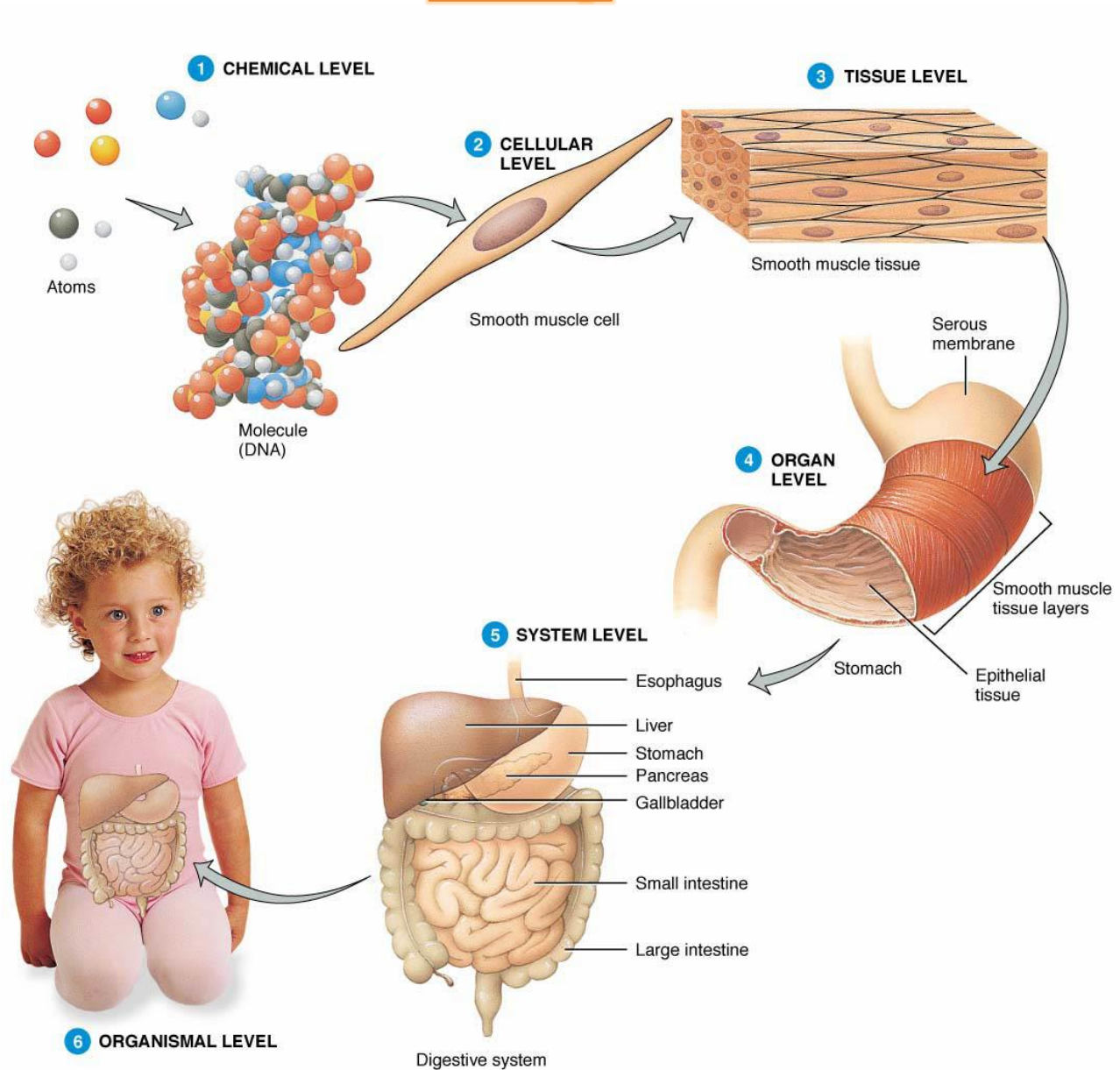
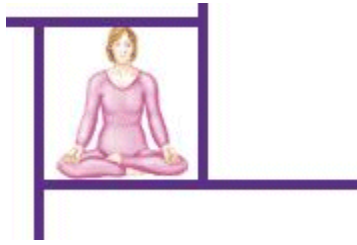


