Lecture 2:

Modes of academic communication

Course 501

Writing and Communication Skills

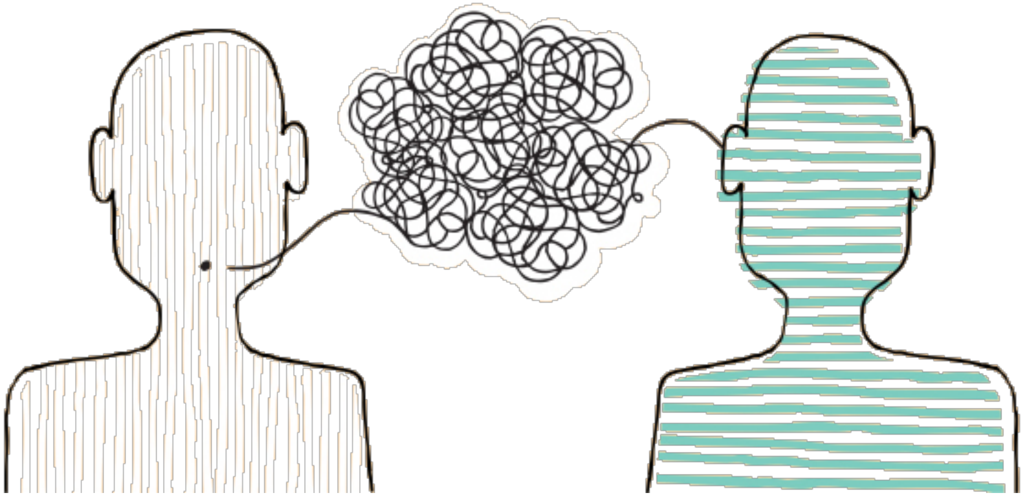
AIMS

- Learn the different forms of academic communication.

Modes communication

- Oral
- Visual
- Written

What are the goals of communication?



Inform

Teach

Persuade

Debate

Report

Document

Take home message!

لكل مقام مقال

Who are you communicating with?

The public

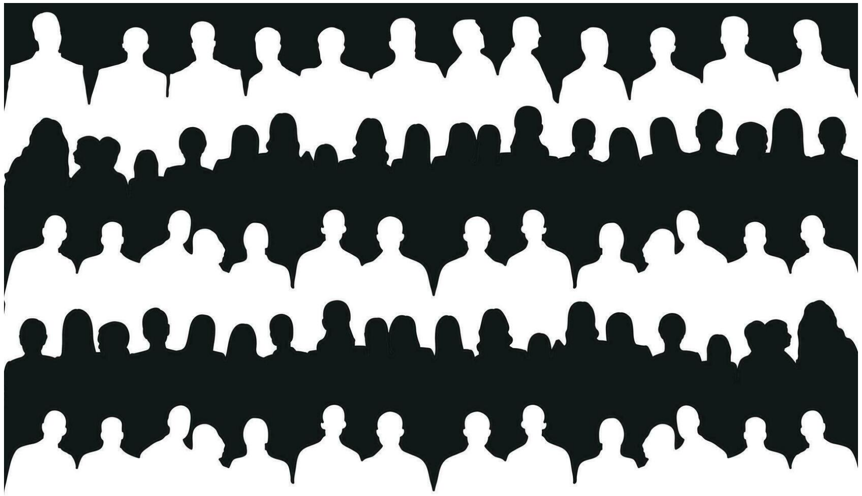
Educated

Specialists

Students

Teachers

Policy makers



Take home message!

