Name: _____ Group: _____ Date: _____

OBSERVING A MECHANICAL CHANGE AND A CHEMICAL CHANGE

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Goal

Identify if a change is mechanical or chemical.

Observation criteria

1. What is a mechanical change during digestion?

2. Does the nature of a food change during a mechanical change?

3. What is a chemical change during digestion?

4. Does the nature of a food change during a chemical change?

5. What substances promote chemical changes during digestion?

6. In the table below, indicate:

a) the location where digestion of starch begins.

b) the secretion that initiates digestion of starch.

c) the digestive glands that secrete this chemical substance.

Location where digestion of starch begins	Secretion that initiates digestion of starch	Digestive glands that secrete this substance

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7. Lugol's solution is an indicator that detects starch in a substance. Describe the reaction of this indicator in the table below.

Reaction of Lugol's solution if starch not present	Reaction of Lugol's solution if starch present

Materials

- 10 elbow macaroni pieces
- 2 watch glasses *or* Petri dishes
- dropper bottle of Lugol's solution
- wash bottle of distilled water
- 250-mL beaker
- hot plate
- stopwatch *or* watch
- spatula
- 2 droppers
- spot plate
- beaker tongs
- electrical mixer *or* mortar and pestle
- dropper bottle of artificial saliva
- toothpicks

Procedure

Test on uncooked macaroni

1. Place a macaroni on one watch glass.
2. Add 2 drops of Lugol's solution.
3. Observe and record the reaction.

Test on cooked macaroni

1. Pour into the beaker 100 mL of distilled water.
2. Bring the water to a boil.
3. Add several macaronis to the boiling water.
4. Cook for about 10 minutes.
5. Collect one cooked macaroni and place it on the watch glass.
6. Add 2 drops of Lugol's solution.
7. Observe and record the reaction.

Tests on cooking liquid and distilled water

1. Collect a sample of cooking liquid with one dropper.
2. Add 20 drops of cooking liquid to one well of the spot plate.
3. Add 20 drops of distilled water to another well of the spot plate.
4. Set aside the spot plate for 4 minutes.
5. Add 6 drops of Lugol's solution to each well.
6. Observe and record the reaction.

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Tests after crushing

1. Empty the contents of the beaker into the mixer.
2. Crush for 15 seconds.
3. Collect a sample of the mixture with the second dropper.
4. Add 20 drops of the mixture to one well of the spot plate.
5. Add 20 drops of the mixture to a second well of the spot plate.
6. Add 20 drops of artificial saliva solution to the second well and mix with a toothpick.
7. Set aside the spot plate for 4 minutes.
8. Add 6 drops of Lugol's solution to each well.
9. Observe and record the reaction.
10. Clean up and put away materials.

Observations

Record your observations in the table below. Give the table a title.

Title:

Test substance	Reaction of Lugol's reagent

Reflecting on your observations

1. Indicate in the table below if starch was present or not present in each substance tested.

Test substance	Starch

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2. What is the source of the starch contained in the cooking liquid?

3. Did crushing the cooked macaroni and cooking liquid change the nature of the starch? Explain your answer.

4. Did adding the artificial saliva change the nature of the starch? Explain your answer.

5. For each action described below, indicate if the change is mechanical or chemical. Explain your answers.

a) Crushing the cooked macaroni and cooking liquid.

b) Adding artificial saliva to the cooked macaroni and cooking liquid.

6. Did your observations help you to better understand the difference between a mechanical change and a chemical change?

7. How could you improve the protocol for this lab?