



Fig. 1: Hedgehog

Hedgehog

The small, likeable hedgehog has a positive image. The “hedgehog principle”, the passive defence against threats using a coat of spines, makes the hedgehog look vulnerable rather than dangerous. This characteristic makes live hedgehogs very interesting to use in activities.

Most pupils know about hedgehogs, but often only from various media or from seeing them run over on the road. Although the hedgehog lives in gardens and therefore very near to us, many people have never seen a live one. Direct encounters are quite rare because it is a nocturnal animal.

Fundamental aims of the activities

- To learn about the way of life and the needs of a small native mammal
- To learn about the survival strategy “hibernation”
- To accept responsibility for a native animal and its habitat

1. Factual information about the hedgehog

Biology

In the history of evolution, the hedgehog belongs to the oldest forms of mammal. Its ancestors were already alive about 65 million years ago. The hedgehog’s family (*Erinaceidae*) belongs to the insect eaters, and the hedgehog is the largest member of this group. The mole and the shrew also belong to this group. The (Western) European Hedgehog (*Erinaceus europaeus*) lives in Germany.

The hedgehog usually lives for 2-4 years, but they can reach an age of 7 years. Many hedgehogs die young: half of the young animals die during their first winter.



Because the hedgehog is nocturnal, it does not see well, but it has an excellent sense of smell and can hear very well. It is constantly sniffing the air. It can recognise enemies at a great distance and recognises its young and other hedgehogs by their smell. Hearing is the hedgehog's second most important sense. Its ears are small but very sensitive. Hedgehogs can also hear very high tones, for example those of insects. The hedgehog can feel things well with the whiskers around its nose.

A hedgehog's sight is not very well developed because of being nocturnal. Hedgehogs are mostly colour-blind and can only see things in brown and cream tones.

The hedgehog's food consists mostly of insects in their various stages of development (caterpillars, larvae, adult insects). Snails and earthworms are a problem for hedgehogs because these can carry parasites like lungworms. Hedgehogs also eat eggs and young birds as well as dead animals. They drink water but cannot drink milk – they cannot digest lactose and get diarrhoea if they drink milk.

The spines

The sharp spines are modified hairs. They mostly contain keratin, a protein, which is also the basis of our hair and fingernails. The spines are 2-3 cm long, and about 2 mm thick and hollow, but they are robust, light and pointed. Shortly after they grow up out of the skin they bend to the side (30-40 degrees). This prevents them firstly from digging into the skin. Secondly, any jolt or impact is cushioned. A hedgehog can even fall from a 1-2 m high wall and will not hurt itself if it is rolled up. Young hedgehogs have about 3,000 spines when they leave the nest. Adult hedgehogs have about 5,000-8,000 spines.

Before birth, the little spines of the baby hedgehogs are buried in skin containing a lot of water. This protects the female during the birth. These small and soft spines become larger and harder when the

hedgehog sheds its baby spines. Each of the spines has an air chamber and is strengthened by a thick ridge. The spines cover the whole of the back. The belly is covered with rough skin, from which coarse fur grows.

When threatened, the hedgehog first pulls the spines on its forehead over the eyes, like a visor. After that, it can roll itself up very quickly – in less than a single second. The legs are pulled towards the body and the hedgehog rolls itself into a ball of spines using a special muscle, called the orbicularis muscle.

When the hedgehog is rolled up, its spines stick up in all directions and support each other. Whether it is rolled up to protect itself against danger or during hibernation, the animal – almost – becomes a fortress that cannot be attacked. A hedgehog can stay rolled up for several hours, and during hibernation can even stay motionless for weeks.



Fig. 2: Hedgehog young in the nest



Hibernation

When the hedgehog has increased its weight to about 800-1,000 g and has good fat stores, it prepares itself for hibernation. The males withdraw first. Depending on the weather, this can already be at the beginning of October. The females follow, after they have recovered from raising their young. The young hedgehogs are last to begin hibernation. They need longer to reach a suitable weight for hibernation. A young hedgehog must weigh at least 500 g by the beginning of November to be able to survive its first hibernation on its own.