خاطبوا الناس على قدر عقولهم

Oral communication

Poetry

Sermons

Speeches

Forums

Debates

Lectures

Poetry
Sermons
Speeches
Forums
Debates
Lectures

Poetry

Sermons

Speeches

Forums

Debates

Lectures

Poetry
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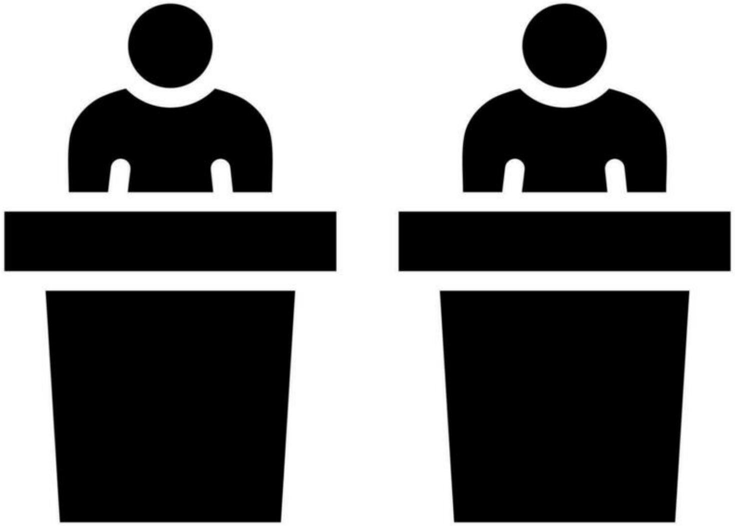
Speeches
Forums
Debates
Lectures

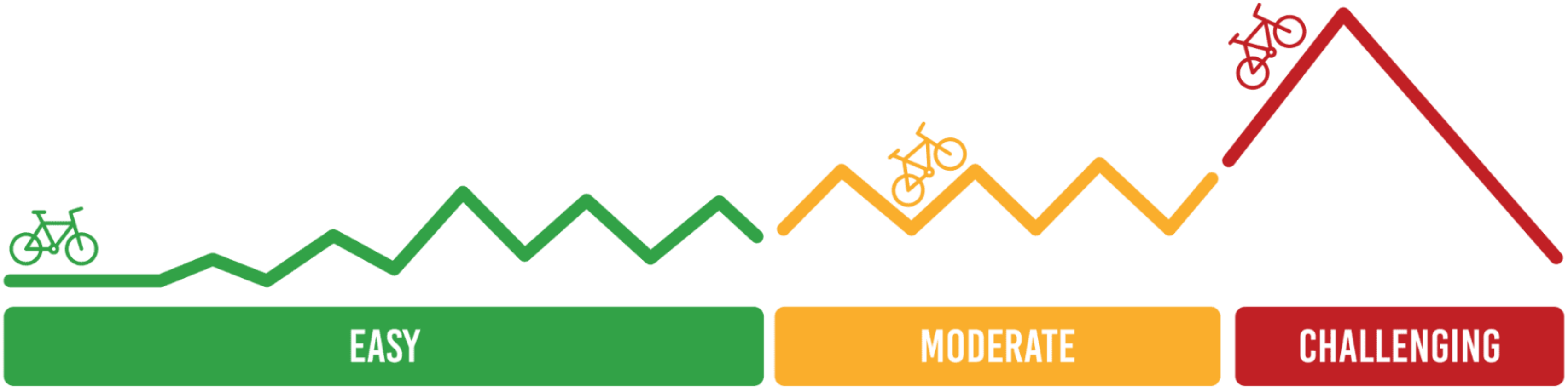


Poetry
Sermons
Speeches
Forums
Debates
Lectures

Poetry
Sermons
Speeches
Forums
Debates
Lectures

How hard?

How easy?



