Things that affect odor searches
(& how hard or easy it might be for the dog to find source)

There are a multitude of things that can affect odor when you place a scentwork hide. And if you are unaware of all of these factors, you might set what you THINK is an easy hide but your dog either struggles greatly or can't find it at all.

There are also many skills the scent searching dog needs to know and unless you understand how to create the right conditions, you won't be practicing the skills you intended.

We want to be sure the hides we set for our dogs are "level appropriate", meaning they provide the right level of challenge and are not too far above the level of difficulty that your dog is ready for. You also don't want too many hides that never challenge the dog or teach him new skills.

It's fun to set hides and watch the dog search, but without knowing about the following factors, you are rushing in without having info you need to set your dog up to succeed.

So let's get right into some of the main factors that influence air currents and the odor particles they carry. And how that can affect your dog's search.

The first is **naturally occurring wind**, which definitely can affect exterior searches, but can also affect searches *inside* the places where you practice or trial because buildings are not completely airtight. There could be leaky windows and doors or even leaky walls depending on the construction and condition of the structure and force of the wind outside. And of course open windows and the opening of doors can let natural wind into the search space.

Obviously **a fan** in a room would move air around. But do you KNOW about all the fans in a room? What about the one cooling a computer that is blowing out warm air, or the one under or behind the refrigerator or a vending machine, and the entire HVAC system that is not only moving air but changing its temperature and humidity levels?

Movement of things- The **movement of people and dogs through the space** will create and affect the air flow. This includes helpers resetting items as well as handler and dog movement during the search. The faster the movement, the more air flow is created and affected. Imagine the effect you would have walking through dry ice fog or smoke in the air. It causes swirls on either side of you, pushes air in front of you, and creates jumbled vortices behind you. Keep in mind that dry ice fog is super cooled and stays low because of that. This video is not to show how odor moves, just to show how movement through a space affects the air in the space. When the dog rushes up on a container or object, they

can push some of the air (& possibly odor) away from themselves and the object. And your movement can do the same.

Movement of doors- Every time a door opens and closes it moves a LOT of air. If you stand at a door and open and close it quickly and repeatedly, you can quickly clear the smoke from a burnt dinner out of the room so the smoke detector shuts up. Maybe that's just my own personal experience, but you get the idea. The smaller the room, the greater effect the door movement is likely to have on the air in the space. And because the air will be affected by all the barriers in the room, including the walls, it can create quite a turbulence. If you are searching a space where a door opens to let you in and then closes behind you before you start the search, take a bit of time at the start line to let that air disturbance settle a bit. Or maybe USE the direction that the door will push the air as part of your training set up and hide placement. At trials, be aware of the air flow created by an exiting team if their doorway is on a different wall than the one you enter.

Barriers: Even if you are searching a completely empty room with smooth walls, the walls are barriers that affect how air flows. Every object in a space can act as a barrier. The barriers could be as large as walls and buildings or as small as a coin purse, but all can interact with the flow of air and change it in some way.

The speed of the relative air flow hitting an object affects how the air moves around it. When you stand on the downwind side of a building on a really windy day, it doesn't feel as windy because the air is moving in many different directions at once. That means the odor would also be moving in many different directions and it might be harder for the dog to find the source than from a hide placed in a location with stronger straight-line winds that the dog can follow right to the source.

The same effect can happen with containers and buried containers. Both from air flow within the space and the air movement created by the dog and humans. The scent on the down wind side may be more chaotic and harder to follow to source or the movement might draw the dog right to the correct container. But object shape and size as well as wind speed can change how the air moves.

This is my dog searching a line of objects along a wall with a fan blowing air down the line. You can see exactly where he picks up the scent and then he follows it back to the source. (5 second pause)

Then he double checks himself by going farther back up the line before committing to the source location.

Temperature: Another really big factor that affects air flow is the temperature of the air. Warm air rises. Hot air rises faster. Think about what happens when you open an oven. The

hot air doesn't fall down, it hits you in the face! This is called **convection**. Cool air falls, and cold air falls faster. If you have opened a refrigerator when you have bare feet, you have experienced the flood of cold air falling on your feet. The horizontal movement of the air is called **advection**.

This can have a huge effect on the air around a hide and how the odor particles move with that air flow.

The sun is a well known heater. It can warm surfaces like entire walls and floors, or specific objects within the space. Anything in the sun is likely to be warmer than those same objects in the shade.

There can be convection and advection when the air outside is different in temperature from the indoor air. This is especially evident at windows and on exterior walls. In this diagram, if a hide is placed above the heat source, the dog might alert on the opposite wall. Because that is where the most odor is accessible to the dog. But it may not be an alert on a single location. It's more likely to be the type of alert a dog would do on an inaccessible elevated hide. But the dog HAS found the highest concentration of odor they can reach, even though the actual source is on the opposite side of the room.

