

Art for SCIENCE COMMUNICATION



WORKSHOP 1/31/2020

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VECTOR v. RASTER ARTWORK

“Rasterizing”

RASTER GRAPHIC

VECTOR GRAPHIC

- Composed of pixels.
- Draw curves only by pixel approximation.
- Enlarging causes loss of resolution.
- Can “paint” gradients and smooth blending.

- Composed of mathematical paths.
- Continuous and smooth lines.
- Enlarging **does not** cause loss of resolution.
- Usually have sharp, graphic look with crisp lines.

“Image Trace”

Programs: Adobe Photoshop (expensive), Procreate (\$10, Apple only), GIMP (free)

File types: .jpg, .tif, .png*

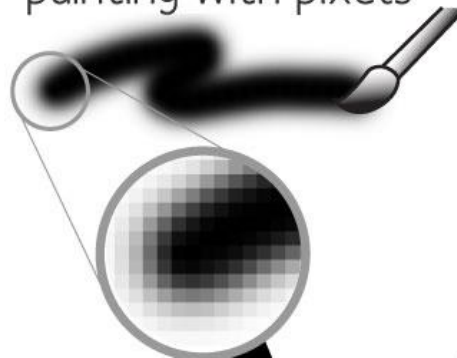
.png's are ideal for Powerpoint because they can be compressed for web and they can have a transparent background

Programs: Adobe Illustrator (expensive), Inkscape (free)

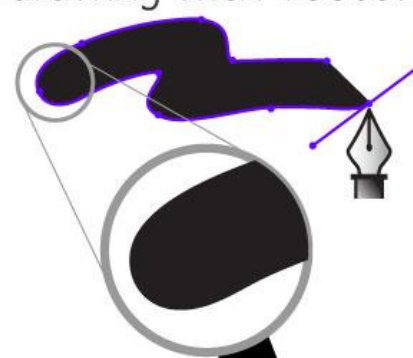
File types: .svg*, .emf*, .pdf*, .eps

*although these file types can be imported into Powerpoint, it is usually easier to export a .png approximately the right size for your powerpoint and to use that.

painting with pixels



drawing with vectors



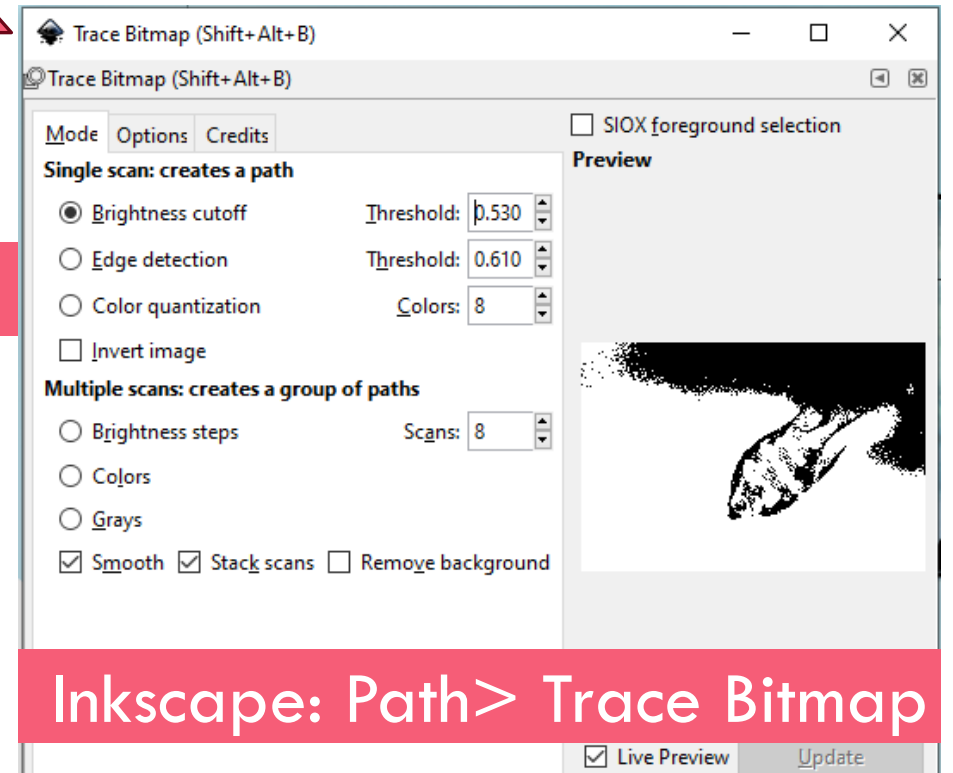
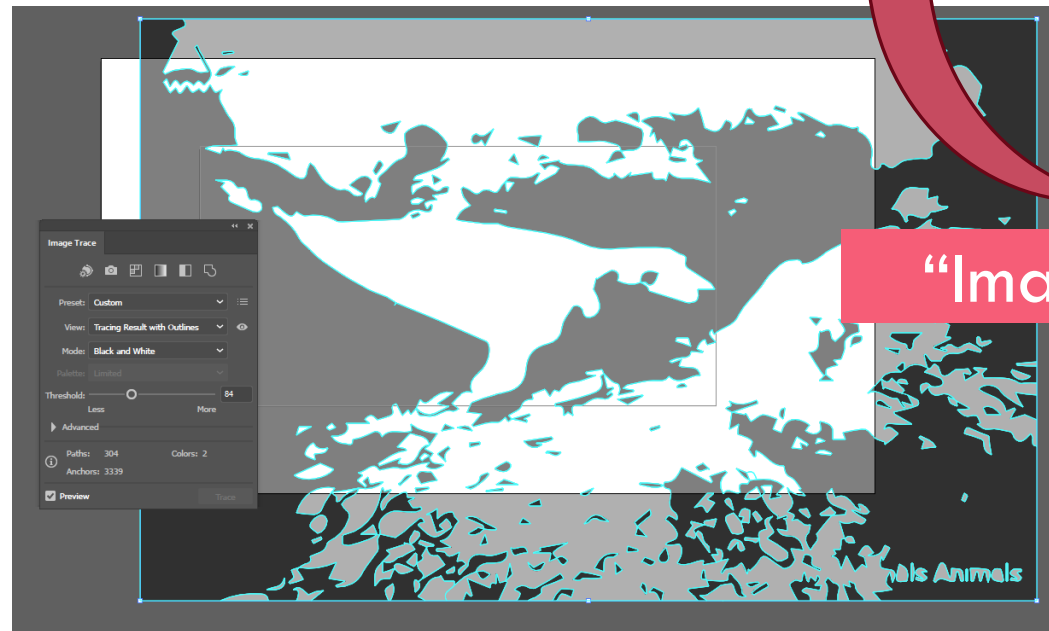
VECTOR v. RASTER ARTWORK

