Virtual Boat of Knowledge

FIELD GUIDE
Pollution is a large problem within rivers and streams across the nation. The Virtual Boat of Knowledge is set forth to help educate people, young and old alike, about the environmental issue of different types of pollution and their ramifications on aquatic life.

The Virtual Boat of Knowledge uses the setting of the Ohio River spanning from Marietta, Ohio to Gallipolis, Ohio. Utilizing GPS data, a 3-D rendering of realistic contours was generated. By using real-life testing procedures and analyses of water quality parameters, users are able to answer a series of questions in an attempt to determine causes of pollution.

Area of Concern
A fish kill has been triggered along the Ohio River. What has caused the kill is unknown at this time. A group of investigators has been hired and given an initial budget of $2,000 to determine the culprit and attempt to mitigate the source before more problems arise.

Taking place between Gallipolis and Marietta, Ohio, several water parameters are measured. Most of these tests are performed using a Datasonde while others are performed in the lab. Among the tests being performed and analyzed are pH, nitrates, phosphates, temperature, dissolved oxygen, and others. These are all forms of pollution that could be detrimental to aquatic life. The possible sources for this pollution could include wastewater treatment facilities, power plants, and farms. Which of these is responsible for the pollution and fish kill? By testing several different locations and analyzing the accumulating data, you, as the investigator, should be able to identify the pollution source.

Any of these four characters can be selected and used as the investigator of the fish kill. Among the areas of customization include head, eyes, hair, body, legs, and feet.
The arrow keys are used to move the avatar around. They will move the character forward, backward, left and right.

To use any object, left click on the object to activate it. This is used to exit navigation mode, utilize the Datasonde, and check the computer screen for any data accumulated.

To rotate the camera while in navigation mode of the boat, move the mouse to the left and to the right. This will aid vision when driving the boat to testing locations.

To rotate the camera while walking around the deck of the boat, hold the right-click button on the mouse and move it left and right.
SCORING SYSTEM

The three most important concepts to scoring is **TIME**, **POINTS**, and **ACCURACY**

**Initial Points Available**: 2,000

**Ways of Earning Points**
Answer in-game questions correctly on 1st or 2nd try.
- 1st Try: +2000 points
- 2nd Try: +1000 points
- 3rd Try: 0 points

**Ways of Losing Points**
1. For every 15 seconds the player is in the boat’s navigation mode, **50 points** will be deducted from the initial money made available to the player. This is due to the costs associated with using the boat (fuel).

2. Every time the testing equipment is used, a 150-point deduction will be taken from the initial points made available to the player.

3. A fourth (4th) incorrect answer to an in-game question will deduct 1000 points from the initial points made available to the player.

In the end, total points available to each student will be used to determine the winner of the game at solving the problem.
**Entering**

To enter into navigation mode, walk toward cabin at the front of the boat. Once inside the cabin and looking in the direction of the steering wheel, click on it.

**Exiting**

To exit into navigation mode, click on the Return button located at the top-right of the screen.
**Datasonde**
This piece of equipment contains many different sensors which will measure parameters such as depth, conductivity, pH, chlorophyll, and dissolved oxygen.

**Laptop**
The computer displays the quality parameters after the Datasonde is placed in the water.
Pollution Culprits

Power Plant

Farms

Abandoned Mines
Pollution Culprits

Chemical Plant

Wastewater Treatment Facility
Testing Parameters

The parameters which will be tested on the Virtual Boat include the following:
- Temperature
- pH
- Nitrates
- Phosphates
- Dissolved Oxygen

Testing Results

Sample View of Computer Screen Used to Analyze Testing Data

This shows which location the Virtual Boat is currently visiting.

Click Return to exit the computer screen

Clicking on these tabs to the right of the bar charts will change which parameter is being displayed.
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