If you place a hide under a window sill and that sill is above your dog's nose reach level, the dog might not have any odor to find if the window is warmer than the air inside the room. Odor from the hide is likely to be rising straight up on the convective air currents from that warmer window. This can happen with hides on exterior walls that have the sun on them as well so be careful when you are placing hides that are above your dog's nose level. You can use the convection to **help** the dog if you place a LOW hide in this kind of situation.

Same with falling cold air. When a window or surface is cooler than the surrounding air, the air and odor is most likely to fall. This effect is excellent for teaching a dog to find higher hides! You want the odor cascading right down to them.

And because cooler air drops, it is likely that air from areas in the shade will be moving toward sunny areas at dog level. This diagram shows how that looks. The blue area and ground would be the shady area and the red area and ground would be the sunny area.

Imagine a hide placed on the sunny side of an open barrier, like a porch railing, where the shade meets the sun. If the dog is on the shaded side of the fence, they might not have any odor to find because it is all being pushed through the barrier! But if the dog is on the sunny side of the fence, it would be an easy hide to find because advection of the cooler air is likely to push the air and odor right to them.

Don't let ring markers be an invisible fence that you don't let your dog cross. The dog might have to go outside the ring to pick up the odor. Especially if the sun came out or moved after the hide was set.

Another way temperature can affect scent work is the effects of **cold on the oil itself**. All of the oils have scent that moves in different ways, and the oils become thicker when they are cold, but Anise can actually crystalize when it gets cold. This means there are very few, if any odor particles released to move on air currents.

If you do exterior practice in cold temperatures or in a cold building, be aware that the hides will not have large scent cones. But the odor that IS released is likely to move more consistently because the cold air is less impacted by convection currents, making it less turbulent and more predictable, and likely easier to follow to source. To help increase the scent cone a bit, place the hides on objects in the sun or near something warm.

Contrasting that, if it is really warm, the amount of odor molecules released from the oils can make really big scent plumes. This can make hides easier to find, or it might cause converging odor, or pooling, or channeling, or swirling issues that you didn't intend. So I'll briefly talk about those.

Converging odor is when the scent molecules from 2 or more hides mix together. The dog has the challenge of trying to work out which odor is in which direction from that mixing point. If you have a Novice dog and set 2 birch hides, but they present a converging odor puzzle for the dog, it could really confuse them! That would be more like a Detective level scentwork challenge! Dogs WILL encounter converging odor puzzles at higher levels, but they usually involve 2 or more different scents. So you need to understand how to use the factors that affect searches in order to create a converging odor puzzle to practice those when your dog is ready for that.

Pooling is just like what happens with water collecting in a low spot. The air and odor molecules can do the same thing and it might create such a strong pool or puddle that it almost has more odor than the hide itself! This can also happen when odor gets trapped in an alcove or against a barrier. The dog could give their alert indication on the pooling because it is almost as strong as the source and it gets them confused. Or it might be that it IS the strongest source of odor, even though it is not at the hide, especially with inaccessible hides. If you think about "where would the dust bunnies and hair balls collect" you'll have a good idea of where pooling might occur.

Channeling is when the air and odor follow along something. Like along a crack in the pavement, or along the chalk shelf of a blackboard. It could be inside a pipe or pipe-like structure or cavity, or along a low spot, like along a curb or in a ditch. Sometimes

channeling can help a dog locate the hide (IF they can follow the odor along the channel to source) but other times it means the dog might alert far from the hide, where the odor is exiting the pipe or cavity. They can be correct that the strongest odor is on the exiting side vs. the opposite end where the hide is actually located. Especially if they can't get their nose right on the source. Sometimes such a cavity is not obvious when you place the hide. Such as in a stack of railroad ties, but you happen to hide it on a hollow one that sucks the odor in through a crack and lets it out elsewhere. Or it could be an improperly stacked pallet of bricks or blocks, or a downed tree that is hollow.

Swirling is usually a side effect of air currents interacting with barriers. If a hide is placed on the up wind side of a barrier, the dog might pick up the scent along one of the sides as the air wraps around the object and then follow that back to the source. But if you put a hide on the back side of an object, opposite of where the wind is hitting it, the odor particles could be caught in the swirling of the air. This might make it a bit harder for the dog to follow the scent to the source.

Dogs learn to work out these challenges, but if you create them accidentally it can make a hide much harder than intended.

Another thing that can affect how the air moves is **floor drains.** Anywhere water will flow, is also very likely where air will flow. So if you have a search set up near a floor drain, know that air is likely going to be flowing toward the drain. It is likely cooler in the drain than the air above it, so the change in temperature can pull air in. The bigger the temperature differences, the greater the likely pull. Also, if there is water flowing into the drain or through the drain pipes under the grate, it is likely to pull more air in.

Compressors, like those inside a refrigerator, freezer, drink machine, or ice machine, can draw air and odor toward them. You can use this to your advantage when placing hides or it can work against you if you are unaware of the effect.

