up to 2 points for each answer:

Question 1 _____

Question 2 _____

TOTAL INCLUDING TIE-BREAKER QUESTIONS _____