A hedgehog's hibernation depends on the temperature, not on the time of year, like many people think. At a temperature between 12 °C and 6 °C the hedgehog begins to doze. It can be dangerous for the hedgehog if this period lasts too long. Too much of the winter fat would be used up which is needed for proper hibernation. When the temperature falls below 6 °C the hedgehog enters into hibernation. Its body functions are reduced to a minimum. To be exact, this means:

- Body temperature sinks from about 35 °C to a minimum of about 5 °C.
- Heart rate slows from about 160-200 beats per minute to about 9 beats per minute.
- Breathing is reduced from 40-50 breaths per minute to about 4 breaths per minute.

This form of saving energy is necessary to survival when it is cold and there is not much food. Reducing body functions means that the fat which the hedgehog has stored will last until food is available again. On average, it loses 30% of its body weight. The hedgehog will usually wake up when the outside temperature stays around 10 °C for some time. Waking up lasts for several hours and uses an enormous amount of energy. The hedgehog uses special stores of "brown fat" in the shoulder area for this. During waking up, heart rate and breathing are very much faster and blood circulation can be five times its usual rate. This is accompanied by shivering of the muscles, particularly in the legs.

The life of the hedgehog in the course of the year

After the hedgehog wakes up from hibernation in March or April (depending on the weather), it first tries to reach its normal weight. The mating season begins in May. Most of the hedgehogs that you see run over on roads in June and July are male animals which travel long distances to find a female. After mating, males and females go their separate ways again.

After a gestation period of about 5 weeks the young are born. The litter usually has five to seven babies. The babies stay safely in the nest until they are about three or four weeks old. Then they leave the nest for the first time. The young become independent after about six weeks. Many females give birth to a second litter in August or September.

Hedgehogs lay down fat stores from October to November. They also build themselves a winter nest from leaves and dry grass which protects them from wind and rain. If the hedgehog cannot keep its body temperature above 15 °C during its daily rest period then it will burrow itself deep into the nest material and enter hibernation. Natural changes in temperature and disturbances particularly by humans can lead to hibernation being interrupted.



Waking up from hibernation needs a lot of energy and repeated disturbances can cause the hedgehog to die of hunger.

Hedgehogs are solitary animals, each with its own territory. From spring to autumn, the male roams an area of over 100 hectares. The size of the female's territory is less than 50 % of the male's territory. Although hedgehogs are solitary, they can fight about food or a female. But when two hedgehogs meet, they usually ignore each other.

The female particularly stays in her own territory which has sufficient food. The nest is in the centre of the territory and the nocturnal hedgehog returns there every morning. This nest has a compact structure with a diameter of 30 to 60 cm. It is made from leaves, grass and torn off pieces of plants and is for prolonged use. The hedgehog often turns around in its nest and the inner padding at the centre is formed into a rest area which is not much bigger than the hedgehog itself.

Habitat

A good hedgehog habitat has various parts. Nesting sites in hedges and bushes are just as important as sufficient food. Nowadays almost all hedgehogs live in or near human settlements because they find better living conditions there than in the monoculture found in the open countryside. So they belong to the group of synanthropic animals – they are ecologically associated with humans.

During the summer, hedgehogs live in several nests, often not very carefully made, which they only use for a short time. Sometimes they just rest in long grass during the day. Breeding nests, in which the hedgehog mother raises her young, are constructed more carefully. Nests for hibernation must be well isolated and must keep out the rain and snow. So that the leaves that are mainly used to build the nest do not fall apart, the hedgehog builds nests for hibernation under supporting branches, for example in hedges, under ground cover plants and also in hollow spaces under garages, sheds or log piles.



Fig. 3: Crossing the road is very dangerous for hedgehogs because at night they are not easy to see.

Dangers and protection

In Bavaria, the hedgehog is not endangered (yet), but its position has become worse in the last few decades. In some federal states in Germany it is already on the Red List of Endangered Animals. Each year, more than 500,000 hedgehogs are run over by cars on Germany's roads. This figure does not include hedgehog babies that die in the nest because the mother has been killed.

The quality of hedgehog habitats has dramatically declined in the open landscape and also in our gardens. This means both loss of structure (no suitable nesting sites and hiding places) and also lack of sources of food. This lack of suitable insects forces the hedgehog to



eat other animals like snails and earthworms, which can be a problem because of the lungworms and other internal parasites. Because of this, the average life expectancy of the hedgehog has been lowered from 6 to about 4 years. If this continues, it won't be long before the entire population of hedgehogs is endangered.

