

# TCAP STUDY GUIDE

## 7<sup>th</sup> Grade Science

### Cell Structure and Function

**\*Know the basic structures that most cells have (i.e., nucleus, cytoplasm, cell membrane, cell wall, ribosome, mitochondria, chloroplast, vacuole, lysosome)**

**\*Identify major cell organelles and their functions.**

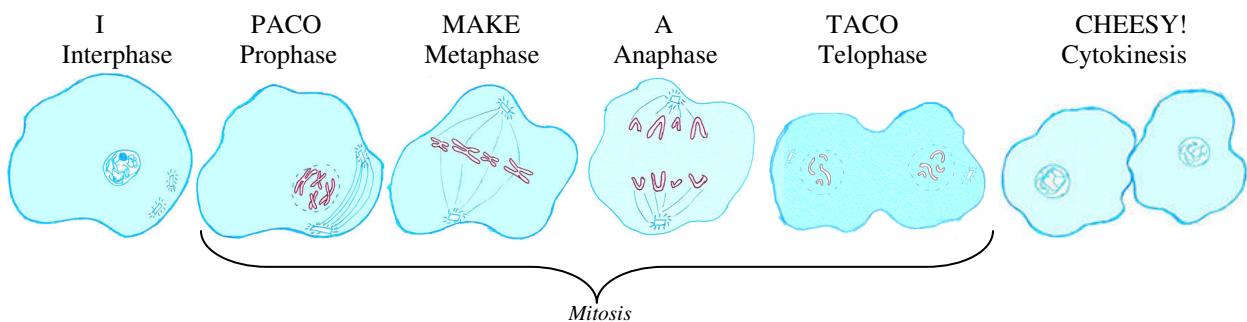
Nucleus – control center, contains DNA  
Cytoplasm – gel-like stuff that fills the cell  
Cell Membrane – Controls what gets in & out  
Ribosome – site of protein making  
Mitochondria - powerhouse/site of respiration

Vacuole – storage containers  
Lysosome – clean-up/ break down food & old cell parts  
**and IN PLANTS**  
Cell Wall – structure and support / outside membrane  
Chloroplast - green, contains chlorophyll, photosynthesis

**\*Distinguish between plant and animal cells.**

Plant cells have cell walls, chloroplasts (for photosynthesis!), and large vacuoles. Animal cells do not! (Animal cells have vacuoles, but they are much smaller)

**\*Put pictures in order showing the movement of chromosomes during mitosis.** These pictures show ALL the cell cycle, not just mitosis.



<http://www.biologycorner.com/bio1/cellcycle.html>

**\*Explain the relationship among cells, tissues, organs, and systems given a diagram and identify the function of organ systems.**

Cells (like muscle cells) working together make up tissues (muscle). Tissues (muscle) working together make up organs (the heart), Organs working together make up organ systems (the circulatory system).

**\*Predict the movement of substances through osmosis or diffusion across the cell membrane, given solutions of different concentrations.**

Stuff always moves from where there is MORE to where there is LESS. A cell in salty water will LOSE water, because the salt can't move in. The water moves out to make the solution outside LESS salty (the salt is more spread out).

# Food Production and Energy for Life

## \*Determine what plants need to make food.

Plants need water, carbon dioxide, and sunlight to make food.

## \*Identify photosynthesis as the food making process in plants.

Photosynthesis is the process by which plants make food!

## \*Select the structures that animals use to obtain oxygen.

### Classify animals according to their means of obtaining oxygen.

Lungs – dogs, cats, people, mammals

Gills – fish, sharks, rays

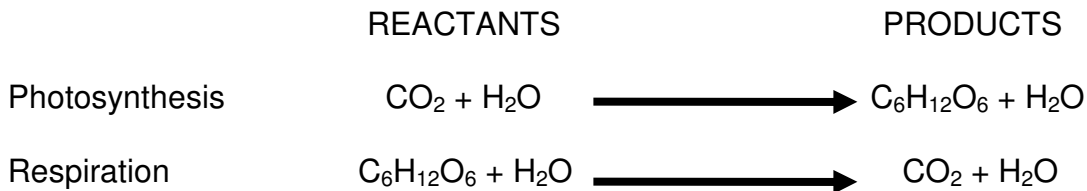
Skin – earthworms, frogs (but frogs also have lungs!)

