Stimulus Responses
Student Sheet 1

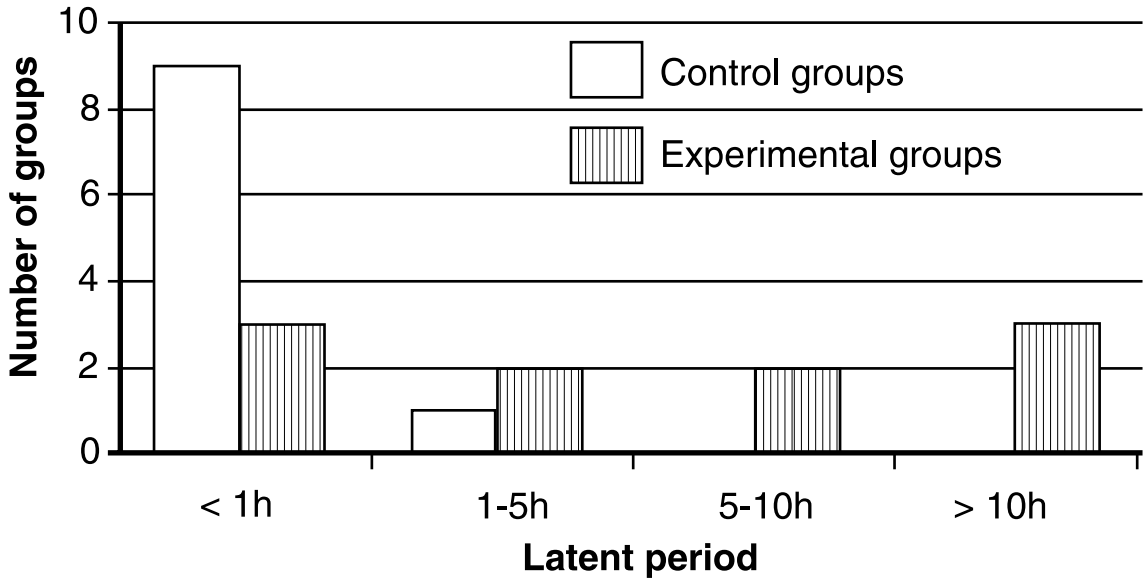
Experiment 1:
ALARM SUBSTANCES IN THE URINE OF SOWS

Question:
Does the smell of urine from an alarmed sow cause other sows to avoid this area?

Procedure:
In a modern pig farm, sows wearing collars are divided into groups of 10 and are expected to learn to take food from an unfamiliar automatic food dispenser (see video).

The afternoon before the first day of the experiment, i.e., 14 hours before the first chance to learn, the entrance to the food dispenser is sprayed with the urine of another sow. This stems either from a sow who was alarmed by being tied to a pole for a short period (defined by her strong pulling on the chain, urinating and defecating, etc.; this is the experimental condition) or from another sow who was allowed to urinate in an undisturbed situation (this is the control).

Ten groups of 10 sows were used as control groups, a further 10 as experimental groups. Each group received the urine from a different sow. The time was measured from the moment when a group had access to the room with the food dispenser to the moment when the first sow of the group entered the room (latent period).



Task:

Analyze the results and draw conclusions with regard to the initial question.

Experiment 2:

OBSERVATIONAL FOOD LEARNING IN LAMBS

Question:

Does a lamb learn by the example of his mother which type of food he can safely feed on in later life?

Preparation:

The animals had the choice between two types of bushes with leaves that were preferred food, a peach (food A) and mahogany (food B). The bushes were presented in pots in an experimental room.

Mothers of the lambs in the experimental group were put off food B by giving them capsules of lithium chloride that caused nausea after feeding on those bushes. As a result, the ewes exclusively fed on bushes of type A.

