Nautilus

Based on collections of the Whipple Museum of the History of Science

https://www.whipplemuseum.cam.ac.uk/explore-whipple-collections

Whipple Museum of the History of Science

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Welcome to the Nautilus expedition.
It is a mission of adventure, fun, creation!
A fantastical exploration of seas and oceans and new lands!

Let's get ready! All on board! Of course, you are the captain! Let's work with the ship's inventory. You can do it by yourself or with company!

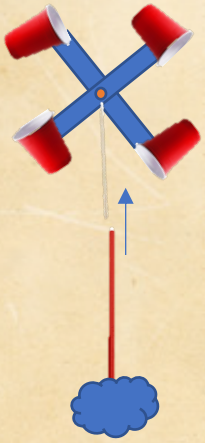
Your own anemometer!

You will need:

- skewer - straw - plasticine -cardboard
- stapler - pair of scissors - 5 plastic cups - ruler , pencil

How to:

- Draw two rectangular shapes on the cardboard (20x8 cm) and cut them out.
- Place one piece on top of the other (as **x** shape) and secure them with the stapler.
- Pierce a hole in the centre of the **x** shape with the skewer.
- Staple one cup at the end of each piece. Make sure the cups are facing the same direction.
- Run the skewer through the hole for about 1 cm. Cover the outer top of the skewer with plasticine so that it stays in place.
- Run the skewer through the straw so that rotation can take place.
- Create a plasticine base and secure the straw.



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What other materials might you work with?

How else could you create an anemometer?

Why do you think the anemometer Is needed for our journey in the sea?

Use the anemometer to measure wind speed and direction.

You can measure wind speed by counting full rotations for 30 seconds. Full rotations correspond roughly to wind blowing at 10 miles per hour.

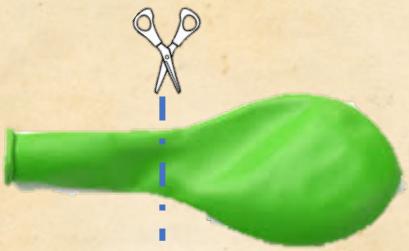
Your own barometer!

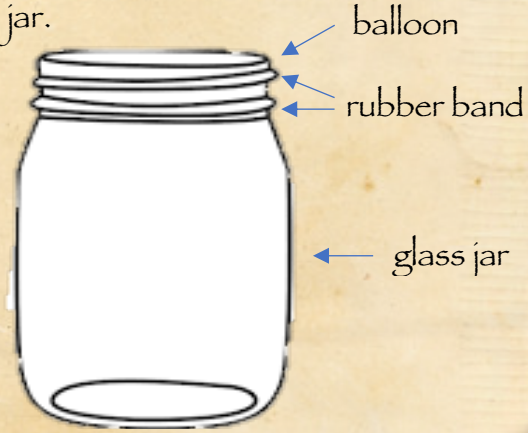
You will need:

- 1 jar (glass or plastic)
- 1 balloon
- 1 skewer
- 1 rubber band
- glue, ruler, markers, colours
- pair of scissors
- paper
- old box

How to:

- Cut the neck of the balloon and fix it on the jar.
- Fasten with the rubber band.





- Glue the skewer on the balloon, around the middle.
- Draw and colour signs for clear and bad weather on the paper. Glue them on the old box.

What other weather signs might you draw?

When the air pressure drops, the balloon slightly raises and the skewer points at a lower position. When the air pressure is high, the balloon is slightly pushed down and the skewer points at a higher position.

??? Why do you think the anemometer Is needed for your journey in the sea?

You can read more from the Whipple Museum webpage:
https://www.whipplemuseum.cam.ac.uk/explore-whipple-collections/meteorology/barometers

Measurements by

Date	Morning	Evening

Your own hourglass!

