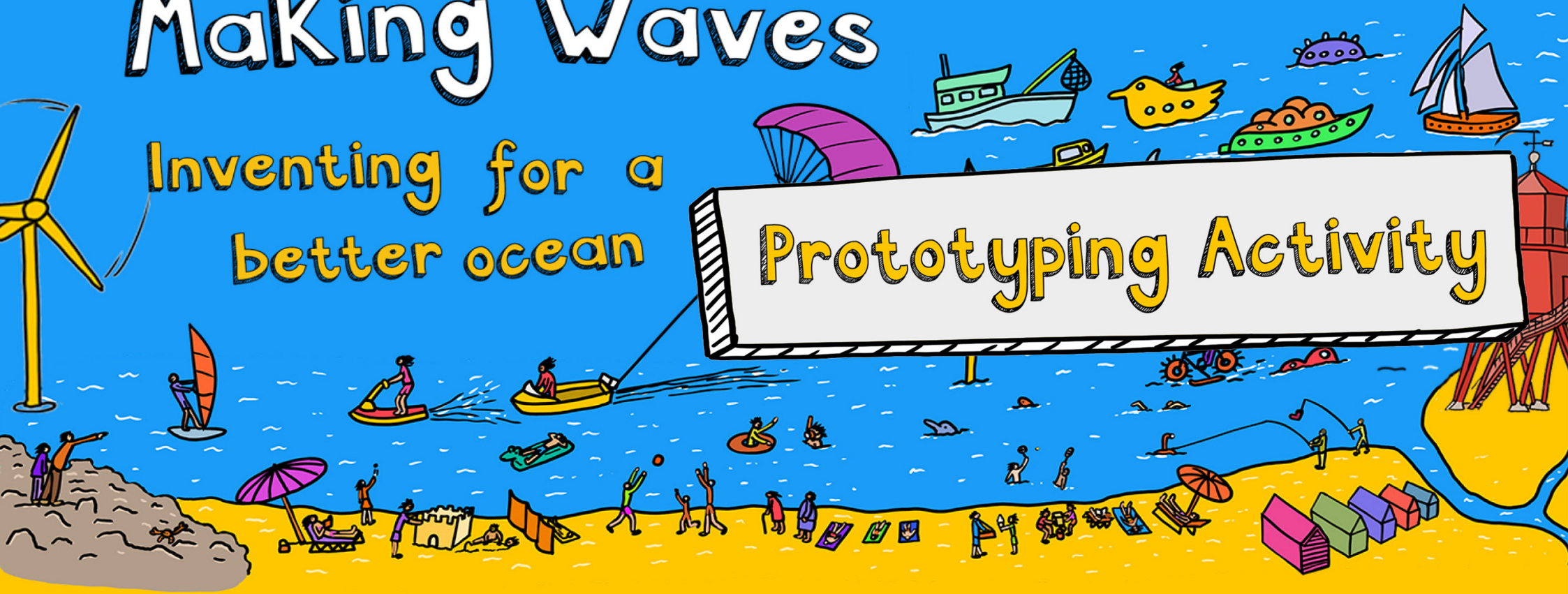


Making Waves

Inventing for a
better ocean

Prototyping Activity

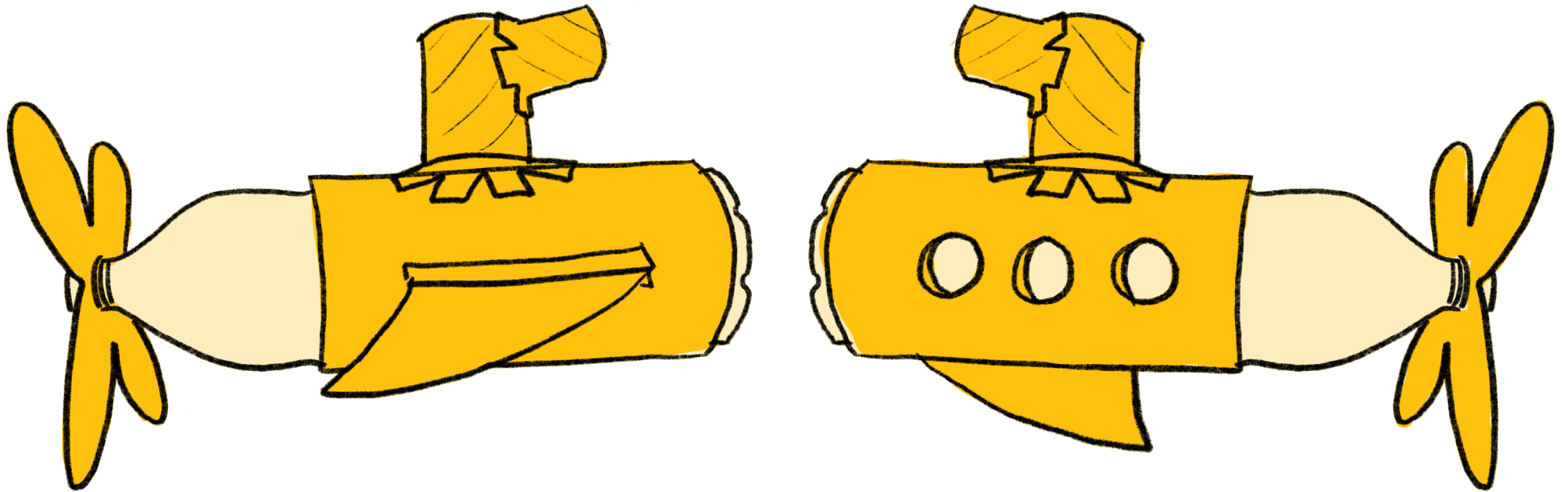


DOGGER BANK
WIND FARM



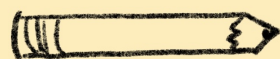
South Tyneside Council

Little
Inventors



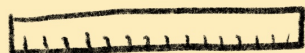
≡ MAKING A BOTTLE SUBMARINE ≡

≡ EQUIPMENT ≡

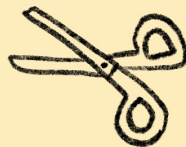


PENCIL

RULER



SCISSORS



TAPE

ONE WILL
BE OKAY

GLUE

(PVA OR HOT GLUE)

CLIPS OR PEGS

(USEFUL FOR HOLDING
SOME THINGS IN PLACE
WHILE GLUE DRIES)



GLUE STICKS
AREN'T GREAT FOR THIS

≡ MATERIALS ≡



BOTTLE



TOILET ROLL TUBES x 2
(OR A KITCHEN ROLL TUBE)



CARDBOARD

(CORRUGATED LIKE DELIVERY BOXES)

NEED →

HOUSEHOLD/KITCHEN PACKAGING
(LIKE CEREAL BOXES)