“Rasterizing”



RASTER GRAPHIC

VECTOR GRAPHIC



“Image Trace”

Illustrator: Object > Image Trace

Inkscape: Path > Trace Bitmap

DIGITAL ART

TIPS

- **ORGANIZATION IS KEY!**
 - Create many versions (save often!) and layers with meaningful filenames.
- **Setting up your workspace**
 - Open **Layers** (Illustrator: Window>Layers; Inkscape: Shift+Ctrl+L)
 - Open **Fill/Stroke Properties** (Illustrator: Window>Stroke, Gradient, Transparency; Inkscape: Shift+Ctrl+F)
- **Set up your canvas.** (Illustrator: Artboard tool; Inkscape: Shift+Ctrl+D).
- Use **guidelines, align, and distribute!** Hold down shift to snap to regular positions.

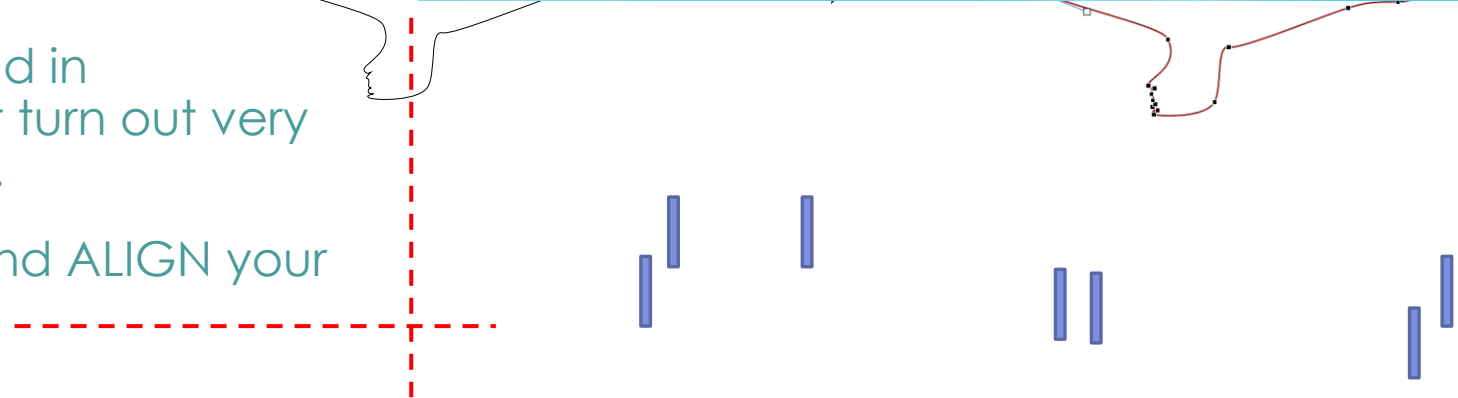
SHORTCUTS

	Illustrator	Inkscape	Powerpoint
Paste in place	Ctrl + F	Ctrl + alt + V	default if in new slide or if original object is moved.
Zoom in/out	Ctrl + "+" or "-"	"+" or "-"	Ctrl + scroll up / down
Move canvas	Spacebar + click & drag	Spacebar	Scroll.
Resize with locked proportions	hold Shift while dragging	hold Ctrl while dragging	hold Shift while dragging
Rotate	Hover outside object while selected to see rotation icon	Click once, then twice on object to show rotation handles	Rotate with rotation icon above object when selected
Reflect	Object> Transform> Reflect	H for horizontal reflection or V for vertical reflection	Arrange> Rotate> Flip Horiz/Vertical
Edit points of path/object	Use direct selection (V) tool to select path segments or points	Double click on object to enter "Edit Path by Nodes" where you can select path segments or points	Right click line or path and select "Edit Points"

DESIGNING YOUR G

TIPS

- Change color of images to match your theme.
- Edit curves and lines just like in Illustrator/Inkscape by converting to shape and right clicking>“Edit Points.”
- Don't remove the background in Powerpoint, it usually does not turn out very well... use Photoshop or GIMP.
- Pay attention to **guidelines** and ALIGN your graphics as much as possible.



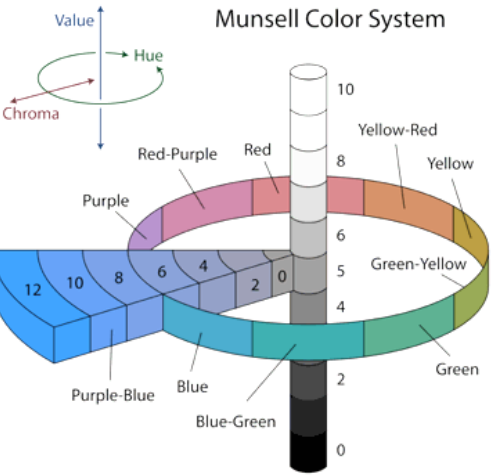
