HELPFUL HINT
Review pharmacodynamics and pharmacokinetics in a pharmacology or fundamentals of nursing textbook.

MATCHING KEY TERMS
Match the term with the correct definition.
1. _____ EMLA
2. _____ metered-dose inhaler
3. _____ pharmacodynamics
4. _____ pharmacokinetics
5. _____ central venous access device
6. _____ peripherally inserted central catheter (PICC) line

   a. Central line inserted via antecubital vein into the superior vena cava
   b. Hand-held device that delivers “puffs” of medication for inhalation
   c. Cream used to numb skin at a depth of 0.5 mm
   d. Behavior of medications at the cellular level
   e. Venous access device placed in the superior vena cava or jugular vein
   f. Time and movement relationships of medications

PHARMACOKINETICS IN CHILDREN
1. Name four factors that influence absorption of medications administered orally.
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________

Answer as either true (T) or false (F).
2. _____ Infants have a larger body surface area–to–weight ratio than adults.
3. _____ Compared with an adult, a child requires a lower dose per kilogram of a water-soluble medication to achieve its desired effect.
4. _____ The immaturity of the blood-brain barrier in a child results in a decreased distribution of medications to the brain.
5. What factors affect drug excretion in the infant?

6. Why would a medication’s peak and trough serum levels be measured?

7. The level at which the serum concentration is lowest is referred to as the medication _______________________.

**PSYCHOLOGICAL AND DEVELOPMENTAL DIFFERENCES**

1. Name three ways parents can assist the nurse with administering medications to children.
   a. _______________________
   b. _______________________
   c. _______________________

2. Describe two strategies to elicit cooperation from each age group of children.
   Toddler
   a. _______________________
   b. _______________________
   Preschooler
   a. _______________________
   b. _______________________
   School-age child
   a. _______________________
   b. _______________________

**CALCULATING DOSAGES**

Answer as either true (T) or false (F).

1. _______ Standard doses exist for pediatric medications.
2. _______ Pediatric doses are usually calculated based on the child’s weight in pounds.
3. _______ The most reliable method for determining pediatric medication dosages is to use the body surface area (BSA) formula.
MEDICATION ADMINISTRATION PROCEDURES

1. List three procedures that should be followed to avoid medication errors when giving medications to children.
   a. ____________________
   b. ____________________
   c. ____________________

2. What is meant by *medication reconciliation*?

3. What should a nurse do if a child cannot swallow tablets or capsules?

4. Why should the nurse mix a powdered or crushed medication with a “nonessential” food?

Answer as either true (T) or (F) false.

5. ______ Medications can be mixed with small amounts of natural honey and given to infants.
6. ______ A sustained-release tablet can be crushed if the child cannot swallow it.
7. ______ Liquid medications should be placed in the infant’s mouth along the side of the cheek using an oral syringe.
8. ______ Oral medications should be administered with the child in an upright position.
9. How can the nurse position a 3-year-old child who does not want to take oral medication?

10. What nursing action should be taken if the child vomits a medication 15 minutes after it was given?

11. What procedures should be followed when administering medications via a feeding tube?
ADMINISTERING INJECTIONS

1. What are the guidelines for giving an explanation to a child before administering an injection?

2. What can the nurse do to make injections less painful?

Match each injection site with its indication for use.

3. ___________ Vastus lateralis
   4. ___________ Ventrogluteal
   5. ___________ Dorsogluteal
   6. ___________ Deltoid

   a. Not used for young children because muscle cannot hold the volume of medication
   b. Usually used for children younger than 3 years
   c. Safe for children older than 18 months
   d. Not used until child has been walking for at least 1 year

Answer as either true (T) or false (F).

7. ______ The nurse documents the amount of medication injected and the site used.

8. ______ The air bubble technique is used when preparing pediatric injections.

9. ______ Preschoolers can receive up to 1.5 ml of a drug safely in the ventrogluteal site.

10. ______ Viscous medication is less painful when injected through a smaller-gauge needle.

ADMINISTERING SUBCUTANEOUS INJECTIONS

1. A subcutaneous injection should not be used if the child’s _____ is impaired.

2. Name four areas of the body that are preferred subcutaneous injection sites.

   a. ______________________
   b. ______________________
   c. ______________________
   d. ______________________

Answer as either true (T) or false (F).

3. ______ Subcutaneous injection sites need to be rotated to prevent the development of abscesses.

4. ______ The angle of needle insertion for a subcutaneous injection is usually 90 degrees.

5. ______ Volumes for subcutaneous injections can be as large as 3 ml.
INTRADERMAL INJECTIONS

1. The intradermal route is most often used for _________________________________.

2. What sites are used for intradermal injections?

3. Describe the procedure for administering an intradermal injection.

RECTAL AND VAGINAL ADMINISTRATION

Answer as either true (T) or false (F).

1. ______ The vaginal route is used to treat candidal infections.

2. ______ The child should be placed in a prone position for administration of a rectal suppository.

3. ______ The nurse should direct the child to take a deep breath as medication is inserted into the rectum.

OPHTHALMIC AND OTIC ADMINISTRATION

Answer as either true (T) or false (F).

1. ______ Instillation of ophthalmic drops is a sterile procedure.

2. ______ Otic solutions should be warmed to room temperature before being administered.

3. ______ To administer eardrops to a 5-year-old child, pull the pinna of the ear down and back.