Paved roads cross most hedgehog territories. Hedgehogs usually walk onto the road straight from a protected place. First they orient themselves by using their sense of hearing. Then they try to cross the road as quickly as possible. They don't roll themselves into a ball when a car is near but they stand still when there are noises so that they can hear better. This is probably because the spines rub against each other when the hedgehog is walking and make a distracting noise.

Apart from dying on the roads, the hedgehog is mainly threatened because of changes in its habitat. The quality of its habitat is becoming worse and worse – there are large areas of monoculture and sterile gardens with no hiding places. There is a loss of structures such as hedges, and the edges of forests and of fields with a complex structure, and because of this the quality of the hedgehog habitats is becoming worse.

There are also many less well-known sources of danger:

- Lawnmowers and weed trimmers injure or kill hedgehogs
- Leaf vacuums take away all their food (insects and their larvae are also removed) and can even suck up young hedgehogs
- Hedgehogs also get caught in bird nets in vineyards and orchards; plastic cord used in agriculture for fastening hay and straw bales and also plastic packaging (silo bales, rubbish) are also dangerous
- Light wells and cellar steps, swimming pools and garden ponds with high sides are lethal traps
- Mouse and rat traps
- Poison used against other animals (rat, snail and insect poisons) are eaten by hedgehogs and cause slow poisoning.

How to protect hedgehogs

You can help hedgehogs best by...

- having a (school) garden with lots of structure and lots of insects.
- having a protected rest and hibernation area in leaf, twig and wood piles and under hedges and bushes, garden sheds, stacks of wood or in compost heaps.
- having a fence with gaps for hedgehogs to pass through (not hermetically sealed).
- avoiding the dangers listed, for example, by not using any pesticides at all.
- covering all holes.
- building small ramps at the edges of ponds and water containers with steep sides.



Literature

Lohmann, Michael (2001):

The Practical Book of Hedgehogs (Das praktische Igelbuch). BLV Verlagsgesellschaft München

This paperback gives a comprehensive view of the biology and life of the hedgehog, but does not go into too much detail. The suggestions on how to look after and keep hedgehogs are clear and easy to understand. The pictures are appealing and meaningful.

Neumeier, Monika (2001):

The Real-life Book of Hedgehogs (Das Igel Praxisbuch). Kosmos-Verlag Stuttgart
This book has lots of pictures and contains lots of information about all areas of the hedgehog's life for the interested reader who has some knowledge of biology. Suitable for junior and senior high school.

Dietzen, W. & E. Obermaier (1989):

Protecting Hedgehogs – The Right Way (Igelschutz – aber richtig). Summary report about numbers of hedgehogs (*Erinaceus europaeus* L.) and evaluation of humans helping hedgehogs to survive the winter. Registered Wildlife Biological Society Munich (publisher).

Klein-Schmidt, K. (2000):

Hedgehogs in the City of Erlangen. Observations of Hedgehogs Fitted with Transmitters (Telemetry) and Following the Trail of City Hedgehogs at Night (Igel in der Stadt Erlangen. Beobachtung sendermarkierter Igel (Telemetrierung) und Nachtwanderungen auf den Spuren der Stadt-Igel. Project report from the Registered Society for Conservation in Bavaria, Erlangen, 44 pages.

Internet addresses

www.pro-igel.de

Information about hedgehogs, hedgehog rescue, literature, addresses.

www.igelschutz-initiative.de

The hedgehog conservation initiative is dedicated to hedgehog rescue, according to its rules. Members of the society look after hedgehog stations.

Contacts

To get a young hedgehog, we recommend that from the start of November onwards you make contact with your **local animal shelter**, a **vet** or a **hedgehog station** if available. Pupils can also be encouraged to look out for young hedgehogs. If you find a young hedgehog, don't pick it up in your hand because it might spread disease (wear gloves and use a small box to transport it). Take it to a vet first of all.