Visual communication

Sci Posters

Infographics

Documentaries

Videos

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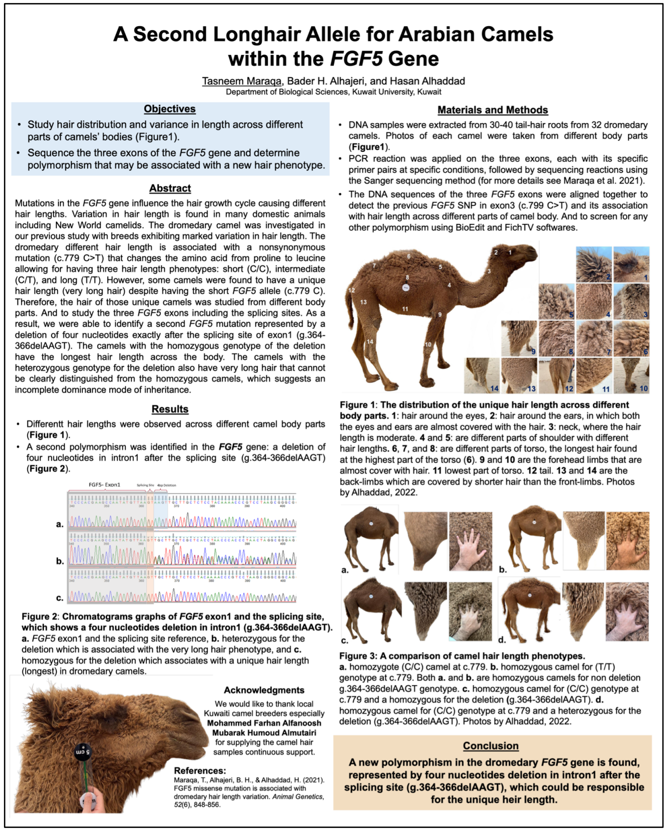
Youtube



A Second Longhair Allele for Arabian Camels within the *FGF5* Gene

Tasneem Maraqa, Bader H. Alhajeri, and Hasan Alhaddad
Department of Biological Sciences, Kuwait University, Kuwait

Objectives

- Study hair distribution and variance in length across different parts of camels' bodies (Figure1).
- Sequence the three exons of the *FGF5* gene and determine polymorphism that may be associated with a new hair phenotype.

Abstract

Mutations in the *FGF5* gene influence the hair growth cycle causing different hair lengths. Variation in hair length is found in many domestic animals including New World camelids. The dromedary camel was investigated in our previous study with breeds exhibiting marked variation in hair length. The dromedary different hair length is associated with a nonsynonymous mutation (c.779 C>T) that changes the amino acid from proline to leucine allowing for having three hair length phenotypes: short (C/C), intermediate (C/T), and long (T/T). However, some camels were found to have a unique hair length (very long hair) despite having the short *FGF5* allele (c.779 C). Therefore, the hair of those unique camels was studied from different body parts. And to study the three *FGF5* exons including the splicing sites. As a result, we were able to identify a second *FGF5* mutation represented by a deletion of four nucleotides exactly after the splicing site of exon1 (g.364-366delAAGT). The camels with the homozygous genotype of the deletion have the longest hair length across the body. The camels with the heterozygous genotype for the deletion also have very long hair that cannot be clearly distinguished from the homozygous camels, which suggests an incomplete dominance mode of inheritance.

Results

- Differentt hair lengths were observed across different camel body parts (**Figure 1**).
- A second polymorphism was identified in the ***FGF5*** gene: a deletion of four nucleotides in intron1 after the splicing site (g.364-366delAAGT) (**Figure 2**).

Figure 2: **Chromatograms graphs of *FGF5* exon1 and the splicing site, which shows a four nucleotides deletion in intron1 (g.364-366delAAGT).** **a.** *FGF5* exon1 and the splicing site reference, **b.** heterozygous for the deletion which is associated with the very long hair phenotype, and **c.** homozygous for the deletion which associates with a unique hair length (longest) in dromedary camels.

Acknowledgments

We would like to thank local Kuwaiti camel breeders especially **Mohammed Farhan Alfanoosh** **Mubarak Humoud Almutairi** for supplying the camel hair samples continuous support.

References:

Maraqa, T., Alhajeri, B. H., & Alhaddad, H. (2021). FGF5 missense mutation is associated with dromedary hair length variation. *Animal Genetics*, *52*(6), 848-856.

