Student On-Boarding Manual
Select a Course.

High School
- AP Biology
- Anatomy & Physiology Fundamentals

Undergraduate
- Neuroscience Fundamentals
- Anatomy & Physiology Integration
- Embryology Fundamentals
- Histology Fundamentals

Graduate/Medical
- Neurorsinaomy
- Gross Anatomy
- Physiology
- Cell Biology

Integrated Systems
- The Neurological System
- The Respiratory System
- The Cardiologists System
- The Endocrine System

Embryology
Formation, Growth, Development & the Developmental Disorders
A comprehensive approach to the formation, early growth, development, and developmental disorders with a special focus on topics covered on the USMLE and COMLEX Exams.

- 67 tutorials (9 hours)
  - Academic Textbook Organization
  - 6-8 Minute Animated, Narrated Tutorials
  - Bulleted Notes & Final Drawings
- Web-based Drawing Pad
  - 100+ Drag/Drop Labels
  - Downloadable Starter Images
  - Precision Touch Sensitivity
- 450+ Quiz Questions
  - Rapid Review
- 100+ Clinical Correlations
  - Real-Life Correlations
- 300+ Scientific References
  - Sources You Trust

Board Preparation
- MCAT Biology & Biochemistry
- Neurosciences - ABPN Neurology Boards
- ABPN Neurosciences - CMIE/MOC
- ABPN Neurosciences - ABPN Neurology Boards
- MCAT Biology & Biochemistry

Course Description
Select a Subject and a Tutorial.

Embryology
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  - Sources You Trust

Expand All Subjects
- Eukaryotic Cells and Molecular Genetics
  - 12 tutorials
- Pre-Implantation Events
  - 7 tutorials
- Early Embryonic Development
  - 7 tutorials
- Cardiorespiratory System
  - 10 tutorials
- Digestive System
  - 5 tutorials
- Urogenital System
  - 11 tutorials

Early Embryonic Development
- Implantation & Placental Formation
- Cleavage & Implantation
- Early Embryonic Development
- Mature Placenta
- The Germ Layers

Select Subject
Select Tutorial
Preview the Notes and the Final Image.

**GERM LAYER FUNDAMENTALS**

Anatonic cavity

**ECTODERM**

Epidermis

Skin: Surface layer (NOT dermis)
Skin appendages (eg. hair, nails, etc...)

Neural crest cells

Neural tube

Neural crest cell derivatives

- Cranial nerves: Pharyngeal arch derivatives
- Dorsal root ganglia
- Sympathetic chain ganglia & Autonomic medullary cells

Enteric nervous system

Additional Nerve & Cartilaginous derivatives

**MESODERM**

Cardiovascular System, Lining of the Body Walls & Organs, Limb Muscles & Bones

Intermediate Ungeonal & Reproductive Systems

Paraxial (somite)

Intermediate Mesoderm

Lateral plate mesoderm

**ENDODERM**

Foregut

Midgut

Hindgut

**THE GERm LAYERS**

**OVERVIEW**

- Ectoderm lines the amniotic cavity.
- Endoderm lines the yolk sac.
- Mesoderm has both extraembryonic and intraembryonic portions.
- The vitelline duct connects the gut tube to the yolk sac.

**Germ Layers**

- The germ layers are the three primary layers of cells that form during early embryonic development:
  - Ectoderm
  - Endoderm
  - Mesoderm

**Ectoderm**

- Skin: Surface layer (NOT dermis)
- Skin appendages (e.g., hair, nails, etc.)
- Neural crest cells
- Neural tube

**Endoderm**

- Gut tube
- Yolk sac
- Vitelline duct

**Mesoderm**

- Cardiovascular system
- Limb muscles and bones

**Notes**

Within the mesoderm, lies the:

- The neural tube
- The neural crest cells (we use an arrow to signify their migration)
- Notochord

The mesoderm divides (from medial to lateral) into:

- The somites (paraxially)
- The intermediate mesoderm
- Lateral plate mesoderm

**THE GERm LAYERS**

**Epidermis**

- The skin, specifically the surface layer (meaning NOT the dermis, the underlying layer)
- The skin appendages (e.g., the hair, nails, and other appendages)

**Neural crest cell derivatives**

- Select cranial nerves: Pharyngeal arch derivatives (which are cranial nerves 5, 7, 9, and 10).
- Dorsal root ganglia, which are the pseudounipolar sensory neurons.
- Sympathetic chain ganglia, which supply the sympathetic portion of the autonomic nervous system, responsible for "Fight or Flight".
- Autonomic medullary cells, which are activated along with the sympathetic nervous system.
The video player becomes a drawing pad with all the tools you need.
Starter canvas to provide guidance for your drawings.
Label exercise provides an additional engaging approach to learning.
Quiz questions are available as our pre-/post tutorials and as subject exams.

