

**EXPLORER CLASS SCORE SHEET**  
*Hawaii's Undersea Volcano*

**SCHOOL NAME and # AS IT APPEARS ON THE TEAM LIST:** \_\_\_\_\_

Team captain: \_\_\_\_\_ Mission attempt #: \_\_\_\_\_

Mission station officials: \_\_\_\_\_

**Set-Up and Safety Check**

- Collect SIGNED safety inspection card.**
- All power cords, power bars, pressurized cylinders, etc. are secured.
- A fuse is present in the vehicle's electrical system.
- No hazardous materials are leaking onto the pool deck.
- Vehicle is hand-launched by team members in a safe manner.
- No team member has entered the water in order to prepare and/or launch vehicle.
- Vehicle is in the water near the control shack at the end of the 5-minute set-up period.

Mission official's notes: \_\_\_\_\_

- Team is ready for the mission: \_\_\_\_\_ (official's initials)**

**Note: An official's decision to disqualify a team due to safety concerns is final. If there is a safety concern, please contact the lead official or competition coordinator.**

**Fuses**

If a team blows the MATE power supply in-line fuse, they are allowed one spare. If the vehicle blows the second MATE fuse, their mission performance period is over. The team will receive points for the mission tasks they have completed up to that point, but will not receive a time bonus score.

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**Mission task scoring breakdown:**

- Task #1: Resurrect HUGO (100 points)**
- Task #2: Collect samples of a new species of crustacean (60 points)**
- Task #3: Sample a new vent site (80 points)**
- Task #4: Collect a sample of a bacterial mat (60 points)**

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**Task #1: Resurrect HUGO (100 points)**

**Scoring – 100 points**

- **5 points each, 10 points total** – remove TWO pins to release the HRH
- **10 points** – remove the HRH from the elevator
- **20 points** – identify which of three potential sites is generating sound
- **20 points** – determine the frequency of the sound within  $\pm 200\text{Hz}$
- **10 points** – install the HRH within target zone at the site that is generating sound
- **10 points** – remove the cap from the port on the HUGO junction box
- **10 points** – retrieve the HRH power/communications connector from its holder on the elevator
- **10 points** – insert the HRH power/communications connector into the port on HUGO

- \_\_\_\_\_ Remove TWO pins (5 points each, 10 points total) \_\_\_\_\_
- \_\_\_\_\_ Remove the HRH from the elevator (10 points) \_\_\_\_\_
- \_\_\_\_\_ Identify which of three potential sites is generating sound (20 points) \_\_\_\_\_
- \_\_\_\_\_ Determine frequency of the sound within  $\pm 200\text{Hz}$  (20 points) \_\_\_\_\_
- \_\_\_\_\_ Install the HRH within the target zone at the sound generating site (10 points) \_\_\_\_\_
- \_\_\_\_\_ Remove the cap from the port on the HUGO junction box (10 points) \_\_\_\_\_
- \_\_\_\_\_ Retrieve the HRH power/communications connector (10 points total) \_\_\_\_\_
- \_\_\_\_\_ Insert the HRH connector into the port on HUGO (10 points) \_\_\_\_\_

TOTAL POINTS FOR TASK #1 \_\_\_\_\_

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**Task #2: Collect samples of a new species of crustacean (60 points)**

**Scoring – 60 points**

- **5 points** – Entering the cave so that your entire ROV, with the exception of the tether, is within the cave entrance.
- **10 points** – Maneuvering to the back wall of the cave so that the mission stations judges determine that a portion of the ROV is physically in contact with the wall
- **5 points each (up to 15 points total)** – Collecting up to three samples of crustacean so that the samples are in control of your ROV and no longer in contact with cave wall or floor
- **15 points** – Maneuvering out of the cave so that your entire ROV, including the tether, is outside of the cave entrance
- **5 points each (up to 15 points total)** – Returning up to three samples to the surface side of the pool under the control of your ROV so that one team member can retrieve the samples

**Penalty points:**

- **-10 points** for damaging or otherwise modifying the cave structure, including the back wall where the crustaceans are located. The definitions of “damage” and “modifying” are up to the discretion of the competition officials. Teams are only penalized **ONCE**. That is, team cannot receive more than 10 penalty points for damaging or otherwise modifying the cave structure.

- \_\_\_\_\_ Enter the cave (5 points) \_\_\_\_\_
- \_\_\_\_\_ Maneuver to the back wall of cave (10 points) \_\_\_\_\_
- \_\_\_\_\_ # of crustaceans collected x 5 points (up to 15 points total) \_\_\_\_\_
- \_\_\_\_\_ Maneuver out of cave (15 points) \_\_\_\_\_
- \_\_\_\_\_ # of crustaceans returned to the surface x 5 points (up to 15 points total) \_\_\_\_\_
- \_\_\_\_\_ Penalty points (-10 for damaging cave) \_\_\_\_\_

TOTAL POINTS FOR TASK #2 \_\_\_\_\_

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**Task #3: Sample a new vent site (80 points)**