Materials and Methods

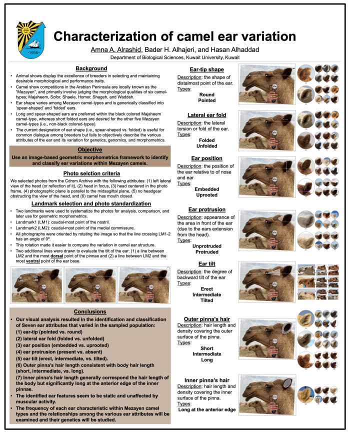
- DNA samples were extracted from 30-40 tail-hair roots from 32 dromedary camels. Photos of each camel were taken from different body parts (**Figure1**).
- PCR reaction was applied on the three exons, each with its specific primer pairs at specific conditions, followed by sequencing reactions using the Sanger sequencing method (for more details see Maraqa et al. 2021).
- The DNA sequences of the three *FGF5* exons were aligned together to detect the previous *FGF5* SNP in exon3 (c.799 C>T) and its association with hair length across different parts of camel body. And to screen for any other polymorphism using BioEdit and FichTV softwares.

Figure 1: **The distribution of the unique hair length across different body parts.** **1**: hair around the eyes, **2**: hair around the ears, in which both the eyes and ears are almost covered with the hair. **3**: neck, where the hair length is moderate. **4** and **5**: are different parts of shoulder with different hair lengths. **6**, **7**, and **8**: are different parts of torso, the longest hair found at the highest part of the torso (**6**). **9** and **10** are the forehead limbs that are almost cover with hair. **11** lowest part of torso. **12** tail. **13** and **14** are the back-limbs which are covered by shorter hair than the front-limbs. Photos by Alhaddad, 2022.

Figure 3: A comparison of camel hair length phenotypes. **a.** homozygote (C/C) camel at c.779. **b.** homozygous camel for (T/T) genotype at c.779. Both **a.** and **b.** are homozygous camels for non deletion g.364-366delAAGT genotype. **c.** homozygous camel for (C/C) genotype at c.779 and a homozygous for the deletion (g.364-366delAAGT). **d.** homozygous camel for (C/C) genotype at c.779 and a heterozygous for the deletion (g.364-366delAAGT). Photos by Alhaddad, 2022.

Conclusion

A new polymorphism in the dromedary *FGF5* gene is found, represented by four nucleotides deletion in intron1 after the splicing site (g.364-366delAAGT), which could be responsible for the unique heir length.



Characterization of camel ear variation

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Background

- Animal shows display the excellence of breeders in selecting and maintaining desirable morphological and performance traits.
- Camel show competitions in the Arabian Peninsula are locally known as the "Mezayen", and primarily involve judging the morphological qualities of six camel-types; Majaheem, Sofor, Shaele, Homor, Shageh, and Waddeh.
- Ear shape varies among Mezayen camel-types and is generically classified into 'spear-shaped' and 'folded' ears.
- Long and spear-shaped ears are preferred within the black colored Majaheem camel-type, whereas short folded ears are desired for the other five Mezayen camel-types (i.e., non-black colored-types).
- The current designation of ear shape (i.e., spear-shaped vs. folded) is useful for common dialogue among breeders but fails to objectively describe the various attributes of the ear and its variation for genetics, genomics, and morphometrics.

Objective

Use an image-based geometric morphometrics framework to identify and classify ear variations within Mezayen camels.

Photo selction criteria

We selected photos from the Cdrom Archive with the following attributes: (1) left lateral view of the head (or reflection of it), (2) head in focus, (3) head centered in the photo frame, (4) photographic plane is parallel to the midsagittal plane, (5) no headgear obstructing the view of the head, and (6) camel has mouth closed.

Landmark selection and photo standardization

- Two landmarks were used to systematize the photos for analysis, comparison, and later use for geometric morphometrics.
- Landmark1 (LM1): caudal-most point of the nostril.
- Landmark2 (LM2): caudal-most point of the medial commissure.
- All photographs were oriented by rotating the image so that the line crossing LM1-2 has an angle of 0º.
- This rotation made it easier to compare the variation in camel ear structure.
- Two additional lines were drawn to evaluate the tilt of the ear: (1) a line between LM2 and the most **dorsal** point of the pinnae and (2) a line between LM2 and the most **ventral** point of the ear base.