Trachea – insects have air passages all through their bodies, with many openings to the outside air. Air flows close to all body tissues

## \*Which picture shows the movement of oxygen and carbon dioxide between living things and their environment. / \*Interpret a diagram depicting the oxygen-carbon dioxide cycle.

Look for the picture that has plants taking in  $\text{CO}_2$  and giving off  $\text{O}_2$ . The animals should be taking in  $\text{O}_2$  and giving off  $\text{CO}_2$ . Plants do photosynthesis and provide oxygen for animals to do respiration (giving of  $\text{CO}_2$  for the plants).

## \*Identify the reactants and products of photosynthesis and respiration.



The chemicals on the left are the reactants.... on the right are products...ALWAYS!

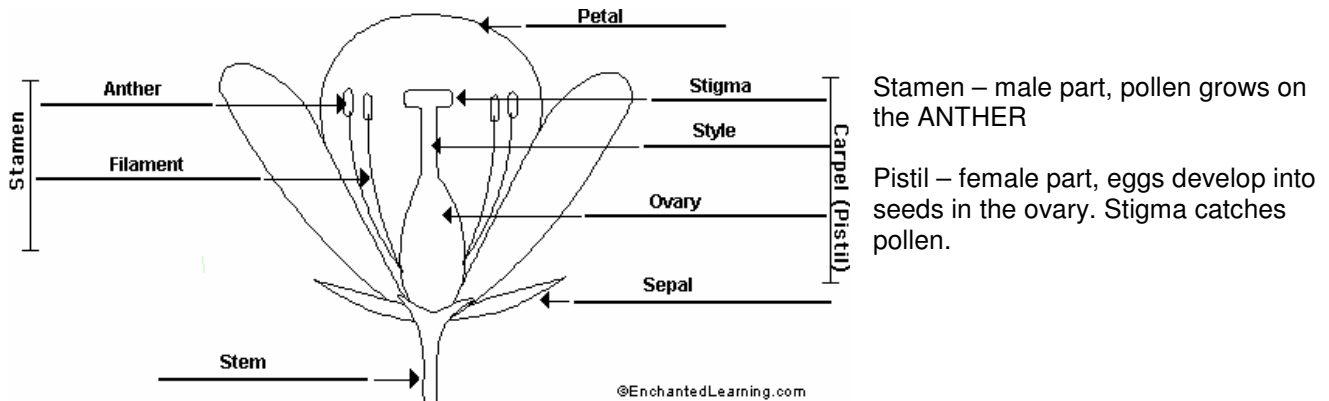
## \*Associate the processes of photosynthesis and respiration with appropriate cellular organelles.

**Photosynthesis** happens in the **chloroplasts** of plant cells

**Respiration** happens mainly in the **mitochondria**

# Heredity and Reproduction

**\*Match a flower part with its reproductive function.**



**\*Tell the difference between sexual and asexual methods of reproduction.** Sexual reproduction includes the joining of two cells with half the DNA needed to make a baby, usually one from the female and one from the male of the species.

Asexual reproduction only takes one parent. Examples of this are a one-celled organism splitting in two, the leg of a starfish growing into a new starfish, or a new plant grown from a cutting of an old plant.

**\*Know advantages and disadvantages of sexual and asexual reproduction.**

	<b>Advantages</b>	<b>Disadvantages</b>
<b>Sexual</b>	Genetic variation/diversity Better genes = better survival	Competition – takes effort to find a mate, attract pollinators, etc.
<b>Asexual</b>	Fast, Easy/ No competition /	No genetic variation/diversity

