WILL IT FLOAT?

Illinois Extension
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

OBJECTIVES

LEARN THE PRINCIPLE OF BUOYANCY AND THE PROCESS OF FORMING AND TESTING A HYPOTHESIS.

GUIDING QUESTIONS

1. WHY DO SOME THINGS FLOAT WHILE OTHERS SINK?
2. HOW DO SCIENTISTS CONDUCT EXPERIMENTS?

MATERIALS

JUICE BOX OR MILK CARTON**
STRAW
CONSTRUCTION PAPER
CRAFT STICKS
GLUE STICK
PIECE OF CARDSTOCK
COPY PAPER
ASSORTED HOUSEHOLD ITEMS**
**ITEMS NOT SUPPLIED

CONCEPTS

- OBJECTS AND WATER CAN'T BE IN THE SAME PLACE AT THE SAME TIME. THIS CAUSES WATER DISPLACEMENT.
- BUOYANCY IS A FORCE THAT PUSHES UP ON AN OBJECT.
- SCIENTISTS ASK QUESTIONS AND THEN "GUESS" THE ANSWER. THIS IS CALLED A HYPOTHESIS. THEY TEST THEIR HYPOTHESIS THROUGH EXPERIMENTS TO SEE IF THEIR GUESS IS CORRECT.

FACTS

- OBJECTS FLOAT BECAUSE THEY ARE BEING PUSHED ON BY A FORCE EQUAL TO THE WEIGHT OF THE WATER THEY DISPLACED.
- OBJECTS THAT FLOAT ARE LESS DENSE THAN THE WATER THEY PUSHED ASIDE. DENSE OBJECTS USUALLY HAVE MORE MOLECULES THAT ARE CROWDED CLOSE TOGETHER.
- BUOYANCY IS A FORCE THAT PUSHES UP ON OBJECTS. THE MORE SURFACE AREA THE OBJECT HAS FOR THE FORCE TO PUSH UP ON, THE GREATER CHANCE IT WILL FLOAT AND THE MORE WEIGHT IT WILL HOLD.
- GREEK SCIENTIST AND MATHEMATICIAN, ARCHIMEDES DISCOVERED THE LAWS OF BUOYANCY WHICH IS KNOWN AS THE ARCHIMEDES PRINCIPLE. ITEMS THAT FLOAT MUST WEIGH LESS THAN THE FLUID OR GAS THEY'RE FLOATING IN; HEAVIER ITEMS SINK.

INTEREST APPROACH-ENGAGEMENT

SOME OPEN ENDED QUESTION TO ASK:

- WHY DO SOME THINGS FLOAT WHILE OTHERS SINK?
- WHAT CAN YOU DO TO MAKE SOMETHING FLOAT?
- WHAT THINGS WILL SINK?

ACTIVITY 1: MAKE YOUR OWN BOAT/RAFT

- USING THE CRAFT STICKS, GLUE STICK, BUILD A RAFT.
- LINE UP ALL THE CRAFT STICKS BUT TWO. PLACE THEM TIGHTLY TOGETHER CREATING A SMALL RECTANGLE.
- USING YOUR GLUE STICK, GLUE ONE OF THE REMAINING CRAFT STICKS ACROSS THE TOP HALF OF THE SMALL RECTANGLE TO HOLD THE STICKS TOGETHER.
- REPEAT WITH THE REMAINING STICK AND GLUE IT TO THE LOWER PART OF THE RECTANGLE.
- YOU CAN SUBSTITUE A JUICE BOX OR MILK CARTON FOR THE BODY OF THE BOAT IF YOU WISH.
- POKE A HOLE IN THE JUICE BOX AND INSERT STRAW. MAKE A "SAIL" FROM THE CONSTRUCTION PAPER. GLUE OR TAPE IT TO THE STRAW.
- DECORATE BOAT/RAFT AS YOU LIKE WITH CRAYONS OR MARKERS.

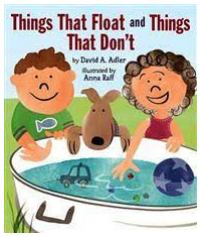
ACTIVITY 2: MAKE YOUR OWN JOURNAL

- TAKE A PIECE OF CARDSTOCK AND FOLD IT "HAMBURGER" STYLE OR WIDTH-WISE.
- FOLD SEVERAL PIECES OF COPY PAPER THE SAME WAY.
- PUT THE CARDSTOCK ON THE OUTSIDE OF THE COPY PAPER TO ACT AS A COVER.
- RECORD THE RESULTS OF YOUR EXPERIMENTS IN YOUR JOURNAL.
- USE BOTH SKETCHES AND WORDS TO TELL WHAT YOU OBSERVED.

BUOYANCY EXPERIMENTS:

- FILL A CONTAINER OR SINK WITH WATER AND TEST WHETHER YOUR BOAT WILL FLOAT.
- RECORD YOUR DISCOVERY IN YOUR JOURNAL.
- NEXT, GATHER A NUMBER OF HOUSEHOLD ITEMS LIKE A MARBLE, PAPERCLIP, PLASTIC TOY, OR AN ORANGE. MAKE SURE TO HAVE A GROWN-UPS PREMISSION TO USE THE ITEM IN YOUR EXPERIMENT. PREDICT WHETHER YOU THINK THEY WILL SINK OR FLOAT. THIS IS YOUR HYPOTHESIS.
- TEST THE ITEMS BY PLACING THEM IN THE WATER.
- DID THEY SINK OR FLOAT? WAS YOUR HYPOTHESIS CORRECT? RECORD YOUR FINDINGS IN YOUR JOURNAL.

ACTIVITY 3: READ THINGS THAT FLOAT AND THINGS THAT DON'T BY DAVID ADLER
HTTPS://WWW.YOUTUBE.COM/WATCH?V=KAF5IEL-XXQ
RECOMMENDED FOR PRE-K TO 1ST GRADE STUDENTS.



DISCUSSION QUESTIONS:

- WHAT SURPRISED YOU?
- HOW WELL DID YOU PREDICT WHAT WOULD FLOAT? IT'S OKAY NOT TO BE CORRECT EVERYTIME. SCIENTISTS ARE OFTEN WRONG WITH THE FIRST HYPOTHESIS. BUT THEY LEARN FROM WHAT THEY OBSERVE IN THEIR EXPERIMENTS AND RETEST WITH A NEW HYPOTHESIS.
- WHAT OTHER THINGS WOULD YOU LIKE TO TEST?

BONUS EXPERIMENT: TESTING THE BUOYANCY OF AN ORANGE

- FILL A CONTAINER WITH WATER AND THEN ADD YOUR ORANGE (WITH PEEL) INTO THE WATER.
- DOES IT FLOAT?
- NOW PEEL THE ORANGE AND REPEAT THE EXPERIMENT. DOES IT STILL FLOAT? WHY OR WHY NOT?

EXTRA WAYS TO EXPERIMENT: CHANGING THE WATER

- ADD BAKING SODA OR SALT TO THE WATER. THE WATER SHOULD BE REALLY CLOUDY SO ADD A LARGE AMOUNT.
- DOES THIS CHANGE WHAT SINKS OR FLOATS?
- RECORD YOUR FINDINGS IN YOUR JOURNAL.

LESSON PLAN CREATED BY WENDY FERGUSON, PROGRAM COORDINATOR