Conclusions

- **Our visual analysis resulted in the identification and classification of Seven ear attributes that varied in the sampled population:**
  (1) ear-tip (pointed vs. round)
  (2) lateral ear fold (folded vs. unfolded)
  (3) ear position (embedded vs. uprooted)
  (4) ear protrusion (present vs. absent)
  (5) ear tilt (erect, intermediate, vs. tilted).
  (6) Outer pinna's hair length consistent with body hair length (short, intermediate, vs. long).
  (7) Inner pinna's hair length generally correspond the hair length of the body but significantly long at the anterior edge of the inner pinnae.
- **The identified ear features seem to be static and unaffected by muscular activity.**
- **The frequency of each ear characteristic within Mezayen camel types and the relationships among the various ear attributes will be examined and their genetics will be studied.**

Ear-tip shape

Description: the shape of distalmost point of the ear.
Types:
Round
Pointed

Lateral ear fold

Description: the lateral torsion or fold of the ear.
Types:
Folded
Unfolded

Ear position

Description: the position of the ear relative to of nose and ear
Types:
Embedded
Uprooted

Ear protrusion

Description: appearance of the area in front of the ear (due to the ears extension from the head).
Types:
Unprotruded
Protruded

Ear tilt

Description: the degree of backward tilt of the ear
Types:
Erect
Intermediate
Tilted

Outer pinna's hair

Description: hair length and density covering the outer surface of the pinna.
Types:
Short
Intermediate
Long

Inner pinna's hair

Description: hair length and density covering the inner surface of the pinna.
Types:
Long at the anterior edge

Phenotypes of Mezayen (مزاين) Camel-types

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Department of Biological Sciences, Kuwait University, Kuwait

- The Cdrom Archive camel biobank consists of tail-hair samples (384) that are accompanied with detailed phenotypic and pedigree information and is organized in a unified format using the SampleEase smartphone application.
- The Cdrom Archive currently contains Arabian Peninsula camel-types generally described as 'Mezayen' (مزاين), which includes Majaheem مجاهيم (28), Sofor صفر (87), Shaele شعل (142), Homor حمر (12), Shageh شقح (12), and Waddah وضح (85).
- Our scientific approach towards investigating the molecular basis of camel phenotypes is to:
  1. **Identify and characterize heritable phenotypes.**
  2. **Select candidate gene(s) identified as being responsible for similar phenotypes in other animals.**
  3. **Sequence the candidate gene(s) using samples of individuals that are positive and negative for the phenotype.**
  4. **Examine genotype-phenotype concordance.**
  5. **Genotype concordant variants across a large number of samples.**
  6. **Test the segregation of variants and phenotypes in pedigrees.**
- **Coat Texture:** hair texture of Mezayen camel coats comes in two varieties, straight (118) and curly (185), the latter appears as rings, especially in the torso region. **Candidate gene:** *KRT71*, which encodes for *Keratin* that is expressed in the inner root sheath of the hair follicle.
- **Syrupy-Sofor:** Syrupy-Sofor (50) is a distinct sub-type of Sofor camels and marked by a unique darker coat color pigmentation at only body extremities such as: withers, upper neck, dorsal footpad, nails, and the tip of the hump and the tail. **Candidate gene:** *TYR*, which encodes for *Tyrosinase* that is expressed in melanosomes and catalyses the production of melanin and other pigments from tyrosine by oxidation.
- **Waddah Skin Color:** The Waddah camel-type is sub-classified into pink (24) and dark (20) according to their skin color, which can be seen in the mouth, udders, nails, and footpad. **Candidate gene:** *KIT*, which encodes a *tyrosine kinase receptor* that is involved in the development of erythrocytes, melanocytes, germ cells, mast cells, and interstitial cells of Cajal. In camels, c.1842delG variant results in a frameshift and leads to a premature stop codon. The variant is associated with white-spotting in piebald camels (Holl et al., 2017).
- **Brown Coat Color:** Mezayen camel breeders further classify their major six camel-types into sub-types based on the tone of their coat color. This specific classification allows for better phenotyping and better differentiation and identification of responsible causing variants. Eleven Mezayen sub-types differ from one another in the darkness and the 'brownness' of the coat. **Candidate gene:** *MC1R*, which encodes for the *melanocortin 1 receptor* for melanocyte-stimulating hormone on the surface of melanocytes. The gene is predominantly expressed in dark coat colors.
  Candidate gene: *ASIP*, which encodes *agouti signaling protein* that acts as an inverse agonist at melanocortin receptors. In camels, missense mutation c.901C > T (p.Arg301Cys) is associated with light coat color (Almathen et al., 2018).
  Candidate gene: *TYRP1*, which encodes for a melanosomal *tyrosinase-related protein 1*. In camels, c.23T_del and c.25A > G are both associated with black coat color (Qureshi et al., 2008).

