

THE OKLAHOMA AQUARIUM  
AND TULSA SYMPHONY  
PRESENT

# SYMPHONY BY THE SEA



THANKS TO OUR SPONSORS FOR MAKING THIS FUN, EDUCATIONAL EVENT POSSIBLE!



# BRASS

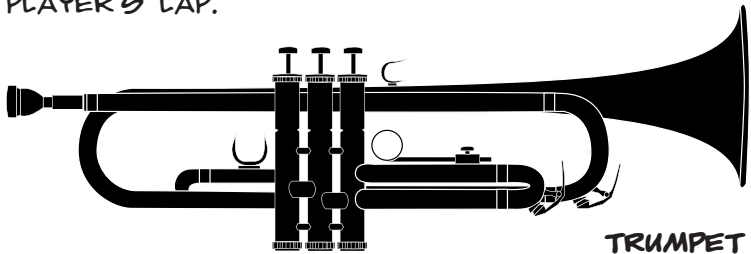
THE MAIN INSTRUMENTS OF THE BRASS FAMILY INCLUDE THE TRUMPET, TROMBONE, FRENCH HORN, AND TUBA. BRASS FAMILY INSTRUMENTS PRODUCE THEIR SOUND BY THE PLAYER BUZZING HIS/HER LIPS WHILE BLOWING AIR THROUGH A CUP OR FUNNEL SHAPED MOUTHPIECE. TO PRODUCE HIGHER OR LOWER PITCHES, THE PLAYER ADJUSTS THE OPENING BETWEEN HIS/HER LIPS. AS WITH OTHER INSTRUMENT FAMILIES, THE SHORTER THE TUBING LENGTH, THE HIGHER THE SOUND AND THE LONGER THE TUBING LENGTH, THE LOWER THE SOUND.

THE TRUMPET IS THE HIGHEST SOUNDING MEMBER OF THE BRASS FAMILY. THE BRILLIANT TONE OF THE TRUMPET TRAVELS THROUGH ABOUT SIX FEET OF TUBING, BENT INTO AN OBLONG SHAPE. THE PLAYER PRESSES THE THREE VALVES IN VARIOUS COMBINATIONS WITH THE FINGERS OF THE RIGHT HAND TO OBTAIN VARIOUS PITCHES.

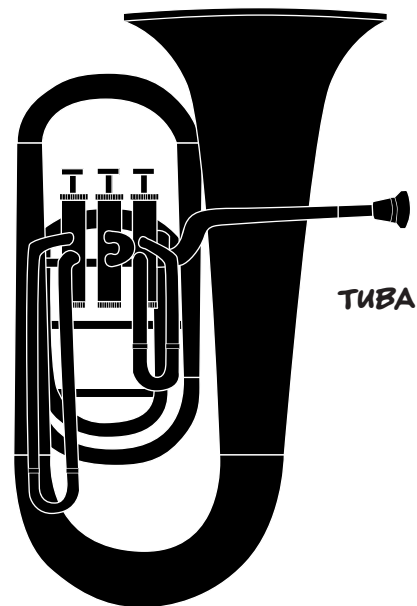
INSTEAD OF VALVES, THE TROMBONE HAS A SLIDE WHICH CHANGES THE LENGTH OF ITS APPROXIMATELY NINE FEET OF TUBING TO REACH DIFFERENT PITCHES. THE MOUTHPIECE OF THE TROMBONE IS LARGER THAN THAT OF A TRUMPET, AND GIVES THE INSTRUMENT A MORE MELLOW SOUND.

THE HORN, OR FRENCH HORN, CONSISTS OF ABOUT TWELVE FEET OF NARROW TUBING WOUND INTO A CIRCLE. THE PLAYER OBTAINS DIFFERENT NOTES ON THE HORN WITH A CLEAR MELLOW SOUND BY PRESSING VALVES WITH THE LEFT HAND AND BY MOVING THE RIGHT HAND INSIDE OF THE BELL.

MADE OF ABOUT SIXTEEN FEET OF TUBING, THE TUBA IS THE LOWEST SOUNDING MEMBER OF THE BRASS FAMILY. THE TUBA HAS FOUR TO FIVE VALVES AND IS HELD UPRIGHT IN THE PLAYER'S LAP.