INHALATION THERAPY

1. A ___________________ used with a metered-dose inhaler increases the effectiveness of the medication.

2. If a child inhales too quickly when using a metered-dose inhaler with a spacer, he or she will hear a ___________.

3. How long should a child hold the breath after inhaling a “puff” of medication from a metered-dose inhaler?

INTRAVENOUS THERAPY

1. What factors should be considered when selecting a site for an intravenous (IV) line?

2. Name a non-pharmacologic technique for helping a child cope with the discomfort of intravenous catheter insertion.

3. What are the guidelines for using EMLA cream before inserting an intravenous catheter?

4. Why should a volumetric infusion pump be used when administering IV fluids?
5. How frequently should an IV site be assessed?

6. What assessments of the site should be made?

7. Give the formula for calculating maintenance fluid needs.

8. Calculate the maintenance fluid requirements for children of the following weights.
   
   35 kg: ___________________
   
   16 kg: ___________________

9. What is meant by IV push medications?

10. How does the nurse administer medication via the IV retrograde route?

11. Why is it important to flush the IV tubing after administering an IV piggyback (IVPB) medication?

12. How frequently should an intermittent infusion port or heparin lock be flushed?

13. In what types of situations are central venous access devices used?

14. What is an implanted venous access device?

15. The major complications of PICC lines are ____________________.

**ADMINISTRATION OF BLOOD OR BLOOD PRODUCTS**

Answer as either true (T) or false (F).

1. _____ Blood should be infused with a dextrose solution on a piggyback setup.

2. _____ Packed red blood cells are administered to infants and children to prevent circulatory hypervolemia.

3. _____ Blood products should be used within 30 minutes of arrival from the blood bank.

4. _____ An important nursing action is to take the child’s vital signs before initiating a blood transfusion.

5. _____ When a transfusion reaction is suspected, the nurse stops the blood infusion immediately and removes the IV.
CHILD AND FAMILY EDUCATION

1. List six points that need to be addressed when teaching parents about administering medications to a child at home.

   a. __________________________

   b. __________________________

   c. __________________________

   d. __________________________

   e. __________________________

   f. __________________________

SUGGESTED LEARNING ACTIVITIES

1. Review a child’s medication administration record. Calculate dosages for prescribed medications. Determine whether the prescribed dosage is safe for the child. Observe medication administration. What techniques were helpful to the child? To the nurse?

STUDENT LEARNING APPLICATIONS

Enhance your learning by discussing your answers with other students.

   Kelly is a 9-year-old girl with cystic fibrosis (CF). Kelly is in the hospital because of a CF exacerbation. Her cough has worsened, she has lost weight, and she is mildly dehydrated. She weighs 55 pounds. Kelly’s admission orders include IV fluids and medications.

1. Kelly needs to have an IV line placed for fluids and medications. What could you do to minimize her discomfort before and during the venipuncture?

2. There is an order to give Kelly D₅W 225 NS at 65 ml/hr. Calculate her maintenance fluid requirements. How does this order compare with your calculation?

3. There is an order to give tobramycin 40mg IVPB every 8 hours. The dosage range for children is 6 to 7.5 mg/kg/day divided every 8 hours. Is Kelly’s dose within that range?
4. Two days later, Kelly’s maintenance IV line is converted to a heparin lock. How does the care of a heparin lock differ from that of a continuous IV?

5. Kelly’s IV line has infiltrated, and a PICC line is discussed. What is a PICC line? What are the advantages of having a PICC line instead of a heparin lock?

6. When you approach Kelly to administer her oral medications, she turns her head away and puts her hand over her mouth. What would you do to get Kelly to take her medications? What would you do if Kelly’s mother were present?

**REVIEW QUESTIONS**

Choose the correct answer.

1. Physiologic differences in the gastrointestinal system between children and adults affect which component of a drug’s action?
   a. Absorption
   b. Distribution
   c. Metabolism
   d. Excretion

2. Drug toxicity may occur more rapidly in the infant for which of the following reasons?
   a. Larger surface area requires a larger dosage.
   b. Fewer enzymes are available to bind with the drug.
   c. Renal immaturity may delay drug excretion.
   d. The blood-brain barrier becomes less selective with maturity.

3. The pediatric maintenance dosage for Dilantin (phenytoin) is 4 to 8 mg/kg/day in three equal doses. A safe morning dose for a child weighing 15 kg is
   a. 30 mg.
   b. 60 mg.
   c. 90 mg.
   d. any of these dosages.

4. Which of the following foods is the best choice for mixing with a medication to be administered to an infant?
   a. Honey
   b. Rice cereal
   c. Similac with iron
   d. Pudding

5. Which of the following sites should the nurse use to administer an intramuscular injection to a 17-month-old child?
   a. Deltoid
   b. Dorsogluteal
   c. Vastus lateralis
   d. Ventrogluteal

6. When administering insulin subcutaneously, the nurse should
   a. use a 1- to 1½-inch needle.
   b. rotate injection sites.
   c. administer a very small volume such as 0.1 ml.
   d. inject the needle at a 30-degree angle.

7. Which of the following actions is appropriate for the administration of a rectal suppository?
   a. Position the child on his abdomen.
   b. Insert the suppository 1 to 2 inches.
   c. Direct the child to take a deep breath.
   d. Ask the child to get up and walk around after insertion.

8. Which of the following statements about the administration of IVPB medications is correct?
   a. The undiluted medication is pushed directly into the IV catheter through the port closest to the patient.
   b. The medication is injected into the port nearest the child and flushed through the tubing slowly.
   c. The IV catheter is used intermittently when medication is infused over a 1- to 2-hour period.
   d. The medication is diluted in at least 20 ml of IV fluid and infused over at least 15 minutes.