DESIGNING YOUR PRESENTATION

TIPS

- **Display an outline** to follow at the bottom of your slides.
- Keep **text to a minimum**; use graphics!
- To keep images looking crisp: use **vector graphics** or **high-resolution** raster images.
- **Practice** your talk, transitions, and animations; don't be surprised by your slides!
- Choose **3 fonts** you like for Titles, Subheadings, and body text. Choose **3 colors** to use.

TRICKS

- Navigate to **ANY** slide by typing in the number of the slide and pressing enter, while presenting.
- Right click while presenting to “**See All Slides**” to let your audience see thumbnails of all slides and click on them to open.
- **F5** to begin presentation at beginning. **Shift+F5** at current slide
- **Slide Master!** Next slide...



HOW TO TALK ABOUT COLOR

VALUE
"lightness"

same saturation & hue

Darker colors make white text easier to see.



SATURATION
"intensity" or chroma

same hue & value

Very saturated colors are often hard on the eyes.



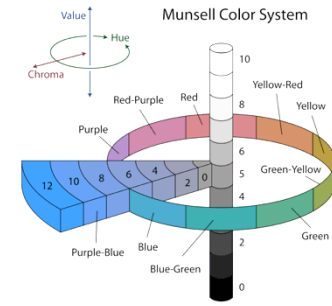
HUE
"color"

same saturation & value

Stick to ~3 hues to keep things simple.



COLOR PALETTE EXAMPLE



FALL October-December

JUVENILE HAULOUT
Juveniles & Subadult Males

SEA LION TAKEOVER
Most elephant seals gone

Post-Molt FORAGING TRIP

What's in a name?
Phyllis migrates for **7 MONTHS**, over **10,000 kilometers**, swimming halfway to Japan and back to feed on abundant fish and squid in the open ocean. Phyllis was a real seal we tracked, who was named after a beloved Año Nuevo docent and philanthropist. The seal named Phyllis set a record by traveling farther west than any other tracked elephant seal.

Phyllis' unique flipper tag ID! **X 685**

Phyllis' diet:

- FISH: 60% (includes herring, sardines, and deep sea fish)
- SQUID: 33%
- Other: 7%

Males v. Females
The foraging patterns of females and males differ greatly, with males typically foraging along the continental shelf and females staying farther offshore.

