Learning Activities

1. h, c, m, j, f, g, n, l, o, p, b, d, e, i, a, k

2. a. Defects present at birth, such as limb malformations
   b. Metabolic defects affecting body chemistry such as cystic fibrosis or phenylketonuria (PKU)
   c. Blood disorders such as sickle cell disease, thalassemia, or hemophilia
   d. Chromosomal abnormalities such as Down syndrome
   e. Perinatal injury resulting from infection, drug exposure, maternal disorders or pregnancy complications

3. a. Noncommunicating (obstructive): obstruction of the cerebrospinal fluid (CSF) flow from the ventricles to the subarachnoid space
   b. Communicating: CSF is inadequately reabsorbed in the subarachnoid space but there is no obstruction

4. a. Mechanical malfunction (kinking or plugging) of the shunt or its tubing
   b. Infection, which may require removal of the shunt

5. Prevent hypostatic pneumonia and pressure sores

6. a. Abnormal vital signs, poor feeding, vomiting, pupil dilation, decreased level of consciousness, seizures
   b. High-pitched cry, unequal or dilated pupils or unequal response to light, bulging fontanelles, irritability or lethargy, poor feeding, abnormal vital signs

7. All women of childbearing age should take a daily supplement of folic acid, 0.4 mg (400 mcg).

8. a. Describe the sac, its location and size, and observe for tears or leakage of spinal fluid; protect from injury, infection, and drying using sterile dressings soaked with saline or antibiotic solution

b. Observe for deformity and movement of extremities, position to maintain maximum function.

c. Measure head to detect increasing circumference and the fontanelles for bulging that may indicate development or worsening of hydrocephalus.

d. Determine presence or absence of sphincter control, constant dribbling of urine, skin care. Place diaper so that it avoids the sac.

e. Try to keep a latex-free environment; educate parents about products that may have latex (pacifiers, nipples, water toys, balloons, tennis balls, adhesives); food sensitivities that are associated with latex allergies (bananas, avocado, kiwi); wear ID tag; avoid wearing latex gloves; fewer medical items now contain latex, reducing exposure of patients and health care providers to this allergen.

9. Prone, with a pad between the legs to maintain abduction and counteract hip subluxation with a roll under the ankles to maintain foot position; supported side-lying

10. a. Consult with physician about feeding (such as sucking); comfort to reduce crying
    b. Elbow restraints; Logan bow; avoid abdominal positioning
    c. Gentle cleansing of sutures; antiseptic mouthwash
    d. Cuddling and other means to express affection and comfort
    e. Pain relief or sedation appropriate to the infant

11. a. Manipulation, splinting, or casting for mild forms
    b. Passive stretching exercises
    c. Surgery

12. Avoid pressure on a wet cast by using palms rather than fingertips to hold cast (and teach parents same). Elevate feet and legs as ordered. Check toes for circulation (capillary refill, pal-
lor, cyanosis, swelling, coldness, numbness, pain, or burning). Apply tape petals to edges of cast to reduce skin irritation. Observe for bleeding on cast if surgery was also done. Light synthetic casts dry more quickly than plaster casts but are not as strong.

13. a. Limited abduction of the affected leg  
b. One buttock is higher than the other, or there may be an unequal number of major skinfolds on each thigh  
c. Barlow’s test, in which the hip is adducted and extended and the examiner feels the hip subluxation or dislocation  
d. Ortolani’s sign, in which the examiner feels, and may hear, a click as the thighs are flexed and abducted

14. Using two people, (1) move the child to one side of the bed, (2) nurse on near side turns child to the midway point, supporting the head and leg, (3) nurse on far side accepts child and completes the turn. Bar between legs should not be used as a lever when turning.

15. a. Screening is done with the Guthrie blood test at 48–72 hours of age, preferably after ingesting proteins; the test is repeated within 2 weeks after having more milk intake.  
b. A confirmation test for high levels on the early screening test is a quantitative evaluation to identify high blood phenylalanine levels.