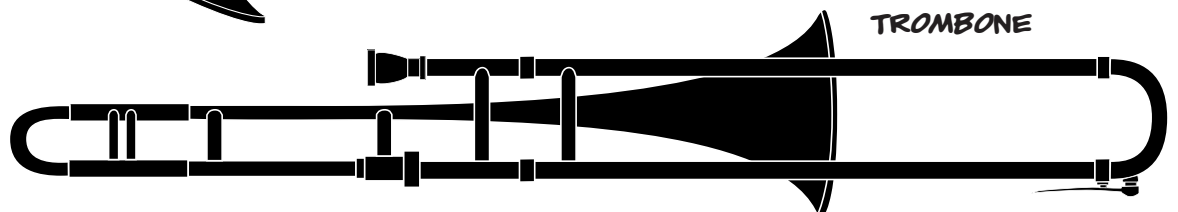
TRUMPET



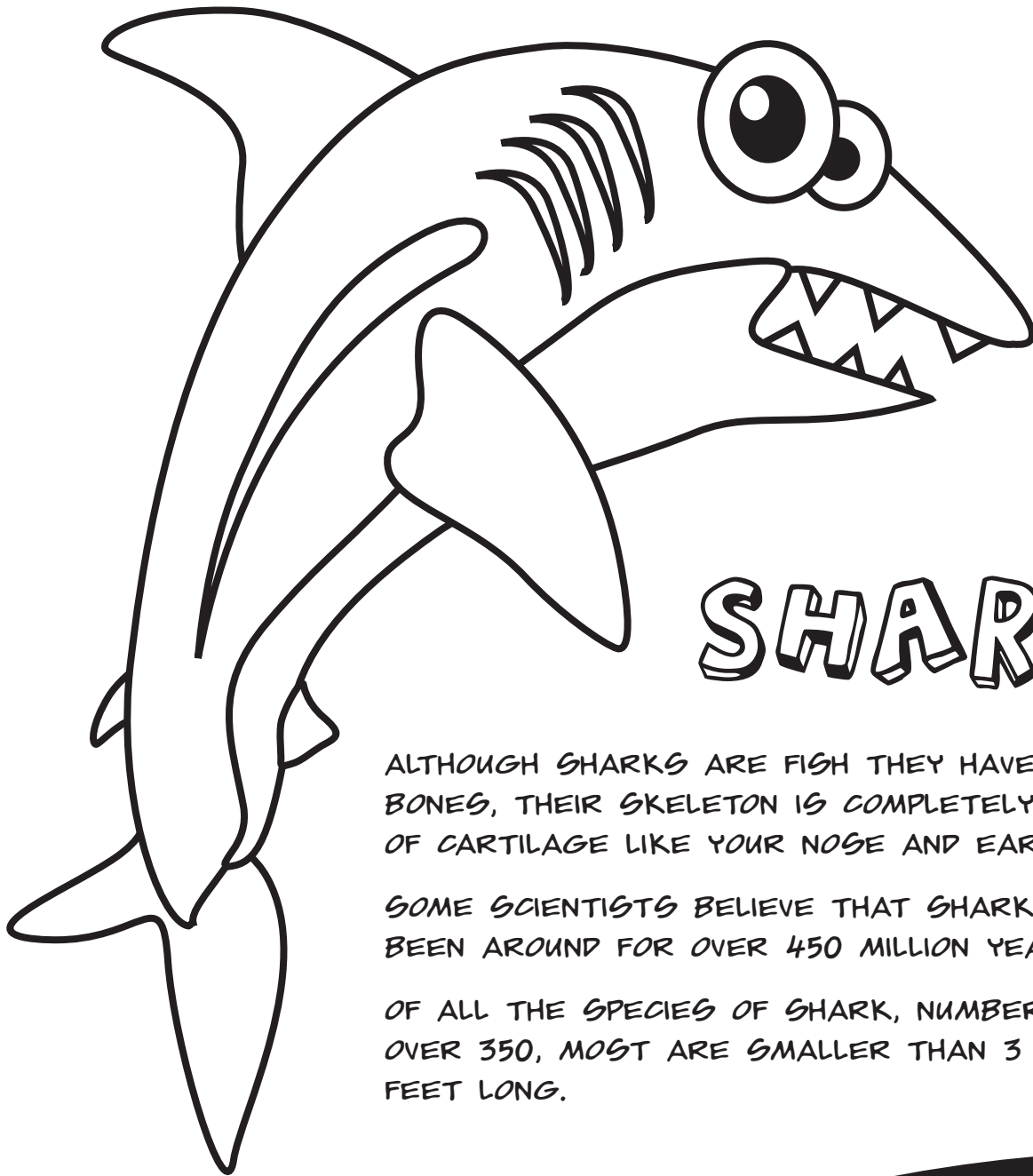
TUBA



HORN



TROMBONE



# SHARK

ALTHOUGH SHARKS ARE FISH THEY HAVE NO BONES, THEIR SKELETON IS COMPLETELY MADE OF CARTILAGE LIKE YOUR NOSE AND EARS.

SOME SCIENTISTS BELIEVE THAT SHARKS HAVE BEEN AROUND FOR OVER 450 MILLION YEARS.

OF ALL THE SPECIES OF SHARK, NUMBERING OVER 350, MOST ARE SMALLER THAN 3 1/2 FEET LONG.

# PERCUSSION

IN THE ORCHESTRA, THE PERCUSSION SECTION PROVIDES A VARIETY OF RHYTHMS AND TEXTURES. THE PERCUSSION INSTRUMENTS ARE AN INTERNATIONAL FAMILY, WITH ANCESTORS FROM THE MIDDLE EAST, ASIA, AFRICA, THE AMERICAS AND EUROPE REPRESENTING MUSICAL STYLES FROM MANY DIFFERENT CULTURES.

SOUND IS PRODUCED ON THE PIANO BY SMALL HAMMERS STRIKING STRINGS. THE HAMMERS ARE CONTROLLED MECHANICALLY AND STRIKE THE STRINGS WHEN THE PLAYER'S HANDS PRESS THE PIANO KEYS.

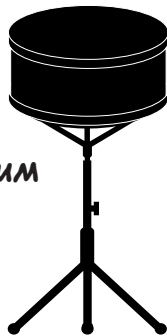
TIMPANI, ALSO CALLED KETTLEDRUMS, ARE CONSTRUCTED OF A LARGE COPPER BOWL WITH A DRUMHEAD MADE OF CALFSKIN OR PLASTIC STRETCHED ACROSS THE TOP. WHEN STRUCK WITH MALLETS, TIMPANI PRODUCE A SPECIFIC PITCH THAT IS DETERMINED BY THE DRUM'S SIZE. MOST ORCHESTRAS USE THREE OR FOUR TIMPANI OF VARYING SIZES.