A year in the life of Phyllis... AN ADULT FEMALE NORTHERN ELEPHANT SEAL

1 560 kilograms! Phyllis returns home from an 7-month trip to sea:

2 Phyllis gives birth to a 35 kg pup.

3 Phyllis feeds her pup 52% fat milk for 26 days.

4 Phyllis leaves to forage for food at sea:

5 Phyllis travels >5,000 km, diving to depths >800 m for >20 min each time.

6 Phyllis returns to molt on land.

7 It takes about 10 days for Phyllis to abruptly molt her skin and fur.

8 After 6 weeks on land and losing over 100 kg, Phyllis returns to the sea.

9 320 kilograms

10 400 kilograms

11 75 days

12 30 days

13 40 days

14 30 days

15 30 days

16 30 days

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97 30 days

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99 30 days

100 30 days

WINTER January-March

BREEDING SEASON
ADULTS & PUPS

Post-Breeding FORAGING TRIP

Can you spot the lightkeeper's house in all the photos?
Follow Phyllis in beach morphology, animal abundance, and distribution across the seasons at Año Nuevo Island!

MOLTING SEASON
ADULTS & JUVENILES

SUMMER July-September

Graphics by Jessica Kendall-Bar.
Drone photos taken by Patrick Robinson under NMFS permit 19108 and MBNMS-2017-018 and stitched by Sarah Wood and Roxanne Beltran. We thank Steve & Phyllis Sooy for their generous contributions to elephant seal research.

We thank the Costa Lab, past and present, for their contributions to this effort:

SPRING April-June

ANÑO NUEVO RESERVE
UC Santa Cruz

UNIVERSITY OF CALIFORNIA SANTA CRUZ
Science

Office of Naval Research
Science & Technology

ANÑO NUEVO
Elephant Seal Research Collaborators

VALUE

"lightness"

same saturation & hue

SATURATION

"intensity" or chroma

same hue & value

HUE

"color"

same saturation & value

REFERENCES: Costa D. P. et al. J. Zool. 209: 21-33 (1986). McDonald, B. I. & Crocker, D. E. Physiol. Biochem. Zool. 79: 484-496 (2006). Robinson, P. W. et al. PLoS One 7: (2012). Goethich, C. et al. Front. Mar. Sci. 5: 1-19 (2018). Klenke, S. S. (University of California Santa Cruz, 2019).

SLIDE MASTER

MAKE YOUR OWN THEME

Go to View>Slide Master...

ANIMATIONS

TIPS AND CAUTIONS

- Use **Animation Pane** to time animations (on click, with/after previous)
- Only use animations when they help **clarify or emphasize** content
- **Minimize use of slow animations** like fade in/out (or speed them up)
- Can **split animations** into separate slides and use **“Morph” transition**

ANIMATIONS I LIKE...

- **Wipe** left to right for the “reveal” of your data or for “drawing” shapes
- **Appear** for each bullet point of a list to keep your audience’s attention (“By Paragraph” in Effect Options)
- **Motion paths and spin** to show behavior/movement
 - When adding multiple animations to a single object, press “Add Animation” to add second animation without overwriting existing animation.

EXAMPLE ANIMATIONS

SLEEP BEHAVIOR

SWS : 5.2min

Recording in water.