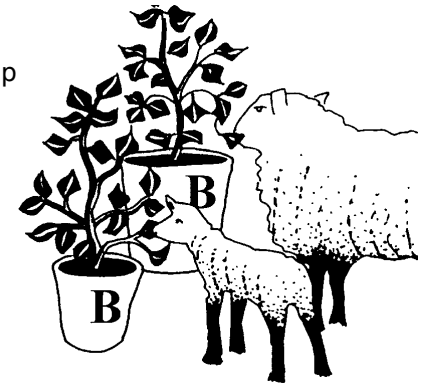
Mothers of the control group were not given lithium chloride treatment and fed from both bushes to the same extent.

The experimental group as well as the control group consisted of 18 ewe-lamb pairs. At the beginning of the experiment, all lambs were 6 weeks old.

Learning process:

For five days, mother and offspring were let into the experimental room once a day. For five minutes, they had access, first to five bushes of food type A and then access for five minutes to food type B (fig. 1, showing one of the food types). Each of the food types was presented in equal numbers. The number of bites from a bush was counted for both mother and lamb. Then, a 10-day break followed. The lambs were weaned and fed with a different type of food.

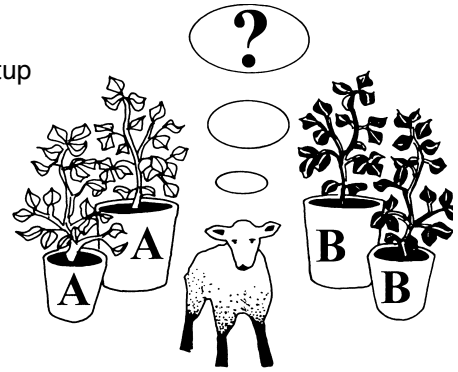
Figure 1:
Experimental setup during learning process.



Preference tests:

Once a day and for seven days, each lamb was let into the experimental room for a period of five minutes on his own. The room contained two bushes of each food type (fig. 2). The position of the plants was changed for each experiment. The frequency of bites from each food type was counted. Then, an eight-week break followed and different food was offered. The tests were repeated.

Figure 2:
Experimental setup during the preference tests.



Results: Learning process

Frequency of bites per bush per five-minute experiment.
(Mean taken from all animals and for each five experimental days.)

		Number of bites from food type A	Number of bites from food type B
Experimental group	Ewe	72	0
	Lamb	20	7
Control group	Ewe	80	57
	Lamb	26	19

Results: Preference tests

Frequency of bites from food type B in percentage of all bites.
(Mean from all lambs and seven experimental days.)

This means:
100% = total preference of food type B;
50% = no preference;
0% = total preference of food type A.

	First test	Second test
Lambs of the experimental group	7.5	9.7
Lambs of the control group	43.9	48.8

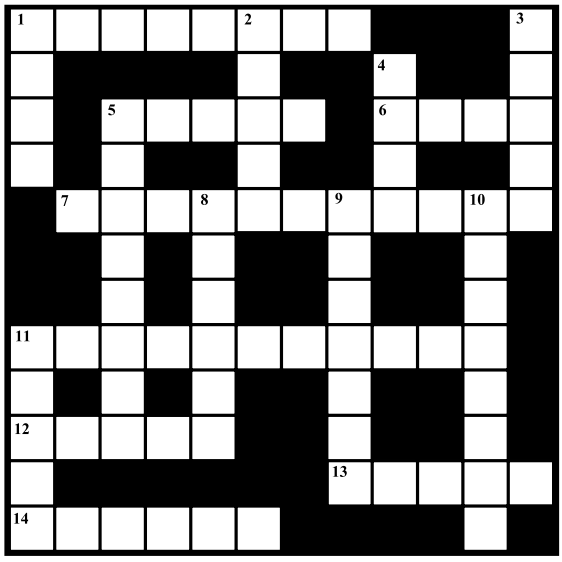
Task:

Analyze the results and draw conclusions with regard to the initial question.

