**Outdoor Classroom 1**

**Wall 1**

**Social Behavior in Nature and the Scientific Research at Hazeva**

**About the Research**

The biology, ecology and social behavior of the Arabian babbler, a songbird with a complex social system, has been studied at Shezaf Nature Reserve since 1971. The entire population of babblers being studied is tagged with colored leg bands.

The Hazeva babbler population has served as the foundation for several important scientific theories, including the Handicap Principle – the theory of honest signaling, and an exploration of altruism among babblers and in nature in general.

**Back story**

One morning at the Shezaf Nature Reserve, four chicks hatched from four turquoise eggs. The chicks were fed by all members of the group of babblers, which differs from the behavior of Israel’s other birds. The group of babblers builds a single nest, in which one pair reproduces and the others help raise the young.

When the nestlings were ten days old, researchers climbed up to the nest and tagged them with colored bands. One of the birds was tagged with red, white, metal and black, and named for the abbreviation of the first Hebrew letters of each color - Altash. By the end of the year, researchers identified Altash as female.

**Tagging babblers**

Babblers names are made up of letters signifying their band colors, generally the color’s first Hebrew letter. The bands are read from top to bottom, and from right leg to left leg.

Each babbler has three colored bands and a metal band imprinted with their identification number. Therefore, each babbler is labeled with the letter ‘Tet’ (for ‘tabaat matekhet’ or ‘metal band’) on one of their legs.

**Identification foldout panel:**

**Male**

Hello! I’m Mr. Babbler. Look at my eyes – my pupil is surrounded by a bright yellow iris.

**Female**

Nice to meet you, I’m Ms. Babbler. Look at my eyes – my pupil is surrounded by a brown iris.

**Chick**

I hatched from my egg blind and featherless. My beak and mouth are bright yellow.

**Fledgling**

I flew from the nest recently. The base of my beak is still yellow, and my irises are brown.

**Nesting**

The nesting period is defined as the time from when the parents build the nest together until the last of the fledglings flies off. Birds cannot carry a heavy pregnancy and still be able to fly, and therefore the fetus develops outside of the mother’s body, in the egg.

The bird lays her eggs in the nest to protect them from predators, and roosts to incubate them at a steady temperature, as in a pregnancy. This isn’t an easy task as it limits the bird, and she can’t leave the nest for a long period of time.

Every bird species has its own ways to care for its eggs and nestlings on the way.

**Nesting** **rotating panel:**

**The Babbler’s Nest**

The senior male and female birds build the nest, and the female lays four eggs. Sometimes, other females will also lay eggs, although the senior male and female birds usually incubate all the eggs themselves.

**The Blackstart’s Nest**

The couple builds their nest in holes and crevices. The female lays four eggs, which she incubates alone while the male guards and provides food for the nestlings.

**The Arabian Green Bee-eater’s Nest**

The bee-eater nests in a deep burrow. The nest holds 4-8 eggs, and both male and female share the work of incubating the eggs and caring for the nestlings. The burrow protects the eggs from rolling out and breaking.

**The Spotted Sandgrouse’s Nest**

The sandgrouse lays 2-3 eggs in a slight depression in the ground, and the eggs are camouflaged. The nestlings hatch after about 20 days and soon afterwards leave the nest to follow their mother.

**Wall 2**

**Group Life – Living Together**

**Social Behavior in Nature and Group Life**

Social behaviors among birds are varied. Some flock together only during migration season – a flock that flies in ‘V’ shaped formation flies more efficiently. Some nest together in colonies that provide safety and defense from predators, and others gather to sleep together to reduce the risk of predation and share information about the best foraging sites.

When birds live together in groups and all members of the group cooperate to rear the young, it’s called “cooperative breeding.”

**Rising panel Social Behavior in Nature**

**Social Behavior in Nature and Flock Life**

Flocks (starlings, cranes)

Colonies (seagulls, sparrows)

Shared sleep / information centers (wagtails)

Cooperative breeding (Babblers)

**Cooperation and Competition among Babblers – Two Sides of the Same Coin**

Do the following scenarios reflect cooperation or competition?