THE XYLOPHONE IS A TUNED INSTRUMENT MADE OF HARDWOOD BARS IN GRADUATED LENGTHS SET HORIZONTALLY ON A METAL FRAME. STRIKING THE BARS WITH HARD MALLETS PRODUCES A BRIGHT, SHARP SOUND. THE XYLOPHONE WAS ORIGINALLY MODELED AFTER AN AFRICAN INSTRUMENT AND ITS NAME IS GREEK, MEANING "WOOD SOUND".

THE SNARE DRUM HAS TWO CALFSKIN OR PLASTIC DRUMHEADS STRETCHED TIGHTLY OVER A HOLLOW METAL FRAME. THE BOTTOM HEAD, OR SNARE-HEAD, HAS METAL WIRES CALLED SNARES STRETCHED TIGHTLY ACROSS IT. WHEN THIS DRUM IS STRUCK ON THE TOP HEAD, THE SNARES PRODUCE A CHARACTERISTIC SHARP RATTLING SOUND AS THEY VIBRATE AGAINST THE BOTTOM HEAD.

CONSTRUCTED LIKE A SNARE DRUM, BUT WITHOUT SNARES, THE BASS DRUM IS MUCH LARGER AND IS PLAYED ON ITS SIDE, SO THAT EITHER HEAD MAY BE STRUCK. THE MALLET FOR A BASS DRUM IS LARGE, WITH A SOFT MATERIAL SUCH AS SHEEP'S WOOL COVERING THE END.

SNARE DRUM



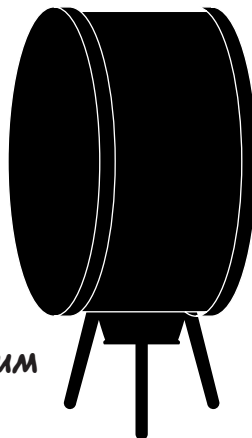
TIMPANI



PIANO

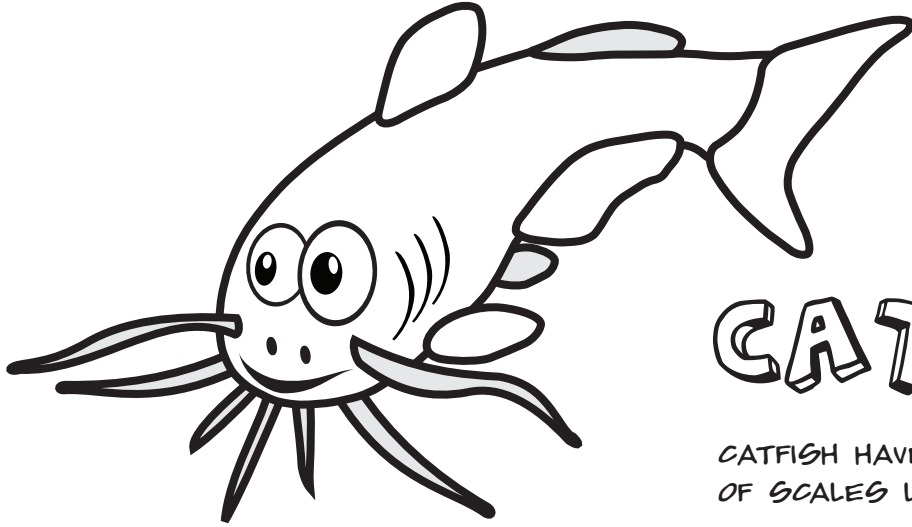


BASS DRUM



XYLOPHONE





## CATFISH

CATFISH HAVE SMOOTH SKIN INSTEAD OF SCALES LIKE OTHER BONEY FISH.

THE WHISKERS ON A CATFISH WHICH ARE CALLED BARBELLS ACT AS THEIR TASTE BUDS.

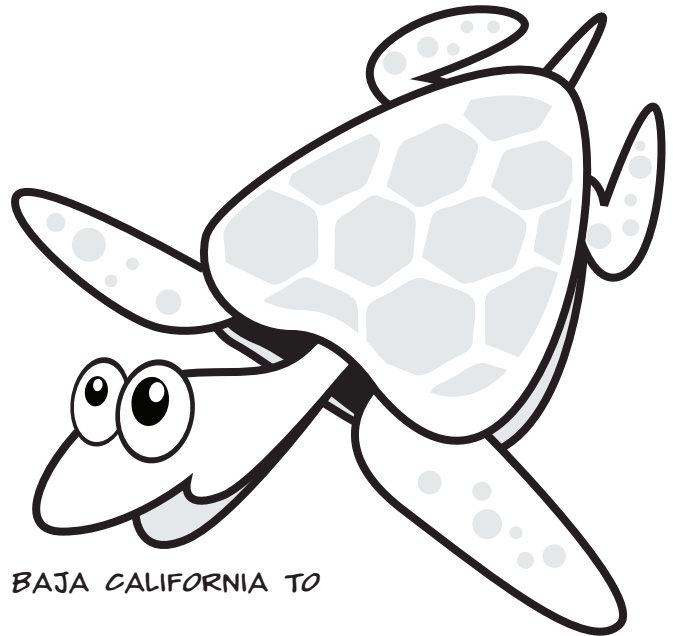
OF ALL THE CATFISH SPECIES FOUND AROUND THE WORLD OVER HALF ARE IN THE AMERICAS.