Further contacts

Swabia:

Registered Society for Hedgehog Rescue Swabia, Nibelungenring 40, 86356 Neusaess, Tel. 08 21/46 75 69

Hedgehog SOS Registered Society, Donau-Ries, Am Kesseldamm 1, 86609 Donauwoerth. Tel. 09 06/2 16 49

Friends of the Hedgehog Registered Society, Schleifweg 54a, 87766 Memmingerberg, Tel. 0 83 31/49 43 18

Lower Bavaria:

Registered Hedgehog Conservation Society Lower Bavarian Danube Valley (Niederbayerisches Donautal), Hochfeld 5, 94469 Deggendorf, Tel. 0 99 01/63 53

Middle Franconia:

Registered Society for Hedgehog Rescue Middle Franconia, Am Bauernwald 69, 90411 Nuremberg, Tel. 09 11/52 03 91 00

Upper Franconia:

Friends of the Hedgehog Registered Society, Upper Franconia, Am Buehlig 3, 95145 Oberkotzau, Tel. 0 92 86/18 91



2. Legal information and handling of hedgehogs

In the Federal Species Conservation Act (Bundesartenschutzverordnung, BArtSchV), the hedgehog is specially protected. In the Bavarian Red List (Rote Liste Bayerns) of 2003 it is not (yet) endangered. In Article 44, Paragraph 1, Number 1 of the Federal Nature Conservation Law (Bundesnaturschutzgesetz BNatSchG) it is forbidden, among other things, *“to chase, catch, injure or kill specially protected animals living in the wild (...)”*. That means that it is not allowed to catch the protected hedgehog.

In Article 45, paragraph 6 of the Federal Nature Conservation Law (BNatSchG) the following is allowed: *“Deviating from the ban in Article 44, Paragraph 1, Numbers 1 and 3, as well as the ban on ownership, it is allowed to take in injured, helpless or sick animals to restore them to health. The animals are to be released as soon as they can look after themselves.”* Under this law, “helpless” includes young hedgehogs born later in the season, which have not reached a weight of 500 grams by the 1st November of that year. These animals have no chance of surviving the winter. Feeding them as described in the suggested activity is possible under this law.

Information on handling hedgehogs

Before you start to look after a hedgehog, you should first bring it to a vet or a hedgehog station. The health of the hedgehog will be assessed and parasites will be removed.

Students should be reminded to handle the hedgehog with care and responsibility. A large sign on the cage with the words: “Attention! Live hedgehog!” reminds the students to behave properly. You should make rules for handling the hedgehogs together with the students.

- Reduce your volume, don’t shout loudly! Hedgehogs can hear very well.
- Don’t put your fingers in front of the hedgehog’s mouth! They can bite.
- After touching the hedgehog, wash your hands!

For activity 4, “Telemetry of a hedgehog”, you must apply for an **exception permit** at the Upper Conservation Authority Office. A sample application can be found in Appendix B at the end of the whole publication. The addresses of the government offices are listed in Appendix C at the end of the whole publication.

Recommendation: For the activity “Caring for a hedgehog” you should **only use a healthy, young hedgehog which is underweight (under 500 g) from 1st November** and you should look after it according to the rules. Injured or sick animals should be taken to an animal shelter.

Information for the teacher: Picking up a hedgehog to have a closer look at it should only be done with gloves, because hedgehogs can bite hard!



3. Activities

Fundamental aims of the activities

- To learn about the way of life and the needs of a small native mammal
- To learn about the survival strategy “hibernation”
- To accept responsibility for a native animal and its habitat

Activities

- A 1 **Help a young hedgehog to survive the winter**
Care and reintroduction to the wild
- A 2 **Get to know the hedgehog’s habitat**
Recognise and evaluate the hedgehog’s habitat
- A 3 **Hedgehog rescue – Improve the hedgehog’s habitat structure**
How to protect the hedgehog
- A 4 **Telemetry of a hedgehog**
Use of space and behaviour at night



Help a young hedgehog to survive the winter

Factual background to the activity

The hedgehog is an insectivore and can only survive the winter in our temperate latitudes by hibernating. The energy it needs for this is stored as fat reserves in the body. Hedgehogs which are born too late or which are ill cannot store enough fat in their bodies. These animals do hibernate, but they do not have enough energy reserves to wake up again and starve in their sleep.

Implementation

A) Autumn: Take in a young hedgehog and feed it

To get a young hedgehog, it is recommended that you contact a local animal shelter, a vet, or a hedgehog station if there is one. From the start of November, people take young hedgehogs that they have found to these places.

If you find a hedgehog in the wild, first take it to a vet or a hedgehog station, where the health of the animal will be checked and parasites will be removed.

Only take in healthy young hedgehogs which are underweight (under 500 g) from 1st November. Injured or sick animals should be taken to a care station.

