Rijkswaterstaat
Ministry of Infrastructure and Water Management

Determining the requirement for berths on the Rhine

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This presentation

- Need to determine the requirement
- Formula
- How it works…
- Q&A

Need to determine the requirement

- Every country and every river sector is different
- But the need for berths for the navigation industry is uniform
- Plenty of discussion… “not enough berths between A and B”
- No objective criteria… yet → first step by German & Dutch delegations
- BUT: → not an exact science

  → local conditions play an important role

  → (spatial) planning permits, Natura 2000 & WFD

Formula

- Formula $N = I_d \times A_r \times A_c$

  N = number or berths required

  I_d = daily intensity of traffic → how many ships pass through in a day
  → ignore ships with 24/7 operation

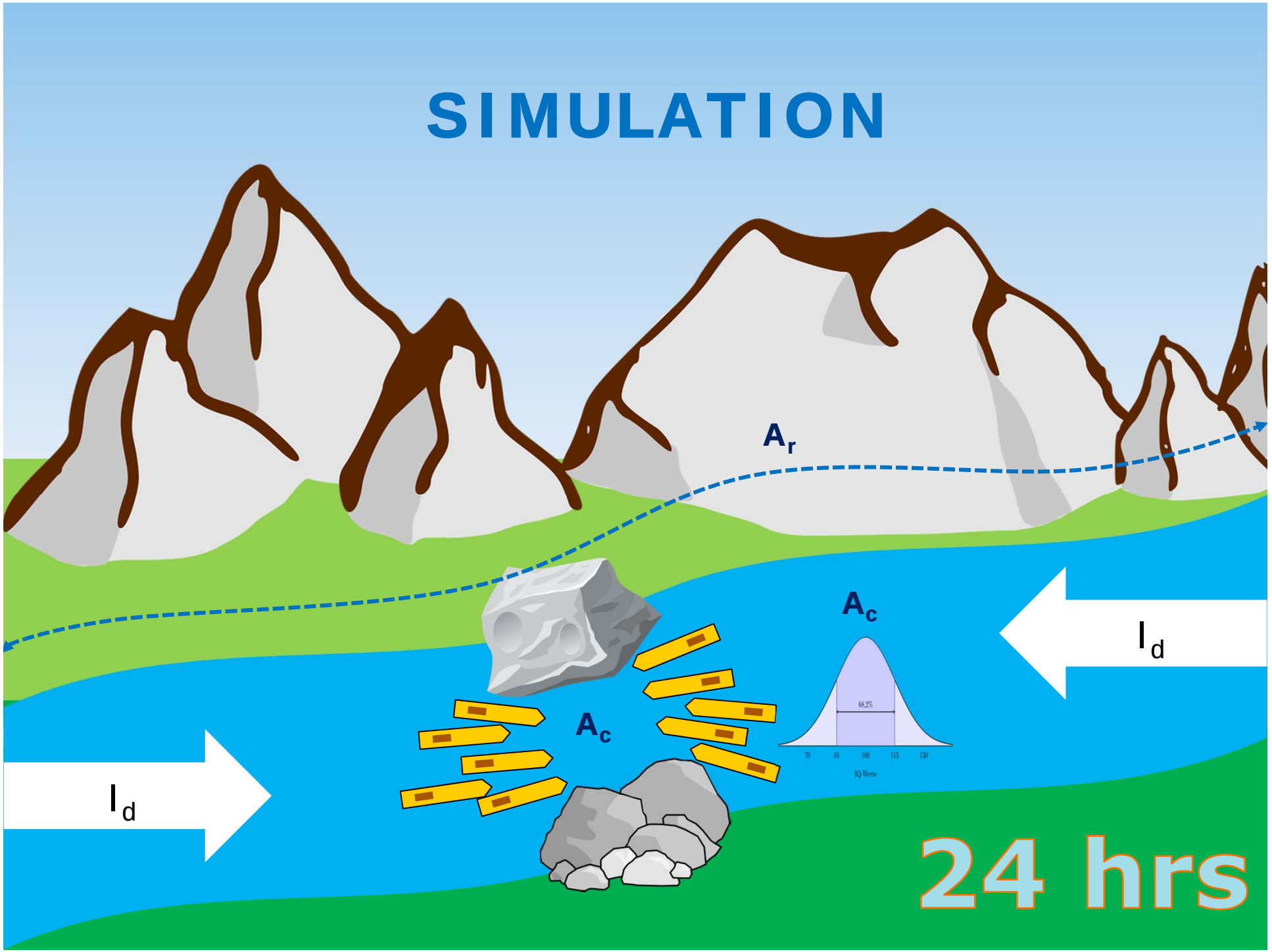
  A_r = retention factor: $A_r = \frac{Time\ required\ to\ pass\ trough\ sector}{Daily\ navigation\ time}$ → 16 or 18 h/day

  $Passthrough\ Time = \frac{sector\ lenght}{average\ speed}$ → 10 km/h

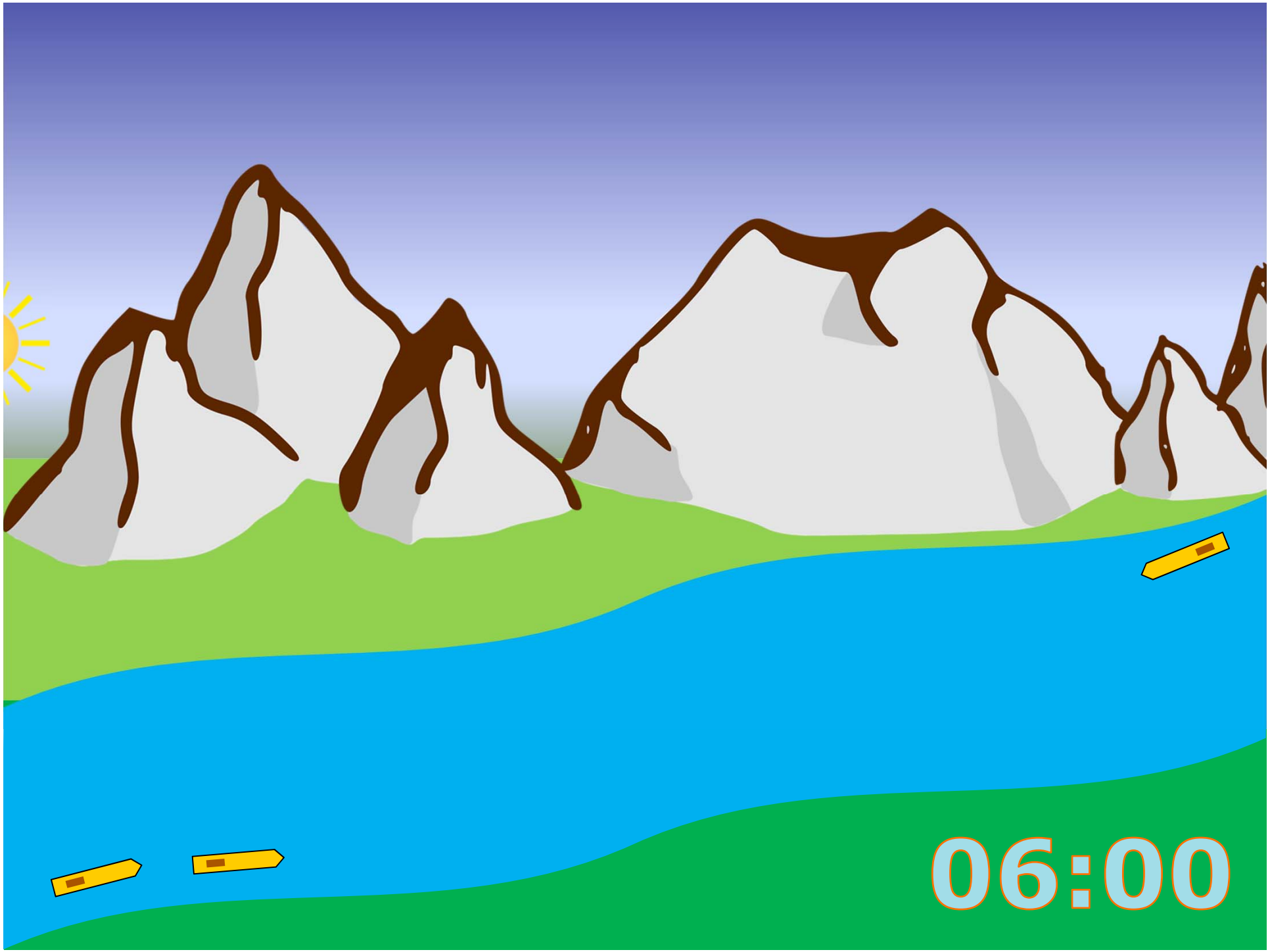
  A_c = correction factor for congestion & peak loads
  more congestion = more berths, so $A_c > 1{,}0$
  but also: plan for 100% coverage? Or 95%? ➔ $A_c < 1{,}0$