Curly vs. Straight Coat

Syrupy-Sofor Color (لون الصفر الدباسية)

Black vs. Pink Skin Color

Brown Coat Color Variation

Multi-generational pedigree of several camel-types where multiple phenotypes are segregating. The camels are bred and maintained by Mr. Mubarak Humoud Almutairi in Abdili, Kuwait.

Thanks to the following Kuwaiti camel breeders:

References:

- Holl et al. (2017). A Frameshift Mutation in KIT is Associated with White Spotting in the Arabian Camel. *Genes* 8(3): 102.
- Almathen et al. (2018). Polymorphisms in MC1R and ASIP Genes are Associated with Coat Color Variation in the Arabian Camel. *J Hered* 109(6):700-706.
- Qureshi et al. (2008). Differentiation of six Pakistani camel breeds by molecular genetics analysis. *ICAR 2008 Satellite Meeting on Camelid Reproduction* pp. 61–65.

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KUWAIT VISION 2035

PREPARING FOR A NEW ERA

The **total population** of **Kuwait** is 4,644,384 as of **June 2023**.

The **population growth** rate of **Kuwait** was 0.97% in the fiscal year from **July 2022-June 2023.**

The **total GDP** of the **country is** US$165 billion, and the **GDP per capita** is US$33,650.

The **debt** to **GDP ratio** of **Kuwait** is 30% as of **June 2023**.

US$165 B

The **total exports** of **Kuwait** in the **fiscal year** from **July 2022 - June 2023** was approximately US$104 billion.

The **total imports** of **Kuwait** in the **fiscal year** from **July 2022 - June 2023** was approximately US$35 billion.

US$3.2 B

Kuwait's annual digital **transformation** spending is expected to **increase at a five-year** CAGR of almost **7.5%** to US$3.2bn by **2027.**

83

Kuwait ranks 83 out of **190** countries in the **Ease of Doing Business Index** 2023, with a **Gini coefficient** of 52.9, underpinning the fact that **Kuwait** ranks **above average** in terms of **happiness** and **quality of life**.

Vision 2035's aim is to reach the top 30th percentile on **global indicators** by 2025 and top 20th percentile by 2035.

Tourism in Kuwait has increased to a **significant level** to reach an yearly mark of 150,000 as of **fiscal year 2023**.

35

Kuwait aims to achieve a ranking in the top 35 percent on **KPIs** across the **seven pillars** stated in the **Vision 2035** framework.

77

Kuwait ranks 77 out of **157 countries**, which is **low** compared to countries of **equal income level.**

Vision 2035 aims to revitalize the economy through the following measures

Economy

Develop a **prosperous** and **diversified economy** by initiating 3,500+ new small businesses in the country to aim to **reduce dependency on oil exports.**

3500+

Education

40,000+

Increase in New Colleges by 1**3+ institutions** and 40,000+ students across all schools, colleges and universities to **foster educational growth and sustainability.**

Global Position

Enhancement of **Kuwait's GDP** by 1.5% and increase in global **presence**, **diplomacy**, **trade culture** and **philanthropy**.