You will need:

- 2 identical jars (glass/plastic)
- cardboard
- button
- sugar
- food colour (optional for colouring the sugar)
- skewer
- glue
- pair of scissors
- pencil
- rope or wool

How to:

- Draw the outline of the lid on the cardboard and cut. Glue the button in the middle of the piece you just cut.
- Run the skewer through the cardboard and through the button's holes.
- Apply glue around the opening of the first jar. On top of it, place the cardboard with the button. Hold them together and let dry.
- Fill up to the middle the second jar with sugar.
- Apply glue around the opening of the second jar. On top of it, place the first jar (the one with the button). Press the two jars together and let dry.
- Apply glue onto the jars around the middle, so that you can hide the cardboard and the button. Wrap with the rope or the wool.

Let's measure time! Turn the hourglass and measure the time until all the sugar passes to the other jar!

Marine hourglasses or sandglasses were used to measure time. A sailor would turn the hourglass and provide the time for the ship's log. The starting point would be noon, where the sun would be at its highest point.

Your own chip log!

You will need:

- 1 kitchen paper roll tube
- 1 wool roll
- cardboard
- 1 rubber
- pair of scissors

How to:

- Hold one end of the wool with your dominant hand and unroll the wool with the other hand as far as you can. Tie a knot. Repeat as many times as you wish in the same way. Think of the knot as the starting point each time. We would suggest no less than 15 repeats. When you tie the last knot, repeat two more times before cutting the wool. This is your wool-tail.
- Punch a small hole at one end of the kitchen paper roll tube. Thread through the hole one end of the wool-tail and tie a knot.
- Roll the wool-tail around the tube until you reach the last knot.
- Cut the cardboard as a triangle. Punch three holes at the interior angles.
- Roll the wool-tail around the rubber, making sure that you leave a 30cm tail.
- Thread the end of the wool-tail through the holes of the cardboard and fasten with a knot.
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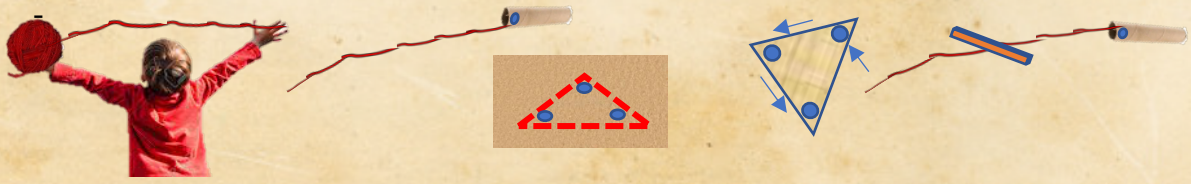


Personal photograph of a ship-log by Rémi Kaupp taken in the Musée de la Marine, Paris.

https://en.wikipedia.org/wiki/Chip_log#/media/File:Loch_à_plateau.jpg

Photo by Whipple Museum: "Harpoon log for measuring a ship's speed"

https://www.whipplemuseum.cam.ac.uk/explore-whipple-collections/astronomy-and-empire/navigational-arts

Note: The knots in the actual chip log were marked proportionally to the nautical mile. Many ships used knots spaced 8 fathoms (14.6 meters).

Use: A sailor would toss the log off the ship's stern. The log would function as a drogue as the ship would travel further in the sea. The sailor would count the knots passing over as the rope would unroll for a fixed time usually kept by a sandglass.

You can read more from the Whipple Museum webpage:
https://www.whipplemuseum.cam.ac.uk/explore-whipple-collections/astronomy-and-empire/navigational-arts