How it works

- Count the number of ships per day at a fixed point
- Ask shipping industry about average navigation hours (16/18/24 hrs)
- Calculate pass-through time & retention factor
- Estimate congestion factor


SIMULATION
A_r
A_c
I_d
A_c
I_d
68,2%
70
85
100
115
130
IQ-Werte
24 hrs


03:00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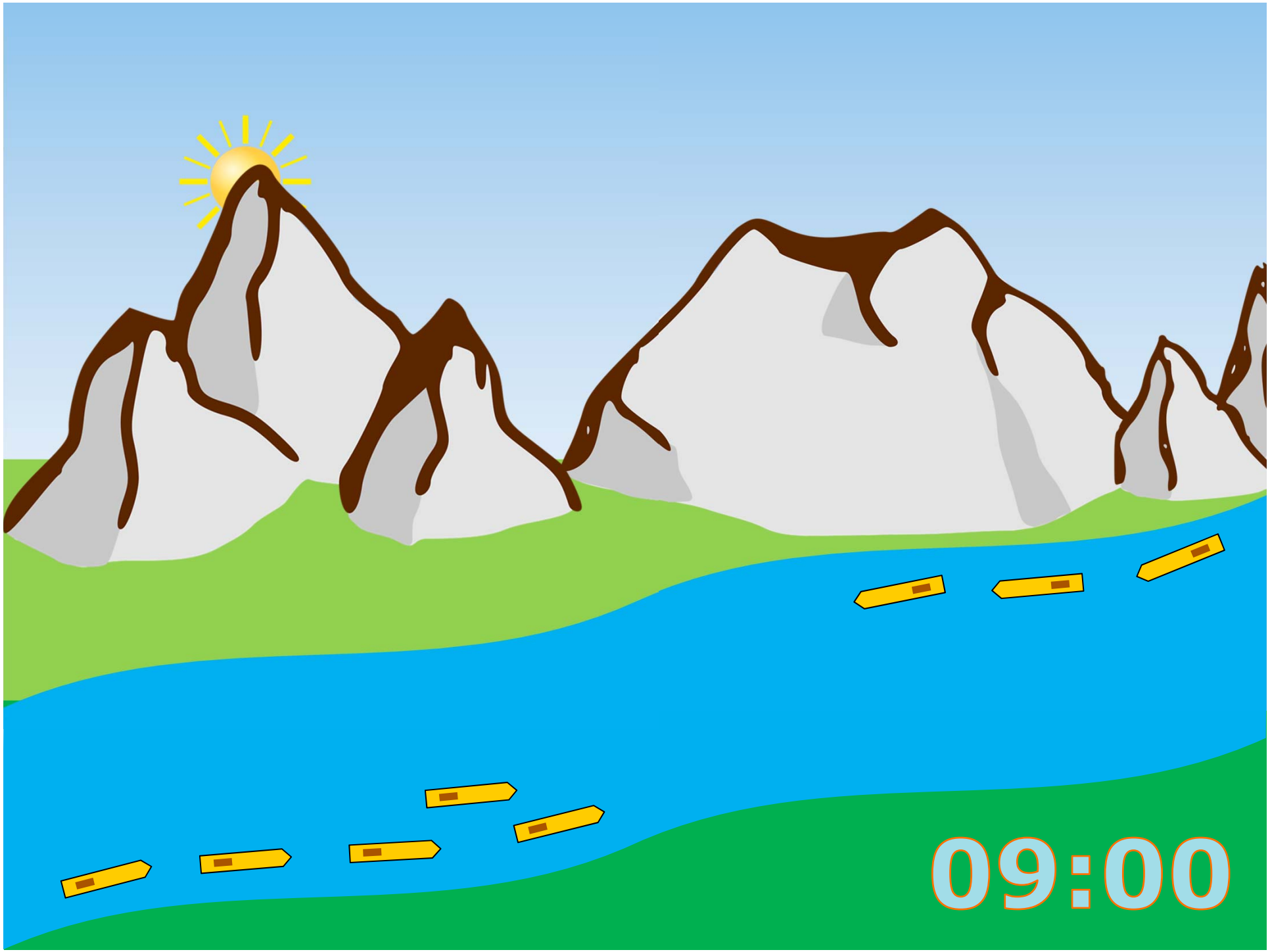
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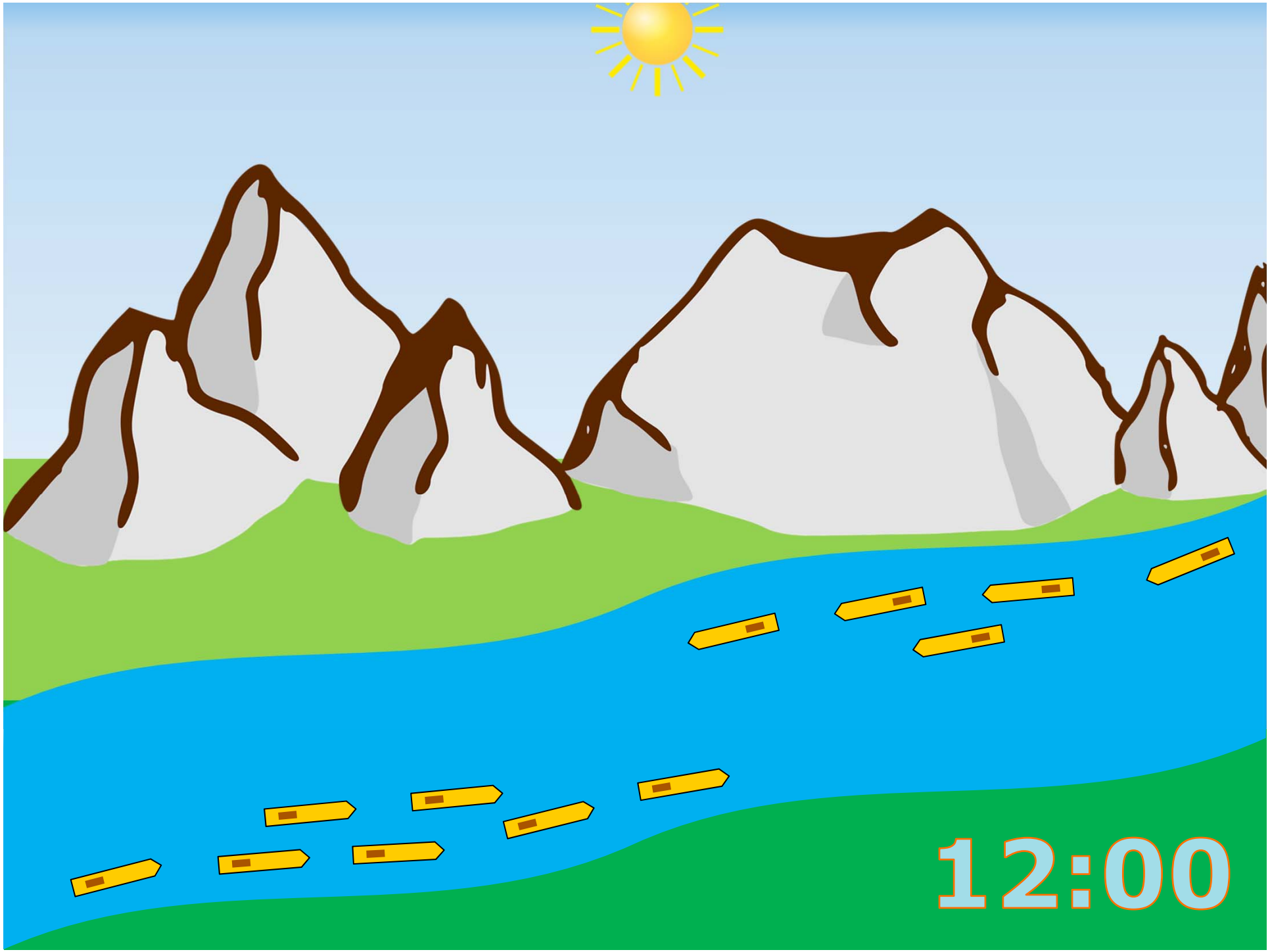
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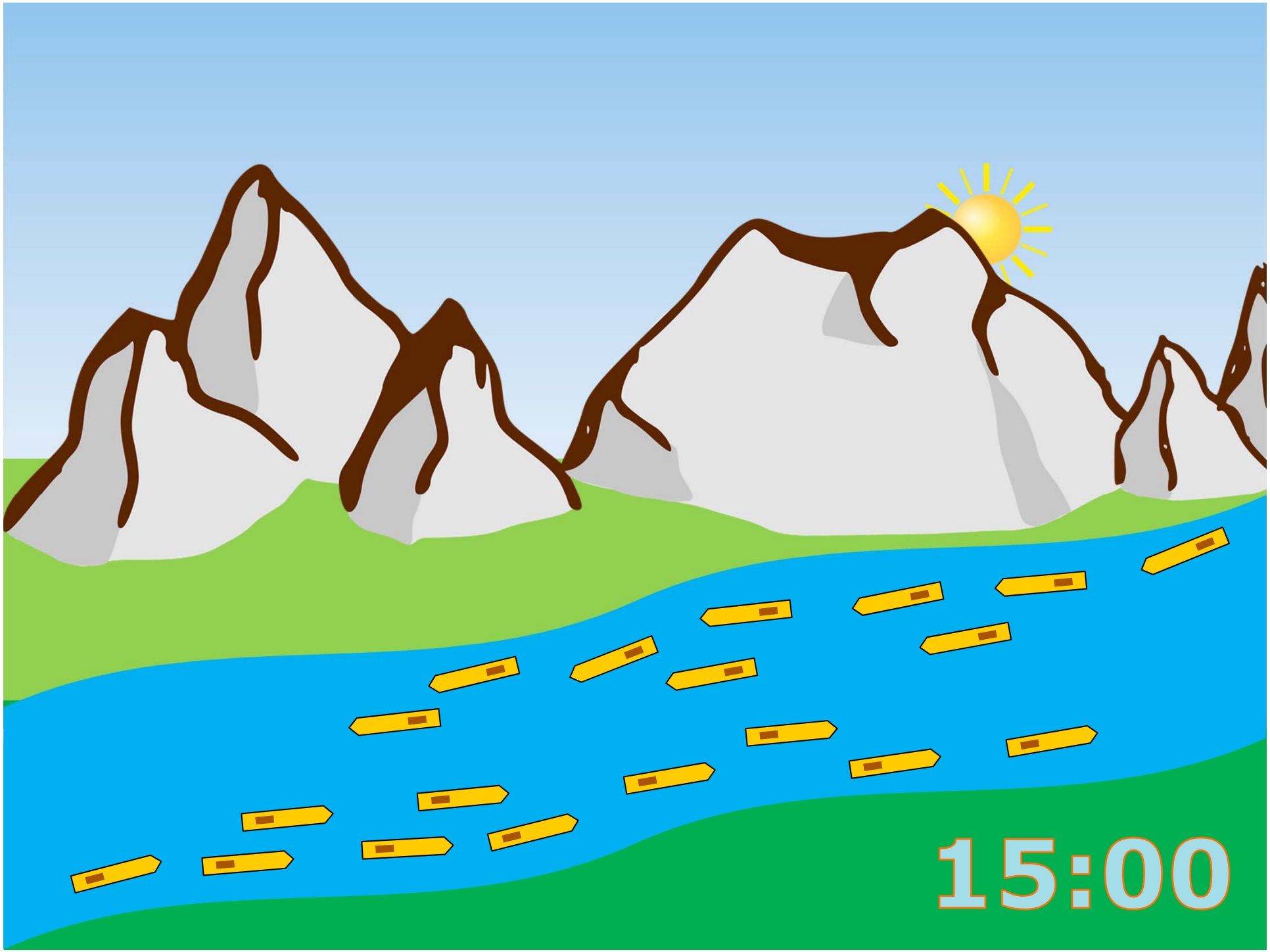
