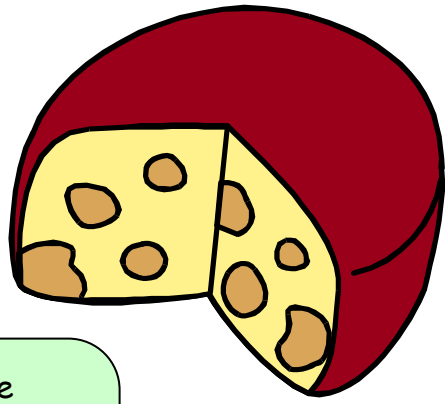
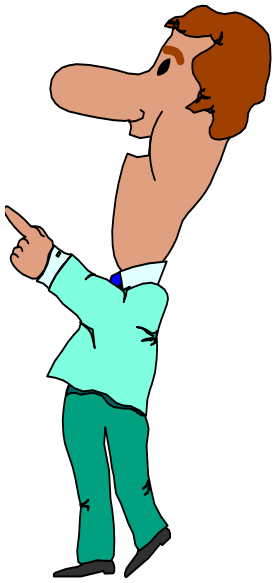
Catch a Whiff of This!!





Time: 15-20 Minutes

Objective: Students will learn the basic anatomy of the fish's olfactory organs while experiencing and learning how smells travel. As a result they will understand how to apply "smell tactics" to their fishing techniques.

Materials

- Container of Stink Bait
- Vinegar
- Bowl of Water
- Mounted Fish (optional)
- Copies or overhead of nare diagram (included)

Methods

Discussion
Observation
Demonstrations

Setting: Best conducted in an enclosed room.

Getting Ready

1. Obtain materials as per list.
2. Place a package of stink bait in a plastic container with a lid on it.
3. Have the students sit at varying distances from the front of the room.
4. Write the heading "Tip List" on the board.
5. Make copies (or an overhead) of the nare diagram (included).

Nare diagram courtesy of *In-Fishermen*. Brainerd, MN

INSTRUCTIONAL OUTLINE

Activity Instructions

1. **Begin the activity by opening the container of stink bait.**

2. **Instruct the students to raise their hands when they smell the aroma permeating from the container**. Keep them raised for 10 seconds then lower them. Have them take mental note of which hands go up when.

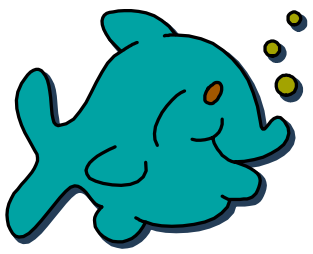
3. **As you are waiting for the hands to go up (and continuing afterwards) lead a discussion as per the narrative about the anatomy of nares, how smells travel, the fishes sense of smell, what smells fish are attracted to and repelled by, and fishing tips related to "smell."** As fishing tips are discussed write them on a board. (Fishing tips are highlighted in green font in the text.) In the end the group should have a fishing tips list focused on the sense of smell. The narrative and suggested demonstrations that follow will be helpful for doing this

1) **Have smell will travel.**

a) **It's pretty obvious that smells travel though air.** Otherwise we wouldn't be able to smell popcorn, stinky cheeses, perfumes, pollutants or the smells coming from this container.

b) What isn't so obvious is how smells travel. What is actually in the air that creates smells? It's chemicals! Smells are simply microscopic chemical molecules that are released by things. They're sort of like tiny bubbles. When we breathe, our nose inhales the molecules that are being emitted from the object and our brain interprets them as different smells.

c) **What we need to know as anglers though is not whether smells travel through air but whether smells travel in water.** To find out I'm going to pour some vinegar into this glass of water, let you "take a whiff" and tell me what you think.



Instructor Notes

Option: drop an alkaseltzer into water, or blow some bubbles into the air to help illustrate the concept of chemical molecules.

Pour about one ounce of vinegar into this glass of water, and pass it around for students to smell.