Anatomy & Physiology

Organization of the Human

Body





ORGANIZATION OF THE HUMAN BODY

The first chapter gives the student an overview of the general organization of the human body. It presents the definitions of anatomy and physiology, and demonstrates the relationship between structure and function. The students are introduced to the structural levels of the body beginning with chemicals, and progress through cells, tissues, organs, and systems. The general functions of the eleven principal body systems are also described along with the basic life processes. Characteristics of anatomical position, names for body regions, directional terms, planes and sections of the body, body cavities, abdominopelvic regions and quadrants are among the topics covered. Considerable emphasis is placed on homeostasis, stress, and feedback systems. The role of the endocrine and nervous systems in controlling homeostasis is examined, while the regulation of blood pressure and blood sugar levels are used as examples to demonstrate the negative feedback system.

OBJECTIVES

1. Define anatomy and physiology.
2. Describe the structural organization of the human body.
3. Explain how body systems relate to one another.
4. Define the important life processes of humans.
5. Define homeostasis and describe its importance.
6. Describe the components of a feedback system, and compare the mechanisms of negative and positive feedback.
7. Describe some of the effects of aging.
8. Describe the anatomical position.
9. Identify the major regions of the body.
10. Define the directional terms, and the anatomical planes.

I. Anatomy and Physiology Defined

OBJ: Define anatomy and physiology

1. Define anatomy:

2. Define physiology:

CHECKPOINT:

What is the basic difference between anatomy and physiology?

Give an example of how the structure of a part of the body is related to its function.

II. Levels of Organization and Body Systems

OBJ: Describe the structural organization of the human body.

♣ *Explain how body systems relate to one another.*

1. What are the six levels of organization of the human body?

2. Explain what each level of organization is structurally composed of.

a.

b.

c.

d.

e. _____

f. _____

*Which level of structural organization usually has a recognizable shape and is composed of two or more different types of tissues?

_CHECKPOINT:

Define the following terms: atom, molecule, cell, tissue, organ system, and organism.

Atom:

—

Molecule:

—

Cell:

—

Tissue:

—

Organ system:

—

Organism:

—

Which of the body systems help eliminate wastes? *Be sure to list them all.*

—

CHECKPOINT:

What types of movement can occur in the human body?

—

Homeostasis: Maintaining Limits

OBJ: Define homeostasis and explain its importance.

- ♣ Describe the components of a feedback system.
- ♣ Compare the operation of negative and positive feedback systems.

1. Define homeostasis:

2. Why is homeostasis important?

A. Control of Homeostasis: Feedback Systems

3. How are the nervous and endocrine systems critical to maintaining homeostatic balance?

4. Define a feedback system.

5. What is a controlled condition?

6. Explain the three parts of a feedback system:

a. receptor-

b. control center-

c. effector-

1. *Negative Feedback Systems*

2. *Positive Feedback Systems*

7. Contrast the functions of negative and positive feedback systems.

B. Homeostasis and Disease

8. Explain the relationship between a human bodies' ability to maintain homeostasis and disease.

*What would happen to the heart rate if some stimulus caused blood pressure to decrease? Would this occur by positive or negative feedback?

CHECKPOINT:

What types of disturbances can act as stimuli that initiate a feedback system?

How are negative and positive feedback systems similar? How are they different?

Similar:

Different:

Contrast and give examples of symptoms and signs of a disease.

III. Anatomical Terms

OBJ: Describe the anatomical position.

- ♣ *Identify the major regions of the body and relate the common names to the corresponding anatomical terms for various parts of the body.*
- ♣ *Define the directional terms and the anatomical planes and sections used to locate parts of the human body.*

1. Define anatomical position:

A. Directional Terms

2. Define directional terms:

3. Define the following directional terms:

a. Superior:

b. Inferior:

c. Anterior:

d. Posterior:

e. Medial:

f. Lateral:

g. Proximal:

- h. Distal:

 - i. Superficial:

 - j. Deep:

 - k. Ventral:

 - l. Dorsal:

4. In four-legged animals define how each of the directional terms below are used:
- a. Anterior:

 - b. Ventral:

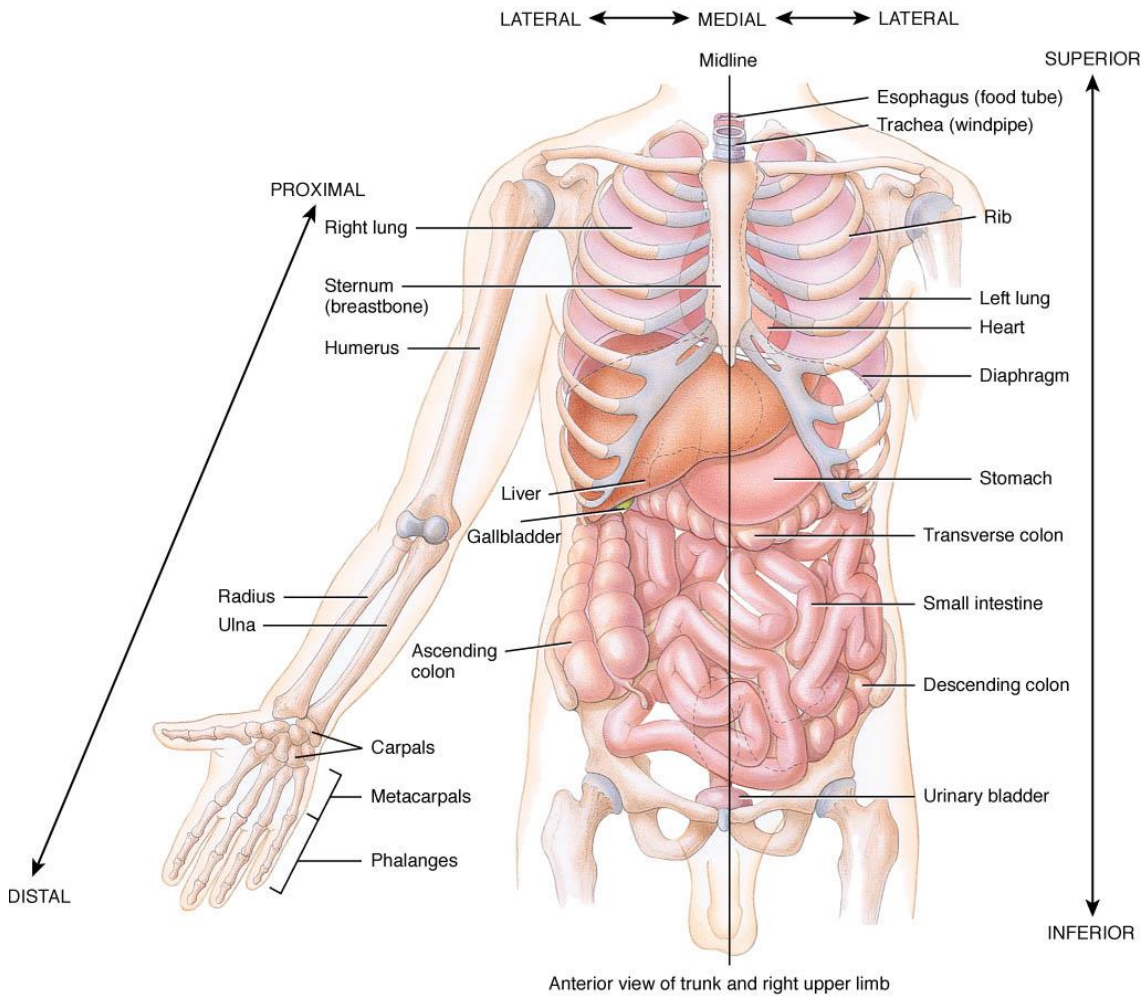
 - c. Posterior:

 - d. Dorsal:

*Is the radius proximal to the humerus? _____ Is the esophagus anterior to the trachea?

Are the ribs superficial to the lungs? ____ Is the urinary bladder medial to the ascending colon? ____

Is the sternum lateral to the descending colon? _____



CHECKPOINT:

Which directional terms can be used to specify the relationships between (1) the elbow and the shoulder, (2) the left and right shoulders, (3) the sternum and the humerus, and (4) the heart and the diaphragm?