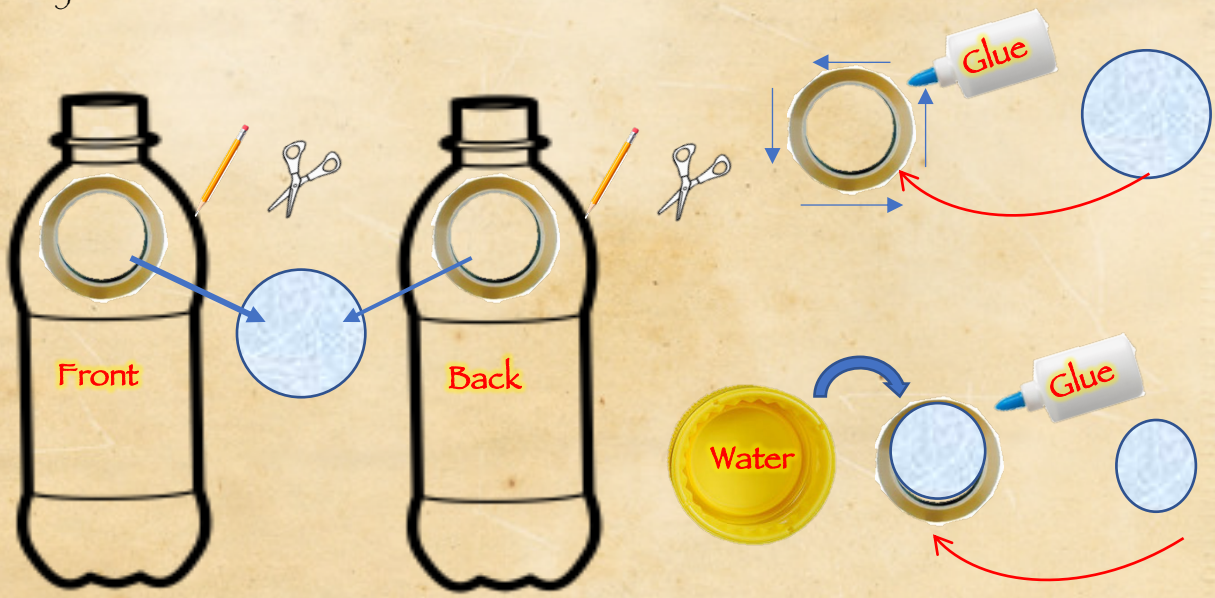
Your own magnifying glass!

You will need:

- plastic bottle
- duct tape
- marker-pen, ruler
- glue
- pair of scissors
- water

How to:

- Draw the outline of the duct tape on the neck of a bottle. Repeat and cut. You will need two identical shapes.
- Apply glue around one side of the duct tape and place the first plastic disc on top of it. Leave to dry and turn upside-down.
- Slowly pour water inside the duct tape until you fill it up. Make sure there is no air bubble.
- Apply glue around the duct tape and place the second plastic disc on top of it. Leave to dry.



? Why does it function as a magnifying glass?

The disc curves outwards, that is, it creates a convex shape. This kind of shape is thick at the centre and thinner around the perimeter. When you add the water, the light passing through is refracted, that is, it bends inwards creating the effect of a magnifying lens and enlarging the shapes underneath.

? Why would you need a magnifying glass for your journey?

Your own globe!

You will need:

- plastic cover for your work area
- gloves
- apron
- 1 balloon
- bowl with water
- plasticine
- mod-rock plaster

- old paper
- glue
- pair of scissors
- thick paper
- paints & brushes

How to:

- Cover your work area with plastic or old newspapers. Wear your apron and gloves.
- Blow up and tie the balloon. Use a bit of plasticine to secure it on the desk.
- Cut the plaster wrap in pieces. Soak them for a few seconds in the bowl of water, apply them on the balloon, and smooth them with your fingers. Make sure you don't apply too much pressure. Leave to dry.
- You can colour with paints.

If you wish, you may:

- Cut out the continents drawn on paper. Glue large balls of old paper to cover the cut-out area.
- Glue the continents on the plaster-balloon.
- Cut the plaster wrap in pieces. Soak them in water for a few seconds and apply them on top of the continents. Smooth the surface and the edges with your fingers so that they will not fall off the plaster-balloon. Make sure you don't apply too much pressure. Leave to dry.
- You can work with paints to colour the oceans and the continents.