L EOG

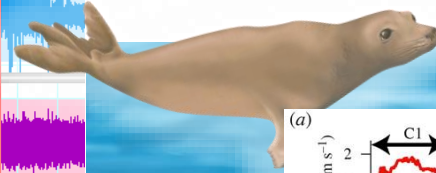
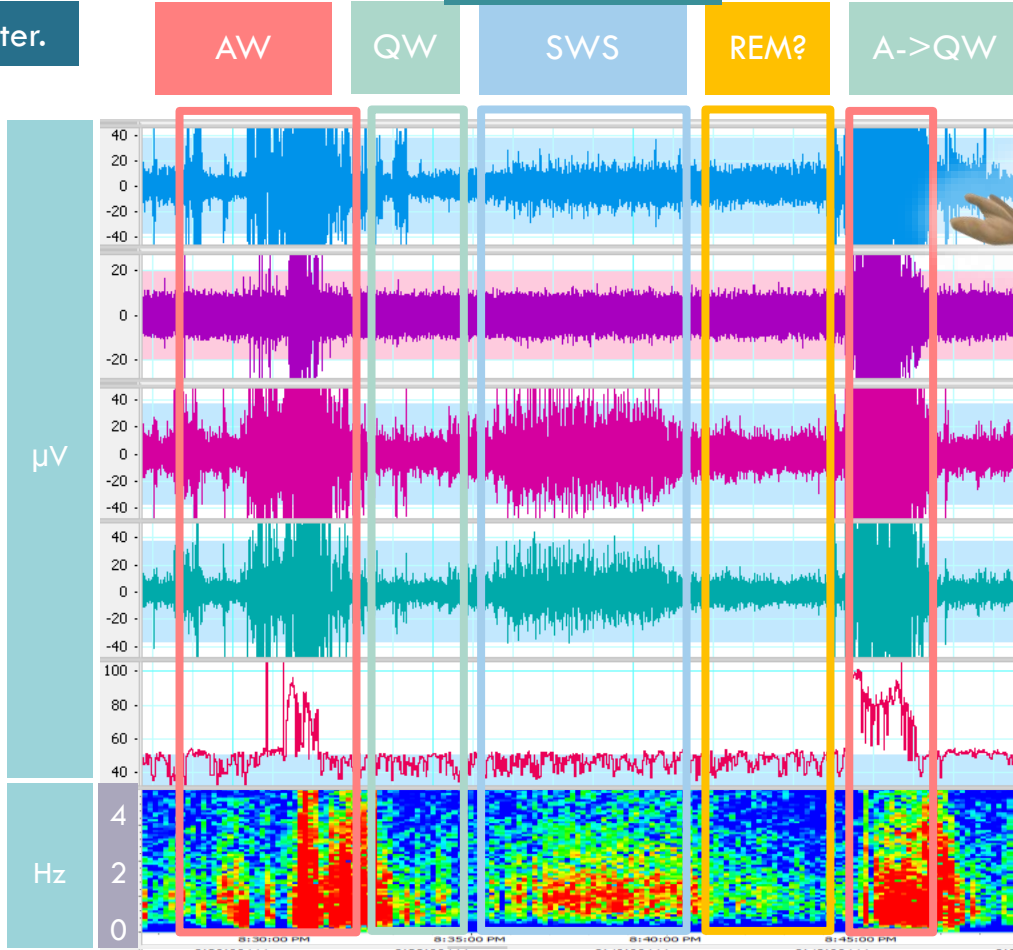
L EMG