16. a. Develops feeding difficulties, loss of Moro reflex, hypotonia, irregular respirations, and seizures. Secretions and excretions such as urine, sweat, and cerumen have a sweet odor. Diagnosis is confirmed with blood and urine tests that detect high levels of the amino acids leucine, isoleucine, and valine. Treatment is a diet low in these three amino acids. Abnormal leucine levels may be greater with infection so emphasis on prevention of infection is vital.  
b. Signs include lethargy, vomiting, hypotonia, diarrhea, and failure to thrive. Diagnosis is by detection of galactose in the urine and blood and by decreased enzymes to convert galactose to glucose. Treatment is by elimination of milk and lactose-containing foods from the diet.

17. a. Close-set and upward slanting eye appearance; small head; round face with a flat nose bridge; protruding tongue  
b. Short, thick hands with incurring fifth finger; simian crease in the palms; wide space between first and second toes  
c. Poor muscle development; loose joints  
d. Congenital heart abnormalities

e. Growth and developmental delay; may reach low-average range for IQ; higher incidence of leukemia; Alzheimer’s disease common for the person with trisomy 21 who reaches middle age.

18. a. Observe for infections, and provide antibiotics as ordered.  
b. Wrap warmly to prevent heat loss.  
c. Dietary interventions (for example, adequate fluids and roughage).  
d. Show concern for the individuality of the infant, and provide referrals to a support group.

19. When the Rh-negative mother is exposed to Rh-positive blood, usually during pregnancy or at birth of an Rh-positive infant, she develops antibodies to Rh-positive blood. The mother’s antibodies can cross the placenta to destroy Rh-positive red blood cells of the fetus, usually a later Rh-positive fetus. Erythroblastosis fetalis may occur in her first pregnancy with an Rh-positive fetus if she was exposed to Rh-positive blood before pregnancy or early in gestation.

20. a. Rh-immune globulin (Rh₀GAM), mother  
b. i. Within 72 hours of the birth of an Rh-positive infant  
ii. At 28 weeks of gestation  
iii. After a spontaneous or elective abortion  
iv. After amniocentesis  
v. To women who have bleeding during pregnancy

21. a. Close infant’s eyes before applying eye patches; remove patches at least once per shift.  
b. Cover testes or ovarian area with a diaper.  
c. Monitor skin turgor and fontanels; measure daily weight; provide added water as required; intravenous fluids

22. Trauma, anoxia

23. Poor muscle tone, lethargy, poor suck, respiratory distress, cyanosis, twitching, forceful vomiting, high-pitched and shrill cry, seizures, opisthotonic posture, tense or bulging fontanel, pupil dilation or inequality of the pupils

24. a. Mental retardation  
b. Cerebral palsy

25. a. Infants of a woman who was hyperglycemic much of her pregnancy receive large amounts of glucose from the mother. They make insulin to metabolize the extra glucose, resulting in excess production of protein and fatty acids.  
b. The infant of a well-controlled diabetic woman may have few effects. The infant of a woman with severe diabetes may be
smaller-than-gestational age due to poor placental circulation.

c. Blood glucose to identify and intervene for hypoglycemia. Result should be 40 mg/dL or higher.

Review Questions

1. Answer: 4
   Rationale: Because the infant’s cranial sutures and fontanelles are open at birth, they often enlarge with increased intracranial pressure. Lethargy is likely, not sleeplessness. A hair tuft or patch suggests spina bifida occulta, not usually associated with hydrocephalus. Temperature elevation is not likely unless infection has occurred.

2. Answer: 1
   Rationale: A shunt allows drainage of the excess CSF when the pressure rises. The only incision expected is for shunt placement rather than a primary treatment. Diuretics may sometimes be used temporarily, but surgery is the definitive treatment. Analgesics may be needed postoperatively, but do not treat the hydrocephalus.

3. Answer: 4
   Rationale: These are classic changes in vital signs when intracranial pressure becomes too high in infants, children, and adults. The other options are not characteristic changes that accompany increased intracranial pressure.