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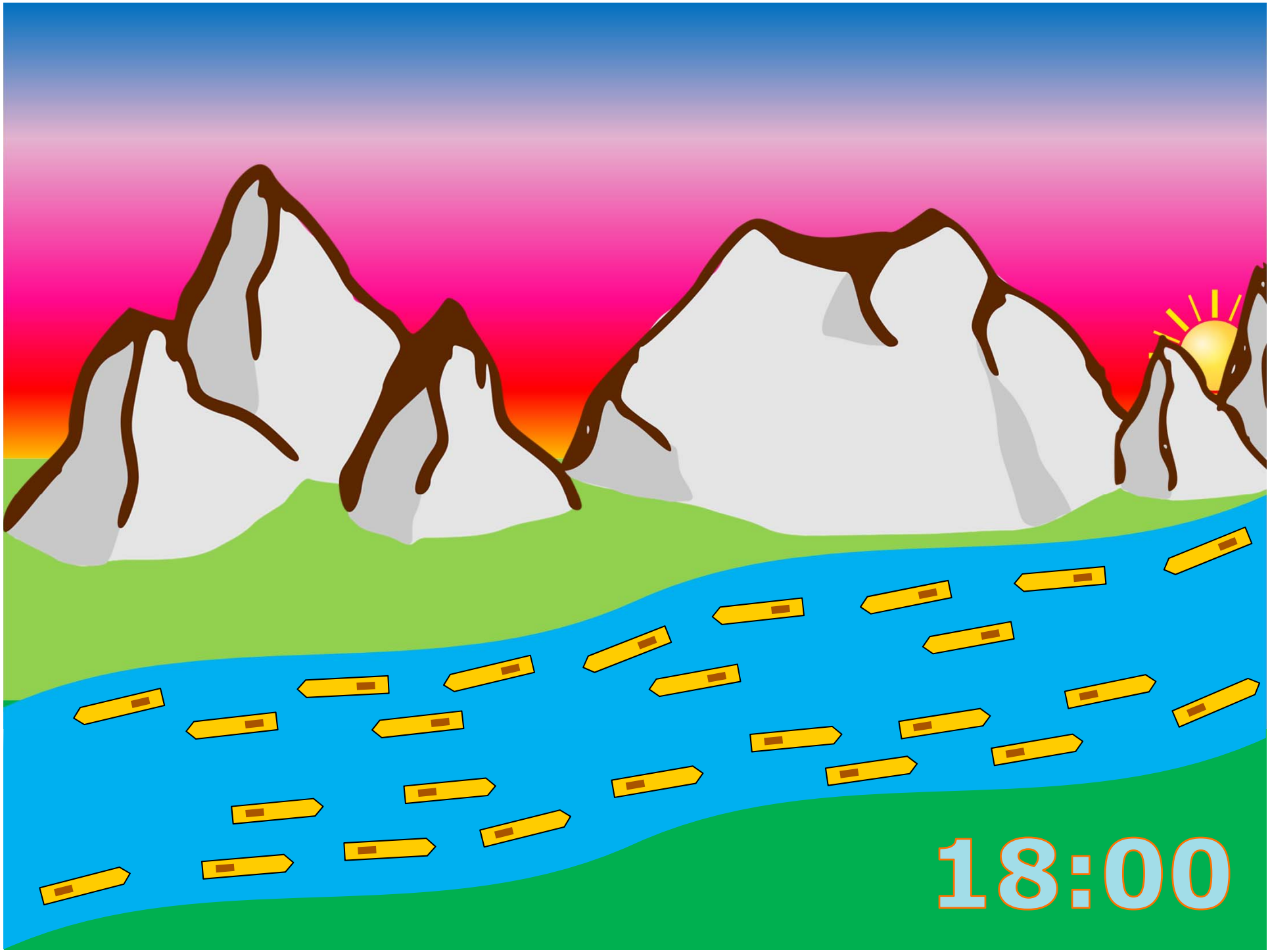
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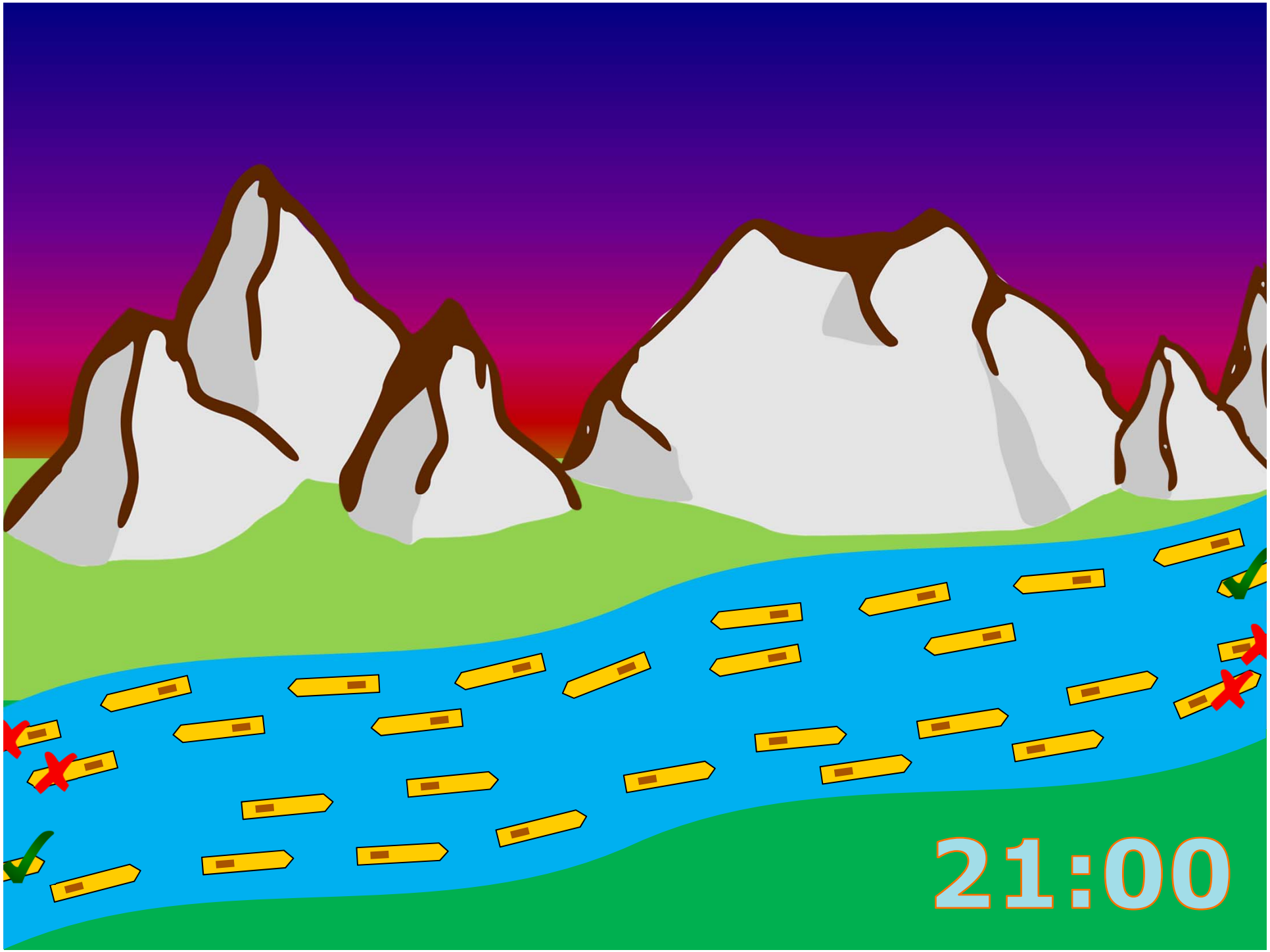
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