4. Which of the following primarily derives from the ectoderm?

A. The brain
B. The gut
C. The heart
D. The kidneys

The brain

Ectoderm derives the neural tube, which derives the brain.
Diffusion (Two Experiments)

**DIFFUSION EXPERIMENT**

**Experiment #1:**
- In the leftmost box, small solute molecules move through the membrane. These molecules move across the membrane from a high concentration to a low concentration.
- In the middle box, random movement continues, and molecules pass through the pores of a membrane.
- In the right box, equal amounts of solute are present on both sides of the membrane.

**Experiment #2:**
- **Solute**
- **Water**

**NET MOVEMENT**

**NET MOVEMENT**

**Genetic Myopathies (Inherited Myopathies)**

**Muscular Dystrophies**

**Dystrophinopathies (Duchenne, Becker)**

**Overview**
- **Duchenne Muscular Dystrophy (DMD)**
  - Incidence: 1 in 3000 live male births
  - 
- **Becker Muscular Dystrophy (BMD)**
  - Incidence: 1 in 150,000 live male births
  - 

**Clinical Features**
- 

**Muscle Weakness and Hypertrophy**
- 

**Treatment**
- 

**Duchenne & Becker Muscular Dystrophies (the Dystrophinopathies)**

**Dystrophinopathies (Duchenne, Becker)**

**Overview**
- 

**Clinical Features**
- 

**Treatment**
- 

**References**
- 

**Images**
- 

**Tables**
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**Diagrams**
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**Figures**
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**Supplements**
- 

**Video Clips**
- 

**Audio Clips**
- 

**Interactive Elements**
- 

**Additional Resources**
- 

**Further Reading**
- 

**Searchable Database**
- 

Create a Study Plan.

Create a New Study Plan

Name Your Study Plan.

Select/Deselect Tutorials

To save, click —
Create Study Plan
View a Different Study Plan.

**Click Switch Study Plan.**

Select the Plan.

The Plan now appears.
Best use of *Draw it to Know it* for hybrid (online/in-class use)...

**Before Class**
Students prepare with our tutorials.

**During Class**
Students complete our exercises with instructor guidance and teaching.
Subject Completion Certificates

Select Take Subject Exam

Week 1
- Tutorials
- Flashcards
- Question Bank

- Early Embryonic Development
  - Implantation & Placental Formation
    - Cleavage & Implantation
    - Early Placental Development
    - Mature Placenta
  - Early Development
    - The Germ Layers
    - Gastrulation
    - Neurulation
    - Embryonic Folding
- Take Subject Exam

4. Which of the following primarily derives from the ectoderm?
   A. The brain
   B. The gut
   C. The heart
   D. The kidneys

Upon Successful completion of the Subject Exam (>70%), the student is awarded a Subject Exam Certificate, which is accessible in the My Account Page.

Account Settings
- Subscriptions
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- Certificates

Certificates
- Embryology
  Early Embryonic Development
  - Hide Subjects
  - 4/19/2017 4:17 pm

Draw it to Know it

MEDICAL & BIOLOGICAL SCIENCES

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Courses
Institutional Analytics
adam fisch
Draw it to Know it, Medical & Biological Sciences certifies that on May 5th, 2016,

John Doe

successfully completed the Early Embryonic Development subject exam within the Draw it to Know it Embryology course.

Adam Fisch, MD, Founder & Editor-in-Chief
Draw it to Know it, Medical & Biological Sciences

Draw it to Know it, Medical & Biological Sciences confirms that this individual scored >70% on the Exam for this subject.
Course Completion Certificates

Upon Successful completion of all Subject Exams, the student is awarded a course completion certificate, visible in the My Account Page.

All Tutorials
Switch Study Plan  Create a New Study Plan

Expand All Subjects ▼
Eukaryotic Cells and Molecular Genetics ▼
12 tutorials

Pre-Implantation Events ▼
7 tutorials

Early Embryonic Development ▼
7 tutorials

Musculoskeletal & Nervous Systems ▼
15 tutorials

Cardiorespiratory System ▼
10 tutorials

Digestive System ▼
5 tutorials

Urogenital System ▼
11 tutorials

Course Completion Certificate

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Draw it to Know it, Medical & Biological Sciences certifies that on May 5th, 2016,

John Doe

successfully completed the Draw it to Know it Embryology course.

Draw it to Know it, Medical & Biological Sciences confirms that this individual scored >70% on the Exam for this subject.
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