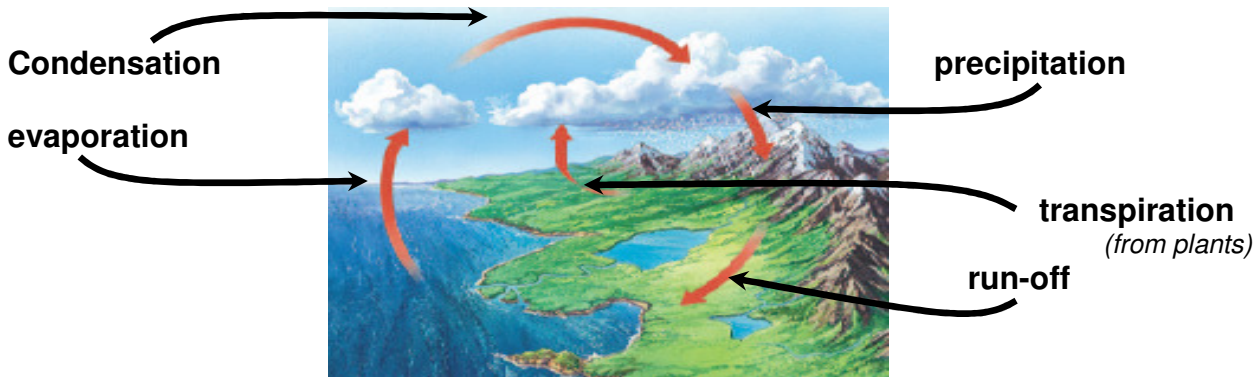
**\*Recognize different pollination methods and the flower structures that make them possible.**

- Flowers pollinated by bees have brightly colored, pretty flowers to attract bees, sticky pollen grains.
- Flowers pollinated by flies have stinky flowers, maybe like rotting meat.
- Flowers pollinated by animals must be tough and sturdy so they aren't destroyed
- Flowers pollinated by the wind typically have long stamen and pistil with very small petals.

# Atmospheric Cycles

- \*Determine how temperature affects evaporation and condensation in the atmosphere.
  - Higher temp's make MORE evaporation happen.
  - Since cold air can hold LESS water vapor than warm air, CONDENSATION is likely to happen as the temp drops and water vapor has to "spill out" of the air (the dew point).

\*Know the parts of the water cycle



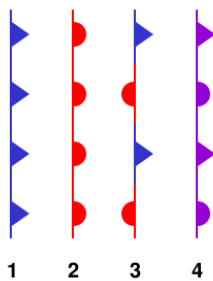
\*Analyze data and make predictions about weather given a scenario.

\*Interpret weather data using a weather map.

Surface Station Model

Data at Surface Station	
Temp (F) → 45	← Pressure (mb) 045
Weather → ••	← Sky Cover
Dewpoint (F) → 29	← Wind (kts)

Temp 45° F, dewpoint 29° F, overcast, wind from SE at 15 knots, weather light rain, pressure 1004.5 mb



Think about the symbols:

1. cold front – brings violent thunderstorms that pass quickly, followed by cooler air.
2. warm front - brings rainy weather that lasts several days, followed by warmer air
3. stationary front – cloudy, wet weather that can last many days; can become a cold or warm front over time
4. occluded front – usually near the end of a period of rainy, wet weather

Remember, High pressure bring Happy weather and Low pressure bring Lousy weather

## Structure and Properties of Matter

**\*Determine the measurable properties of matter and appropriate metric units (i.e., weight, mass, volume, density, size (length, width, height), temperature).**

Mass – grams

Weight – Newtons (N)

Volume – mL or liters /  $\text{cm}^3$

Length – cm, m, or km

Temperature – degrees Celsius

Density – g/ml or  $\text{g/cm}^3$

**\*Compare the motion and arrangement of molecules in solids, liquids, and gases.**

	<b>Arrangement</b>	<b>Motion</b>
<b>Solid</b>	Tightly packed, locked in place	Slower moving
<b>Liquid</b>	Loosely packed, not locked in place	Faster than in solids, but slower than in gases
<b>Gas</b>	Each atom free to go where it will. They are spread apart.	Fastest moving

**\*Know the difference between elements, compounds, and mixtures (i.e., Na, Cl, NaCl, C, O<sub>2</sub>, CO<sub>2</sub>, H<sub>2</sub>, H<sub>2</sub>O).** Elements are made of only one type of atom. Compounds are made of two or more types of atoms chemically bonded (like a marriage) together. Mixtures are combinations of elements and compounds NOT chemically bonded together.

**\*Classify substances as elements or compounds from their symbols or formulas.** How many **capital** letters are in the chemical symbol? H<sub>2</sub>O and CO<sub>2</sub> each have two or more, so they are compounds. H<sub>2</sub> and O<sub>2</sub> only have one each, so they are elements. Even though NaCl has 4 letters, it is a compound made of two elements, sodium (Na) and chlorine (Cl).