You can read more from the Whipple Museum webpage:
https://www.whipplemuseum.cam.ac.uk/explore-whipple-collections/globes

Draw inspiration from what comes next!

Add notes, stickers, photos on your globe (with a bit of plasticine).

The Captain's treasure-chest cards!

Anemometer

When travelling in the sea
oh, so careful you must be.
North or south, fast or slow,
when wind blows,
this is how you know.

https://canstockPhoto.com

Telescope

A kind of magic wand!
'Bring 'em near' Galileo,
islands, pirates, or stars!

https://www.amazon.co.uk

Chronometer

When travelling the seven seas,
you measure time with this.

https://www.whipplemuseum.cam.ac.ik

Globe

https://www.whipplemuseum.cam.ac.uk

Compass

Anywhere you go, this is your guide.
Never let loose, hold it tight,
follow the arrows and get it right!

https://www.istockphoto.com

Aeolus

Divine, mythical keeper of the winds.
He lets the breeze out for the ships!

https://www.youtube.com/watch?v=pbap8oxdt80

Eclipse

Playing hide-and-seek in the sky,
the sun and the moon up that high.

https://commons.wikimedia.org/

Astronomers

Wise people were these,
working on the ships.
They helped find new lands,
studying geometry
and the stars!

https://en.wikipedia.org/wiki/

Chip Log

https://www.whipplemuseum.cam.ac.ik

What might you need for your journey?

Say it with a riddle, a limerick, or a drawing-as-puzzle!

The Captain's Journal story-cards!

Create your own story journal.

You can play with the cards and create your own!

Departure

https://publicdomainvectors.org

Difficult Tasks

https://www.sutterstock.com

Magical Gifts

https://pixabay.com

Antagonist

https://commonswikimedia.org

Mythical Creature

https://publicdomainvectors.org

Powers of the Mythical Creature

Powers of the Antagonist

Combat - Battle

https://www.flickr.com

Alliance

https://thenounproject.com

Victory

or

Retreat

New Land

For each new place (free choice)

- a smell
- a taste
- a story or poem or song
- a scientist or an artist
- a photo
- an object
- a recipe

Challenges / Obstacles

https://freesvg.org

Trickery

https://www.flickr.com

Magic Spell

https://openclipart.org

Imaginary Island

- People
- Animals
- Trees
- Nature
- Clothes
- Cities
- Food
- Transportation

...

Let's create the story! You can work with company!
You can say it out loud, write it down, illustrate it, create it only with drawings, create it with collage, sing it, dance it out!

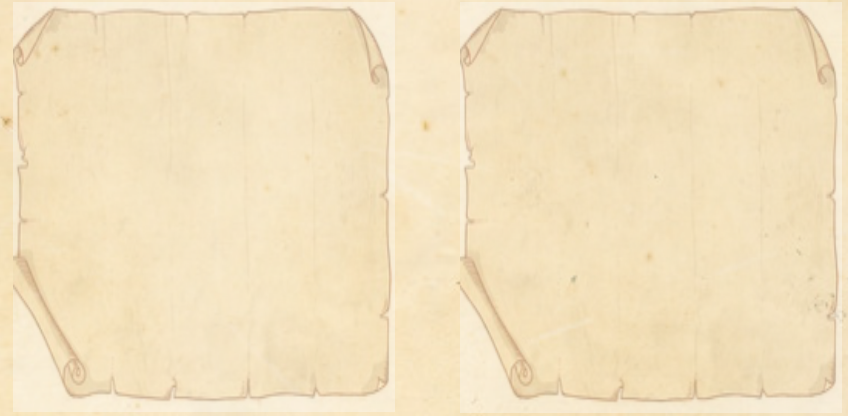
You can work with the labels in the next page to:

- create more story-cards
- create the story as a comic
- create a photo album of the story or of the new land
- any other way you wish

If you wish to write your story down, you can do it as a zine book.