**Scoring – up to 80 points**

- **10 points each (up to 30 points total)** – measuring the temperature of venting fluid at three different locations along the height of the chimney
- **20 points** – Accurately measuring the temperature of venting fluid at the base of the chimney within  $\pm 5.0^\circ\text{C}$  of the benchmark
- **10 points** – Creating a graph of the temperature data versus chimney height
- **10 points** – Collecting a sample of a vent spire so that it is completely removed from the chimney structure
- **10 points** – returning the sample of the vent spire to the surface side of the pool under the control of your ROV so that one team member can retrieve the sample

- \_\_\_\_\_ # of vent locations measured x 10 points (up to 30 points total) \_\_\_\_\_
- \_\_\_\_\_ Accurately\* measure the temperature at base of chimney (20 points) \_\_\_\_\_  
\*Must be within  $\pm 5.0^{\circ}\text{C}$  of the benchmark
- \_\_\_\_\_ Create a graph of temperature data versus chimney height (10 points) \_\_\_\_\_
- \_\_\_\_\_ Collect a sample of a vent spire (10 points) \_\_\_\_\_
- \_\_\_\_\_ Return a sample of a vent spire to the surface, side of pool (10 points) \_\_\_\_\_

**TOTAL POINTS FOR TASK #3** \_\_\_\_\_

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**Task #4: Collect a sample of a bacterial mat (60 points)**

**Scoring – 60 points**

- **20 points** – Collecting a sample of a bacterial mat so that the sample is completely removed from and no longer in contact with the “seafloor”
- **20 points** – Returning the sample to the surface side of the pool so that one team member can retrieve the sample
- **up to 20 points** – Returning the following volume of sample to the surface
  - < 25mL – 0 points
  - 25mL to 100mL – 10 points
  - 101mL to 175mL – 20 points
  - 176mL to 225mL – 10 points
  - >225mL – 0 points

**Penalty points:**

- **-40 points** for returning the entire bacterial mat to the surface.

- \_\_\_\_\_ Collect a sample of bacterial mat (20 points) \_\_\_\_\_
- \_\_\_\_\_ Return sample to the surface side of the pool (20 points) \_\_\_\_\_
- \_\_\_\_\_ Volume measurement (0 to 20 points) \_\_\_\_\_
- \_\_\_\_\_ Penalty points (-40 points) \_\_\_\_\_

**TOTAL POINTS FOR TASK #4** \_\_\_\_\_

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See below for **SCORING SUMMARY WORKSHEET**

2010 MATE International ROV Competition

<b>Task #1: Resurrect HUGO</b>			
Remove the pins to release the HRH – 2 pins, 5 points each	0	5	10
Remove the HRH from the elevator	0		10
Identify the site that is generating sound	0		20
Determine the frequency of the sound with $\pm 200\text{Hz}$	0		20
Install the HRH in target zone at the sound generating site	0		10
Remove cap from port of HUGO junction box	0		10
Retrieve the HRH connector from its holder	0		10
Insert the HRH connector into the port on HUGO	0		10
<b>Task #1 point total:</b>			
<b>Task #2: Collect samples of a new species of crustacean</b>			
Enter the cave	0		5
Maneuver to the back wall of the cave	0		10
Collect up to three samples of crustacean	0	5	10 15
Maneuver out of the cave	0		15
Return up to three samples of crustacean to the surface	0	5	10 15
Damaging or altering cave structure	-10		
<b>Task #2 point total:</b>			
<b>Task #3: Sample a new vent site</b>			
Measure temperature at 3 vent sites – 3 sites, 10 points each	0	10	20 30
Accurately measure the lowest vent site within $\pm 5.0^{\circ}\text{C}$	0		20
Create a graph of temperature versus vent height	0		10
Collect a sample of a vent spire	0		10
Return a sample of a vent spire to the surface side of the pool	0		10
<b>Task #3 point total:</b>			
<b>Task #4: Collect a sample of bacterial mat</b>			
Collect a sample of a bacterial mat	0		20
Return sample to surface, side of the pool	0		20
Volume measurement:	0	10	20
< 25mL	0 points		
25mL to 100mL	10 points		
101mL to 175mL	20 points		
176mL to 225mL	10 points		
> 225mL	0 points		
Bringing the entire container of bacterial mat to the surface	-40		
<b>Task #4 point total:</b>			
<b>PENALTY POINT DEDUCTIONS</b>			
*Illegally pulling tether _____ infractions X - 5			
*Illegal communication _____ infractions X - 5			
**Diver assistance _____ infractions X - 5			
Exceeded 5-minute demobilization period _____ minutes X - 1 =			
<b>TIME BONUS</b>			
1 point for every minute and 0.01 point for every second under 15 minutes			
Duration of Mission: _____			
Minutes under 15 remaining: _____ X 1 point = _____			
Seconds remaining: _____ X 0.01 point = _____			
<b>Time bonus</b>			
<b>TOTAL MISSION SCORE</b>			

\*Issue a warning for the first infraction. Begin deducting points AFTER the first infraction.

\*\*Diver assistance is provided ONLY AFTER a team requests it. The only exception to this is once the mission time has ended. At this time the divers will assist the ROV to the surface as part of the team's 5-minute demobilization period. Teams WILL receive penalty points for diver assistance during the demobilization period. In addition, teams leaving debris (e.g. parts of their ROV) on the pool bottom such that a diver must retrieve the debris will also receive penalty points.

**Mission official's initials: \_\_\_\_\_ Team captain's initials: \_\_\_\_\_**