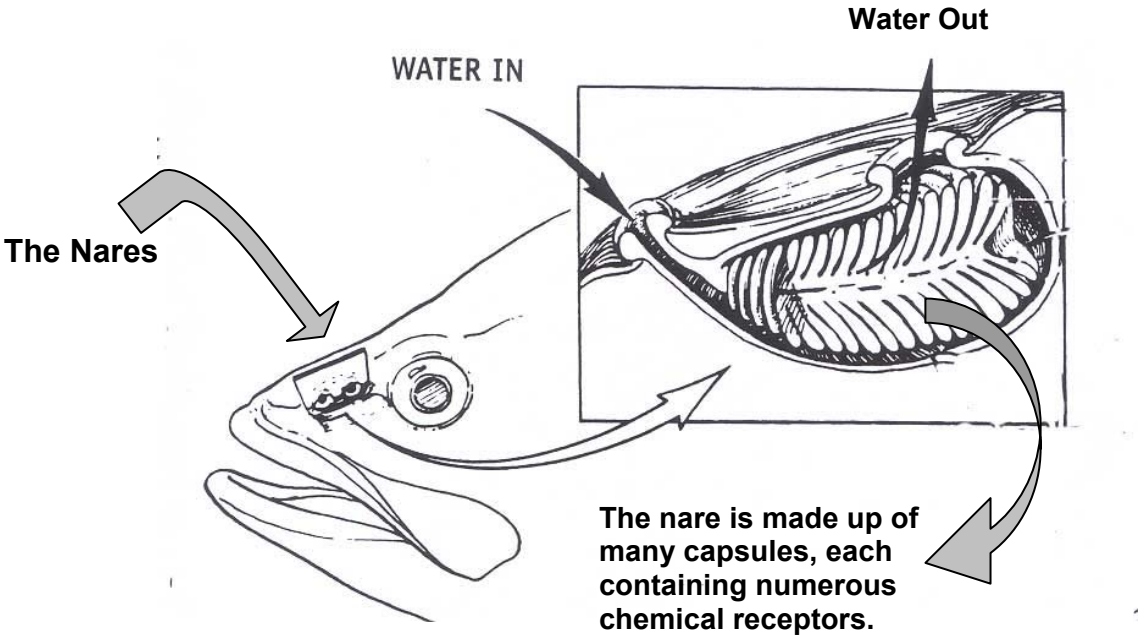
d) **So, do smells travel through water? Indeed!** If they didn't we wouldn't have been able to smell the vinegar odor that is permeating from water. Chemical molecules are released into water from objects the same way they are released into air.

2) **It's all because of "the nares."**

a) **Can fish smell smells that are in water though? After all they have no noses!** How many of you say "yes," and how many say "no?" Actually, fish have a very keen sense of smell.

b) **Even though fish don't have noses, they do have something similar to our nostrils. They are called nares.** Most gamefish have two nares on each side of their snout. Fish don't breath through their nares like we breathe through our nose and nostrils though. Fish breathe with their gills. Nares are a special adaptation for smelling.

c) **Water flows through the nares as the fish swims or into the nares while they are facing into a current.** Behind the nares, in a chamber, are sensors (chemical respecters) that detect chemicals that are dissolved in the water. Once detected the nerves send signals to the fish's brain that interpret the smells. These smells might attract a fish or keep it at bay depending on what the fish interprets the smells to be from.



If a fish mount or live fish is available use it to point out the location of the nares. Then provide a diagram of the nare (below) to each student or project it from an overhead while explaining how it works

3) **Do fish smell good?**

a) **Most people don't think fish smell "very good." And they don't. However, they do have a very good sense of smell.**

b) How good is a fish's sense of smell you ask? Well, if I were to add the glass of vinegar water into a garbage can full of water do you think you could detect the vinegar smell? Probably not, but a fish could. In fact some fish could even detect it if I poured it into the amount of water that it takes to fill up a million railroad cars. I don't think we can even begin to imagine how good their sense of smell is!

c) **Do you think all fish possess the same ability to smell? Or do some fish "smell" better than others?** Actually, some species of fish are stronger smellers than others. For example, one study compared an eel's sense of smell with a yellow perch's sense of smell. The research found that the eel was a better or stronger smeller because its receptors, organs in the nares, covered a wider area and could therefore detect more chemicals or smell in the water than the yellow perch. This incredible sense of smell aids the eel in finding its spawning grounds as it travels from the ocean into freshwater rivers.

Hold up a picture of a perch and an eel. Refer back to the nare diagram if necessary.

d) **Why might fish have evolved to have such a keen sense of smell?** Fish rely heavily on their sense of smell to find food, warn of danger, and find their way to spawning areas.

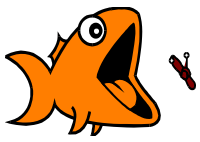
e) Are there some fishing tips we can glean from knowing that fish can smell smells in water and that they have a good sense of smell? Absolutely!

- Since fish use their sense of smell to locate things in their environment including food they will also be able to detect smelly baits.
- The fishes keen sense of smell allows it to detect food as well as bait for a long ways away!
- Certain fish might be more effectively fished using smelly baits than others.