Turn the panel to find out

**Rotating panel Cooperation/Competition**

The babbler Tagc feeds Latgl, the babbler immediately beneath him in the hierarchy and replaces him on guard duty / Competition

Calht guards from predators at the tops of the trees while his flock mates forage on the ground / Cooperation

Zpat and Glst, two senior babblers in the group, hurry to forage for food and fly to the nest to feed the nestlings, who do you think will reach the nest first? / Competition

**Outdoor Classroom 2**

**Wall 1**

**Communication in Nature**

**Without Words**

When humans want to communicate, they use language and words, as well as nonverbal communication such as gestures, movements and body language. Animals can’t communicate verbally like humans, but they have many ways to communicate based on vocal sounds, signals and body movements.

Communication signals serve to mark living territories, to warn of predators, for courtship and mating, for self-defense, to warn about poisons and more.

**The Handicap Principle**

Animals send each other signals all the time: males call females to mate, rivals signals to each other that they’re strong. These messages must be reliable to be effective.

The messages must handicap the sender, so that he can only afford to send them if he is in fact as large, strong, and successful as he asserts. This is called the Handicap Principle, proposed by Professor Amotz Zahavi.

This principle is exemplified by the peacock’s impressive yet unwieldly tail, the deer’s heavy antlers and in the altruism among babbler groups.

**Walls 1**

**The Handicap Principle in Babblers**

Amotz Zahavi believed that the Handicap Principle does not only include physical handicaps. He claimed that babblers competed using altruistic gestures, such as guarding and feeding, which were intended to demonstrate the individual’s fitness. According to the Handicap Principle, a babbler benefits from his investment in the group because he can show off his competence and earn prestige among the other group members, which increases his chances of climbing the social hierarchy.

Relations between babblers alternate between cooperation and competition, and these are in fact two sides of the same coin.

At age two-and-a-half, Altsh left the group and disappeared. Later, she was discovered by researchers in another group, where she had become the senior female after driving out the previous matriarch. She was later driven out herself and became senior female of another group.

All the babblers in the group recognized Altsh as the undisputed leader; she guarded more than anyone, fiercely defended the territory, fed other babblers, kept other females away from the senior male, and laid all the eggs in the nest.

Why did she do so much for the group? And how does this behavior prove her fitness to her fellow babblers?

**On the left are babblers’ social behaviors. Rank them in the order of which actions you think most contribute to the group.**

**Social Behavior Rating Station**

**Babblers’ Activities** Preening/incubating/guarding/nest building/morning dance/nesting incubation

**Human Equivalents** Hugging/kindergarten/soldier on guard/children building with blocks/the *Hora* dance/feeding and giving charity

**Camouflage Colors**

Camouflage? Ornamentation? Warnings? Animals’ colors have many purposes. Birds’ colors are especially visible and important.

In bird species in which the male doesn’t take part in caring for the young and only fertilizes the female, bright ornamental colors have evolved (like the peacock and sunbird). These colors reliably signify the males’ fitness and health.

The colors reflect the male’s health (an undernourished male cannot invest in ornamental colors) and also make him more visible to predators. This helps the female select the most fit males. In these species, the female’s colors are dull in comparison and serve to camouflage her while she’s nesting and incubating her offspring.

**What Does My Color Say about Me?**

Warning colors

“Don’t eat me – I’m poisonous!”

*The poekilocerus grasshopper*

Brown camouflage colors

“Who sees me?”

“Where am I?!”

“Surprise!”

*Desert lark / Desert mantis / Painted carpet viper*

Green camouflage colors

“You won’t guess that I’m here”

*Middle Eastern jewel beetle*

Territorial declaration

“Take note! You’re on my property!”

*Brown-necked raven / Blackstart – desert songbird*

Seen from a distance, night and day

*Great gray shrike /Morning wheater/ Greater hoopoe lark*

Display colors

“I have nectar!”

*Loranthus*

Ornamental colors, calls attention but also endangers

“I’m the perfect mate!”

*Sunbirds*

Bright courtship colors

“See me? I’m healthy and strong!”

*Sinai rosefinch*

Accentuation and courtship colors

“Ornamentation or camouflage? Depends on who’s looking”

*Arabian green bee-eater*

Anti-glare coverage

“The mask of zorro”

*Great gray shrike*