## SEA TURTLE

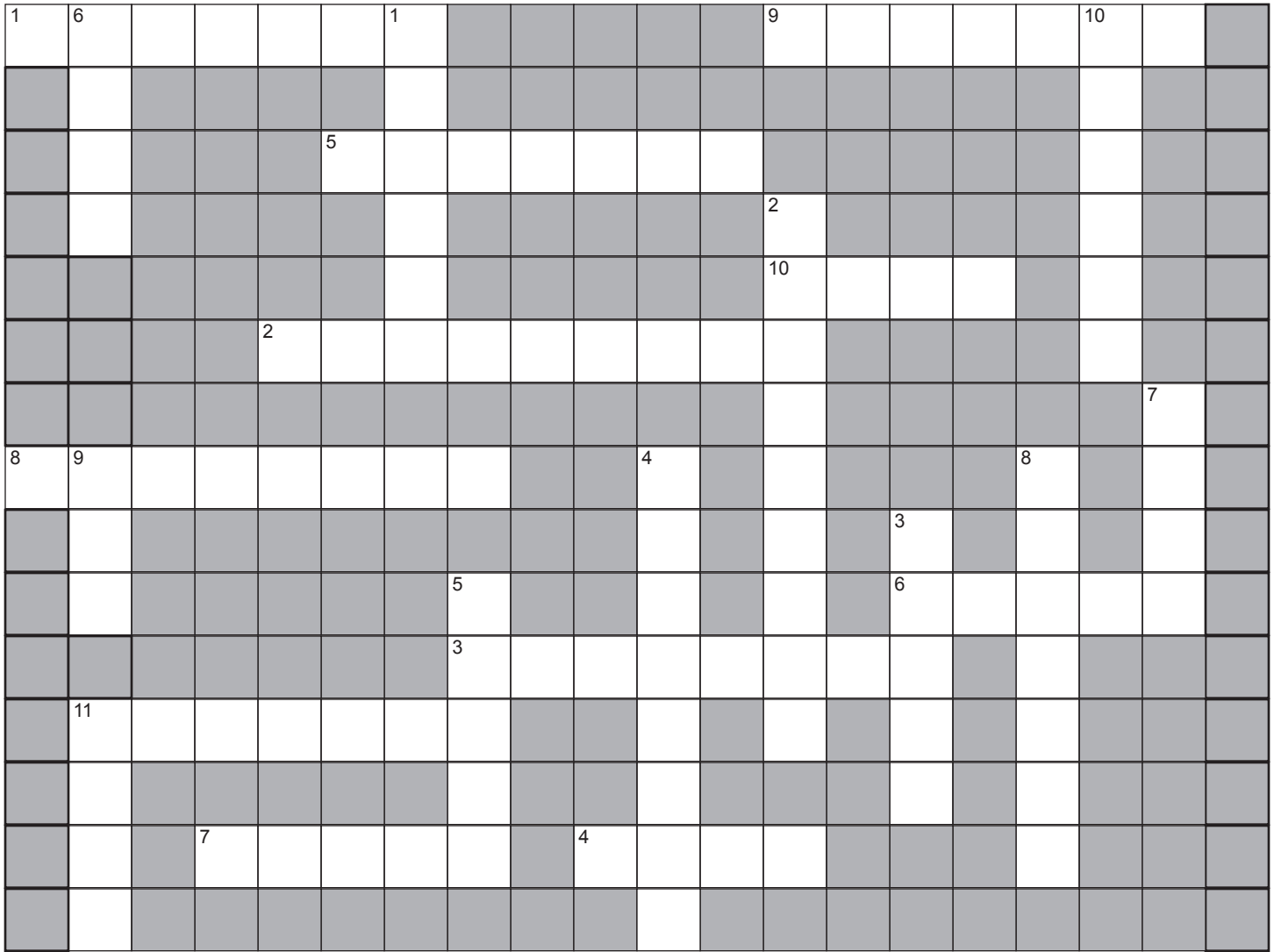
OUT OF ALL SEVEN SPECIES OF SEA TURTLE THERE IS NOT ONE THAT IS NOT ENDANGERED.

LOGGERHEAD SEA TURTLES MIGRATE FROM BAJA CALIFORNIA TO THE SEA OF JAPAN TO LAY THEIR EGGS.

THE EXTINCT SPECIES OF SEA TURTLE, THE ARCHELON, WAS 16 FEET FROM FLIPPER TO FLIPPER.



# CROSSWORD PUZZLE



## ACROSS

1. EIGHT-LEGGED SEA CREATURE
2. GERMAN COMPOSER LUDWIG \_\_\_\_\_, ALSO GIANT, SLOBBERING DOG FROM THE MOVIES
3. THE STATE WE LIVE IN
4. THE BIGGEST HORN IN THE BRASS SECTION
5. THE "BIG SKY STATE" OR HANNAH
6. TRUMPET, TROMBONE AND TUBA ARE \_\_\_\_\_
7. TIMPANI AND SNARE ARE KINDS OF \_\_\_\_\_
8. WHAT AN UNDERWATER COWBOY WOULD RIDE
9. OKLAHOMA FISH WITH WHISKERS
10. A CLOSE RELATIVE OF THE CLARINET THAT USES TWO REEDS INSTEAD OF A MOUTHPIECE
11. A DOUBLE-REEDED INSTRUMENT WHERE AIR TRAVELS OVER NINE FEET TO PRODUCE ITS DEEP SOUND

