

Martian habitats in the classroom: testing *Artemia*

Activity 3 worksheet: Navigating a new world – testing *Artemia* phototaxis for future Martian aquaculture

Materials

- Aged/dechlorinated tap water
- Sea salt or non-iodized coarse salt
- Freshly hatched *Artemia nauplii*
- Transparent sealed tubes or clear plastic vials (without air bubbles)
- Light source (LED torch or desk lamp)
- Dark background or box to reduce ambient light
- Marker pen or adhesive labels
- Stopwatch or timer

Procedure

Testing *Artemia* response to light

1. Fill a transparent tube with salt water (3%).
2. Add 10 *Artemia nauplii* and seal it, ensuring no air bubbles are trapped inside.
3. Place the tube horizontally in a darkened area, ensuring that the experimental light source will be the main source of illumination.
4. Illuminate one end of the tube using a torch or LED light and observe the distribution of the nauplii after 1–2 minutes.
5. Indicate where *Artemia* density is highest.
6. Repeat the procedure with the tube positioned vertically, illuminating it either from above or below.
7. Compare the distribution of *Artemia nauplii* under different orientations and lighting conditions.
8. Allow the organisms to recover under normal light conditions between trials.

Results/discussion

- How do *Artemia nauplii* move and distribute themselves in the horizontal and vertical tube setups?
- What can be inferred from *Artemia nauplii* distribution in horizontal and vertical tubes about their response to light?
- Why is it important to let the *Artemia nauplii* recover in normal light between trials?
- How could understanding *Artemia*'s movement towards light help scientists design life-support systems for Martian aquaculture?
- How might the intensity or colour of the light influence the behaviour of *Artemia nauplii*?
- What limitations of this experiment should be considered when applying results to Mars?