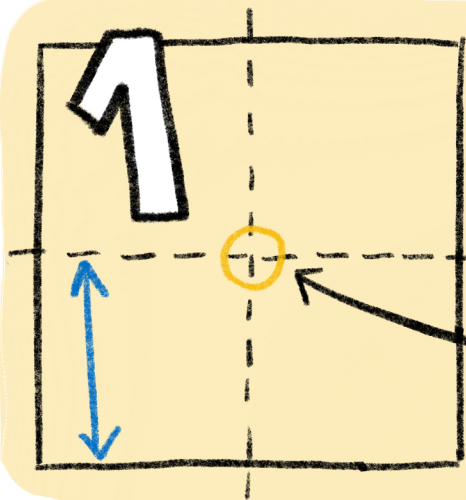


PAPERCLIP OR GARDEN WIRE

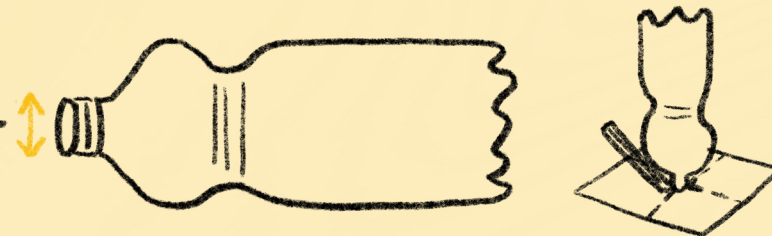
OTHER INTERESTING SHAPED RECYCLING



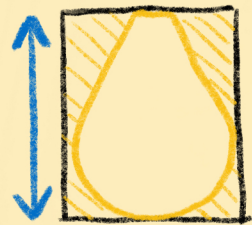
EXTRAS



- MEASURE A SQUARE OF CARDBOARD
- USE YOUR RULER TO DRAW 2 LINES THAT INTERSECT IN THE MIDDLE OF YOUR SQUARE



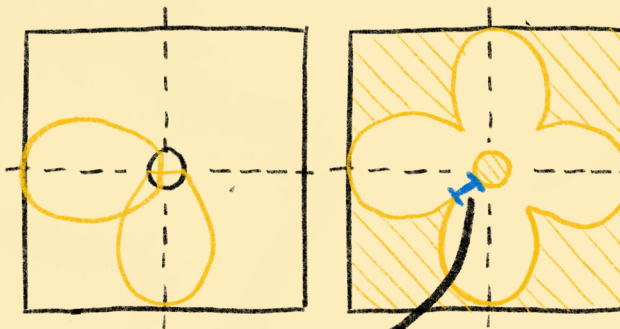
CAREFULLY PLACE YOUR BOTTLE OVER THE CENTRE AND DRAW AROUND WITH A PENCIL



- DRAW AND CUT OUT A TEMPLATE FOR THE PROPELLER BLADES.
- MOVE YOUR TEMPLATE AROUND THE CENTRE CIRCLE AND DRAW AROUND IT



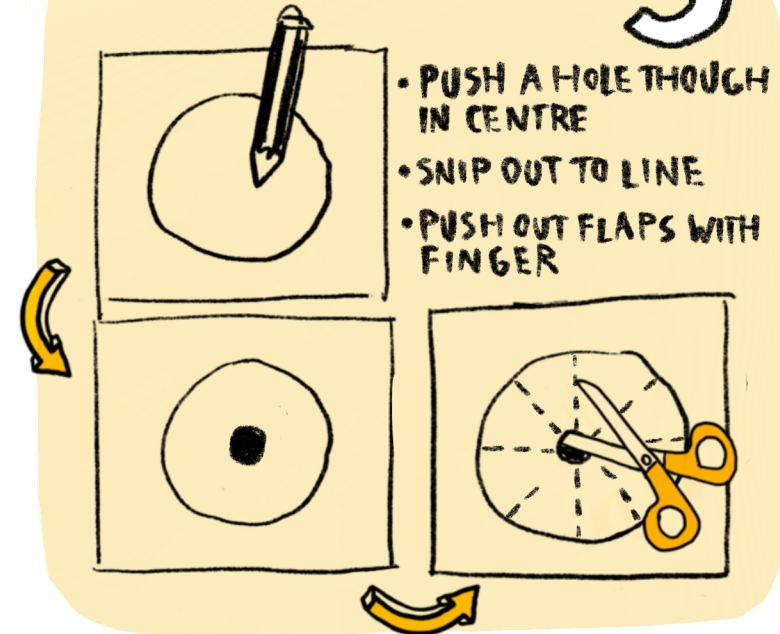