1.5% INCREASE

Health Care

8000+

Improve **service quality, medical care** and **projected** increase by 8,000+ **hospital beds.**

Living Environment

Increase **environmentally sound resources** and **tactics** by a **projected increase** of 15% in **Renewable Energy resources**.

15% INCREASE

Infrastucture

11% INCREASE

Develop and **modernize** the **national infrastructure** by an **Investment increase** by 11% to enhance the **quality of life** of all **citizens** and **residents** of the country.

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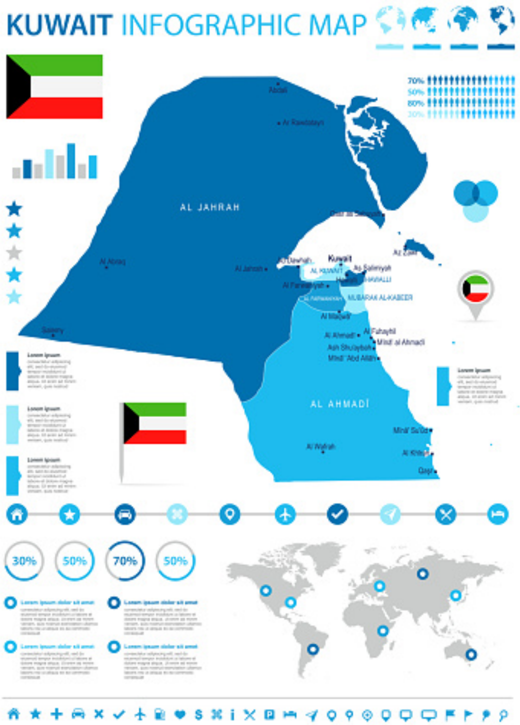

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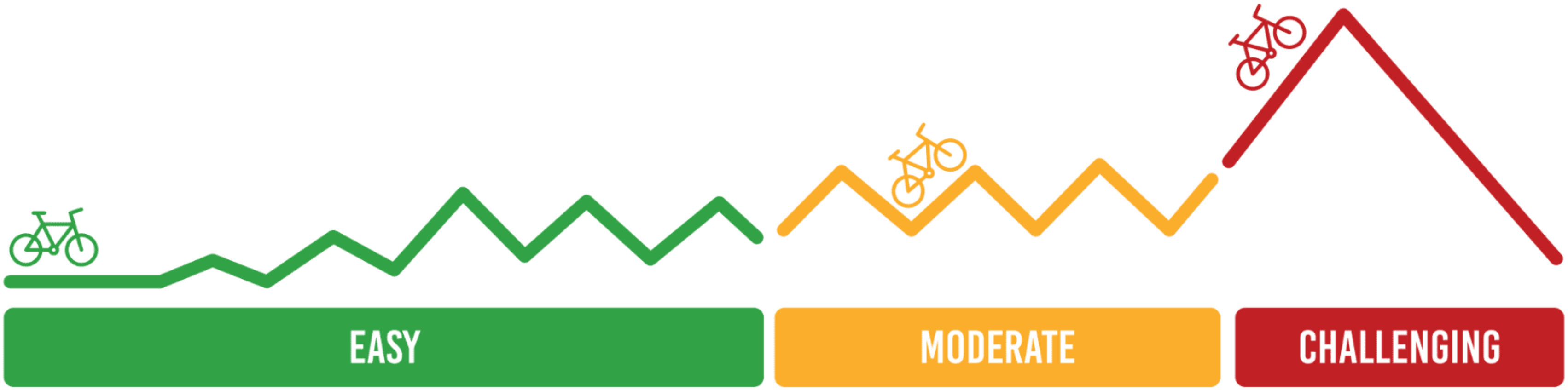
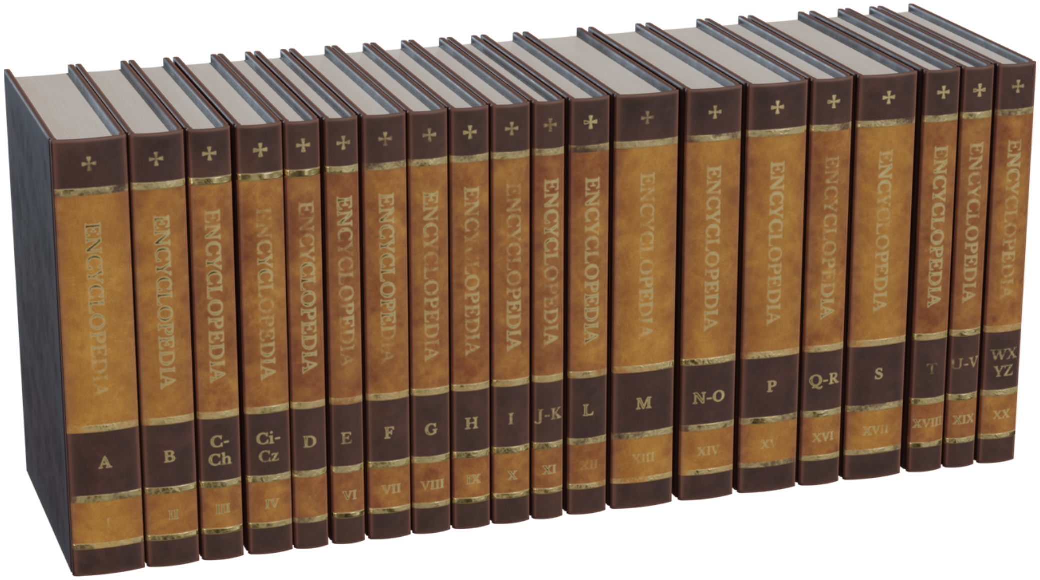
How easy?