R EEG

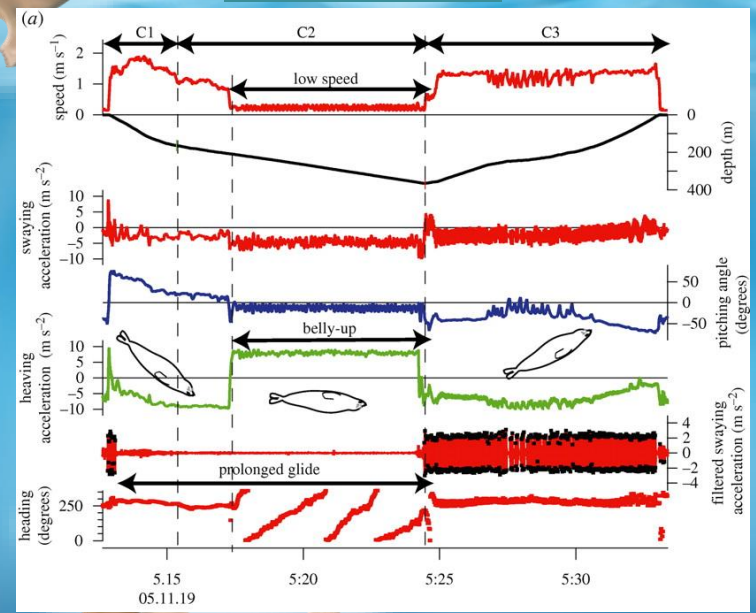
L EEG

HR ♥

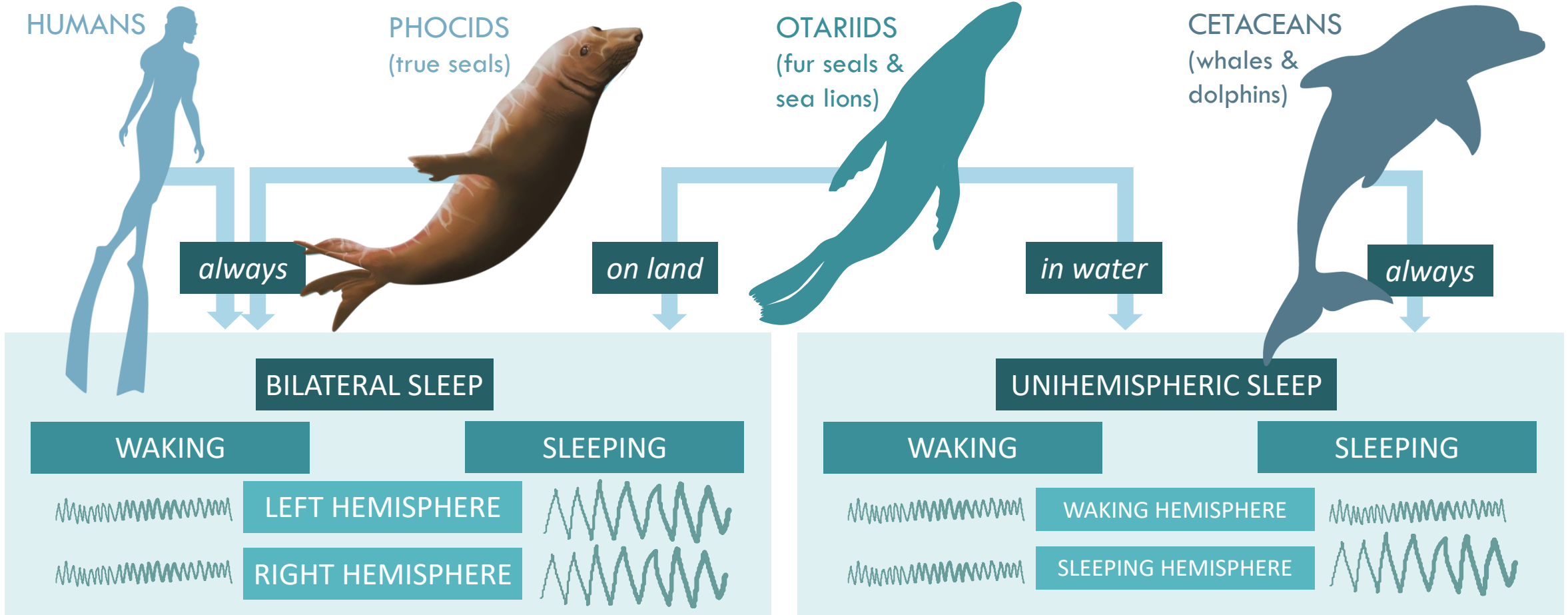
δ
SPECTRAL
POWER



Does this pattern look familiar?