WHAT SHAPE WILL YOU TRY?



IT'S IMPORTANT THIS DISTANCE ISN'T TOO SHORT AS IT MIGHT TEAR IF IT IS! (1.5/2 CM MIN)

CUTTING OUT THE CIRCLE:

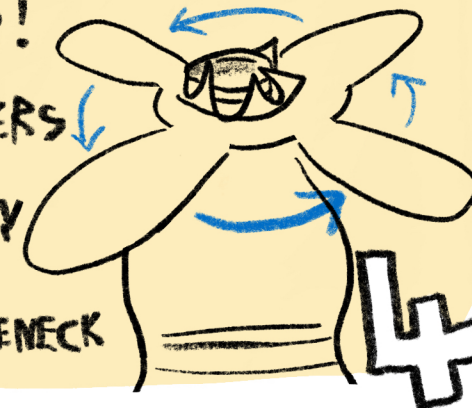
3

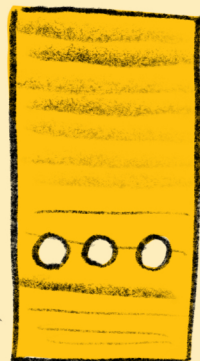


- PUSH A HOLE THROUGH IN CENTRE
- SNIP OUT TO LINE
- PUSH OUT FLAPS WITH FINGER

- GLUE LAYERS

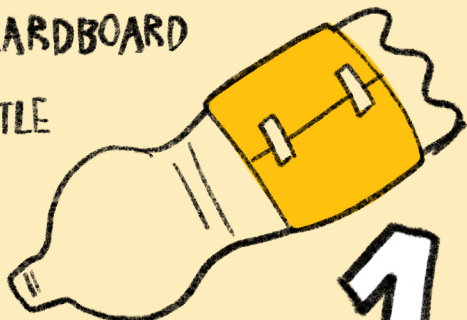
- CAREFULLY PUSH OVER BOTTLE NECK





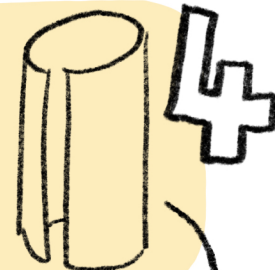
- CUT A STRIP OF CARDBOARD
- ROLL AROUND BOTTLE
- GIVE OVERLAP OR TAPE

IF YOU WANT TO CUT OUT WINDOWS DO THIS FIRST!