- (1) _____
- (2) _____
- (3) _____
- (4) _____

B. Planes and Sections

- 5. The parts of the human body are studied in four major imaginary planes that pass through body parts: sagittal plane, frontal plane, transverse plane, and oblique plane. The sagittal plane is further divided into subdivisions. Describe the location of each of these planes and the subdivisions below:
 - a. Sagittal plane:

i. Midsagittal plane:

ii. Parasagittal plane:

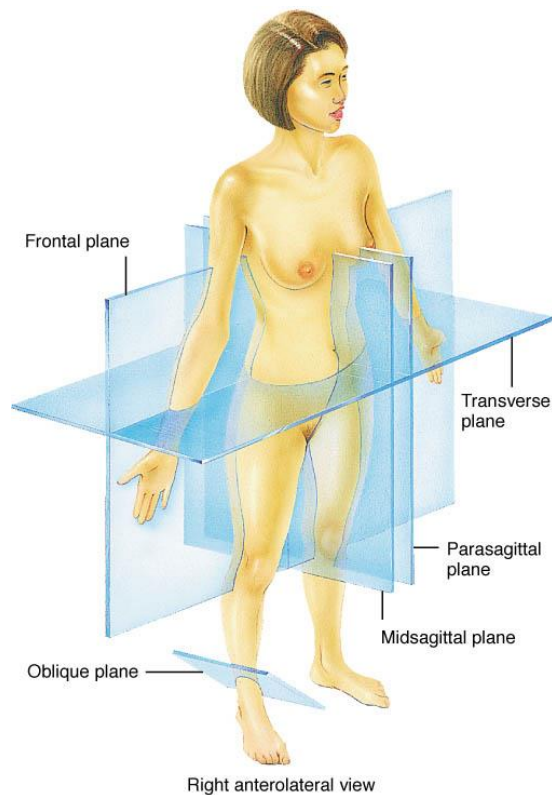
b. Frontal plane:

c. Transverse plane:

d. Oblique plane:

PLANES

Which plane divides the heart into anterior and posterior portions?



*Which plane divides the brain into equal right and left sides; the transverse plane, frontal plane, or midsagittal plane? _____

CHECKPOINT:

Explain why descriptive anatomical positions are used.

For each directional term defined in item number 5 on page 9 of this packet, provide your own written example using the terms in relation to body parts.

a. Superior:

b. Inferior:

c. Anterior:

d. Posterior:

e. Medial:

f. Lateral:

g. Proximal:

h. Distal:

i. Superficial:

j. Deep: _____

k. Ventral:

l. Dorsal:

IV. Body Cavities

OBJ: Describe the principle body cavities and the organs they contain.

♣ *Explain why the abdominopelvic cavity is divided into regions and quadrants.*

1. Define body cavities:

A. Dorsal Body Cavity

2. Describe the dorsal body cavity and the two main areas it consists of.

B. Ventral Body Cavity

3. Describe the ventral body cavity and the two main areas it consists of.

4. Name and describe the three smaller cavities of the thoracic cavity.

5. Name and describe the two portions of the abdominopelvic cavity.

C. Abdominopelvic Regions and Quadrants

6. Describe the abdominopelvic regions (using nine regions) and name its nine regions (one method of explaining the location of the many abdominal and pelvic organs).

7. Describe the abdominopelvic regions (using quadrants) and name the quadrants (another method of explaining the location of the many abdominal and pelvic

organs).

Organ locations

In which **cavities** are the following organs located (thoracic, abdominal, or pelvic):