Write these tips on the board or have students take them down as notes.

4) **Some smells are swell while others repel.**

a) **As for smells that are in the water, do you think some of them might attract fish more so then others? Indeed! The smell of things they like to eat are likely to be the most appealing.** Depending on the type of fish, that smell might be crayfish, herring, anchovies, worms, crab, squid, etc. In fact, many fish are attracted to the smell of blood. Hence the popularity of blood worms for bait. Sharks, barracudas and peranas are scary examples of this.

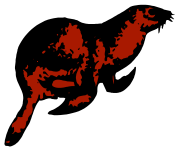


b) Do you think that some smells in the water might actually repel fish? If you answered yes you are right. What types smells?

Hold up the container of stink bait.

c) **The smell of predators will definitely put a fish on the alert.**

- Salmon for instance use their sense of smell to help them detect the presence of seals and sea lions, both whom dine heavily on them. In fact salmon can detect what would amount to a tiny bit of one drop of scent in a big swimming pool full of water.



- Likewise, bass, trout and other freshwater fish that live in the presence of river otters are likely to be on constant "smell alert" since otters have voracious appetites for fish.

- What about gasoline and motor oil? These are sure indicators that what type of predator lurks close by? Humans!

d) **The smells emitted by wounded fish also alert fish to danger.** There is a substance in the skin of baitfish called the "fright substance." When a baitfish is wounded or eaten this substance permeates the water. The smell is then detected by other members of the school and warns them of danger.

e) **Can we glean any fishing tips from knowing that "some smells are swell to a fish while other repel?"** Absolutely!

- Avoid getting human related scents in the water. It could alert fish to your presence even before you wet a line.
- When keeping fish to eat it would probably be better to use a storage technique that keeps them out of the water, such as a live well or cooler, so that they don't emit the fright substance.
- When catching & releasing fish avoid injuring fish to keep the fright substance to a minimum.
- It would probably be safe to say that adding the right types of smells to the water could actually help us attract fish, especially fish that have keener senses of smell.

Add these tips to the list on the board.

5) **Potency Predictions**

a) **Now let's think about what happens to smells as they travel through the water and how that too might affect our fishing.** You'll need to think back to the flag exercise.

b) Did all of you detect the "aroma" coming from the container at the same time? No, you probably noticed that the hands went up at different times. The people in the front smelled the aroma first and it slowly found it's way to the back of the room.

Note. If some of the students in the back of the room detect the smell before the ones up front you can refer back to the different species' abilities to smell.

c) What does this show us? The further away you are from the source of a smell the longer it takes to get to you. That's probably true in water also. The further your bait lands from a fish the longer it takes the scent to reach the fish.

d) Do you think the strength of the smell coming from our container is different for the people in the front seats compared to the back seats? Probably so. I believe the people up here will vouch for the fact that the smell is very potent up front! The reason for this is that the chemical molecules are very concentrated near the source of the smell. As the molecules travel to the back of the room they spread further apart. This illustrates that smells become weaker with distance.

Whish the container holding the stink bait under the noses of the people in the front row.

e) If we were to leave the container open for long period of time what do you think would happen to the smell of the bait? It would likely weaken and finally dissipate altogether. The reason for this is that most or all of the molecules that hold the scent would be released.

f) **What are some fishing tips we can glean from these observations?**

- Try to place your bait close to where you think the fish are holding. The smell will be stronger and it is apt to reach them quicker."
- Replace old bait with fresh bait periodically since the smell will be stronger.

Add the adjacent tips to the tip list on the board.

6) **Activity Wrap-Up**: As you can see, our knowledge of how fish use their sense of smell can add greatly to our tackle box of fishing tips & techniques. We've learned that:

- Fish use their sense of smell to help them detect things, such as food and predators, in their surroundings.
- Fish smell things from a long ways away!
- Putting the right types of "smells" in the water can help us attract and catch fish.
- Avoid getting people scents in the water since it can alert fish to your presence even before you wet a line.
- To help keep the "fright substance" out of the water use a storage technique that keeps your fish out of the water such as a live well or cooler.
- When catching & releasing fish, avoid injuring them to help keep the fright substance released to a minimum.
- Place your bait close to where you think the fish are holding. (The smell will be stronger and reach them quicker)
- Put fresh bait on your hook periodically.
- Make sure your bait stays fresh.

Wrap up the activity by reviewing the tips that were accumulated throughout the discussion.