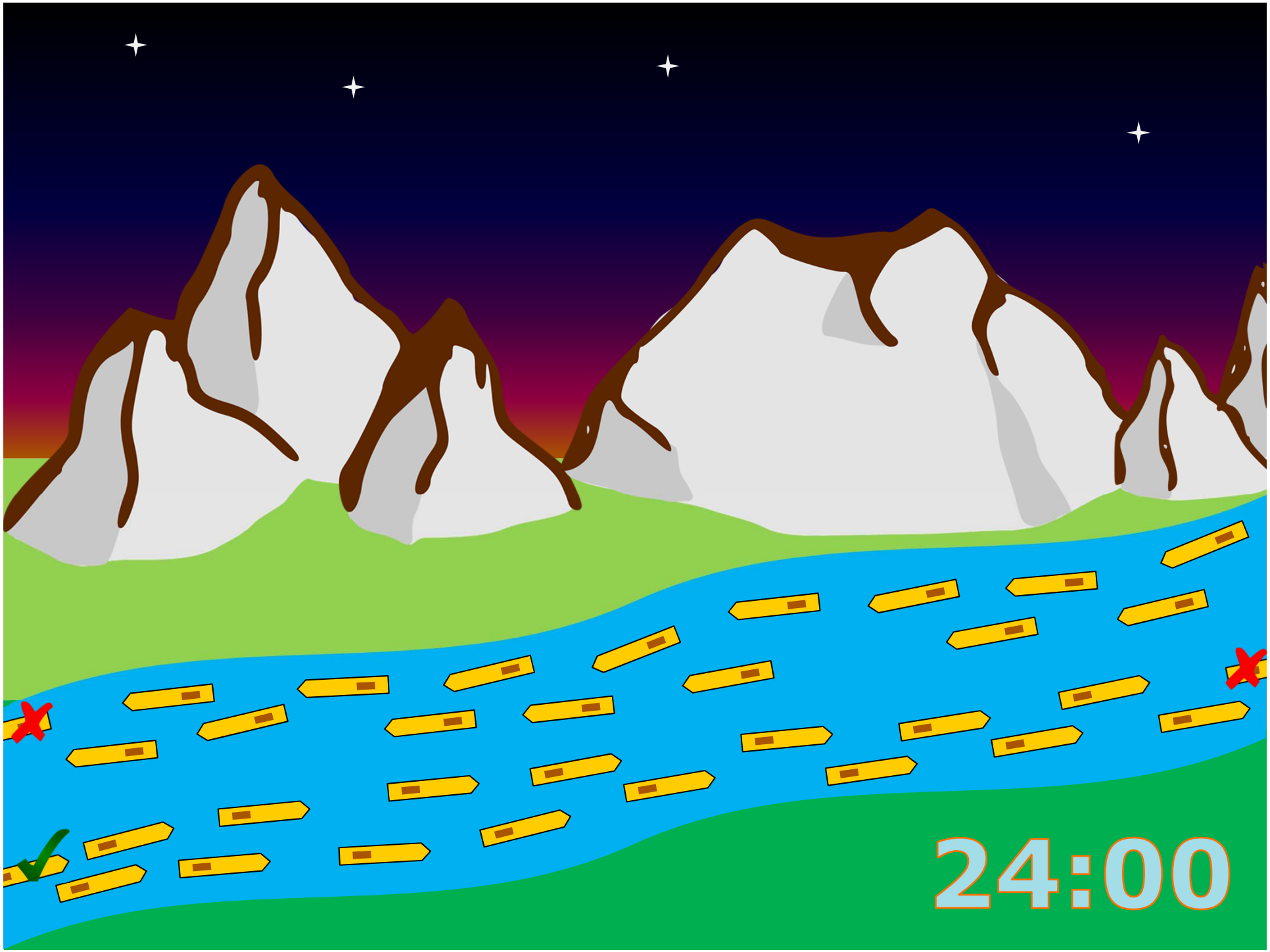
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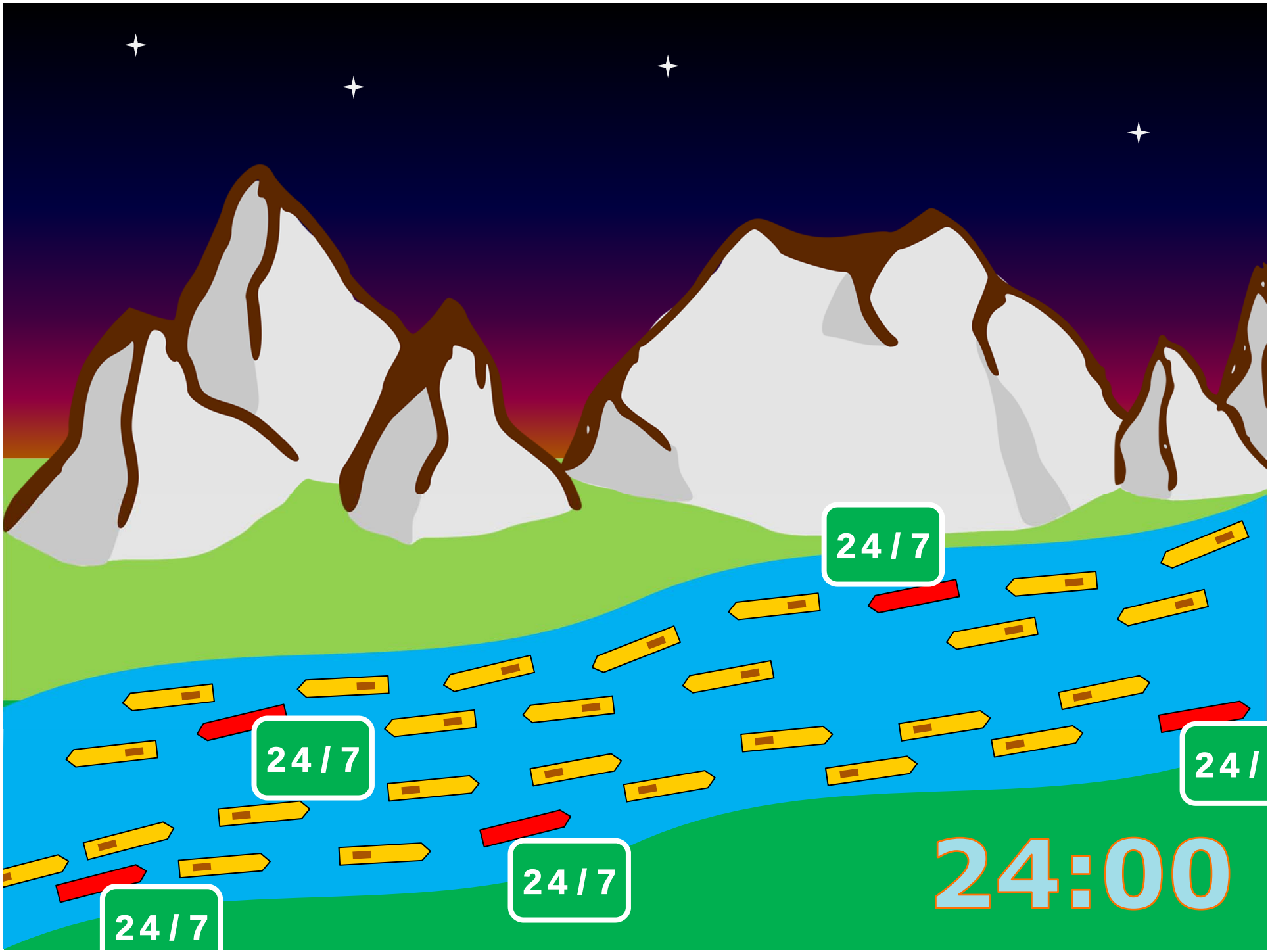
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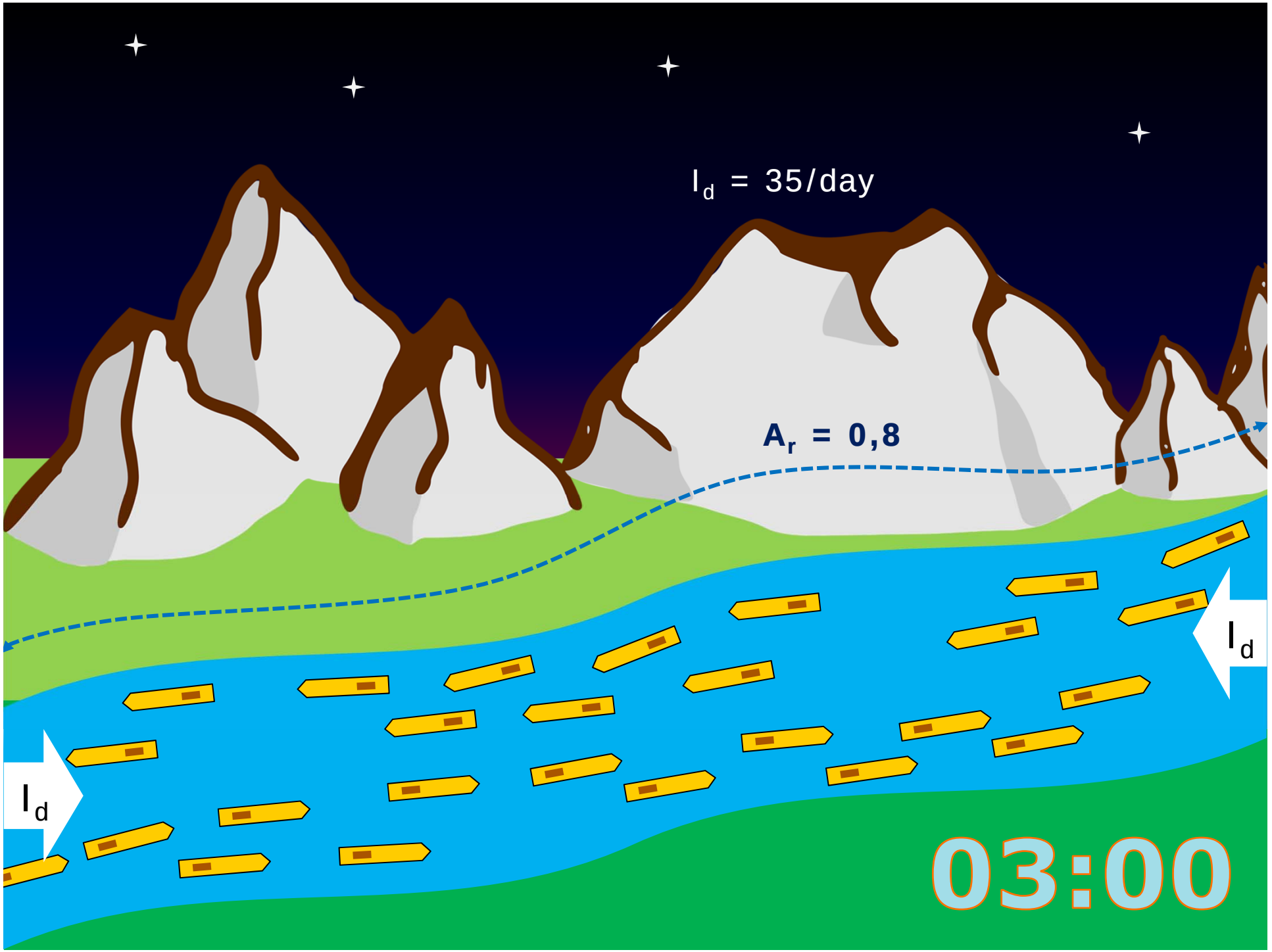
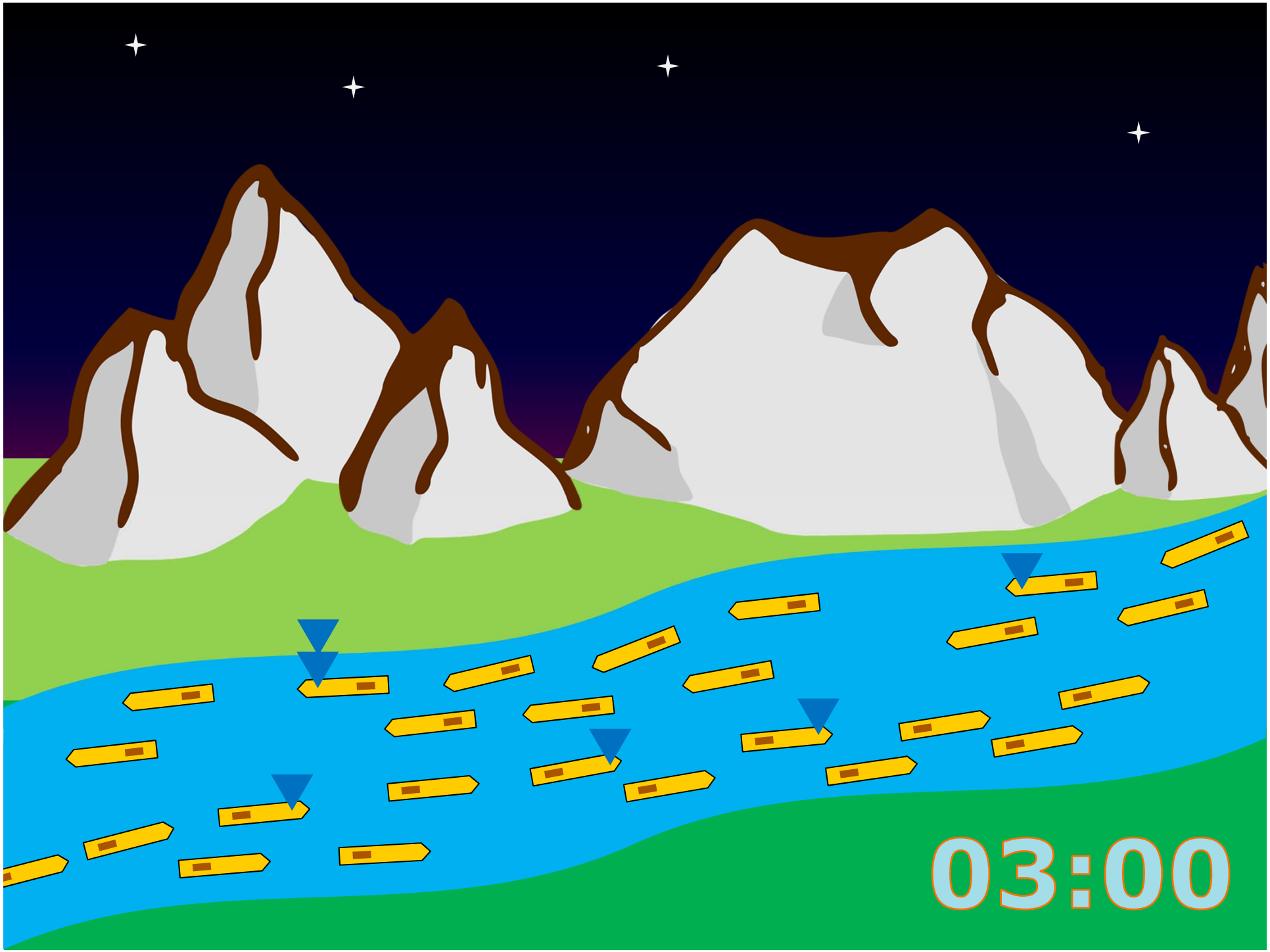