MARINE MAMMAL SLEEP

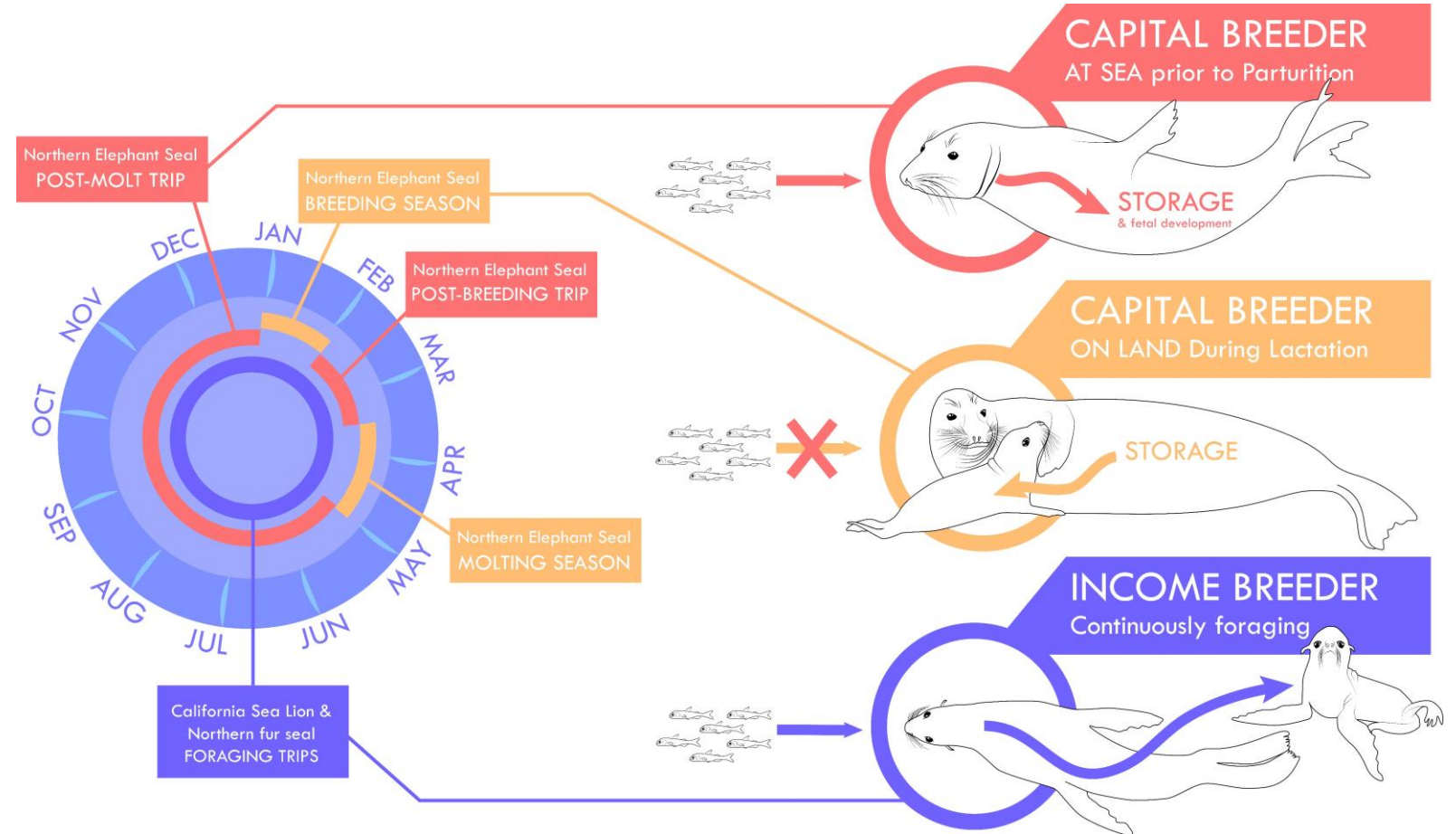




THE NORTHERN ELEPHANT SEAL

THE STUDY SYSTEM:

- Well-studied species
- Well-established tagging protocols
- Deep dives
- Long migrations
- As capital breeders, life history with interesting implications for sleep...



INTRO TO INKSCAPE

OUTLINING YOUR STUDY ORGANISM

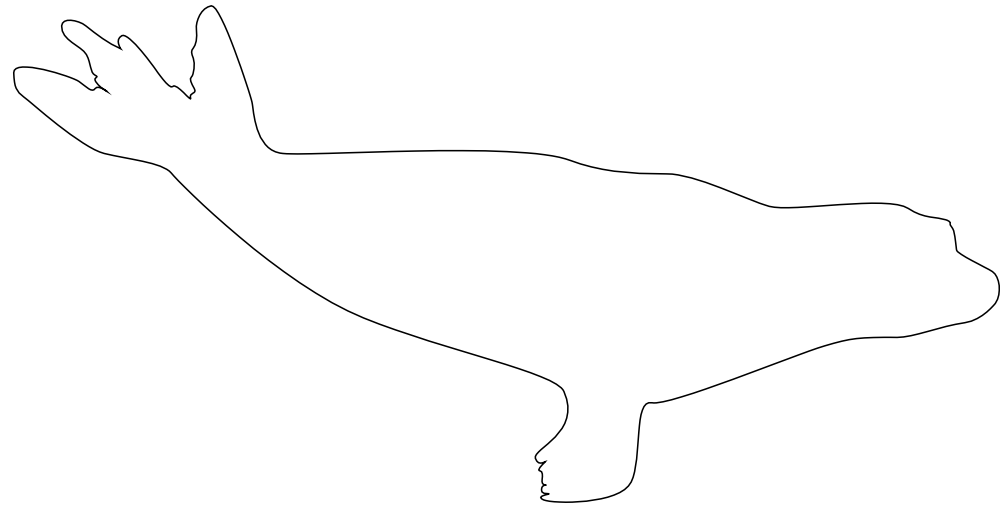
- Put your reference photo into Inkscape by dragging & dropping or Importing it.



INTRO TO INKSCAPE

OUTLINING YOUR STUDY ORGANISM

- Use pen tool / Bezier tool (Shift + F6) to draw your outline like is shown to the right. Create a CLOSED loop outline, starting and ending on the same point.
- Have patience.