## DOWN

1. \_\_\_\_\_ BOB
2. DRIVES A TRAIN, AND LEADS AN ORCHESTRA
3. BIGGEST ANIMAL IN THE OCEAN
4. THE ONLY PLACE TO FIND A SHARK IN OKLAHOMA
5. MUSICAL BROTHERS
6. SPONGEBOB'S BOSS IS A \_\_\_\_\_
7. THE BLACK AND WHITE THINGS ON A PIANO
8. THE VIOLIN, CELLO AND BASS MAKE MUSIC USING \_\_\_\_\_
9. LOOKS LIKE AN UNDERWATER SNAKE - SOME ARE ELECTRIC
10. A GROUP OF FISH
11. THE LARGEST AND LOWEST INSTRUMENT OF THE STRING FAMILY

# WORD SEARCH



PERCUSSION  
TROMBONE  
TIMPANI  
STRING  
CELLO  
OBOE  
BRASS  
BASSOON

WOODWINDS  
VIOLA  
TRUMPET  
FLUTE  
PIANO  
CYMBALS  
PICCOLO  
TUBA

CATFISH  
ALLIGATOR  
SNAPPING TURTLE  
SPONGE  
URCHIN  
BASS  
STINGRAY  
SHARK

PARROT FISH  
EEL  
JELLYFISH  
SEAHORSE  
PIRANHA  
OCTOPUS  
SUNFISH  
BARNACLE

# STRINGS

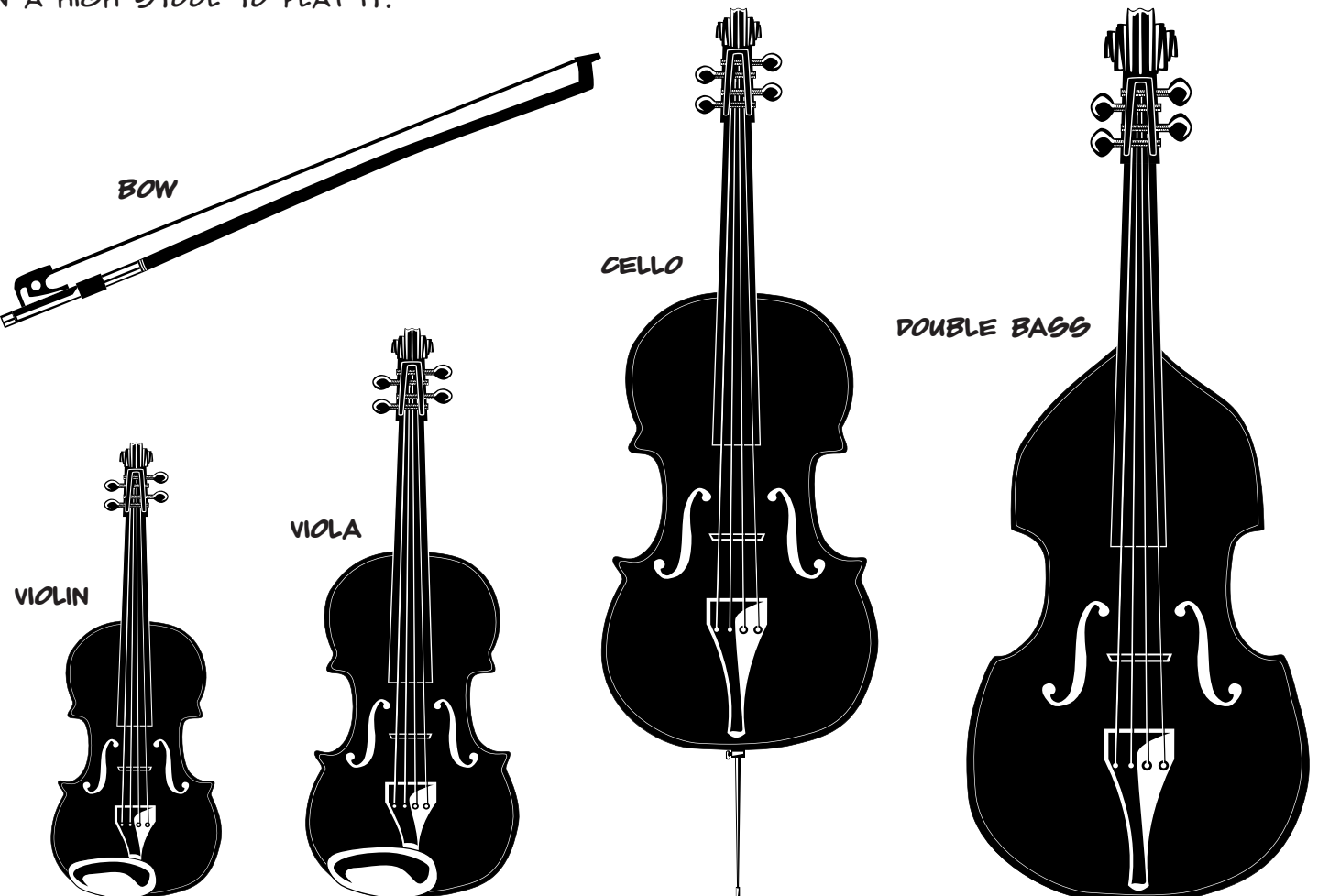
THE FOUR MAJOR INSTRUMENTS IN THE STRING FAMILY ARE THE VIOLIN, THE VIOLA, THE CELLO AND THE DOUBLE BASS. THESE INSTRUMENTS ARE MADE OF MANY PIECES OF WOOD WHICH ARE GLUED - NEVER NAILED - TOGETHER. THE BODY OF THE INSTRUMENT IS HOLLOW, THUS BECOMING A RESONATING BOX FOR THE SOUND. FOUR STRINGS (SOMETIMES FIVE ON THE DOUBLE-BASS) ARE WRAPPED AROUND PEGS AT ONE END OF THE INSTRUMENT AND ATTACHED TO A TAILPIECE AT THE OTHER. THEY ARE STRETCHED TIGHTLY ACROSS A BRIDGE TO PRODUCE THEIR ASSIGNED PITCHES.