You can get inspired for your own zine book from the Cambridge Museums webpage:
https://www.museums.cam.ac.uk/school-sessions/how-make-geology-zine

You can read about book making from the Cambridge University Library:
https://www.museums.cam.ac.uk/school-sessions/book-making-online




Sounds of the sea

& Musical Instruments

You will need:

- aluminium foil paper tube
- rice
- aluminium foil
- glue
- glasses
- water

How to:

- Insert about 1 palm of rice in the aluminium foil paper tube.
- Cut 2 identical pieces of aluminium foil and fold them at least 3 times.
- Apply glue around one end of the paper tube and wrap it with the folded aluminium foil.
- Repeat for the other end.
- Hold the tube and move it rhythmically.

- Place some glasses on the table. Pour water in them. Try not to fill them up to the same level.
- Wet your finger and run it through the top of the glasses.

Take some time to engage with the musical instruments. Close your eyes. Focus on your breath, the sound, the tempo, the rhythm.

You can read more on sounds and acoustics from the Whipple Museum website:
https://www.whipplemuseum.cam.ac.uk/explore-whipple-collections/acoustics

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What other materials might you work with to create your own musical instruments?
How would you create your own musical instruments?

You can read other ideas from the Whipple Museum webpage:
https://www.museums.cam.ac.uk/school-sessions/wonder-whipple-make-shaker

Musical instrument by

Materials:

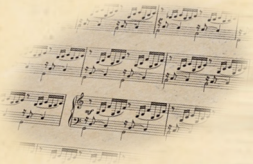
Experimental and thinking space

- How to
- Drawing / Photo

Personal and miscellaneous ...

What music would you like to listen to during your journey?

You can create and compose your own music or song and choreography!



What books would you like to read during your journey?

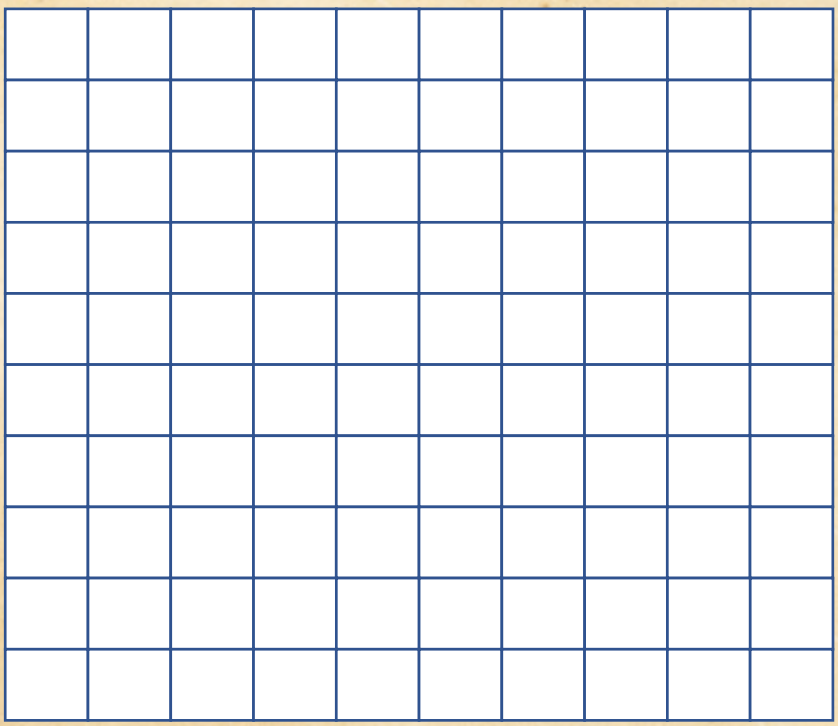
What games would you play during your journey?

You can create your own games!

You can play them by yourself (such as crosswords)

or with your sailors!

They can be board games or movement games!



Stamps & Postcards!

Create your own stamps and postcards to send from the sea or from the new lands!

https://www.flickr.com