Urinary bladder _____ Lungs _____

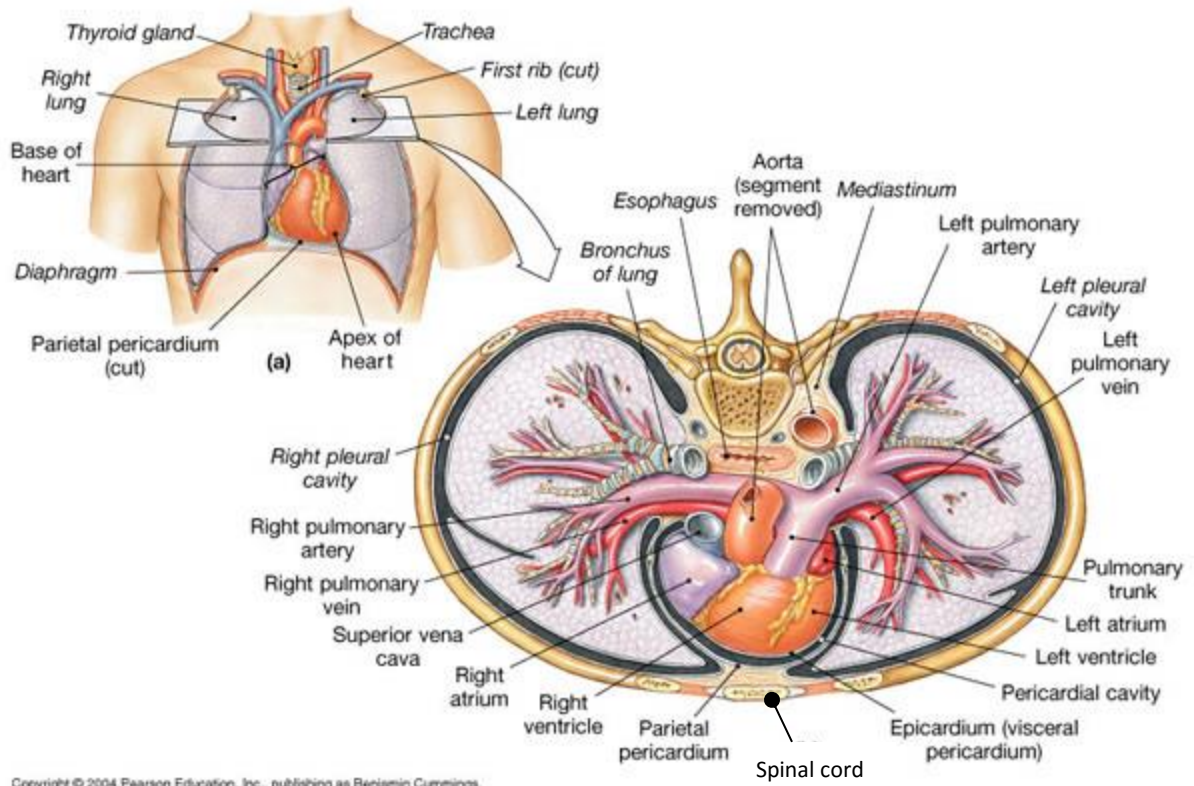
Stomach _____ Thymus _____

Heart _____ Spleen _____

Small intestine _____ Liver _____

Internal Female Reproductive Organs _____

**Which of the following structures are contained in the mediastinum: right lung, heart, esophagus, spinal cord, aorta, left pleural cavity? Refer back to page 16; figure 1.9 to ascertain where the mediastinum is pictured in the diagrams below.*



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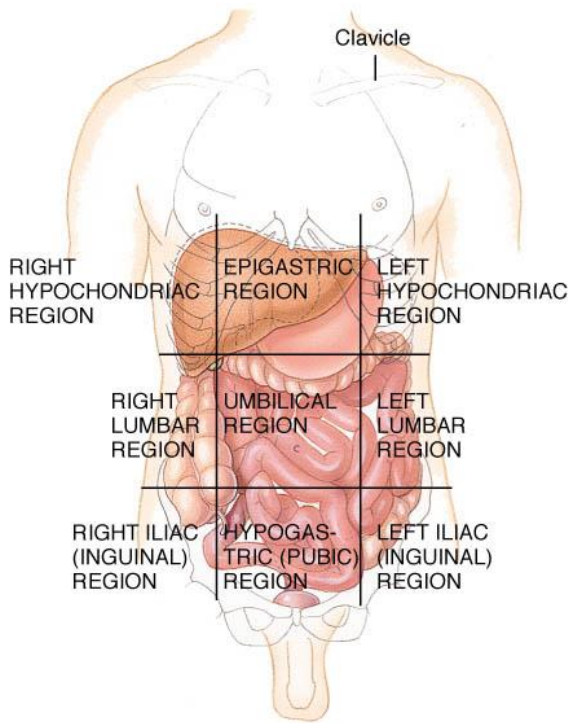
*Refer to the diagram on the next page: In which of the nine abdominopelvic regions is each of the following found:

most of the liver _____

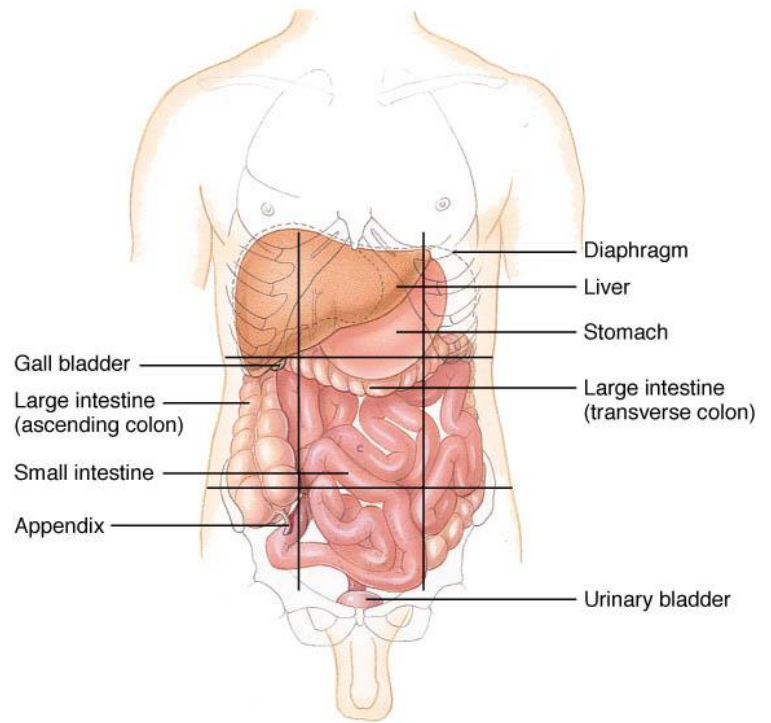
ascending colon _____

urinary bladder _____

appendix _____

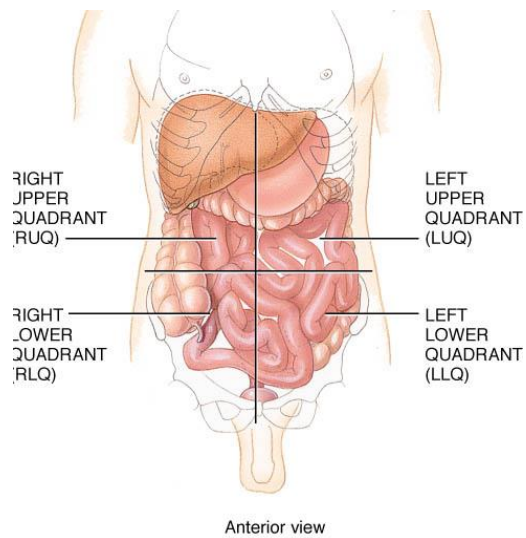


(a) Anterior view showing location of nine abdominopelvic regions



(b) Anterior superficial view of abdominopelvic regions

*In which abdominopelvic quadrant would the pain from appendicitis (inflammation of the appendix) be felt?



Critical thinking applications: *Please choose 2 to answer*

1. Taylor was going for the playground record for the longest upside-down hang from the monkey bars. She didn't make it and may have broken her arm. The emergency technician would like an x-ray film of Taylor's arm in the anatomical position. Use the proper anatomical terms to describe the position of Taylor's arm in the x-ray film.
2. Imagine that a manned space flight lands on Mars. The astronaut life specialist observes lumpy shapes that may be life forms. What are some characteristics of living organisms that may help the astronaut determine if these are life forms or mud balls?
3. Guy was trying to impress Jenna with a tale about his last rugby match. "The coach said I suffered a caudal injury to the dorsal antecubital in my groin." Jenna responded, "I think either you or your coach suffered a cephalic injury." Why wasn't Jenna impressed by Guy's athletic prowess?
4. There's a special fun-house mirror that hides half of your body and doubles the image of your other side. In the mirror, you can do amazing feats, such as lifting both legs off the ground. Along what plane is the mirror dividing your body? A different mirror in the next room shows your reflection with two heads, four arms, and no legs. Along what plane is this mirror dividing your body?