I_d = 35/day
A_r = 0,8
I_d
I_d
03:00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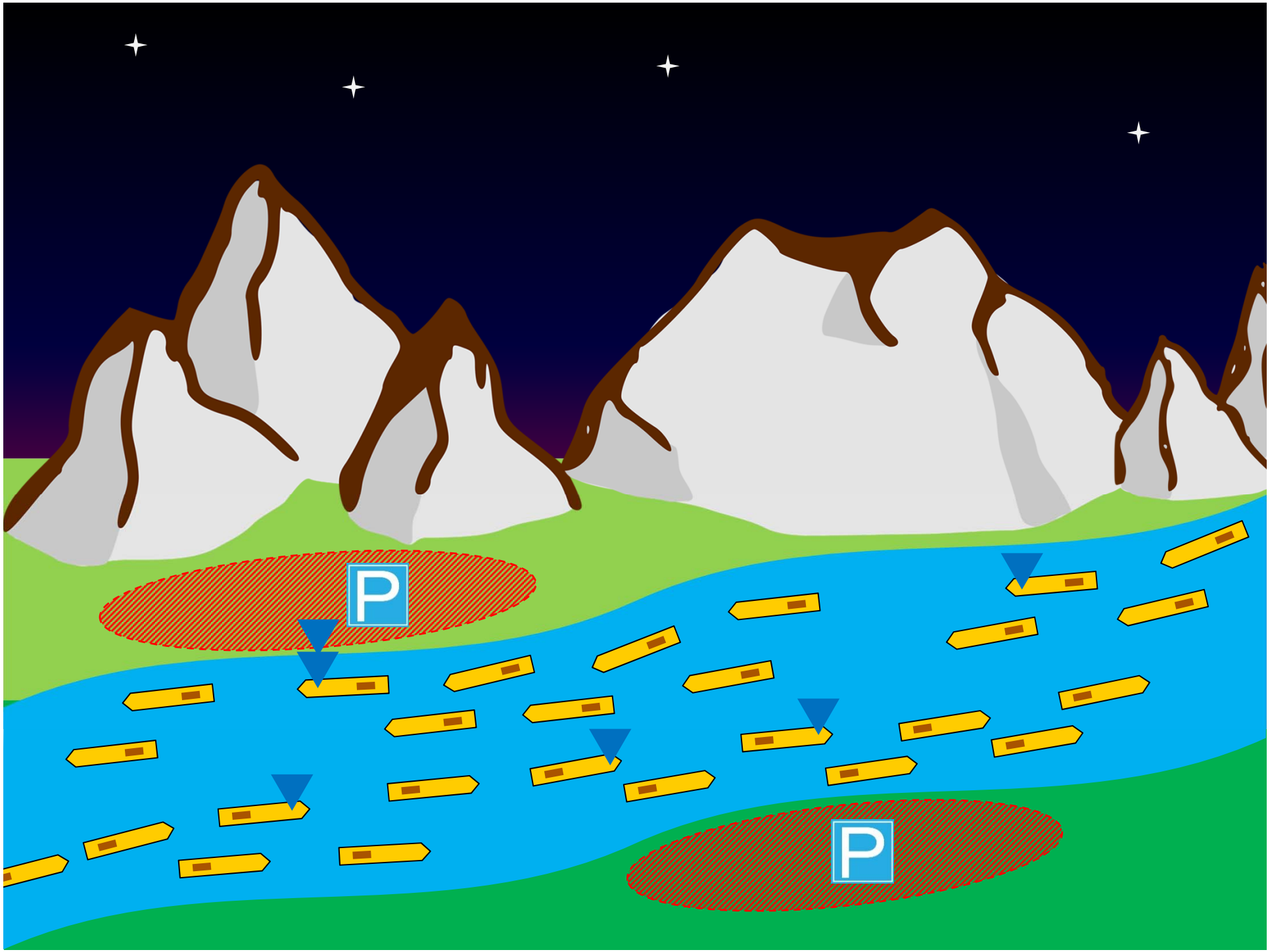
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