4. Answer: 2
   Rationale: This position avoids pressure on the delicate sac, which might cause further nerve damage and helps reduce subluxation of the hips, which often accompanies the neural defect. Side-lying may be used to change the baby’s position, but having the head below the heart level would increase intracranial pressure. Supine positions may damage the sac.

5. Answer: 2
   Rationale: A car seat elevates the upper body and helps the infant to burp and limit spitting up. Position on the abdomen can damage the repair; side-lying does not reduce spitting. Sucking may be restricted. There are no universal visitor restrictions simply because of the repair, although hospitals may have their own restrictions.

6. Answer: 2
   Rationale: Because sucking may be difficult both preoperatively and postoperatively, maintaining nutrition is a priority of care. A parent support group or referral to a website is appropriate, but is not a priority. It is appropriate to ask the parents if they have a support group because this infant is 9 months old. An intravenous line may or may not be essential after surgery, depending on how extensive the repair is. Continuous sedation is not necessary.

7. Answer: 4
   Rationale: Checking circulation distal to the cast is essential care in any patient with a cast application. The cast should be exposed to allow drying. Powder may cause skin irritation. Lowering the feet increases dependent edema and may cause circulatory impairment.

8. Answer: 1
   Rationale: Because the cup of the hip joint is inadequately developed, the leg on that side often cannot be fully abducted, or if abducted, slips out of the joint.

9. Answer: 1
   Rationale: The Pavlik harness maintains thigh flexion and hip abduction to promote deepening of the acetabulum by maintaining pressure against it. Surgery is not often needed and less invasive treatments are attempted until the child needs to walk. The actual leg lengths are equal and should remain that way; subluxation causes the appearance of a shorter leg on one side. The harness is not guaranteed to make a difference in the time required in a spica cast, should one be needed.

10. Answer: 2
    Rationale: Lethargy increases as intracranial pressure becomes elevated. Fontanelles would be bulging, not sunken, which is a sign of dehydration. Pupils become dilated, often unequal for one-sided lesions, and slow or nonreactive to light as the intracranial pressure rises.

11. Answer: 3
    Rationale: The child with PKU cannot normally metabolize phenylalanine, which is an essential amino acid. Some is required for normal growth, but levels must be kept as low as possible to prevent neurologic damage. These other options are not relevant for treatment of PKU.

12. Answer: 2
    Rationale: Enzyme defects cause the body to be unable to use galactose and lactose normally, causing these problems if the infant is fed milk. Most inborn errors of metabolism involve excess or abnormal metabolism of specific amino acids, not depletion.

13. Answer: 3
    Rationale: Parents must grieve for the idealized baby they expected before they can fully bond the infant they now have. The nurse can best help by encouraging them to share their feelings or helping them contact support people such as the clergy. Parents should have genetic counseling by a specialist to determine their risks for future affected children. Bonding should be encouraged. It is too early to begin
teaching about something relatively far in the future.

14. Answer: 1
Rationale: The infant’s position before surgical closure prevents holding close and cuddling, but parents can interact with their baby in other ways. Diaper will be placed loosely under the baby to reduce sac damage.

15. Answer: 3
Rationale: Prevention of crying as much as possible reduces the risk for damage to the suture line; holding the baby also promotes parent-infant bonding. Infants can be held with restraints. There is no contraindication to holding in this question.

16. Answer: 4
Rationale: For best protection of future babies from Rh problems such as erythroblastosis fetalis, the drug should be given within 72 hours to prevent isoimmunization in the Rh-negative woman. Rh\textsubscript{O}GAM can be given at the other times, but none are the latest time it should be given.

17. Answer: 4
Rationale: Controlling the woman’s phenylalanine levels during pregnancy reduces the damage that could be done to the fetus. A diet high in fiber and adequate in dairy is good for any pregnant woman but not specific for the woman with PKU. Added leucine is not relevant for this inborn error of metabolism.