Taking in a hedgehog:

- Inform the school principal and caretaker
- Prepare a cage for the feeding phase: for example use a large guinea pig cage or build a hedgehog cage yourself (you need about 2 m² per hedgehog; look at relevant literature). The cage should have a sleeping box and food and water bowls.
- Put the cage outside a building, where it is protected from the wind and weather, and not in the sun. Protect it from dogs.
- Prepare the food: for a medium-sized hedgehog you need about 150 grams of food per day. The following foods are good: tinned cat or dog food (beef or chicken, no sauce) mixed with a spoonful of dry hedgehog food or rolled oats. Eggs (hard boiled or scrambled, fried in a little oil), cooked chicken meat or lightly fried minced beef. Do not use salt or seasonings, but add a very small amount of mineral supplements (from pet shops).
- Only give water to drink, never milk (danger of diarrhoea)!

Season:



Grade level:



Development:



Aims of the activity

- To learn about the features of an insectivore
- To learn about the needs of an animal that requires care
- To accept responsibility for keeping an animal correctly
- To recognise connections between the habitat and existence of the hedgehog

Materials needed

- Autumn: cage for feeding
- Winter: cage for hibernation
- Spring: cage for reintroduction into the wild
- Food
- Bedding for the cages
- Report on the project (documents to record data, scales)



Fig. 4: Picking up a hedgehog



Never keep a hedgehog in a house or cellar because the temperature does not fall under 6°C. The hedgehog would not hibernate properly in these conditions and use too much energy.



Fig. 5: Young hedgehogs must be put on the scales to check their weight regularly.



Fig. 6: When you check the hedgehog's weight you can carry out a short "patting" activity. The spines prick you but are very bendy. This activity should be as short as possible and should be done only once.

Care of the hedgehog:

- Put newspaper on the floor of the cage and change it every day.
- Offer fresh food when necessary.
- Change the water every day.
- Weigh the hedgehog every week. Use gloves for this.
- Make a feeding and cleaning schedule for the students and check they are keeping to it.
- Keep a record of the care: date and time found, place found, weight at the beginning, visits to the vet, medicines taken etc. Continue to record weight gains or losses.

Determining the gender (by the teacher): Put gloves on and pick up the hedgehog. Stroke the hedgehog's back until it unrolls. Slowly turn it on to its side with the flat of your hand, so that you can see its belly. Males have a knob of skin (penis opening) in the middle of the back half of their bodies. Females have a vagina directly in front of the anus.

B) Autumn/Winter: Transition to hibernation, care until reintroduction to the wild

A hedgehog that is being looked after should begin hibernation as late as possible. The longer it is fed, the larger is its gain in weight and that means the chance of it waking up again after hibernation is greater. Small hedgehogs should weigh at least 500-700 grams at the beginning of hibernation. Older animals should weigh at least 800-1,000 grams.

Even young hedgehogs which have never hibernated before have a kind of inner clock. They suddenly stop eating. If this happens, put the animals in the prepared hibernation cage.

The cage for hibernation should be outside the building, protected from the wind and weather, and not in the sun. Protect it from dogs. The area should be quiet and should be exposed to daily fluctuations in temperature.

The equipment in the cage is similar to that in the feeding cage. The little house should have more isolation and padding (for example dry leaves, straw and hay). The cage needs a strong fence and a cover (look at relevant literature).

**C) Reintroducing the hedgehog to the wild**

For a smooth reintroduction to the wild it is recommended, especially for young animals, to set up a larger cage with separate sleeping and feeding areas (look at relevant literature). After some time you open the fence but keep feeding at the usual place. The hedgehog can come back there to sleep until it can find a better nesting place in the new territory or until it leaves the area. This cage for reintroduction to the wild is often used for several weeks.



Fig. 7: Reintroducing the hedgehog to the wild, using a pile of leaves and twigs built together with the students.



Get to know the hedgehog's habitat

Factual background to the activity

How 'hedgehog-friendly' a garden is can be measured by the number of hiding places (for example piles of leaves or twigs), how easy it is to get through the fence (for example, fences and walls that completely enclose the garden), by the variety of different structures and by the food available. In this activity, students examine how suitable an area is as a habitat for hedgehogs, as well as looking for signs of hedgehogs living there. Basic needs of the hedgehog must be available, such as a place to sleep or enough food and water. In addition, students determine possible dangers for hedgehogs. These can include traffic, enemies (especially dogs), uncovered manholes and also holes in the ground.