To see where the air (and potentially the odor) are moving, it can help to use smoke or vapor or if there is a noticeable breeze, you can drop something that is really light, like a tiny feather, or a bit of dried leaf or grass. You can get hand-held, battery operated, smoke or vapor making machines to check a potential hiding place. Or you can puff some lightweight, visible particles into the air, like powder. Just make sure your body and movement is not blocking or changing the air flow when you use it. And if you use it prior to running the dog, it's best to use a method that doesn't leave tiny particles behind that the dog could inhale.

Humidity levels and precipitation also affect the air movement, and it can greatly affect oils and odor molecules. So it can affect your training and searches.

Searches at trials still happen when it rains, so be sure to practice that!

The **more humid the air**, especially when it is raining, the more moisture gets intermingled with the odor molecules and it can dilute the scent and make the molecules heavier and harder to move through the air. This, as well as flowing water carrying odor, affects how far and where the scent will spread. It also makes the air more dense and heavy and harder to move, so the things that were discussed that affect air movement tend to have a muted effect.

The other issue with heat and humidity is that it makes dogs pant. And when they are panting, they are taking in significantly less air (& odor) through their nose. Just like when we breathe through our mouths. So it can mean they miss hides and odor because they are panting vs. sniffing.

When air is warm and dry **(low humidity)** the air and odor molecules are easier to move and the things that affect air movement get amplified. Scent can travel farther, but the dry air can dry out the oils faster, so the scent doesn't last as long in the air making them seem weaker. And dry air also dries out the dog's nose and nasal passages making it harder to hold onto the odor molecules.

Ideal exterior conditions would be about 40-60% humidity, light breeze, heavy overcast, and around 70*F. But trials rarely have those perfect conditions, so you should train in all sorts of weather!

Another factor that can affect a search is the **age of the hide**. How old your oils are and how they are stored can also have an effect, but this is referring to how long the hide sits in place before your dog searches for it. I personally know of a dog that found a hide that was accidentally left behind, outside, in Ohio, 12 months earlier! But most folks "age" their hides measured in minutes and hours, not months. At a trial, a hide has the potential to be placed in the morning and not run till the end of the day. It doesn't happen frequently, but it can happen. So you should practice on hides that have been in place for at least 10 min. and up to 8 hours before your search, plus every time frame in between.

The surface: What the hide is placed on or near can affect how available the odor is for the dog. Smooth surfaces let the air slide right by, which works well if that's what you are going for. But the rougher a surface is, the more it will trap and hold the odor molecules. Fabric and paper, including cardboard, will also absorb odor molecules, as will plastic. So if you have a scent vessel set for more than a few brief minutes on the types of surfaces that can absorb the oil molecules, consider them as scented, which is also called 'hot', unless you can clean them with something that will break down and remove the oil molecules. Depending on the surface, you might be able to give it ample time to dry out the oil. And if

you have a hide set for longer, the molecules might not come out of the pores of the item even after washing. So you want to try and avoid hiding on items you don't want to be considered 'hot' for long term. Can dogs learn to ignore those faint odors? Absolutely. Do you want them to do so? That depends on what organization you plan to trial in or what type of odors your dog searches for.

Which brings me to another factor, which is the **strength of the odor**. AKC uses 2 drops of oil on each Q-tip head (with one fluffy end per hide). But other organizations have varying strengths of oils due to the way they are prepared. So if you want to compete in multiple venues, you'll want to practice with a variety of amounts of oil on the hides. If you were to only do AKC style searches, and then went to compete in an org with Q-tips that might only have the scent molecules from being in the same container as the oil, your dog will likely struggle. And if you usually train on low odor Q-tips and then have your dog search for an AKC Q-tip, they might get overwhelmed by the volume of odor they have to work through to find the source. They might also be more likely to "fringe alert", meaning they alert on a lower concentration of odor away from the actual hide. Because that volume of odor is closer to what they are used to getting rewarded for finding. But training and practice with a variety of strengths can help dogs learn to work through these issues.

The last factor that affects searches is the dog/handler team. And there are MANY variables to this topic alone that I won't be going into detail on here. But briefly- some dogs do have better scenting abilities than others, just like there are variabilities in senses from human to human. And some dogs have an easier time with (or more training on) ignoring environmental distractions and staying on task. And the dog's experience and training as well as the handler's experience and training play a massive role in a search! The more proper practice you do, the better both of you will get at searching successfully.

Now that you are more aware of the things that affect hides, you can see why it is hard for humans to know exactly what a dog might be working through, especially on hides you didn't set yourself. There are very few absolutes and 'always' this or that type variables in scentwork because many of the factors combine to create new odor pictures and movement.

Hopefully you understand why training and practice on as many of these variables as possible is so important to help the dogs learn how to work through these things and succeed! The dogs can make it look so easy that we forget about all the things they are working through to find the source!

I hope you have found this helpful and educational! And hopefully it will improve your hide setting to help your dog learn new skills and improve their searches. Thanks for watching!