## Physical and Chemical Changes in Digestion

Remember: **Physical changes** result in no new substance and can usually be reversed. Examples include:

- Phase changes
- Changing the shape of an object
- Making or separating mixtures

**Chemical changes** result in a new substance and is not reversible. They are recognizable by:

- A change in temperature
- Heat and/or light being released
- A residue forming
- Gas being released
- A colour change

State whether the following are physical or chemical transformations, and give a brief justification using the abovementioned reasons.

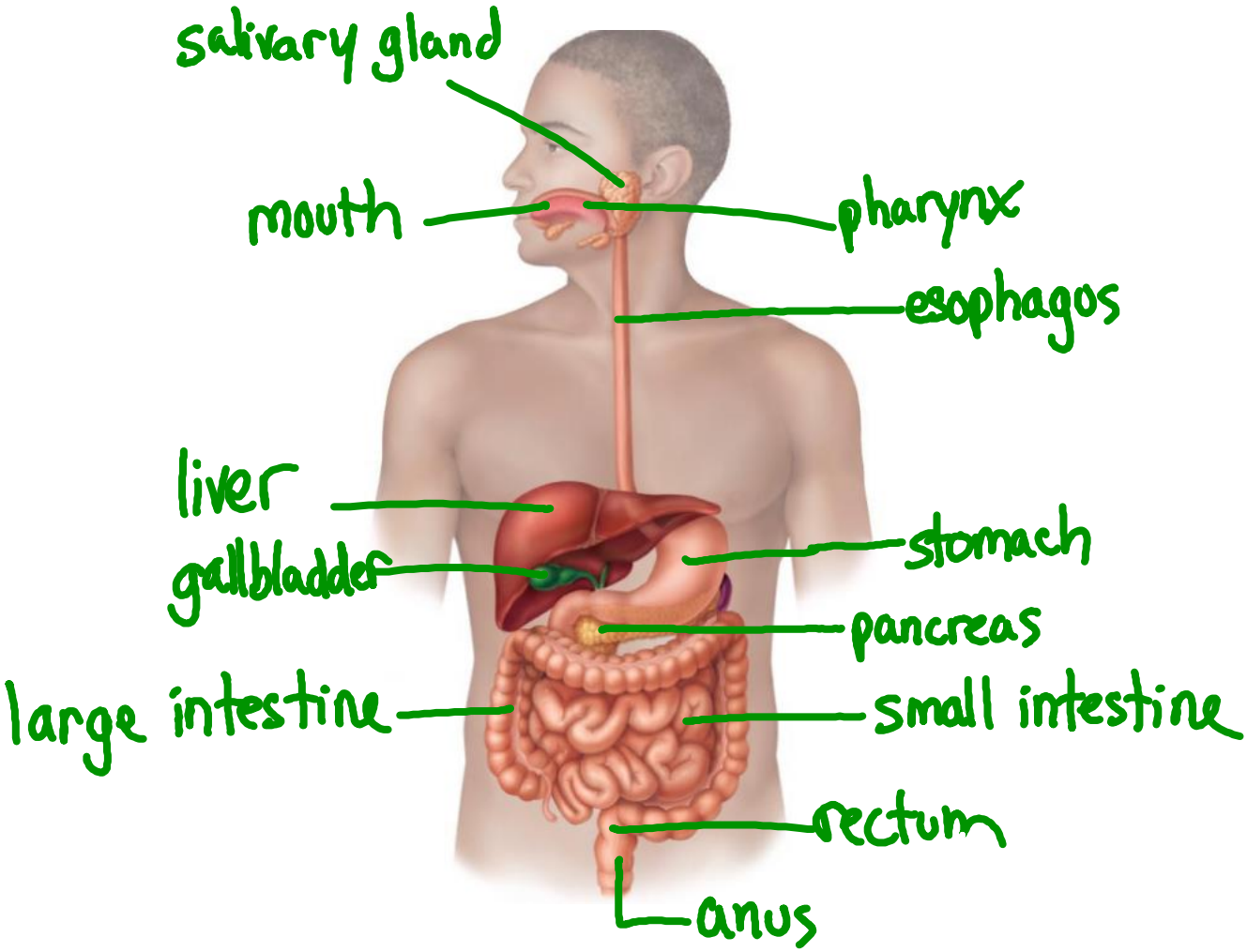
| Transformation | Physical? | Chemical? | Justification |
|---|---|---|---|
| Clothes drying on a clothesline. | ✓ | | Phase change |
| Bread rising. | | ✓ | Yeast releases gas |
| Sublimation of iodine. | ✓ | | Phase change (s→g) |
| Hydrogen exploding. | | ✓ | heat/light released |
| Bicycle rusting. | | ✓ | Change of colour |
| Solidifying candle wax. | ✓ | | Phase change (l→s) |
| Melting ice cream. | ✓ | | Phase change (s→l) |
| Crumpling aluminum foil. | ✓ | | Change of shape |
| Dissolving sugar in tea. | ✓ | | Making a mixture |
| Baking a cake. | | ✓ | Gas released |
| Masticating (chewing) the cake with your teeth. | ✓ | | No new substance |
| Breaking down flour into sucrose with salivary amylase. | | ✓ | New substance |
| Peristatic contractions sending the cake to your stomach. | ✓ | | No new substance |
| HCl and protease breaking down the egg into polypeptides. | | ✓ | New substance |
| Churning the cake in your stomach. | ✓ | | No new substance |
| Having bile emulsify oils in the cake. → separating groups of oil molecules, but not changing them | ✓ | | No new substance |
| Pancreatic juices breaking disaccharides into monosaccharides. | | ✓ | New substance |
| Pancreatic juices breaking down fat into glycerol and fatty acids. | | ✓ | New substance |
| Absorption of nutrients from the villi of the small intestine. | ✓ | | No new substance |
| Water, minerals and vitamins absorbed in wall of large intestine. | ✓ | | No new substance |
| Muscle contraction to eliminate feces through anal sphincter. | ✓ | | No new substance |

Fill in the following table.

| Nutrient | Targeted by: | Broken down into: | Where this happens |
|---|---|---|---|
| Starch | Amylase | Monosaccharides (glucose) | mouth (saliva) |
| [redacted] | | | |
| Fats (building blocks = fatty acids + glycerol) | Bile | (not broken down, just emulsified) | start of small intestine |
| All 3 | Pancreatic juices | All 3 building blocks | start of small intestine |
| Proteins | protease | polypeptides | Stomach |

Ignore

Label the following digestive system picture with as many digestive organs as you can:




If you're reading this, make sure you also remember how to determine the number of calories in food given the # of grams of fat (9 cal/g), proteins (4 cal/g) and carbohydrates (4 cal/g). Good luck!