Teaming with Cells

Copy Instructions

Make Single-sided Copies

• Cut each page in half to make two cards.
• This document includes 3 sets of cards, marked A, B & C. Each set has 4 cards.
• The cards are companions for the cell types introduced in the Mystery Cell Models.

Tips

• Print in color and laminate for re-use.
• Print each set of cards on a different color of paper, to make it easier to keep track of which cards belong together.
Ciliated epithelial cells
Waving cilia push mucus up & out

Cilia
Wave back and forth to push away mucus & trapped debris

Cell Junctions
Connect neighboring cells together, forming a strong barrier

Ciliated epithelial cells
Waving cilia push mucus up & out

Goblet cells
Makes lots of mucus. Mucus forms a protective layer across the whole epithelium.

Basal cells
Ciliated and goblet cells don’t live very long. This cell type divides to make more of them.

These cells fit together tightly, forming a barrier that keeps harmful things away from the cells and tissues underneath.
**Tissues of the Bronchus (cross-section)**

- **Bronchi** (BRAHNG-kai) Tubes where air travels inside the lungs
- **Nose** Takes in air, warms it, and traps some dust
- **Trachea** (TRAY-kee-uh) Tube where air travels to get to the lungs
- **Bronchi** (BRAHNG-kai) Tubes where air travels inside the lungs
- **Lungs** Lots of surface area for gas exchange (taking up oxygen and getting rid of carbon dioxide)
- **Diaphragm** (DIE-uh-fram) Contracts and relaxes to help move air in & out of the lungs
- **Airway epithelium**
  - Protects other tissues from things in the air, like bacteria and viruses
  - Clears away dust & other junk
- **Gland tissue**
  - Makes liquid and mucus. Mucus forms a protective layer; liquid keeps things moving.
- **Blood vessels**
  - Tubes for blood, which carries nutrients, gases (oxygen, carbon dioxide), and immune cells
- **Smooth muscle**
  - Expands and contracts to make the bronchus get wider or narrower
- **Cartilage**
  - Tough tissue that holds the bronchus open

**Organs of the Respiratory System**

The respiratory system brings air in and out of the body, delivering oxygen and taking away carbon dioxide.
**Intestinal Absorptive Cell**

- **Microvilli** on these cells make the intestine 600 times more absorbent than it would be without them. They’re covered with proteins that bring nutrients into the cell.

**Cell Junctions**

Connect neighboring cells together, forming a strong barrier.

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**Cell Types of the Intestinal Epithelium**

- **Absorptive cells**
  - Take up nutrients from food
  - Connect together tightly to keep bad things out of the tissues underneath

- **Goblet cells**
  - Make mucus, which keeps food moving

- **Stem cells**
  - Cells in the intestinal epithelium don’t live very long. This cell type divides to make more of them.
  - New cells migrate from the bottoms of crypts to the tips of the villi.
Tissues of the Small Intestine
(cross-section) The inside of the small intestine is covered with finger-like structures called villi [VILL-ee]

Intestinal epithelium
Protects other tissues from food, bacteria, and other things in the digestive tract
Absorbs nutrients from food and transfers them to blood

Blood vessels
Tubes for blood, which carries nutrients, gases (oxygen, carbon dioxide), and immune cells

Smooth muscle
Pushes food through the digestive tract

Gland tissue
Makes digestive enzymes

Connective tissue
Holds layers of tissue together and keeps them flexible

Organs of the Digestive System
The digestive system is a giant tube that takes in nutrients for the body.

Mouth
Takes in food and chews it into smaller pieces

Esophagus
(eh-SOFF-uh-gus) Tube where food travels to get to the stomach

Stomach
Mixes food with digestive juices and breaks it down into smaller pieces

Small intestine
Adds more digestive enzymes to food
Absorbs nutrients and liquid from food and moves them to the blood

Large intestine
Filled with bacteria that break down food and make micro-nutrients
Absorbs liquid & micro-nutrients
**Spongy Parenchyma Cell**

**Cell wall**
Strong fibers support the shape of the cell and protect it from things in the environment like pests, pathogens, and weather.

**Chloroplasts**
This is where photosynthesis takes place: using the sun’s energy to make sugar.

**Vacuole**
Stores water & nutrients, provides pressure, and breaks down waste.

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**Cell Types in Leaf Tissue**
(cross-section)

**Epidermal cells**
Make wax to keep the leaf from drying out.

**Pallisade cells**
Using energy from the sun, they make sugar from carbon dioxide.

**Spongy Parenchyma cells**
Take in carbon dioxide from the air. Loosely packed for efficient gas exchange. Using energy from the sun, they make sugar from carbon dioxide.

**Guard cells**
Expand and contract to open and close pores that let air in.
**Tissues of the Leaf**
(cross-section)

- **Epidermal tissue**
  The “skin” of the leaf

- **Mesophyll tissue**
  Makes lots of glucose (a type of sugar). The plant uses glucose for food and turns it into other molecules it needs. Provides shape and structure for the leaves

- **Vascular tissue**
  Tubes that carry water & nutrients

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**Organs of the Plant Shoot System**

The shoot system includes the parts of a plant that are above the ground (or above the root system).

- **Leaves**
  Using photosynthesis, they make sugar for the plant

- **Buds**
  Areas of active growth

- **Nodes**
  Branch points where leaves & stems meet

- **Stems**
  Support the leaves
  Have tubes inside that carry water & nutrients