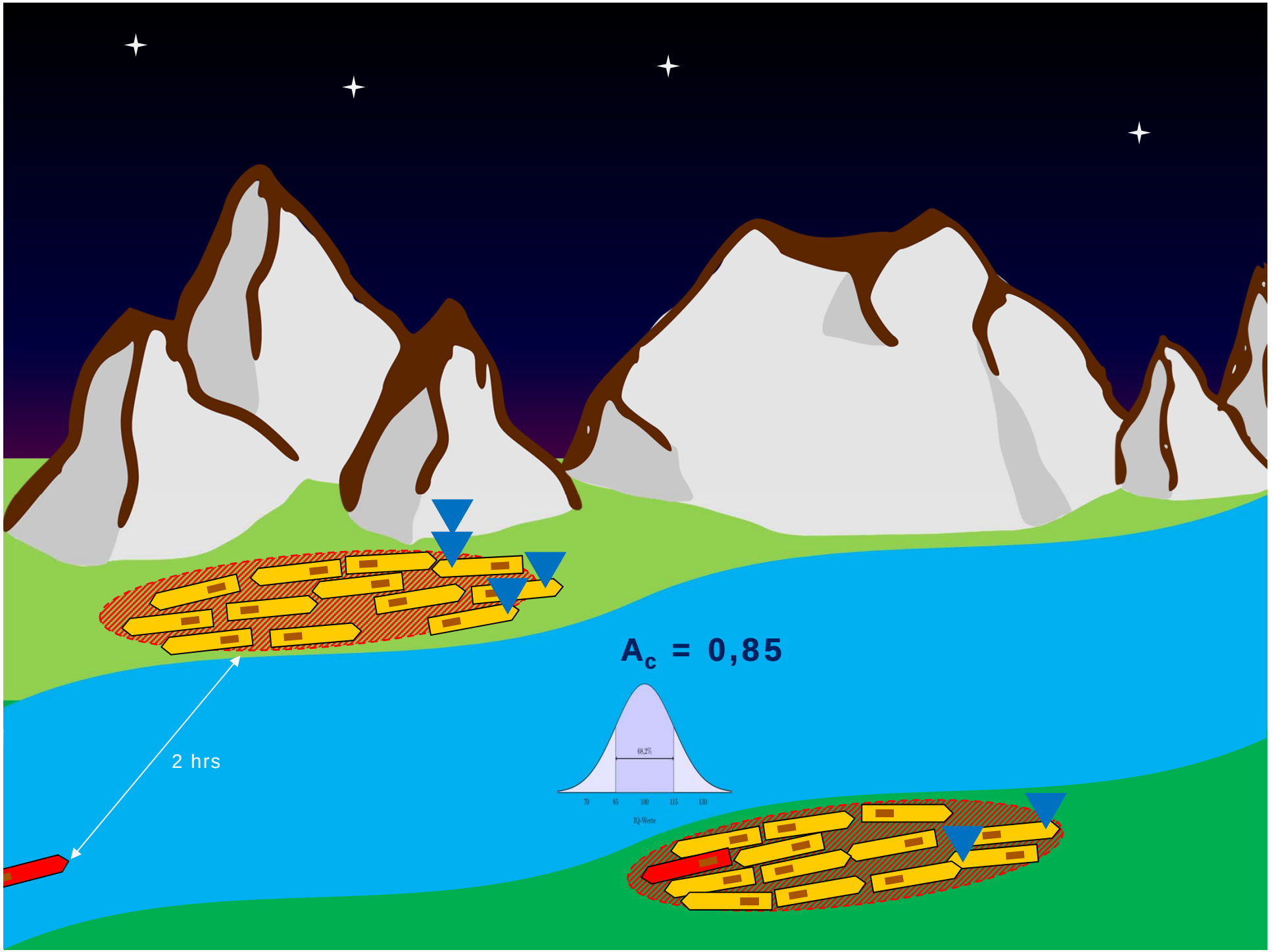
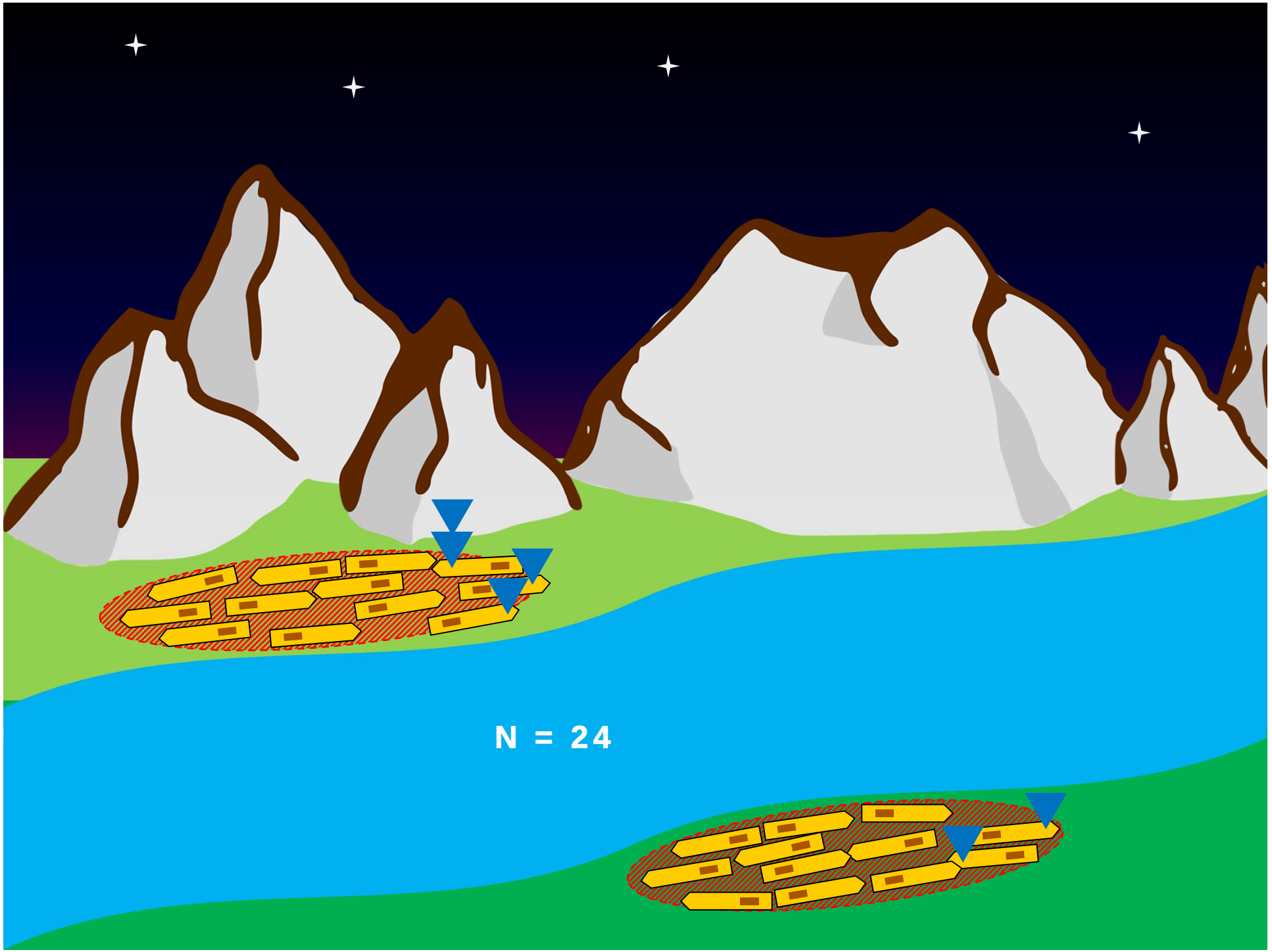
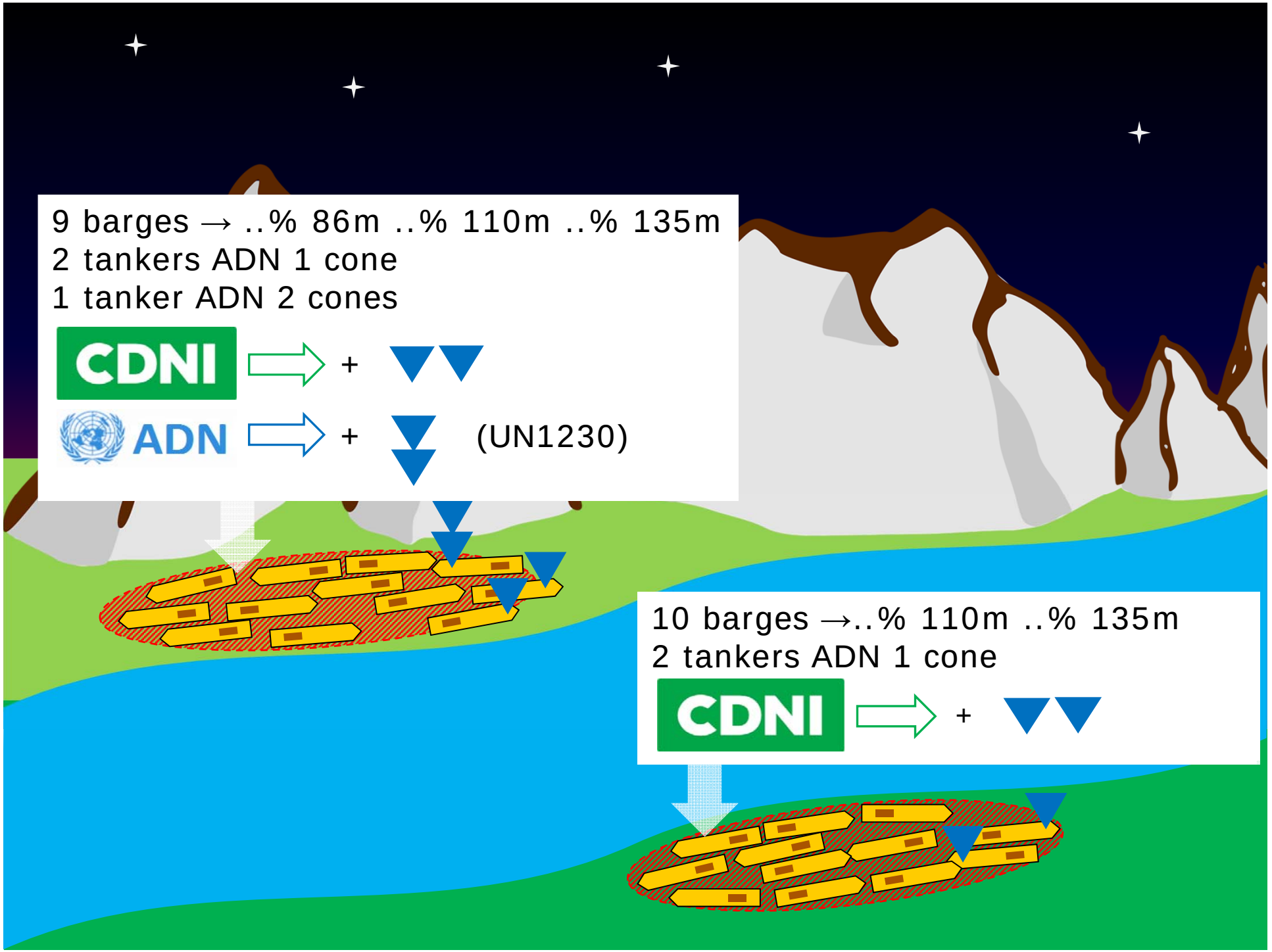
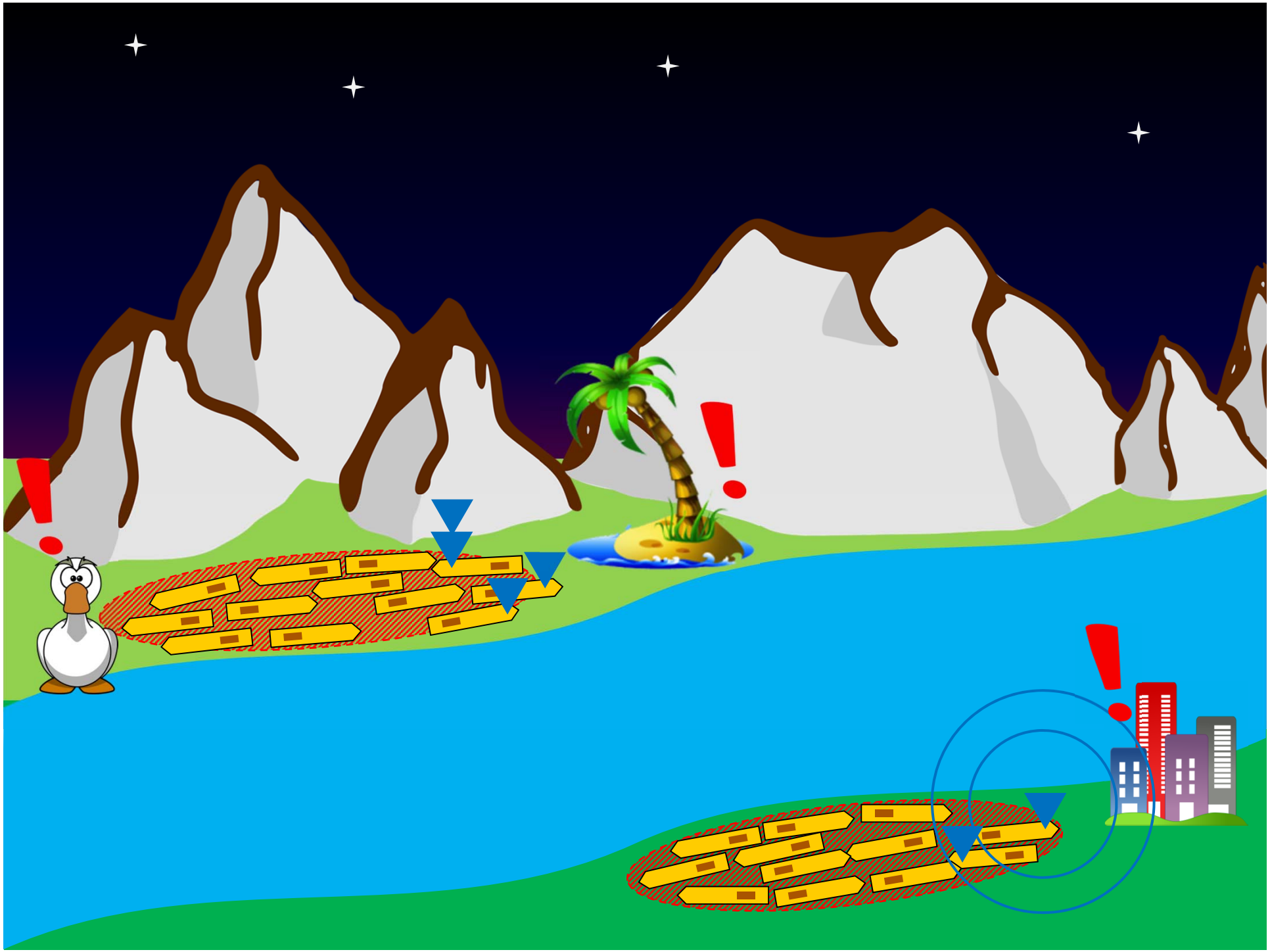

A_c = 0,85
2 hrs
68,2%
70
85
100
115
130
IQ-Werte


N = 24


9 barges → ..% 86m ..% 110m ..% 135m
2 tankers ADN 1 cone
1 tanker ADN 2 cones
CDNI
+
ADN
+
(UN1230)
10 barges →..% 110m ..% 135m
2 tankers ADN 1 cone
CDNI
+



Questions