Implementation

- Choose a suitable area of land, ideally the school garden or a nearby park and, if necessary, find out whether you are allowed to use it and examine it
- In the classroom: learn about the needs of a hedgehog and sources of danger
- First the students are put into groups and the materials are handed out. Then the students can explore outdoors.
- The students examine the area of land to find out whether it is suitable as a habitat for hedgehogs.

Tasks

Together with the students you can

- Find dangers
- Find and evaluate hiding places
- Look out for hedgehog tracks
- Examine the food available: look for insects which could be food for hedgehogs in rotting leaf litter and piles of leaves, in piles of dead wood and in overgrown areas. Catch these with your magnifying bug jars and identify them.

At the end, the results of the groups are compared, summarised and evaluated.

Season:



Grade level:



Development:



Aims of the activity

- To recognise the needs of a hedgehog in its habitat
- To find and interpret animal tracks
- To recognise connections between habitat structure and quality
- To learn about opportunities to protect hedgehogs

Materials needed

- Clothing suitable for the weather, closed shoes
- Magnifying glass or magnifying bug jar
- Disposable rubber gloves
- Tweezers

The following Activity 3 demonstrates the direct use of the results of Activity 2 (Get to know the hedgehog's habitat) and should be based on these results.



Hedgehog rescue – Improve the hedgehog's habitat structure

The following Activity 3 demonstrates the direct use of the results of Activity 2 (Get to know the hedgehog's habitat) and should be based on these results.

Implementation

- The activity should take place over a longer period. During a shorter time, only a few improvements can be seen (exception: moving in to the winter nest). If you begin the activity in autumn, you can look for signs in spring that a hedgehog has been living in the hedgehog house, for example, or you can look at the gaps in the garden fence to see whether they show signs of use.
- You should think about how well the students can use the tools required for the activity, and explain their use if necessary.
- Changes to the area should be discussed with the owners of the land (or the person responsible for it) before you begin.

You may wish to do some of the following:

- Build nesting places for the hedgehog (hedgehog house)
- Cover holes (wire mesh)
- Build ramps in waters or garden ponds (wooden ramp)
- Make more gaps in the fences (scissors, saws)
- Improve the food available (place deadwood, twig or leaf piles on the land or start a compost heap)

Season:



Grade level:



Development:



Aims of the activity

- To understand that a habitat is part of a complex system and that you can help shape it
- To find out how you can shape a habitat to make it 'hedgehog-friendly' – to accept responsibility for an endangered wild animal
- To develop knowledge of one's own environment

It is difficult to say which **materials you need**. This will depend on the opportunities you have and the willingness of your students to participate, as well as how good they are at organising the tasks.



Telemetry of a hedgehog

Factual background to the activity

The hedgehog telemetry activity is very useful for learning how basic food resources, body shape and the way of life of an animal are dependent on each other. Every aspect of the wild animal is observed. Pupils can develop or expand their ideas about the close relationship between a creature and its habitat. They should recognise the special responsibility that humans have for the creatures in their environment. Pupils can develop knowledge of the reasons why the wild hedgehog may become endangered and how it might be protected.

In this activity you can show that the hedgehog lives by itself and prefers to spend time on non-sealed surfaces. Hedgehogs look for food on grass areas, in the bushes, in old leaves and at feeding places (for example for birds). They cross sealed areas at high speed. Hedgehogs like to stay in areas with overgrown grass, with plants growing on waste ground and in gardens that are not well looked after, as well as bushes.

Hedgehogs usually walk onto the road straight from a protected place. First they orient themselves by using their sense of hearing. Then they try to cross the road as quickly as possible. They don't roll themselves into a ball when a car is near but they stand still when there are noises so that they can hear better. This is probably because the spines rub against each other when the hedgehog is walking and make a distracting noise.