THE VIOLIN IS THE SOPRANO VOICE IN THE STRING FAMILY. IT IS HELD UNDER THE CHIN, RESTING ON THE SHOULDER. THE VIOLIN HAS A LOVELY TONE THAT CAN BE SOFT AND EXPRESSIVE, OR EXCITING AND BRILLIANT.

THE VIOLA IS THE ALTO VOICE IN THE STRING FAMILY. LIKE THE VIOLIN, IT IS HELD UNDER THE CHIN, RESTING ON THE SHOULDER. THE VIOLA IS SLIGHTLY LARGER AND IS TUNED FIVE NOTES LOWER THAN THE VIOLIN, AND HAS A DARKER AND WARMER TONE QUALITY.

THE CELLO IS THE TENOR VOICE IN THE STRING FAMILY. WHILE SHAPED LIKE A VIOLIN, THE CELLO IS MUCH LARGER AND IS HELD BETWEEN THE PLAYER'S KNEES. BECAUSE IT CAN PRODUCE BEAUTIFUL SOUNDS FROM ITS LOWEST TO ITS HIGHEST NOTES, IT IS A POPULAR INSTRUMENT.

THE DOUBLE BASS, OR STRING BASS, IS THE LARGEST AND LOWEST INSTRUMENT OF THE STRING FAMILY. THE DOUBLE BASS HAS ROUNDED SHOULDERS INSTEAD OF SQUARE SHOULDERS LIKE THE OTHER STRING INSTRUMENTS. BECAUSE OF ITS SIZE, THE PLAYER STANDS OR SITS ON A HIGH STOOL TO PLAY IT.

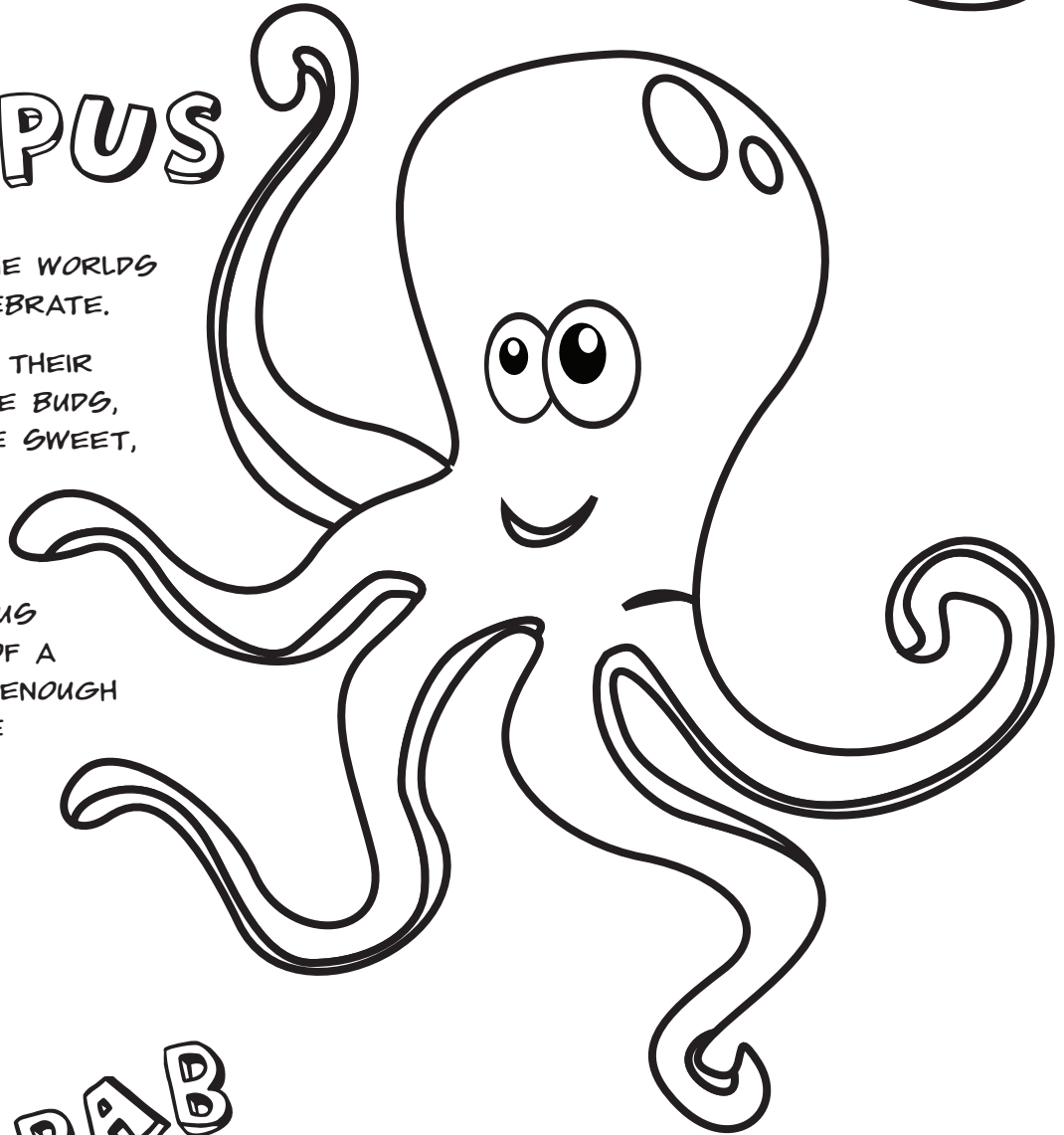


# OCTOPUS

THE OCTOPUS IS THE WORLD'S SMARTEST INVERTEBRATE.