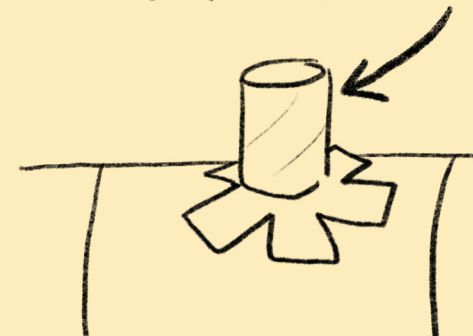
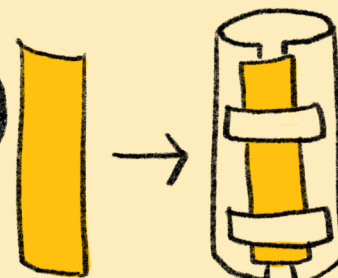
1

- GET 2 MORE TOILET ROLL TUBES (OR HALF A KITCHEN ROLL ONE!)
- CUT ALL THE WAY DOWN LIKE THIS →



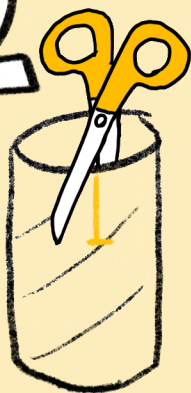
- PLACE THE FIRST ONE OVER THE ONE ON YOUR BOTTLE

5



- THERE WILL BE A GAP SO YOU NEED TO COVER IT WITH AN EXTRA STRIP OF CARD BEFORE TAPING OR IT WON'T ROTATE!

2



- START WITH A LOO ROLL TUBE
- CUT SLITS ABOUT 2 CM DOWN AROUND ONE END.