Information on materials needed

- You must apply for an exception permit at the Upper Conservation Authority Office in time (4 weeks before the activity). For the form see Appendix B at the end of the whole publication. You must also apply to the Regulatory Authority for Telecommunications (for the addresses, see the box on the following page).
 - Telemetry equipment:
 - Transmitter:** 5K00P0N, for example from the firm "GFT – Gesellschaft für Telemetriesysteme mbH", Eichenweg 26, 25358 Horst, Tel. 041 26-38 79-3/5, Fax: +49-(0) 41 26-38 79-4 e-mail: rls.gftmbh@t-online.de
 - Receiver:** Receiver antenna: 2 metre H antenna from an electronics store
- You must expect to pay several hundred Euros for this equipment. If the activity is to be done only once, it might be a good idea to work to-

Season:



Grade level:



Development:



Aims of the activity

- To give the opportunity to directly experience the wild hedgehog in its habitat in the city or town
- To observe the behaviour of a wild animal and how much space it uses
- To recognise the connection between the number of a species that can be found and the structural conditions of its habitat
- To recognise and internalise the need to protect native animals



Fig. 8: Hedgehog with transmitter

Materials needed

- Exception permit for tagging the hedgehog
- Telemetry equipment
- Two-part glue such as "Pattex Stabilit Express"
- Glow sticks (weak lights)
- Flashlight with red cellophane covering
- Map of the area

**Regulatory Authority for Telecommunications and Post**

Branch Offices of the Federal Authority in Bavaria:

Augsburg, Morellstr. 33, 86159 Augsburg
Tel. 08 21/25 77-0

Bayreuth, Josephsplatz 8, 95444 Bayreuth
Tel. 09 21/75 57-0

Landshut, Liebigstr. 3, 84030 Landshut
Tel. 08 71/97 21-0

Munich, Maria-Josepha-Str. 13 - 15, 80802 Munich
Tel. 089/3 86 06-0

Nuremberg, Breslauer Str. 396, 90471 Nuremberg
Tel. 09 11/98 04-0

Regensburg, Im Gewerbepark A 15, 93059 Regensburg
Tel. 09 41/46 26-0

Rosenheim, Arnulfstr. 13, 83026 Rosenheim
Tel. 080 31/260-0

Wuerzburg, Barbarastr. 10, 97074 Wuerzburg
Tel. 09 31/79 41-0

gether with another institute (for example a Wildlife Biological Society).

- You can buy glow sticks in sport fishing shops and in toyshops.

Implementation

- September is a good month to observe hedgehogs. The young of the first litter are already looking for food independently. They are very active because they have to feed a lot to gain fat reserves for the winter. Also, twilight comes relatively early.
- One or two hedgehogs must be fitted with a transmitter. Finding these hedgehogs can be made easier by asking the pupils or their parents for information, or asking the public for help (for example in printed media). The nocturnal hedgehogs are easiest to find on grass areas, because they like to use these when looking for food. Apart from that, they make

noises which are easily heard: rustling sounds when they are walking through leaves or chewing noises when they are eating. It is recommended to put a piece of red cellophane over your flashlight, as this makes finding the hedgehogs easier.

- Shorten several of the spines on the hedgehog's back to half their original length with a pair of nail scissors. The area of this should be about as big as a 1 Euro coin. (This does not hurt the hedgehog).
- Place the transmitter on the animal's back so that it is not disturbed by it and it can't get stuck anywhere. Put the glue on the shortened spines and on the transmitter and press together when it begins to harden.
- If several hedgehogs are being fitted with an antenna, you can mark the antennas with different coloured tape so that you can see which animal is which at night time.
- When you are observing the hedgehog you can follow it for about an hour each night without disturbing its normal everyday activity. If you are observing the hedgehog with a group of students, it is necessary to make the animal more visible because of its ability to move about in the area, its excellent knowledge of the gaps in fences and in comparison the poor ability of the group to move about. To mark the animal, glow sticks are very useful, as these can be placed between the hedgehog's spines during observation or fixed with tape to the transmitter's antenna. They are removed again after about an hour. During the day you can use the signal to find the hedgehogs in their daytime nests and learn about the requirements for a daytime hiding place.

Possible questions to be answered through observation

- Where and how often are streets crossed?
- Which barriers does the hedgehog find while moving around?
- Where does the hedgehog find food?



- Which hiding places does the hedgehog use?
- When / In which situations or environments does the hedgehog run quickly and when does it move more slowly?
- Does the hedgehog meet other animals?
- Which sounds does a hedgehog make?
- Mark the hedgehog's route in the map.

After the project is finished, remove the transmitter by cutting it off with a pair of nail scissors! Otherwise parasites could get under the transmitter or it could cause an infection.

