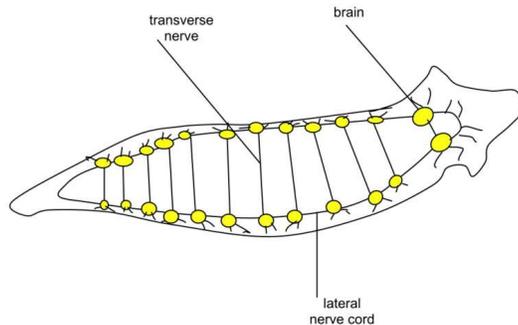


What happens to the pieces of cut planarian?

Planarians are free-living flatworms and are related to parasitic flatworms like the liver fluke and the tapeworm. They are found throughout the world in wet environments. They range in size from 3-12 mm (almost the size of a penny) and are scavengers –feeding on the decaying remains of animals and plants.



Planarians derived their names from the fact that they are fairly flat –*planum* means flat and hence planarians. They are very simple organisms that display a centralized nervous system. The central nervous system is composed of two lobes that look like a horseshoe shape around the head. The lobes connect to the ventral cords and send projections all the way down to the very tip of the



animal (see figure). This is how the brain controls the motion and musculature of these animals. Planarians don't have a mouth; they only have a single opening to their body called the pharynx. The food enters through the pharynx, is digested and whatever is not digested comes back out through the same pharynx. The two cartoon-like cockeyes in the head part are the photoreceptors and are known as "eyespot". The eyespots can detect light. Planarians avoid light; whenever they see light they'll run away from the light and hide somewhere.

Planarians are interesting because they are one of the organisms with the most incredible ability to regenerate. The regenerative capabilities of this organism have been known for hundred of years. With the advances in molecular biology planarians have become a model organism for studying stem cells.

In this investigation we will observe the remarkable process of regeneration and compare how it varies in different segments of planarians. In research groups you will select five different cuts, be conservative but also creative in the types of cuttings you will do. As an interesting fact, Thomas Hunt Morgan in 1898 demonstrated that a tiny little fragment 200 times smaller than the original size of the animal was capable of regenerating all the missing parts and produced a complete properly shaped organism.

The first thing you will do is discuss with your research team the cuttings you will perform, make a sketch of the cuts, write down the reasons for choosing a particular cutting and the predictions you have for the pieces. For about 10 days you will follow the progression of the pieces and **write down the things you notice**. Use the table below to record your procedures, your observations and the questions you have. At the end of the investigation you will share your observations and questions with the class.

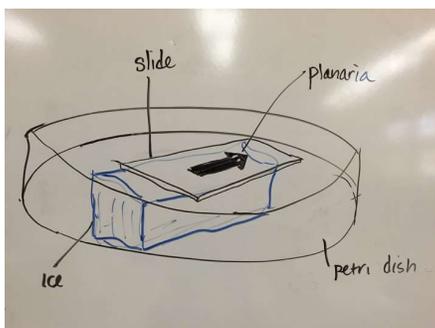
Name: _____ Period: _____ Date: _____

Materials:

Planarians, razor blade, microscope slide, de-chlorinated tap water, cotton swabs, petri dish, labels, ice cubes

Procedure:

1. Discuss with your researcher group and come up with five different cuts that you will perform to the planarian. Sketch the cuts; briefly explain why you choose one cut, and your predictions for each piece. Use the data table provided, use the back of the page if more space is needed.
2. Making the cuts:
 - a. Fill a petri dish about 1/2 full of de-chlorinated tap water. Place a drop of water on the glass slide and transfer a planarian from the supply dish to the drop of water using a cotton swab.
 - b. Chill the slide on an ice cube to slow down the movement of the planarian.
 - c. After the animal has relaxed, make the cuts that you discussed with your research group. Start with the easy cuts and move to the more complicated ones as you acquire more practice and become more confident.
 - d. Place the different pieces (two or more) in the petri dish of water. Label the dish well so you remember which cut you made (keep a record of the cutting on your data table)
 - e. Repeat the procedure, making each of the rest of the cuts. When finished with all of the cuts, store the petri dishes in a cool, dark place.
3. Examine the pieces every few days. If pieces are starting to mold remove them from the petri dish. Check with your teacher before discarding any pieces.
4. Make note of your observations of what is happening with each piece and sketch them out on your data table. Check to see if parts are moving, or changing color, etc.
5. Record the questions that you have.



Name: _____ Period: _____ Date: _____

Data Table for planarian investigation

What do you notice?
(Make a sketch and write few notes)

Cut #	Sketch your cut	Predictions	Date:	Date:	Date:
1.					
	Reasoning for doing this cut:				
2.					
	Reasoning for doing this cut:				
3.					
	Reasoning for doing this cut:				
4.					
	Reasoning for doing this cut:				
5.					
	Reasoning for doing this cut:				

While observing the pieces what are the questions that come to your mind? **What do wonder about?**