OCTOPUSES UTILIZE THEIR SUCKERS AS TASTE BUDS, AND CAN RECOGNIZE SWEET, SOUR AND BITTER FLAVORS.

EVEN THOUGH THE BLUE-RINGED OCTOPUS IS ONLY THE SIZE OF A GOLF BALL, IT HAS ENOUGH VENOM TO PARALYZE TEN 165-POUND MEN.

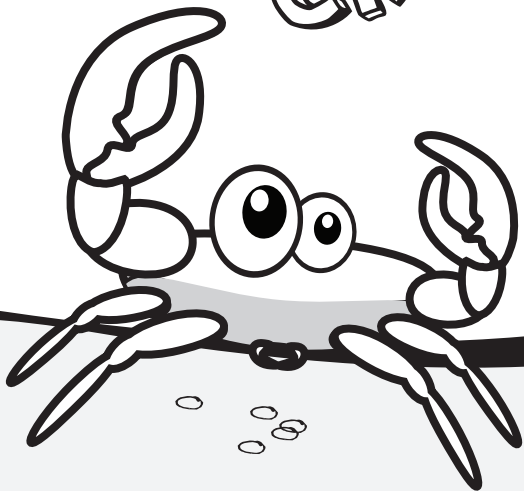


# CRAB

CRABS ARE ARTHROPODS, MEANING JOINTED FEET.

INSTEAD OF A SPINE, A CRAB'S SKELETON IS ON THE OUTSIDE AND IS CALLED AN EXOSKELETON.

THE LARGEST CRAB IS A JAPANESE SPIDER CRAB WHICH GETS A LEG SPAN OF 13 FEET.



# WOODWINDS

THE THREE BRANCHES OF THE WOODWIND FAMILY HAVE DIFFERENT SOURCES OF SOUND. VIBRATIONS BEGIN WHEN AIR IS BLOWN ACROSS THE TOP OF AN INSTRUMENT, ACROSS A SINGLE REED, OR ACROSS TWO REEDS. REEDS ARE SMALL PIECES OF CANE. A SINGLE REED IS CLAMPED TO A MOUTHPIECE AT THE TOP OF THE INSTRUMENT AND VIBRATES AGAINST THE MOUTHPIECE WHEN AIR IS BLOWN BETWEEN THE REED AND THE MOUTHPIECE. TWO REEDS TIED TOGETHER ARE COMMONLY KNOWN AS A DOUBLE REED. THIS DOUBLE REED FITS INTO A TUBE AT THE TOP OF THE INSTRUMENT AND VIBRATES WHEN AIR IS FORCED BETWEEN THE TWO REEDS.

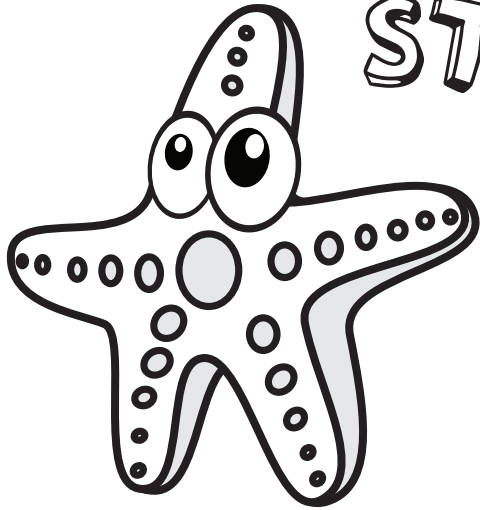
ORIGINALLY MADE OF WOOD, THE FLUTE IS NOW MADE FROM SILVER OR GOLD AND IS ABOUT TWO FEET IN LENGTH. THE PLAYER BLOWS AIR ACROSS THE SMALL HOLE IN THE MOUTHPIECE TO PRODUCE A SOUND THAT CAN BE EITHER SOFT AND MELLOW OR HIGH AND PIERCING. IT LOOKS LIKE A NARROW TUBE WITH A ROW OF HOLES COVERED BY KEYS ALONG ONE SIDE.

THE CLARINET PRODUCES A FLUID SOUND WHEN AIR IS BLOWN BETWEEN A SINGLE REED AND THE MOUTHPIECE. BY PRESSING METAL KEYS WITH THE FINGERS OF BOTH HANDS, THE PLAYER HAS THE ABILITY TO PLAY MANY DIFFERENT NOTES VERY QUICKLY.

THE OBOE IS SIMILAR TO THE CLARINET IN MANY WAYS. BOTH ARE MADE FROM WOOD AND HAVE METAL KEYS THAT CAN PRODUCE MANY NOTES RAPIDLY. UNLIKE THE CLARINET, THE OBOE DOES NOT HAVE A MOUTHPIECE, BUT HAS TWO REEDS TIED TOGETHER. BY PLACING THEM BETWEEN ONE'S LIPS AND BLOWING AIR THROUGH THEM, THE REEDS VIBRATE AND PRODUCE A SOUND.