Stimulus Response
Student Sheet 2

QUIZ

1. Which human action, shown in the video, illustrated that the reflex is an automatic reaction?
2. Give **two** or more examples, from the video, in which the behavioral needs of animals are not met in pens and cages.
3. What stimulates battery hens to lay more eggs?
4. In comparison to a newborn piglet, to what additional stimuli does a piglet react, two hours after birth, when searching for a teat?
5. Name **two** types of internal stimuli.
6. Which is the predominant sensory organ in (a) pigs and (b) hens?
7. In what situation did a chemical substance, released in the urine, cause a reaction (fear and readiness to run) in pigs?
8. Which animal was used to demonstrate that she reacts to separation from her offspring with searching and calling behavior?
9. What stimulus did the mother sheep use to successfully locate her offspring?
10. What senses did the mother sheep use to identify the lamb returned to her as her own offspring?
11. Suggest **one** reason that would explain why chickens perceive the world in a way different from us.
12. Learning processes play an important role in the coordination between a stimulus and a response during the establishment of learned reactions. What animals were used, and in what situations, to illustrate: (a) habituation, (b) classical conditioning, (c) trial-and-error learning, (d) observational learning.
13. Name **three** effectors.
14. What stimulated piglets, reared in otherwise barren indoor environments, to become less fearful and demonstrate their natural need for exploratory behavior?
15. Can you describe any well-known animal stereotypes other than those shown in the video?



Across

1. An input from the external world (8).
5. Coordination is the third one in the stimulus-response process (5).
6. What pigs use to communicate fear (4).
7. Scrambled “in trust for a” battery farmed animal’s experience (11).
11. The total context (11).
12. The first center for sensory information going into the brain (5).
13. Purvey around a thousand for doggy sense (5).
14. An unthinking reaction (6).

Down

1. Female pigs (4).
2. A major stimulus for egg-laying (5).
3. To do this is an alternative to responding by 13 across (5).
4. The smallest piglet (4).
5. The fundamental purpose of adaptation (8).
8. How 4 down appears, when reared free-range (6).
9. The video’s subject scrambled “in a slam” (7).
10. The chicken’s course is a mixed up “clot base” (8).
11. Some learning is by trial and this (5).

Primary senses

Most animals have one sense that is more important to them than their other senses. We often refer to this as their primary sense. In the video, three different species are discussed that have three different primary senses: chicken (vision), pig (smell), and sheep (hearing). Here is a list of other animals. Match them up to their primary sense:

bat, owl, monkey, pigeon, dog, snake, mole, rabbit, worm, shark

visual auditory olfactory gustatory tactile

Complete the missing words in the top line to name the five steps from a stimulus to a response:

Stimulus				**Response**
Seeing, hearing, smelling, tasting, touching.	Specialized part of the body that detects stimuli and has nerves that pass the impulses on toward the brain.	Reflexes versus learned reaction.	Muscles, glands (scent, sweat), color-sensitive cells.	Behavior that is visible from the outside, unless inner organs react (heart or glands) because of a change in physiological activity.

Correct this chart by selecting the appropriate animal and human examples, from columns 2 and 3, to illustrate each process named in column 1. *For example, (a) and (f) are not examples of a reflex.* Select, by letters, the two examples that are correct in each case.

Process (Column 1)	**Animal Examples** (Column 2)	**Human Examples** (Column 3)
Reflex **1**	Dog approaches his food bowl when hearing his owner handling the food box. **a)**	Craving chocolate when hearing someone else tearing open a chocolate wrapper. **f)**
Habituation **2**	Dog learns to open a door by jumping up at handle. (It is known that dogs do badly at learning by observation.) **b)**	Learning the basics of riding a bike: where to sit, how to pedal, how to steer. **g)**
Classical Conditioning **3**	Dog reacts less and less to a shouted order if ignoring the order has no relevant consequences for the dog. **c)**	Closing the eyes when an object approaches quickly. **h)**
Trial-and-Error Learning **4**	Birds learn quickly to search for food where other birds forage. **d)**	Keeping balance on a bike by shifting body weight and steering movements. **i)**
Observational Learning **5**	Dogs move their heads and prick their ears when hearing a sudden noise. **e)**	Children and adults react less and less to threats when ignoring them has never led to a consequence. **j)**