Written communication



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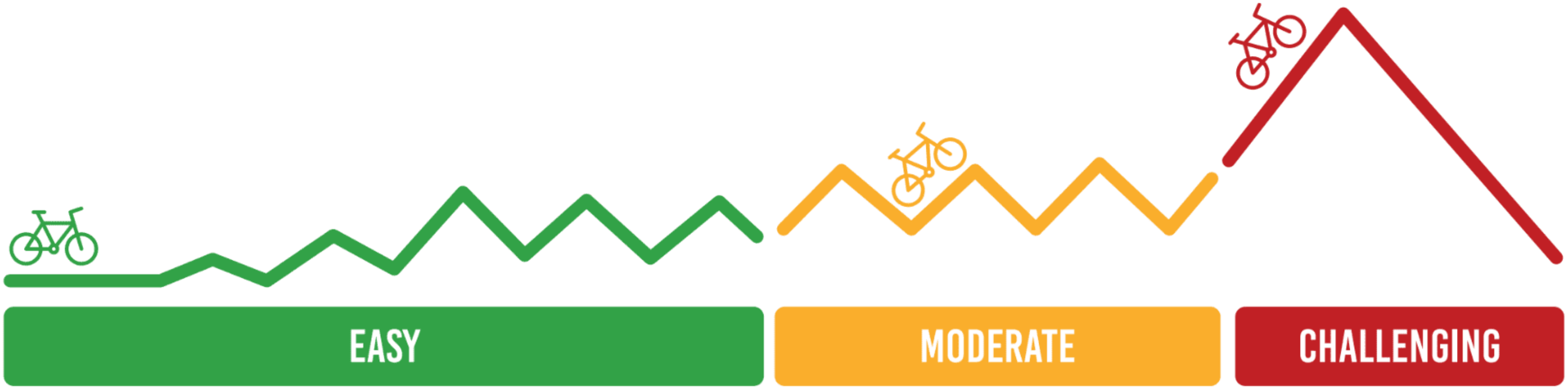

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Target

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