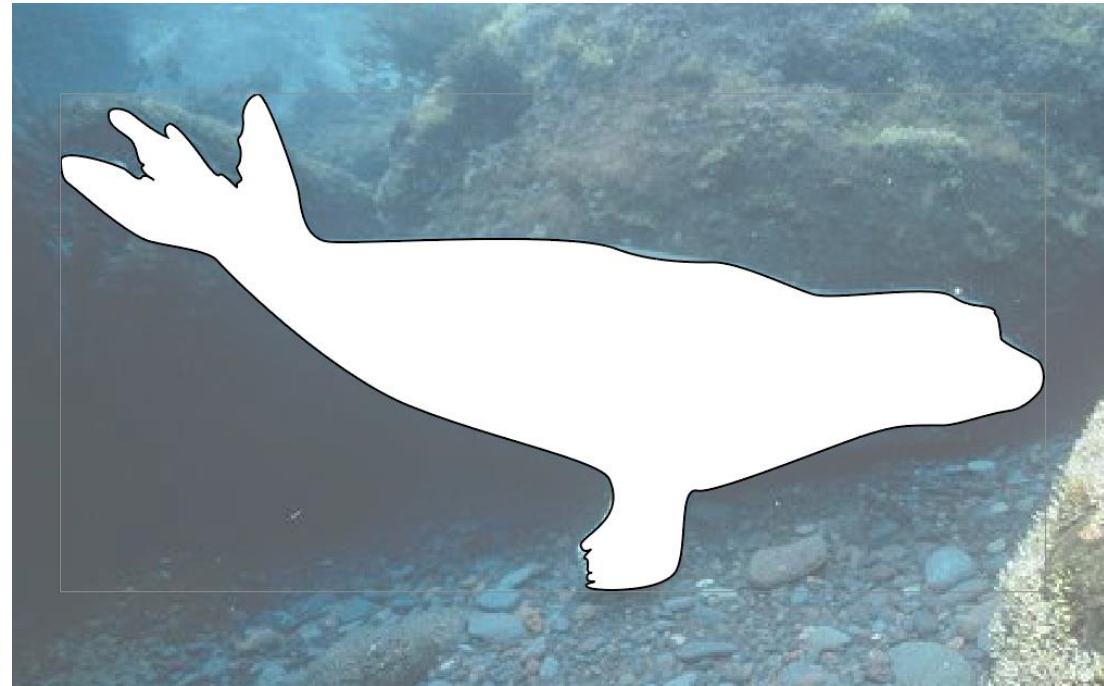


INTRO TO INKSCAPE

OUTLINING YOUR STUDY ORGANISM

- Add a white fill to your outline, and a thin black stroke, so that it pops out from your reference photo.

You can do this in the Fill/Stroke panels in Illustrator and Inkscape and in "Shape Outline" and "Shape Fill" in Powerpoint.



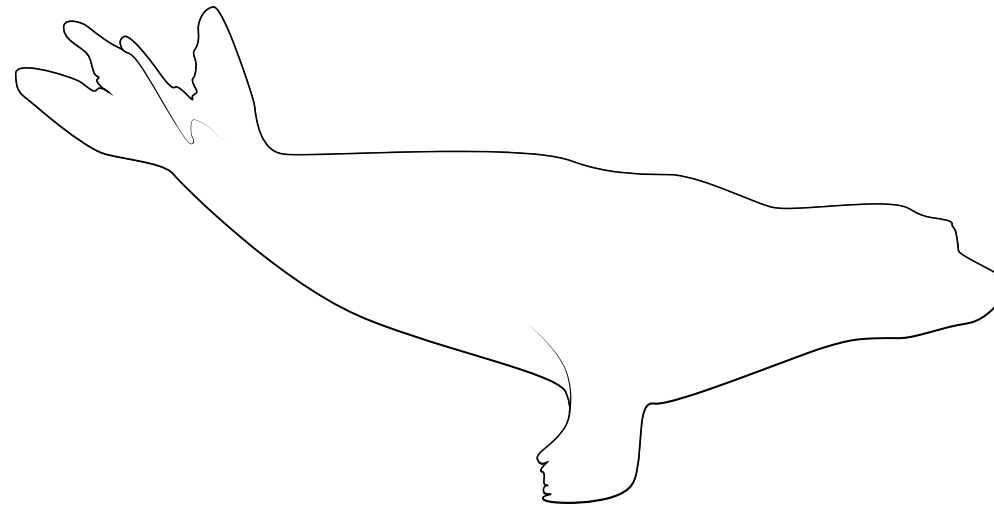
INTRO TO INKSCAPE

OUTLINING YOUR STUDY ORGANISM

- Add lines to make the body outline more meaningful and detailed.

In Inkscape: Select the Pen/Bezier tool and select "Triangle In" to create a triangle stroke effect along your path (a tapered line).

In Illustrator, you can create the lines in the pen tool and flexibly change the stroke effect afterwards by changing the "Profile" of your stroke in the Stroke effects panel.



INTRO TO INKSCAPE

OUTLINING YOUR STUDY ORGANISM

- Next, add in any other **details** to your study organism using these same methods.

Make sure to start a new layer each time you add something new.



Then, digitally paint it in!

Next workshop will cover how to do this.