TEAM NEPTUNE UGANDA

21. SINKING PAPER CLIPS

QUESTION

- IN A WELL KNOWN PHYSICS DEMONSTRATION, SMALL METAL OBJECTS(E.G PAPER CLIPS PINS OR NEEDLES(STAY AFLOAT ON WATER. IF A SMALL AMOUNT OF SOAP ISD THEN ADDED TO THE WATER, SOME OF THE FLOATING OBJECTS INSTANTANEOUSLY SINK. INVESTIGATE THE CRITICAL CONDITIONS FOR SINKING

INTRODUCTION

- THE WELL KNOWN DEMONSTRATION REVOLVES AROUND SURFACE TENSION OF WATER. WE WIOLL DISCUSS HOW THE SURFACE TENSION OF WATER IS AFFECTED BY LIQUID SOAP
- SURFACE TENSION IS THE NAME WE GIVE TO THE COHESION OF WATER MOLECULES AT THE SURFACE OF A BODY OF WATER. THE COHESION OF WATER MOLECULES FORMS A SURFACE "FILM" OR "SKIN." SOME SUBSTANCES, SUCH AS SOAP, MAY REDUCE THE COHESIVE FORCE OF WATER, WHICH WILL REDUCE THE STRENGTH OF THE SURFACE "SKIN" OF THE WATER.

FURTHER INTO THE INTRODUCTION

- WATER MOLECULES ARE ATTRACTED TO OTHER WATER MOLECULES. THE OXYGEN END OF WATER HAS A NEGATIVE CHARGE AND THE HYDROGEN END HAS A POSITIVE CHARGE. THE HYDROGEN ATOMS OF ONE WATER MOLECULE ARE ATTRACTED TO THE OXYGEN ATOMS FROM OTHER WATER MOLECULES. THIS ATTRACTIVE FORCE IS WHAT GIVES WATER ITS COHESIVE PROPERTIES.

DOES ADHESION HAVE ANYTHING TO DO WITH IT?

- NOT A LOT ACTUALLY
- THE FORCES OIF SURFACE TENSION BASICALLY DEPEND ON THE COHJESIVE FORCE BETWEEN A WATER MOLECULE WHICH FORM A TIGHT SKIN(IN QUOTES OBVIOUSLY)

HOW ABOUT WEIGHT OF THE OBJECTS

- COULD A PIN SINK FASTER THAN A PAPERCLIP ASSUMING THE PIN HAS A GREATER WEIGHT THAN A PAPER CLIP?

EXPERIMENT

- REQUIREMENTS
- PIECES OF PAPER
- PAPER CLIPS
- PINS
- STOP CLOCK
- CONTAINER

PROCEDURE

- MEASURED AN EQUAL VOLUME OF WATER IN THE CONTAINERS.
- MEASURED LIQUID SOAP IN THREE CATEGORIES, LITTLE, MODERATE AND HIGH.
- PLACED THE PIECES OF PAPER ON TOP OF THE WATER IN THE CONTAINERS
- PLACED THE PAPER CLIPS ON TOP OF THE PAPERS AND PUSH THEM DOWN

VARIABLES

- VARIED THE PINS AND PAPER CLIPS
- VARIED CONCENTRATIONS OF THE LIQUID SOAP

CONCLUSION

- THE CONDITIONS FOR SINKING WERE AS FOLLOWS;
- THE CONCENTRATION OF THE LIQUID SOAP
- SHAPE AND WEIGHT OF THE PINS OR PAPER CLIPS