THE BASSOON IS A LARGE DOUBLE REED INSTRUMENT WITH A LOWER SOUND THAN THE OTHER WOODWIND INSTRUMENTS. ITS DOUBLE REED IS ATTACHED TO A SMALL CURVED TUBE CALLED A BOCAL WHICH FITS INTO THE BASSOON. WHEN THE PLAYER BLOWS AIR BETWEEN THE REEDS, THE VIBRATING COLUMN OF AIR INSIDE THE INSTRUMENT TRAVELS OVER NINE FEET TO THE BOTTOM OF THE INSTRUMENT, THEN UP TO THE TOP WHERE THE SOUND COMES OUT.





# STARFISH

STAR FISH ARE NOT REALLY FISH BUT IN A FAMILY CALLED ECHINODERMATA, WHICH MEANS SPINY SKIN.

STARFISH COME IN ALL THE COLORS OF THE RAINBOW.

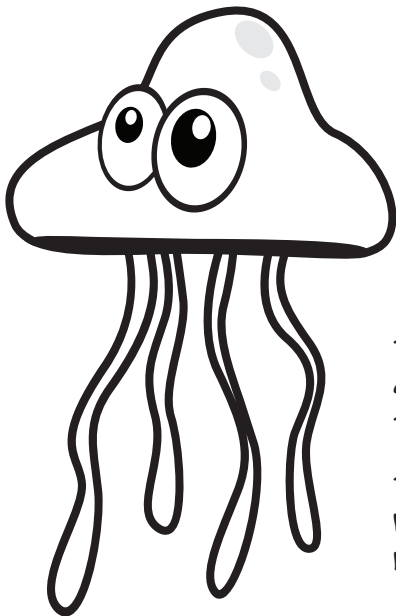
STARFISH HAVE AN EYE ON THE TIP OF EACH LEG THAT ALLOWS THEM TO SEE LIGHT AND DARK.

# SEAHORSE



SEAHORSES LIVE, ON AVERAGE, ONLY ABOUT FOUR YEARS, DON'T HAVE A STOMACH, AND HAVE TO CONTINUALLY EAT.

IT IS THE MALE SEA HORSE THAT ACTUALLY HAS THE BABIES WHICH HE CARRIES IN A SPECIAL POUCH.

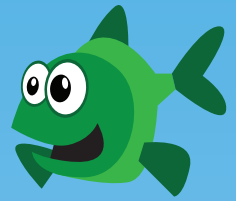
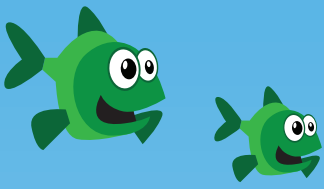


# JELLYFISH

THE MOST DEADLY VENOM IN THE ANIMAL KINGDOM COMES FROM THE BOX JELLY WHICH HAS KILLED MORE THAN 5000 PEOPLE WITH ITS STING SINCE THE 1950'S.

THERE ARE JELLY FISH FOUND IN EVERY OCEAN OF THE WORLD, RANGING FROM THE SURFACE TO THE DEEPEST PARTS OF THE OCEAN.





# PARTICIPATING TULSA SYMPHONY MUSICIANS

## STRING QUARTET

WINONA FIFIELD, VIOLIN  
MICHAEL NICHOLSON, VIOLIN  
PHIL WACHOWSKI, VIOLA  
KARI CALDWELL, CELLO

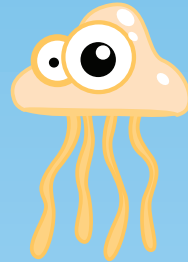
## WOODWIND QUINTET

DANA HIGBEE, FLUTE  
LISE GLASER, OBOE  
BRAD BEHN, CLARINET  
MICHELLE JOHNSON, HORN  
SUSIE BROWN, OBOE

## BRAVO BRASS QUINTET

TIM MCFADDEN, TRUMPET  
STEVE HAEFNER, TRUMPET  
BRUCE SCHULTZ, HORN  
BILL DAMRON, TROMBONE  
JOHN ALLEN, TUBA

EXECUTIVE DIRECTOR • RON PREDL  
EDUCATION DIRECTOR • KATHY RAD



# OKLAHOMA AQUARIUM

COO/EXECUTIVE DIRECTOR • TERI BOWERS  
COMMUNITY EDUCATION MANAGER • KAREN DILLS  
BIOLOGIST/PROGRAM INSTRUCTOR • MICHELLE ZARANTONELLO  
BIOLOGIST/PROGRAM INSTRUCTOR • ANN MONEY  
PROGRAM COORDINATOR • SASHA RUBEY  
PROGRAM ASSISTANT • LINDA MCCARTER

NOW THAT YOU HAVE SEEN A LITTLE BIT OF WHAT THE SYMPHONY DOES, WE WOULD LIKE TO INVITE YOU AND YOUR FAMILY TO JOIN US FOR A CONCERT AT THE PERFORMING ARTS CENTER:

**THE MUSIC OF FRANCE • SATURDAY, MARCH 27 AT 7:30**

YOUR PARENTS CAN GO TO [WWW.MYTICKETOFFICE.COM](http://WWW.MYTICKETOFFICE.COM) OR CALL 596-7111  
AND USE THE CODE "OCEAN" TO GET 1/2 PRICE TICKETS FOR THE ENTIRE FAMILY!