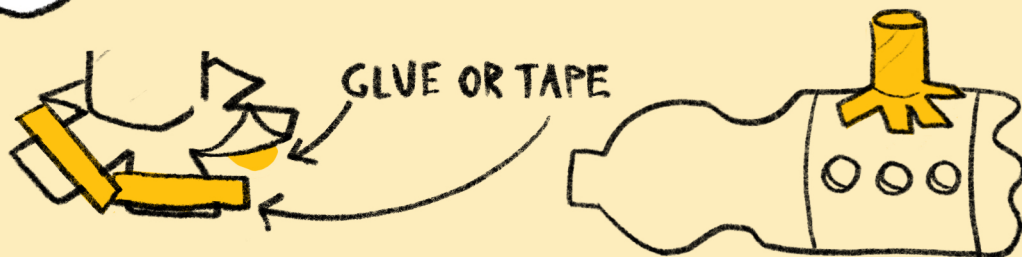
AT LEAST 6 WORKS BETTER



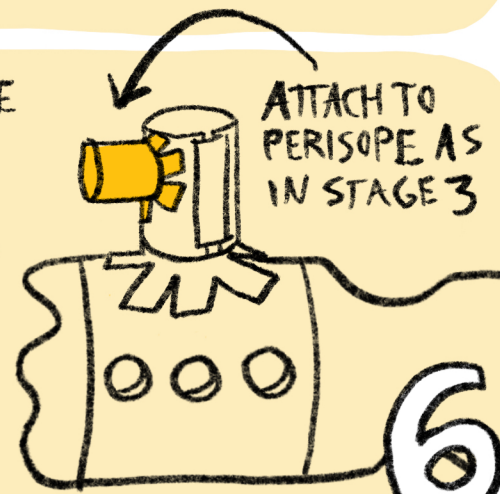
FOLD OUT TABS

3

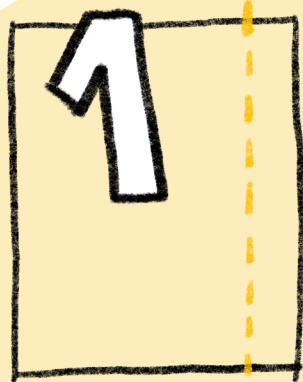
PLACE ON TOP OF THE CARDBOARD SECTION



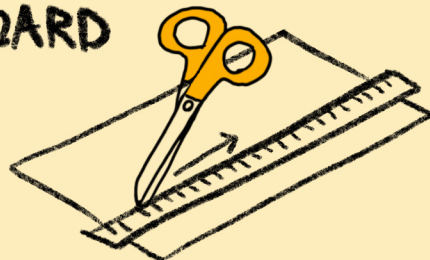
- ROLL UP SECOND LOO ROLL TUBE TO MAKE A NARROWER TUBE
- SECURE THE REPEAT STAGE 2 TO MAKE TABS



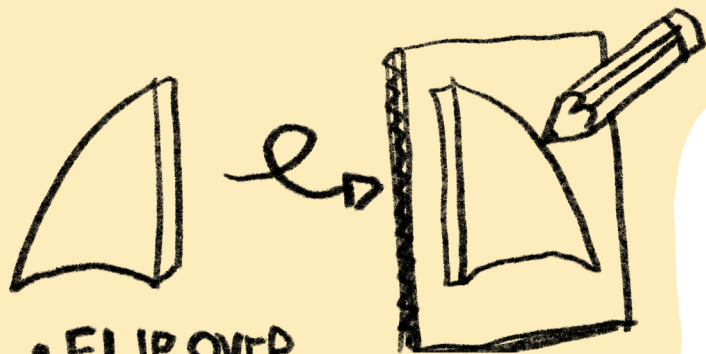
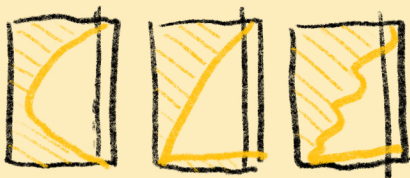
6



- WITH A RULER AND CLOSED SCISSORS SCORE A 'TAB' DOWN THE SIDE OF YOUR CARDBOARD

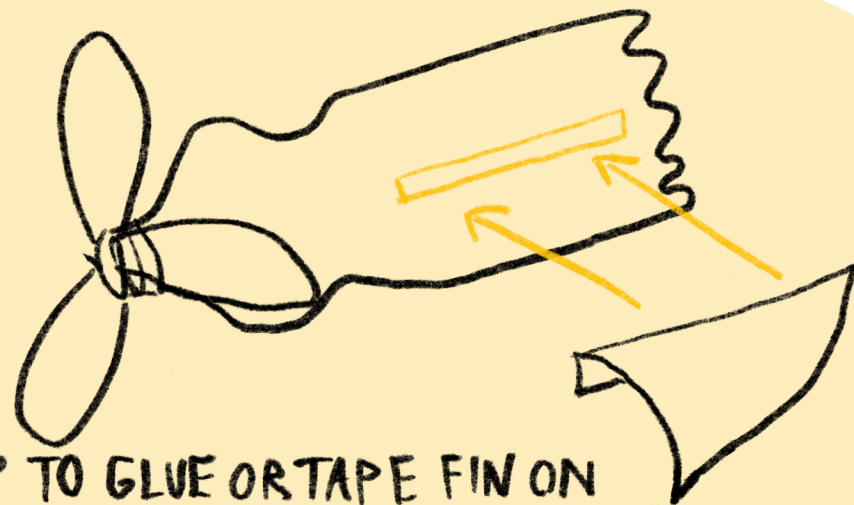


- DRAW YOUR FIN SHAPE
- CUT OUT 



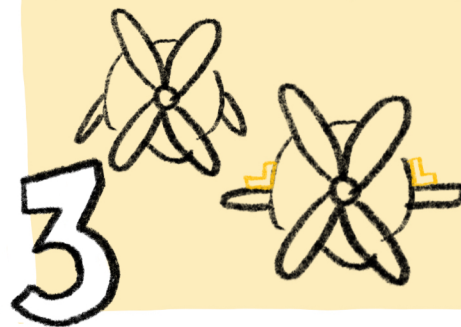
- FLIP OVER
- TRACE TO MAKE 2nd FIN

2



- USE FLAP TO GLUE OR TAPE FIN ON TO EACH SIDE. (OR EVEN TOP OR BOTTOM!)