18. Answer: 2
Rationale: The infant’s altered nasal and facial structures predispose him or her to development of respiratory and ear infections. Increased risk for the other infections is not specifically characteristic for the infant with Down syndrome.

19. Answer: 4
Rationale: The infant who has received excessive glucose from the mother during pregnancy manufactures large amounts of insulin to metabolize the glucose. At birth, the placental supply of glucose stops, but the baby’s pancreas does not immediately reduce insulin production, resulting in temporary hypoglycemia. An intravenous line may be started to provide glucose therapy as needed. Intracranial hemorrhage is not likely unless there are added risks for it.

20. Answer: 1
Rationale: Some diabetic mothers have vascular damage that can impair blood flow to the placenta, reducing transfer of gases, nutrients, and waste products between mother and fetus. Insulin from the mother (naturally produced or injected) does not cross the placenta. Diabetes alone does not usually cause placental bleeding.

21. Answer: 2
Rationale: Amnioinfusion after membrane rupture reduces the amount of meconium in amniotic fluid that might otherwise be aspirated by diluting and washing out the meconium. Stimulating infant breathing before meconium is suctioned may cause deep aspiration of the substance. Intubation may be necessary but is not an early intervention. An apnea monitor can assess adequate oxygenation but it does not actively promote it. Apnea monitoring is not an initial step and is most often needed by the preterm infant rather than the term or post-term infant who is most likely to have thick meconium in the amniotic fluid.

**Case Studies**

1. Newborn with meningomyelocele
   a. Nursing concerns:
      i. Maintain intact and clean skin and sac; observe for leaking spinal fluid. Change infant positioning to avoid pressure on sac while avoiding added complications such as skin trauma or respiratory infections.
      ii. Observe for deformities, spasticity, and movement in extremities.
      iii. Observe head circumference and fontanelles for possible hydrocephalus.
      iv. Observe for rectal sphincter and urine control.
   b. Most initial parent teaching will be provided by specialty physicians and nurses. General nurses should reinforce teaching about bladder emptying during infancy and possible changes later in life. Reinforce acceptable methods to maintain skin healing in the back and skin integrity for the bladder and anus.
   c. Involve parents in their baby’s care, including temporary care of any surgical incisions. Preoperative parent care is specialized to the infant’s specific needs but might include skin care and maintenance of a clean environment preoperatively. IV fluids and antibiotics may be started preoperatively. Legs and hips should be maintained in best alignment possible both preoperatively and postoperatively. If formula or breastfeeding is possible, assist the woman to start as soon as possible. Pumping her breasts can maintain milk production until the baby is able to nurse and the breast milk can be given to the baby by bottle or gavage tube if necessary, providing the immunoglobulins of breast milk.
d. In addition to skin care, the nurse must continue to observe for possible increased intracranial pressure in this newborn: enlarged or bulging fontanels rather than flat, irritability, and vomiting. Shunt placement during or shortly after meningocele repair is common.

2. a. Signs of hydrocephalus: seizure (mother does not describe, however), irritable, lethargic, thin, mother reports repeated vomiting, enlarged head circumference. Low height and weight may be related to hydrocephalus or other problems. Gestation at birth is not known to determine if she was small for gestational age.

b. Assess size, separation, and evidence of bulging of fontanels and cranial sutures. Observe for “sunset eyes.” Diagnostic tests may include transillumination of head, echencephalography, computed tomography (CT), and magnetic resonance imaging (MRI). A ventricular tap may be performed to reduce fluid and ICP and to analyze fluid removed.

c. Maintain skin integrity with change of position and lamb’s wool padding. Change positions frequently or as ordered, to reduce chances for respiratory or surgical site infections.

d. Positioning will be ordered specifically for each infant and is likely to vary each day, according to physician orders. If fontanels are flat, the infant usually remains in a flat position. Bulging fontanels may require some degree of head elevation. Presence of bowel sounds is when feedings may usually resume.

Applying Knowledge
Answers will vary.