≡ TIP ≡ EXTRA BRACE IF FINS ARE FALLING FLAT



SCORE



L-SHAPE BRACE



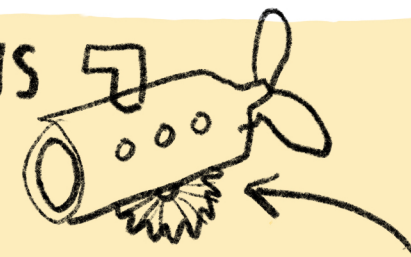
ATTACH TO FIN AND BOTTLE



ALTERNATIVE CONCERTINA FINS

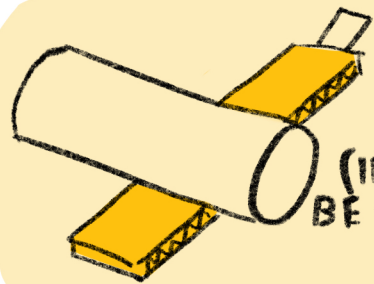


- FOLD PAPER

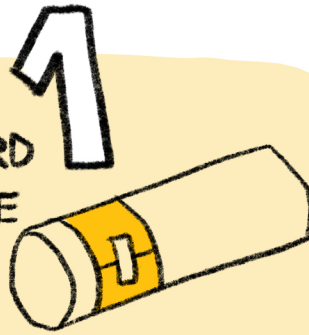


- GLUE TO CARDBOARD STRIP THEN

ALTERNATIVE PROPELLER DESIGN

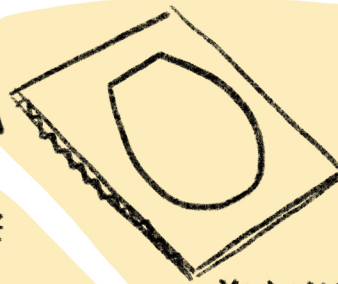


- WRAP A STRIP OF CARDBOARD TIGHTLY AROUND YOUR TUBE
- (IF YOU USE GLUE NOT TAPE THEN BE CAREFUL NOT GLUE IT TO THE TUBE!)



1

2



- DRAW AND CUT OUT 1 FIN
- TRACE AND CUT OUT MORE (TRY 6 BUT IT'LL DEPEND ON THE SIZE OF YOUR FIN AND TUBE!)

YOU CAN TRY DIFFERENT SHAPES TOO



- STAND YOUR TUBE UP ON THE FLAT EDGE OF YOUR FIN.
- DRAW AROUND AND CUT OUT CURVE

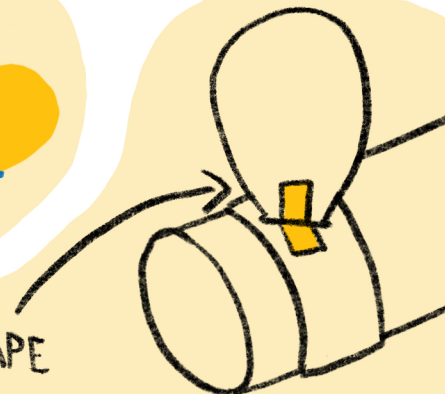


WHY?
IT HELPS THE FINS ATTACH MORE SECURELY AS THERE IS MORE AREA OF THE 2 PIECES JOINING.

3



- ATTACH FINS WITH A TAB OR TAPE ON EACH SIDE.
- CONTINUE ROUND KEEPING THEM ALL AT THE SAME ANGLE.



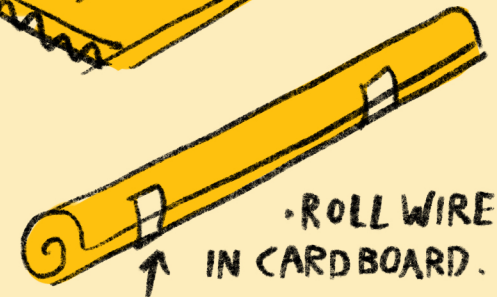
4



MOVING ARM ATTACHMENT



- STRAIGHTEN OUT A PAPERCLIP
- LAY IT ON A STRIP OF CARDBOARD



- ROLL WIRE UP IN CARDBOARD.
- TAPE OR GLUE TO HOLD.

- ATTACH TO SUBMARINE USING A CARDBOARD STRIP AND GLUE



YOU CAN USE TAPE TO FIX ON A CLIP OR PEG OR DESIGN YOUR OWN ATTACHMENT!